COLLEGE OF ENGINEERING AND TECHNOLOGY,
BAMBHORI POST BOX NO. 94, JALGAON – 425001. (M.S.)

NBA Accredited

Website : www.sscoetjalgaon.ac.in Email : sscoetjal@gmail.com

Mandatory Disclosure

Part-I

January 2013

ISO 9001:2008

Shram Sadhana Bombay Trust's

COLLEGE OF ENGINEERING AND TECHNOLOGY,

BAMBHORI POST BOX NO. 94, JALGAON – 425001. (M.S.)

Included under section 2 (f) & 12 (B) of the UGC Act, 1956

with NBA Accredited courses & ISO 9001 : 2008 certified

Website- www.sscoetjalgaon.ac.in Phone No. (0257) 2258393.

Email: sscoetjal@gmail.com Fax No. (0257) 2258392.

Principal: Dr. K.S.Wani
M. Tech, DBM, Ph.D.

Ref. No. COET/AICTE/MD/ / 13 **Date:**

C E R T I F I C A T E

Certified that all enclosures contained in PART-I , PART-II & PART-III bearing page no. **01** to page no. **1207** are pertaining to our institution which are being submitted in two separate above mentioned bound booklets/box file of Mandatory Disclosure. All xerox copies may be treated as original.

PRINCIPAL

MANDATORY DISCLOSURE

Mandatory Disclosure by Institutions running AICTE approved Engineering/Technology/Pharmacy programmes to be included in their respective Information Brochure, displayed on their website and to be submitted to AICTE every year latest by 30th April together with its URL

The following information is to be given in the Information Brochure besides being hosted on the Institution's official Website.

"The information has been provided by the concerned institution and the onus of authenticity lies with the institution and not on AICTE."

I. NAME OF THE INSTITUTION

Name	**SSBT's College of Engineering & Technology, Bambhori Jalgaon.**	
Address	Post Box No. 94 , Jalgaon (Maharashtra State)	
Pin Code	425 001	
Phone No.	(0257) 2258393	
Fax No.	(0257) 2258392	
Web site	www.sscoetjalgaon.ac.in	E-Mail: sscoetjal@gmail.com

II. NAME & ADDRESS OF THE DIRECTOR

Name	**Dr. Kishor Sopan Wani**
Designation	**Principal**
Address	31/2, Annapurna, Gandharva Colony, Jalgaon-425001
STD Code With Phone No.	0257 – 2252989 (R)
Fax No.	0257- 2258392 (O)
E-mail	wani.kishor@gmail.com

III. NAME OF THE AFFILIATING UNIVERSITY

Name	**North Maharashtra University, Jalgaon**		
Address	**Umavi Nagar, Post Box No.80, Jalgaon Dist. Jalgaon** **Pine Code :- 425 001.**		
Phone No.	**(0257) -2258428, 429**		
Fax No.	**(0257) 2258403, 2258406**	**E-Mail**	info@nmu.ac.in ,registrar@nmu.ac.in
		Web site	**www.nmu.ac.in**

IV] GOVERNANCE

* **Members of the Board and their brief background.**

Shram Sadhana Bombay Trust (Phone No. 022-26435608/24950888) is the promoting body of the College of Engineering and Technology, Bambhori, Jalgaon. The trust is a charitable organization registered with Charity Commissioner Bombay vide registration number E-6942 dated 12 Oct. 1978 and status of registration is current and valid. The trust strives to enhance human productivity through various welfare measures and is a leading light in educational research.

Brief background of the promoters are as follows :-

1.	Shri. Rajendrasing D. Shekhawat	Managing Trustee	M.L.A., Amravati .
2.	Shrimati Paravti Chorge	Trustee	Social Worker
3.	Shrimati Lata Karamsot	Trustee	Social Worker.

* Shram Sadhana Bombay Trust has entrusted the responsibility of running the college to the Board of Governors who are the apex decision making body. The members of the Board are as under.:-

1.	Dr. D. R. Shekhawat	Chairman	Educationist
2.	Shri. Rajendrasing D. Shekhawat	Member	Industrialist
3.	Shri. V. R. Phadnis	Member	Journalist
4.	Shri. Jayesh Rathore	Member	Technocrat
5.	Shrimati Jyoti Rathore	Member	Engineer & Social Worker.
6.	Dr. R.H. Gupta	Member	Educationist
7.	Shri. Shashikant R. Kulkarni	Member	Architect
8.	Dr. Kishor S. Wani	Ex Officio Member Secretary	Principal
9.	Shri. S. P. Shekhawat	Member	Associate Professor
10.	Shri. Shantanu Vashishtha	Member	Asst.. Professor

* **Members of Academic Advisory Body.**

Academic Advisory Body is constituted of following members :-

1.	Dr. Kishor S. Wani	Chairman	Principal
2.	Dr. R.H. Gupta	Member	Academic planning
3.	Dr. M. Hussain	Member	Director, R.& D.
3.	Shri. S.P. Shekhawat	Member	Director, Academics
4.	All Heads of Departments	Members.	

*** Frequency of Board Meeting and Academic advisory Body.**

Governing Body meets once in six months and gives broad direction keeping in view the vision of the Trust which is to provide and promote an affordable, accessible quality higher education with emphasis on technology development .

Academic Advisory Body meets once in a quarter or earlier to check compliance of direction given by Governing Body and steer and resolve academic issues which come up during academic session.

* **Organisational Chart and Processes**

The style of management is integrative, participative and consultative at every decision making stage. Duties and responsibilities of various functionaries are well laid down. The organisational chart clearly depicts the flow of authority, responsibility and accountability. Hence the decision making process is transparent.

* **Nature and Involvement of faculty and Students in Academic Affairs and Improvements.**

Extent of faculty involvement in academic affairs is governed at three levels . Principal meets all Heads of Department every month to take stock of academic progress, course coverage activities. A more detailed interaction of faculty is held fortnightly under direction of Director Academics. Heads of Department are on daily contact with respective faculty, attend their class, offer guidance on teaching skill and methodology beside weekly meeting with all faculties on weekly academic performance, identifying deficiencies and suggesting means to improve upon the same.

Every student gives feedback on all relevant subjects with regard to syllabi, course content, degree of difficulty, if any, in assimilation of the subject and suggestion on improvement. Students have direct access to any faculty, heads of department, coordinator academics and Principal to make suggestion on academic subject.

* **Mechanism /Norms & Procedure for Democratic & Good Governance.**

As mentioned earlier, Apex decision making body is the Board of Governance who decides and give broad direction. Governing Body has nominated local committees i.e.

Local Management cum Finance Committee, Hostel Committee, Grievance Redressal Committee and Academic Advisory Committee which meet once in a quarter or earlier to check compliance of direction given by Governing Body. Day to day operation of the college is managed by Principal and other appointed staff. Various Local Management Committees are well represented by both teaching and non teaching staff who effectively participate in the respective proceedings and help in observance of democratic and good governance practice of the college.

* **Student feedback on Institutional Governance/Faculty Performance**.

A committee of three Heads of Department under guidance of Director Academics and Principal meets students of all classes in each department and takes feedback on teaching methodology and performance of faculties as perceived by them. This process takes place twice in a semester. The feedback is scrutinized and analysed with a view to improve faculty performance.

* **Grievance Redressal Mechanism for Faculty, Staff and Students**.

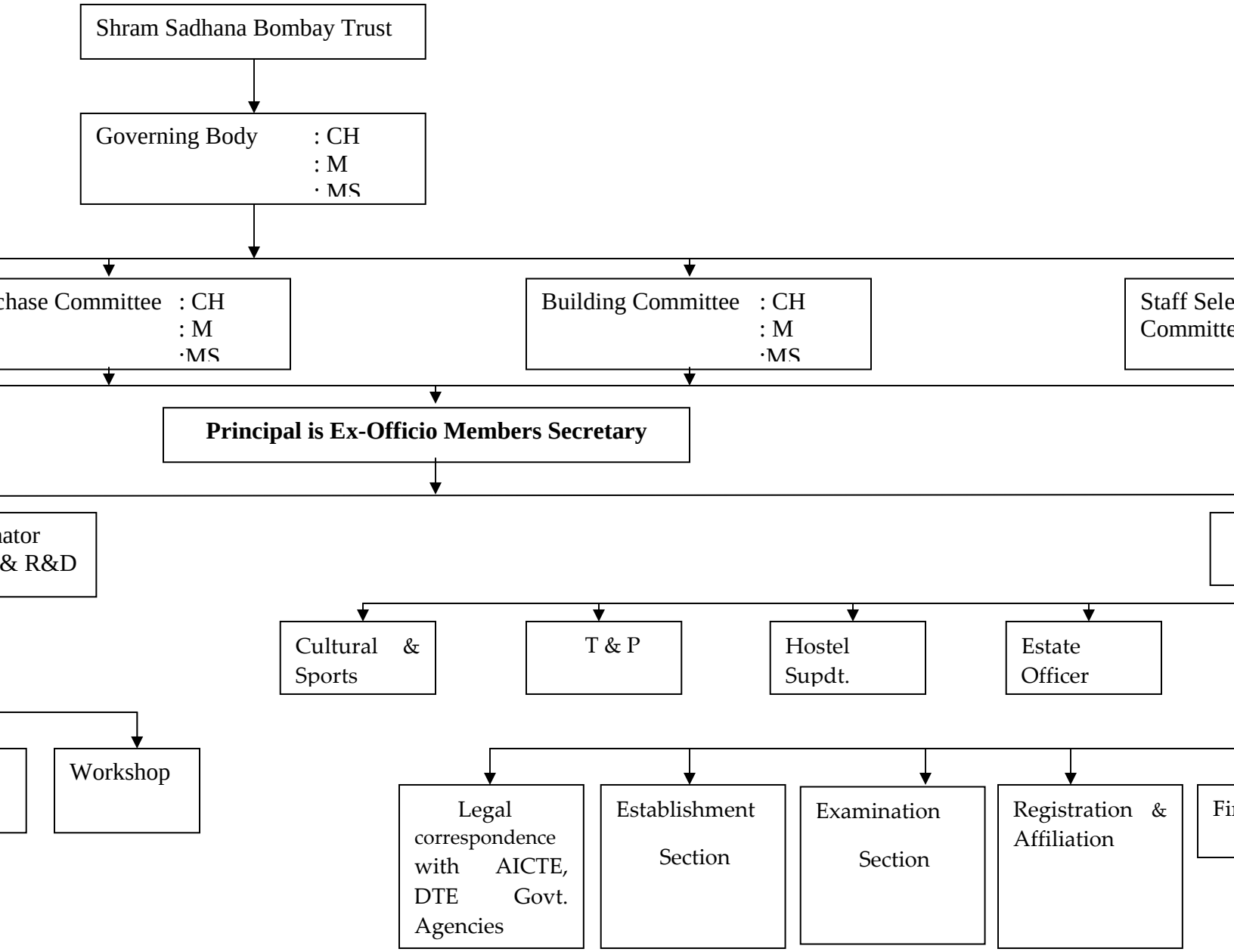
Transparent management and administrative policy is by itself aids the redressal process in the college. The organisational chart gives out clear flow of authority and responsibility on both academic and administrative front. Faculty, Staff and Students are thus clear of the various processes and policies and can approach any functionary with any supposed difficulty which need to be resolved. There are suggestion boxes placed at vantage points for all personnel to drop their ideas in confidence which are looked into with all seriousness.

* **Grievance Redressal Mechanism as per affiliating University.**

The vigilance committee is constituted and is functioning as per the guidelines of affiliating university and is functioning with Principal as Chairman and members as follows.:-

1. One Representative of Management.
2. Two Professors
3. One lady teacher
4. Two Students – One gents student and one lady student.
5. One Police Officer, Inspector, Paldhi Police Station by Virtue of office.

Also grievance cell is functioning in the college. The students grievances are looked into by the H.O.D. Concerned, Principal and if needed, they are referred to the management for appropriate decision. For Hostel the students approach the Rectors (Girls' Hostel and Boys' Hostel) and then they are referred to the Principal for appropriate decision.



s constituted by GB.
Science.

V. PROGRAMMES: ENGINEERING & TECHNOLOGY

A) Name of the Programmes approved by the AICTE 2012-2010

Sr.	Course Name	Number of seats	Duration	Approved by AICTE
	UG Courses			
1	Civil Engineering	60	4 Years	Yes
2	Chemical Engineering	30	4 Years	Yes
3	Computer Engineering	120	4 Years	Yes
4	Mechanical Engineering	120	4 Years	Yes
5	Electrical Engg.	60	4 Years	Yes
6	Electronics and Tele-comm. Engg.	120	4 Years	Yes
7	Information Technology	60	4 Years	Yes
8	Bio-Technology	30	4 Years	Yes
	Total	**600**		
	PG Courses			
1	ME Civil (Environmental Engg.)	18	2 Years	Yes
2	ME Mechanical (Machine Design)	18	2 Years	Yes
3	ME E&TC (Digital Electronics)	18	2 Years	Yes
4	ME Computer Science & Engg.	18	2 Years	Yes
	Total	**72**		
	Management course			
	MBA	60	2 Years	Yes
	Total	**60**		
	Total Intake	**732**		

B) Name of the Programmes Accredited by the AICTE

Sr.	Course Name	Number of seats	Duration	Approved by AICTE	NBA Accredited for 5 years w.e.f. 19/07/2008 vide letter no. NBA/ACCR-414/2004/19.07.08
1	Civil Engineering	60	4 Years	Yes	Accredited
2	Chemical Engineering	30	4 Years	Yes	Accredited

3	Computer Engineering	120	4 Years	Yes	Accredited
4	Mechanical Engineering	120	4 Years	Yes	Accredited
5	Electrical Engg.	60	4 Years	Yes	Accredited
6	Electronics and Tele-comm. Engg.	120	4 Years	Yes	Accredited
7	Information Technology	60	4 Years	Yes	Accredited

C) Cut off mark/rank for admission during the last three years

Year 2010-2011

Sr.	Branch	Sanction Intake	Duration	Cut off Mark/rank	Tuition Fee
1	Chemical Engineering	30	4 years	51.00	Rs. 49991
2	Civil Engineering	60	4 years	47.66	Rs. 49991
3	Computer Engineering	120	4 years	45.00	Rs. 49991
4	Mechanical Engineering	120	4 years	46.00	Rs. 49991
5	Electrical Engg.	60	4 years	45.00	Rs. 49991
6	E & TC Engg.	120	4 years	46.33	Rs. 49991
7	Information Technology	60	4 years	47.00	Rs. 49991
8	Bio-Technology	30	4 years	50.00	Rs. 49991
	PG Courses				Rs. 49991
1	ME Civil (Environmental Engg.)	18	2 years	60.00	Rs. 49991
2	ME Mechanical (Machine Design)	18	2 years	60.00	Rs. 49991
3	ME Computer Sci. & Engg.	18	2 years	60.00	Rs. 49991
4	ME Elextronics & Tele.(Digital Electronics)	18	2 years	60.00	Rs. 49991
5	MBA	60	2 years	50.00	Rs. 49991

Year 2011-2012

Sr.	Branch	Sanction Intake	Duration	Cut off Mark/rank	Tuition Fee
1	Chemical Engineering	30	4 years	42.66	Rs. 53064
2	Civil Engineering	60	4 years	40.00	Rs. 53064
3	Computer Engineering	120	4 years	40.66	Rs. 53064
4	Mechanical Engineering	120	4 years	40.33	Rs. 53064
5	Electrical Engg.	60	4 years	40.33	Rs. 53064
6	E & TC Engg.	120	4 years	40.33	Rs. 53064
7	Information Technology	60	4 years	41.33	Rs. 53064
8	Bio-Technology	30	4 years	40.00	Rs. 53064
	PG Courses				Rs. 53064
1	ME Civil (Environmental Engg.)	18	2 years	58.00	Rs. 53064
2	ME Mechanical (Machine Design)	18	2 years	61.00	Rs. 53064
3	ME Computer Sci. & Engg.	18	2 years	60.00	Rs. 53064
4	ME Elextronics & Tele.(Digital Electronics)	18	2 years	60.00	Rs. 53064
5	MBA	60	2 years	45.00	Rs. 53064

Year 2012-2013

Sr.	Branch	Sanction Intake	Duration	Cut off Mark/rank	Tuition Fee
1	Chemical Engineering	30	4 years	40.00	Rs.56607
2	Civil Engineering	60	4 years	40.33	Rs.56607

3	Computer Engineering	120	4 years	40.33	Rs.56607
4	Mechanical Engineering	120	4 years	41.00	Rs.56607
5	Electrical Engg.	60	4 years	40.33	Rs.56607
6	E & TC Engg.	120	4 years	40.33	Rs.56607
7	Information Technology	60	4 years	41.66	Rs.56607
8	Bio-Technology	30	4 years	42.00	Rs.56607
	PG Courses				Rs.56607
1	ME Civil (Environmental Engg.)	18	2 years	52.54	Rs.56607
2	ME Mechanical (Machine Design)	18	2 years	61.00	Rs.56607
3	ME E&TC (Digital Electronics)	18	2 years	58.00	Rs.56607
4	ME Computer Science & Engg.	18	2 years	61.42	Rs.56607
3	MBA	60	2 years	50.00	Rs.56607

D) Placement Facilities

a) Training & Placement Cell: SSBT's C.O.E.T., Bambhori, Jalgaon has an independent T & P Cell devoted to cater to the needs of organisations in conducting campus interviews for placements. It is headed by Training & Placement Director & departmental staff and Student Coordinators lead a team of placement representatives from various courses of study assist the Cell.

The cell has the following facilities:

i) Separate Internet connection, computers, laser printer, scanner for office automation.

ii) Separate lounge for industrialist and visitors.

iii) Newspaper, magazines, etc.

iv) All audio/video facilities for presentations, written test, group discussions and interviews.

b) T & P Activities:

i) Campus Interviews

ii) Industrial Training

iii) Industrial Visits (Students & TPC members)

iv) Expert Lectures

v) Industrial Meet

vi) Job-Oriented Courses

vii) Deputation of faculty members to various training programs.

viii) Mock competitive exams, Interviews, Group Discussions, etc.

ix) Personality development programme.

x) Alumni meet.

xi) Entrepreneurship development programme.

D) Campus placement in last three years with minimum salary, maximum salary and average salary

BRANCH/YEAR	Chemical	Civil	Computer	Electrical	E&TC	IT	Mech	MBA	Total
2010-11	06	16	50	14	58	22	29	26	221
2011-12	01	23	58	18	28	17	37	38	220
2012-13	00	00	74	00	19	20	00	07	120

3. MINIMUM SALARY: Rs. 1,20,000/-

4. MAXIMUM SALARY: Rs. 4,00,000/-

5. AVERAGE SALARY: Rs. 2,10,000/-

- Name and duration of programme(s) having affiliation/collaboration with Foreign University(s)/Institution(s) and being run in the same Campus along with status of their AICTE approval. If there is foreign collaboration, give the following details: Details of the Foreign Institution/University:

NA

- For each Collaborative/affiliated Programme give the following:

NA

- Whether the Collaborative Programme is approved by AICTE? If not whether the Domestic/Foreign Institution has applied to AICTE for approval as required under notification no. 37-3/Legal/2005 dated 16th May, 2005.

NA

Discipline wise existing faculty for the Institution (Please give Department wise information of Existing faculty members in all the course (s) on the date of submitting the application.9(2012-13)

Annexure III (A)

Name of the Course	Sr N0	Name (s) Of the Teaching Faculty	Designation (Lecturer) Asstt. Professor	Qualifications with field of Specialization.			Date of Birth	Experience a) Teaching b) Industry c) Research			Date of joining the institute	Pan. No.	Pf. No MH5 0148/	Basic Pay +AGP& Gross Salary pay as on 31.12.2012
				UG	PG	Ph.D.		A	B	C				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Principal														
	01	Dr.K.S.Wani	Principal	B.Sc. Tech. Chem.	.M. Tech Chem.Tech	Biotechnology	24.09.59	26	--	--	14.07.1997	AACPW5827F	340	B=58663/- G=104487/ -
A) Existing Faculty														
PG Level **Civil Engg.**	01	Dr. M. Husain	Prof. & HOD	Civil Engg	Environmental Engg.	Solar Energy	05.12.69	16	--	--	15.07.96	ABCPH4558D	305	B=58663 G=95621
	02	P.A. Shirule	Associate Prof.	Civil Engg.	Environmental Engg.	--	07.06.73	12.6	01	--	03.07.00	AAATS0310D	378	B=47792 G=59740
UG Level **Civil Engg.**	01	Dr.S L Patil	Professor	Geology	Geology	Geology	1-1-1962	24	--	--	1.7.1988	AAYPP8955O	17	B=53000 G=86390
	02	S B Pawar	Associate Prof.	Civil Engineering	Construction Management	_	5-10-66	22	1.6	--	15.1.1991	ABAPP3094Q	46	B=55861 G=80998
	03	Ms.Sonali B. Patil	Asstt.Prof.	Civil Engg.	Environmental Engg.	--	28.11.79	04	--	--	01.02.08	BCCPP7743J	621	B=23244 G=36028
	04	Ms.Jyoti R. Mali	Asstt.Prof.	Civil Engg.	Environmental Engg.	--	23/04/71	03	--	--	25/09/09	BRMPM2203F	698	B=22248 G=32260
	05	J.N.Kale	Sr. Lecturer	Civil Engineering	Const Tech.&Mana	_	25/12/65	4.6	18	--	01.01.2008	AQKPK8134B	658	B=28813 G=40338
	06	Bhushan V.Shinde	Asstt.Prof.	Civil Engg.	GTE	--	03.07.86	0.5	--	--	24.01.2012	BCSPS4620M	749	B=22248 G=30035

First Year Engg.	07	F.I. Chavan	Sr. Lecturer	Civil Engg.	Environmental Engg.	--	13.05.74	12	--	--	12.07.00	AFXPC 4580K	418	B=29499 G=47724
	08	Swami Suman Birendra Kumar	Lecturer	Civil Engg.	--	_	03/10/1989	05	01	--	16/07/2012	DZLPS8746E	763	30000/- Cons.
	09	Ms. Tejswini Dilip Patil	Lecturer	Civil Engg.	--	--	02/04/1991	0.5	--	--	28/07/2012	--	764	30000/- Cons.
	10	Durgesh Gulabsing Pardeshi	Lecturer	Civil Engg.	--	--	04/01/2012	0.5	--	--	01/12/2012	CBJPP2969M	782	30000/- Cons.
	11	Pramod J. Sushir	Lecturer	Civil Engg.	--	--	31/03/1988	0.5	--	--	02/07/2012	--		30000/- Cons.
	12	Jitendra Govind Kachare	Lecturer	Civil Engg.	--	--	13/02/1991	0.5	--	--	06/12/2012	CQBPK3361D	783	30000/- Cons.

Name of the Course	Sr N0.	Name (s) Of the Teaching Faculty	Designation (Lecturer) Asstt. Professor	Qualifications with field of Specialization.			Date of Birth	Experience a) Teaching b) Industry c) Research			Date of joining The institute	Pan. No.	Pf. No. MH50148/	Basic Pay +AGP& Gross Salary pay as on 31.12.2012
				UG	PG	Ph.D		A	B	C				
PG Level **Mech. Engg.**	01	Mr. N.K. Patil	Associate Prof.	B.E. Prod.	MTech Energy MBA Mgt.	_	23.09.69	21	--	--	23.08.91	ABHPP 1813C	191	B=50703 G=73519
	02	Mr. P. N. Ulhe	Asst. Prof.	B.E.Prod.	M/c Design.	_	09.03.74	10	02	--	14.12.02	AASPU 0960B	521	B=29499 G=47724
UG Level **Mech. Engg.**	01	Dr M.S. Murthy	Professor	B.Tech. Mech.	ThermalEngg.	Ph.D.in Mech.	01/07/72	04	--	--	24/07/08	AGOPM0535C	620	B=53000 G=86390
	02	Dr.Dheeraj S. Deshmukh	Professor	. Mechanical	M.Tech.(HPE)	Ph.D.in Mech.	10/09/74	10	--	--	01/12/12	AIVPD9743Q	811	B=53060 G=91794
	03	Mr. J. R. Chaudhari	Associate Prof.&HOD	B.E. Prod.	Mtech.. Metallurgy MBA	_	01.11.66	22	--	--	30.08.90	AATPC1846M	42	B=56153 G=81422
	04	Mr.K.Shrivastava	Associate Prof.	B.E.Mech,	M.E. Thermal	_	07.11.73	14	--	--	08.01.98	AURPS3200K	379	B=47792 G=59740
	05	Mr. S.P.Shekhawat	Associate Prof.	B.E.Mech,	M.E. M/c Dgn	_	03.05.74	12	--	--	15.07.99	AURPS3142G	429	B=46400 G=53360
	06	Mr. P. G. Damle	Associate Prof.	B.E.Mech,	M.E. M/c Dgn	_	08.10.73	10	--	--	12.07.02	AFJPD7491N	464	B=46400 G=58000
	07	Mr.M.V.Rawalani	Associate Prof.	B.E.Prod.	M.E.Mech. MBA	_	07.06.70	10	--	--	01.07.06	AAVPR9327E	280	B=46400 G=58000
	08	Mr. D.B. Sadaphale	Asst. Prof.	B.E.Mech,	M.E. M/c Dgn	_	01.07.76	12	--	--	20.02.02	APCPS4219Q	499	B=30174 G=48769
	09	Mr. P.M. Solanki	Asst. Prof.	B.E. Prod.	CAD/CAM	_	06.10.81	06	--	`--	08.08.06	BTTPS2528G	606	B=24659 G=38222
	10	Pravin D. Patil	Asst. Prof.	B.E. Prod.	CAD/CAM	_	30.03.80	04	0.6	--	25.08.08	ATIPP9771G	653	B=24310 G=37681
	11	Mukherjee Chandan Krishna	Sr. Lecturer	B.E. Mech.	MBA	_	09.03.63	04	5.8	--	25.08.08	PFZPM3427E	654	B=30174 G=42243
	12	Mahesh V. Kulkarni	Asst. Prof.	B.E. Mech.	M.E. (HPE)	--	23/07/79	5.4	--	--	01.12.12	AUOPK5456G	810	B=24310 G=37681

Name of the Course	Sr N0.	Name (s) Of the Teaching Faculty	Designation (Lecturer) Asstt. Professor	Qualifications with field of Specialization.			Date of Birth	Experience a) Teaching b) Industry c) Research			Date of joining The institute	Pan. No	Pf. No. MH50148/	Basic Pay +AGP& Gross Salary pay as on 31.12.2012
				UG	PG	Ph.D		A	B	C				
UG Level **Mech. Engg.**	13	Prashant Bornare	Lecturer	BE Mech	MBA	--	01.06.79	05	--	--	15.10.2007	ATVPB6575F	647	B=23244 G=27892
	14	Mr. Ajay Bhardwaj	Lecturer	BE Prod.	--	--	05.07.68	13	--	--	10.08.1999	KRRPB7024M	438	B=23786 G=27354
	15	Patil Devidas Ramkrishna	Lecturer	B.E. Mechanical	--	--	01/09/86	0.7	--	--	02/07/2012	BYKPP0732P	728	30000/- Cons.
	16	Saindane Vikas Kalidas	Lecturer	B.E. Mechanical	--	--	04/06/89	0.7	--	--	02/07/2012	EEIPS3850A	727	30000/- Cons.
	17	Shinde Dinesh Subhash	Lecturer	B.E. Mechanical	--	--	29/08/88	0.7	--	--	02/07/2012	DKRPS0327A	729	30000/- Cons.
	18	Ms. Jagruti R.Surange	Lecturer	B.E. Production	--	--	20/11/82	0.7	--	--	02/07/2012	EINPS4464K	756	30000/- Cons.
	19	Hadpe Mukesh D.	Lecturer	B.E. Mechanical	--	--	25/04/86	0.7	--	--	02/07/2012	ABZPH9695N	776	30000/- Cons.
	20	Milind D. Dhanke	Lecturer	B.E. Mechanical MBA(O&MM)	--	--	15/07/83	0.7	--	--	02/07/2012	AJSPD5814E	754	30000/- Cons.
	21	Pankaj Sambhaji Jadhav	Lecturer	B.E. Mechanical	--	--	02/08/84	0.7	--	--	02/07/2012	BLHPP8133J	755	30000/- Cons.
	22	Patil Dhiraj Deepak	Lecturer	B.E. Mechanical	--	--	17/07/81	0.6	--	--	06/08/2012	BEWPP0784H	730	30000/- Cons.
B) Additional Faculty Appointed														
First Year	23	Jeevan L. Chaudhari	Lecturer	B.E. Mechanical	--	--	05/12/88	00	--	--	01/12/2012	--	814	30000/- Cons.
	24	Dipak C. Talele	Lecturer	B.E. Mechanical	--	--	19/06/87	00	--	--	01/12/2012	AJBPT3747M	813	30000/- Cons.
	25	Muzamimmil Iqbal Shaikh	Lecturer	B.E. Mechanical	--	--	20/09/90	00	--	--	01/12/2012	EIXPS2735B	808	30000/- Cons.

Name of the Course	Sr N0.	Name (s) Of the Teaching Faculty	Designation (Lecturer) Asstt. Professor	Qualifications with field of Specialization.			Date of Birth	Experience a) Teaching b) Industry c) Research			Date of joining The institute	Pan. No	Pf. No. MH501 48/	Basic Pay +AGP& Gross Salary pay as on 31.12.2012
	26	Viki Ashok Revaskar	Lecturer	B.E. Mechanical	--	--	10/04/89	00	--	--	01/12/2012	AMQPR9979M	809	30000/- Cons.
	27	Nileshkumar B. Bauskar	Lecturer	B.E. Mechanical	--	--	24/05/83	00	--	--	01/12/2012	AONPB5787N	815	30000/- Cons.
	28	Ms.Jagruti D. Rane	Lecturer	B.E. Mechanical	--	--	12/02/91	00	--	--	01/12/2012	--	-	30000/- Cons.
	29	Chaudhari Sandip B.	Lecturer	B.E. Mechanical	--	--	16/03/88	00	--	--	01/12/2012	ANBPC3940P	812	30000/- Cons.
	30	Shrikant Gajananrao Ingale	Lecturer	B.E. Mechanical	--	--		00	--	--	01/12/2012	--	--	30000/- Cons.
	31	Hiswankar Sagar Chandrashekhar	Lecturer	B.E. Mechanical	--	--		00	--	--	01/12/2012	--	--	30000/- Cons.

Name of the Course	S N0.	Name (s) Of the Teaching Faculty	Designation (Lecturer) Asstt.Professor	Qualifications with field of Specialization.			Date of Birth	Experience a) Teaching b) Industry c) Research			Date of joining the institute	Pan. No	Pf. No. MH5 0148/	Basic Pay +AGP& Gross Salary pay as on 31.12.2012
				UG	PG	Ph.D.		A	B	C				
UG Level **Chem. Engg.**	01	Dr.Vijay R Diware	Associate Prof.&HOD	B. Tech. Chem.	PGD PM	Chem Tech.	10.10.65	15	08	--	23.08.99	AAIPD0087N	432	B=47792 G=59740
	02	Mr. S.A. Thakur	Asst. Prof.	B.Tech. (Chem)	MBA	--	17.09.68	14	08	--	03.08.98	ABUPT8138K	400	B=31538 G=48884
	03	A.R. Lokhande	Asst. Prof.	B.Sc Tech	M.Tech. Chem Tech	--	18.10.59	4	17	2	10.07.08	AAYPL8598A	619	B=28813 G=41779
	04	N.Y. Ghare	Asst. Prof.	B.Tech.	M.E. Chem.	--	14.01.68	4	05	7	10.07.08	--	618	B=28813 G=41779
	05	Sangore V.P.	Asst. Prof.	B Sc. Chem.	Msc. Poly Chem.	--	29.12.72	13	--	--	16.08.99	BAGPS9043G	364	B=30174 G=46769
	06	Ms. Sapana S. Madan	Lecturer	B.Tech. Chemical Engg	M.Tech. Chemical Engg	--	14/08/89	0.6	--	--	02/07/12	BRDPM3716M	760	30000/- Cons.
First Year	07	Ms.Sharddha V. Pande	Lecturer	B.Tech. Chemical Engg	--	--	17/07/83	0.0	--	--	01/12/12	BSLPP7680K	780	30000/- Cons.
	08	Rahul Sudhakar Zambre	Lecturer	B.Tech. Chemical Engg M.Tech. Chemical Engg	--	--	22/02/88	0.6	--	--	02/07/12	--	--	30000/- Cons.

Name of the Course	S N0.	Name (s) Of the Teaching Faculty	Designation (Lecturer) Asstt.Professor	Qualifications with field of Specialization.			Date of Birth	Experience a) Teaching b) Industry c) Research			Date of joining the institute	Pan No.	Pf No. MH50148/	Basic Pay +AGP& Gross Salary pay as on 31.12.2012
				UG	PG	Ph.D.		A	B	C				
UG Level **Bio-Tech**	01	Dr. I. D. Patil	Professor & HOD	B.Sc.	M.Sc (Chem Tech.)	Chem Tech.	01.06.72	13	--	--	01.10.99	AIEPP2072P	315	B=54590 G=94441
	02	Mr. Sharanappa A.	Asst. Prof.	BE BioTech	Chem.Engg & B.T.	--	26.08.83	05	--	--	22.01.07	ALMPA4992L	608	B=26381 G=36933
B) Additional Faculty Appointed														
	03	Ms Sarika S. Pawar	Asst. Prof.	B. Tech (Chem.Engg.)	M. Tech Chem.Engg.	--	15.01.82	3	--	--	01.07.11	AXQPB5469D	699	B=22248 G=32260
	04	J.P.Parpalliwar	Lecturer	B.Tech. Bio- Tech	--	--	22.07.86	3.8	--	--	01.07.09	BJBPP3441H	673	B=22557 G=25941
	05	Ms.Ashwini Prakash Jatkar	Lecturer	B.E. Bio-Tech	--	--	27/03/90	0.6	--	--	02/07/12	ARMPJ7427P	704	30000/- Cons.
	06	Ms. Payal Askok Patil	Lecturer	B.E. Bio-Tech	--	--	25/10/89	0.6	--	--	16/07/12	--	762	30000/- Cons.
	07	Ms. Sarwat G. Shaikh	Lecturer	B.E. Bio-Tech	--	--	09/01/91	0.0	--	--	01/12/12	--	781	30000/- Cons.
First Year	08	Ms.Karuna Liladas Sorde	Lecturer	B.E. Bio-Tech	--	--	09/01/89	0.6	--	--	23/07/12	--	--	30000/- Cons.

Name of the Course	Sr. No.	Name (S) of the teaching faculty	Designation (Lecturer/ Asstt.Prof. Professor)	Qualifications with field of Speciliazation			Date of Birth	Experience in years a)Teaching b)Industry c) Research			Date of Joining of the institute	Pan No.	Pf. No. MH5 0148/	Basic Pay +AGP& Gross Salary pay as on 31.12.2012
				UG	PG	PhD.		A	B	C				
PG Level **Computer Engg.**	01	Mr. A. T. Bhole	Associate Prof.	B.E. Computer	ME Comp.	--	12/09/76	07	2.1	--	27/11/07	AHRB 8772G	602	B=46400 G=58000
	02	Mr.Sandip.S. Patil	Associate Prof.	B.E.Computer	M.Tech. Comp.	--	20.01.80	8.4	--	--	12.02.04	ARXPP 7021N	561	B=46400 G=58000
UG Level Computer Engg.	01	Mr. K. P. Adhiya	Associate Prof.&HOD	B.E.Computer	Comp. Sc.& Engg.	--	07.12.68	21.3	--	--	26.08.91	AAVPA 2101M	183	B=57537 G=83429
	02	Mr.M.E. Patil	Associate Prof.	B.E.Computer	ME Comp.	--	06.10.75	10	1.8	--	02.12.02	AMCPP 1860H	523	B=46400 G=58000
	03	Mr.Sanjay Gharde	Asst. Prof.	B.E.Computer	M.Tech. Inf.Tec.	--	14.09.79	8	2	--	14.02.04	AMDPG 6120G	564	B=28690 G=44470
	04	Ms.Shital A Patil	Lecturer	B.E.Computer	--	--	12.10.82	6.10	--	--	17.06.06	--	576	B=24327 G=34058
	05	Ms. Nilima P. Patil	Asst. Prof.	B.E. Computer	Comp. Sc.& Engg.	--	21/10/81	5.02	--	--	14/08/07	--	627	B=23244 G=27892
	06	Mr. N.Y.Suryawanshi	Asst. Prof.	B.E. Computer	Comp. Sc.& Engg.	--	27.01.81	4.3	--	--	01.07.09	BVSPS9335Q	655	B=24141 G=33797
	07	Mr.Dinesh D. Puri	Asst. Prof.	B.E. Computer	M.Tech Comp.	--	15.04.82	0.6	--	--	01.12.12	BCEPP8937N	788	B=28690 G=44470
	08	Ms.Priti R. Sharma	Lecturer	B.E. Computer	--	--	18/06/82	4.8	--	--	14/02/08	--	624	B=23244 G=27892
	09	Mr. Dipak Bage	Lecturer	B.E. Computer	--	--	01.02.82	4.2	--	--	13.08.08	ARJPB4738J	679	B=22557 G=25941
	10	Ms.Yogeshwari Borse	Lecturer	B.E. Computer	Comp. Sc.& Engg.	--	01.06.79	3.5	--	--	21.07.09	AUYPB2375H	678	B=2257 G=25941

	11	S.D.Rajput	Lecturer	B.E. Computer	--	--	06.07.85	3	--	--	01.07.2011	APCPR7490G	706	B=21600 G=21600
	12	Mangale Chittaranjan S.	Lecturer	B.E.Computer Engg.	--	--	12/02/83	3	--	--	20/12/2010		745	30000/- Cons.
	13	Mahajan Manoj Kumar Lotan	Lecturer	B.E.Inf.Tech.	--	--	17/11/84	0.6	--	--	16/07/2012		709	30000/- Cons.
	14	Kotkar Vijay Arun	Lecturer	B.E.Computer Engg.	--	--	26/11/85	0.6	--	--	02/07/2012		710	30000/- Cons.
	15	Rathod Babulal Darbar	Lecturer	B. Tech. Tnf.Tech.	--	--	28/11/85	0.6	--	--	02/07/2012		708	30000/- Cons.
	16	Avinash Pitambar Patil	Lecturer	B.E.Computer Engg.	--	--	23/01/89	0.6	--	--	02/07/2012		707	30000/- Cons.
	17	Vijay Shrikisan Ingale	Lecturer	B.E.Inf.Tech.	--	--	01/05/84	0.6	--	--	02/07/2012		711	30000/- Cons.
	18	Sushant S.Bahekar	Lecturer	B.E.Computer Engg.	--	--	14/06/90	0.6	--	--	02/07/2012		739	30000/- Cons.
	19	Ms.Nutan D.Khadse	Lecturer	B.E.Computer Engg.	--	--	07/09/89	0.6	--	--	02/07/2012		752	30000/- Cons.
	20	Kalyan K. Dani	Lecturer	B.E.Computer Engg.	--	--	06/04/88	0.6	--	--	02/07/2012		751	30000/- Cons.
B) Additional Faculty Appointed														
	21	Jitendra R.Patil	Lecturer	B.E.Computer Engg.	--	--	04/10/84	0.6	--	--	02/07/2012		750	30000/- Cons.
	22	Ravikumar Rajkumar Ahuja	Lecturer	B.E.Computer Engg.	--	--	06/04/90	0.6	--	--	16/07/2012		766	30000/- Cons.
	23	Ms. Mayuri Ravindra Patil	Lecturer	B.E.Computer Engg.	--	--	15/12/89	0.6	--	--	16/07/2012		765	30000/- Cons.
	24	Atul Vasudev Dusane	Lecturer	B.E.Computer Engg.	M.E Computer	--	23/06/87	1.0	--	--	01/12/2012		784	30000/- Cons.
	25	Ms.Shruti Naresh Pardeshi	Lecturer	B.E.Computer Engg.	--	--	18/02/88	00	--	--	01/12/2012		818	30000/- Cons.
	26	Mulchandani Ravi N.	Lecturer	B.E.Computer Engg.	--	--	08/05/91	00	--	--	01/12/2012		785	30000/- Cons.
	27	Ashish Kailas Patil	Lecturer	B.E.Computer Engg.	--	--	13/11/89	00	--	--	01/12/2012		787	30000/- Cons.
First Year	28	Ms.Chitra Jalamsing Patil	Lecturer	B.E.Computer Engg.	--	--	03/12/90	00	--	--	01/12/2012		786	30000/- Cons.
	29	Ms.Punam M.Bafna	Lecturer	B.E.Computer Engg.	--	--	11/10/89	00	--	--	02/07/2012		--	30000/- Cons.

Name of the Course	Sr. No.	Name (S) of the teaching faculty	Designation (Lecturer/ Asstt.Prof. Professor)	Qualifications with field of Specialization			Date of Birth	Experience a)Teaching b)Industry c) Research			Date of Joining of the institute	Pan. No.	Pf. No. MH5 0148/	Basic Pay +AGP& Gross Salary pay as on 31.12.2012
				UG	PG	PhD.		A	B	C				
UG Level **Inf.Tech**	01	Mrs. Archana K. Bhavsar	Associate Prof.&HOD	B.E. Computer	CSE	--	22.02.77	5.10	--	--	17/03/08	AIIPB7174L	616	B=47792 G=54961
.	02	Mr.S.J. Patil	Asst. Prof.	B.E. I.T.	CSE	--	16.09.80	7.02	--	--	16.12.05		589	B=24327 G=34058
	03	Mr.Nitin Jagtap	Asst. Prof.	B.E. I.T.	CSE	--	31/05/80	5.3	2.5	--	02/07/07		628	B=23244 G=27892
	04	Rajput S.H.	Asst. Prof.	B.E. Computer	CSE		26/10/84	4.9	--	--	20/02/08		625	B=23244 G=27892
	05	R.B.Sangore	Lecturer	B.E. Computer	--	--	19.09.85	3.5	3	--	17.07.09		629	B=22557 G=25941
	06	Prashnt C.Harne	Lecturer	B.EComp. Sci&Engg.	--	--	12/01/1988	0.6	--	--	02/07/2012		720	30000/- Cons.
	07	Ms.Ankita D.Punjabi	Lecturer	B.Ecomp. Sci&Engg.	--	--	30/12/89	0.6	--	--	02/07/2012		722	30000/- Cons.
	08	Baljitsingh S. Kalsi	Lecturer	B.E. Comp.	--	--	13/10/88	0.6	--	--	02/07/2012		721	30000/- Cons.
	09	Mrs. Shirin S. Pinjari	Lecturer	B.E. Comp.	--	--	08/09/89	0.6	--	--	09/07/2012		768	30000/- Cons.
	10	Ms.Tejashri S.Joshi	Lecturer	B.E. Comp.	--	--	14/12/90	0.6	--	--	16/07/2012		769	30000/- Cons.
	11	Sachin Bansilal Patil	Lecturer	B.E. IT	--	--	01/05/89	00	--	--	01/12/2012		796	30000/- Cons.
	12	Shambhu kumar R.Singh	Lecturer	B.E. IT	--	--	14/09/90	00	--	--	01/12/2012		797	30000/- Cons.
B) Additional Faculty Appointed														
	13	Ms. Snehal A.Dhumale	Lecturer	B.E. IT			01/08/89	00	--	--	01/12/12		798	30000/- Cons.
	14	Ms A. S.Agarwal	Lecturer	B.E. Computer	--	--	04.10.87	3.3	--	--	20.07.09	--	--	8000-275-13500

Name of the Course	Sr. No.	Name (S) of the teaching faculty	Designation (Lecturer/ Asstt.Prof. Professor)	Qualifications with field of Specialization			Date of Birth	Experience a)Teaching b)Industry c) Research			Date of Joining of the institute	Pan. No.	Pf. No. MH50148 /	Basic Pay +AGP& Gross Salary pay as on 31.12.2012
				UG	PG	PhD.		A	B	C				
PG Level **E & TC**	01	Mr. P. H. Zope	Asstt. Prof.	BE Ind. Electronic	Digital Electronics	--	24.06.75	08	1	--	01.07.03	AAFPZ 6540B	509	B=29499 G=47724
	02	Mr. A. H. Karode	Asstt. Prof.	BE Electronics	E&TC	--	01.06.76	8	2	--	01.07.03	ALMPK 9914G	496	B=29499 G=47724
UG Level **E & TC**	01	Mr.S.R.Suralkar	Associate Prof.&HOD	B.E. Electronics	M.E. Inst. & Control	--	28.10.66	21	--	--	17.08.91	ACAPS 3443H	180	B=57537 G=83429
	02	Mr. P. J. Shah	Associate Prof	B.E. Ind. Ele.	ME Power Electronics	--	11.08.67	19	1	--	01.08.95	ALBPS 7337J	38	B=56153 G=81422
	03	Mr. M. P. Deshmukh	Associate Prof	BE Electronics	ME Inst. & Control	--	20.06.66	18	--	--	01.07.96	AARPD 2514M	32	B=55861 G=80998
	04	Mr. V. M. Deshmukh	Associate Prof	BE Electronics	ME Inst. & Control	--	17.06.65	18	--	--	01.08.98	APRED 2513N	35	B=55861 G=80998
	05	Mr. P.V. Thakre	Associate Prof	B.E. Electronics	M.Tech.(Energy Engg.)	--	19.07.70	14	--	--	16.07.07	ACZPT 9698L	597	B=54802 G=73983
	06	Mr. S. U. Nyati	Associate Prof	BE Electronics	M.E. Electronics	--	10.01.72	10	2	--	01.08.02	ADGPN 2607P	410	B=47792 G=59740
	07	Mr.N.M.Kazi	Asstt. Prof.	BE Electronics	E&TC	--	12.06.72	10	2	--	01.08.02	AAOPW 6412G	502	B=33984 G=52675
	08	Mr. A.C. Wani	Asstt. Prof.	BE Electronics	M.E. Electronics	--	30.07.76	9.5	--	--	09.06.03	AAOPW 6412G	502	B=29499 G=47724
	09	Mr. S. P. Ramteke	Asstt. Prof.	BE. E&TC	Digital Electronics	--	31.03.79	8.6	--	--	13.02.04	AJIPR 6640Q	563	B=26381 G=38252
	10	Hingonekar Shailendra A.	Asstt. Prof.	E &TC	Elect.Digen.Tech.	--	06.03.69	2.6	--	--	21/07/10	AAYPH4559H	694	B=29548 G=45800

Name of the Course	Sr. No.	Name (S) of the teaching faculty	Designation (Lecturer/ Asstt.Prof. Professor)	Qualifications with field of Specialization			Date of Birth	Experience a)Teaching b)Industry c) Research			Date of Joining of the institute	Pan. No.	Pf. No. MH50148/	Basic Pay +AGP& Gross Salary pay as on 31.12.2012
				UG	PG	PhD.		A	B	C				
UG Level **E & TC**	11	Mrs.Bharti K. Khadse	Asstt. Prof.	Electronics	Digital Elect.	--	03/01/73	5	--	--	01.07.11	AVIPK6571B	713	B=27161 G=42099
	12	Mr. S. K. Khode	Lecturer	BE E&TC	--	--	01.01.79	5	--	--	01/06/07	--	607	B=23786 G=28544
	13	Ms.Mayuri J. Deshmukh	Asstt. Prof.	B.E.E&TC.	Digital Elect.	--	23.09.84	5	--	--	02/07/07	--	634	B=23244 G=25568
	14	Ms.Kiran Mantri	Lecturere	BE E&TC	--	--	26.01.83	5	--	--	20.07.07	--	636	B=23244 G=27892
	15	Mr. Ashish Bari	Lecturer	BE E&TC	Digital Elect.	--	26.04.81	5	--	--	04/08/07	--	637	B=23244 G=29055
	16	Mrs.Deepika R.Patil	Lecturer	BE E&TC	Digital Elect.	--	25.06.81	4	1.6	--	01.07.09	BBDPP9701N	668	B=23244 G=27892
	17	Ms.Priyanka Shanbhag	Lecturer	BE E&TC	--	--	30.04.88	4	--	--	21.07.09	--	682	B=22557 G=25941
B) Additional Faculty Appointed														
	18	Ms.Akshada B.Sapkal	Asstt. Prof.	BE E&TC	Digital Elect.		20.10.87	0.5	--	--	02/07/12		714	30000/- Cons.
	19	Ranjitsingh S.Kalsi	Lecturer	BE E&TC	--	--	14.06.86	0.5	--	--	02/07/12		415	30000/- Cons.
	20	Yogesh S. Santwani	Lecturer	BE E&TC	--	--	04.05.88	0.5	--	--	02/07/12		716	30000/- Cons.
	21	Manoj R. Sadanshiv	Lecturer	B. E. Electronics	--	--	27.08.85	0.5	--	--	02/07/12		717	30000/- Cons.
	22	Kunal Kishor Pandey	Lecturer	BE E&TC	--	--	01/03/1984	0.0	--	--	01/12/12		791	30000/- Cons.
	23	Imran Aliyar Khan	Lecturer	BE E&TC	--	--	31/07/1986	0.0	--	--	01/12/12		816	30000/- Cons.
	24	Kamalaskar Harshal Nandkishor	Lecturer	BE E&TC	--	--	28/03/1989	0.0	--	--	01/12/12		794	30000/- Cons.
	25	Shantanu Sunil Nandedkar	Lecturer	BE E&TC	--	--	17/12/1989	0.0	--	--	01/12/12		792	30000/- Cons.

	26	Rahul Deshmukh	Lecturer	B. E. E &TC	--	--	17/12/1987	0.0	--	--	01/12/12		793	30000/- Cons.
	27	Ms.Pryanka Prabhakar Kosti	Lecturer	B. E. E &TC	--	--	15/10/1990	0.0	--	--	01/12/12		790	30000/- Cons.
	28	Ms. Rachana R. Patil	Lecturer	B. E. E &TC	--	--	01/07/1990	0.0	--	--	01/12/12		789	30000/- Cons.
	29	Pravin Vasant Pathade	Lecturer	B. E. E &TC	--	--	18/07/1990	0.0	--	--	01/12/12		795	30000/- Cons.
First Year	30	Ms. Amrita A. Pande	Lecturer	B.E. E & TC	--	--	04/06/1986	5.0	--	--	07/09/07	--	--	30000/- Cons.
	31	Ms. Preeti M.Talele	Lecturer	Electronices	Electronices	--	19/09/1971	0.0	--	--	01/12/12	--	--	30000/- Cons.

Name of the Course	Sr. No.	Name (S) of the teaching faculty	Design-ation (Lecturer/ Asstt.Prof. Professor)	Qualifications with field of Specialization			Date of Birth	Experience a)Teaching b)Industry c) Research			Date of Joining of the institute	Pan No.	Pf. No. MH50148/	Basic Pay +AGP& Gross Salary pay as on 31.12.2012
				UG	PG	PhD.		A	B	C				
PG Level **Electrical**	01	Dr.Shilendra kumar S. Mittal	**Professor**	B.Sc.Engg. (Electrical)	M.E. Inst.&Cont.	Ph.D. (Electrical)	01/05/1965	24	--	--	13/05/11	AGRPM1487E	702	B=57915 G=100193
UG Level **Electrical**	02	D.U.Adokar	Associate Prof & HOD	Electronics	Electronics	--	31.03.65	22	--	--	01.07.09	AAMPA8549G	666	B=44,206/- G=77,149/-
	03	V.S.Pawar	Associate Prof	Electrical	EPS	--	08.04.71	18	--	--	16.08.99	AMYPP3902G	437	B=41,703/- G=73,519/-
	04	M.M.Ansari	Asst.Prof	Electrical	EPS	--	11.10.73	15	--	--	05.07.00	AHFPA4503J	474	B=26,990/- G=52,685/-
	05	S.M.Shembekar	Asst.Prof	Electrical	EPS	--	31.08.76	9	--	--	01.01.09	BSFPS5799N	657	B=22,499/- G=45,724/-
	06	D.S.Patil	Lecturer	Electrical	--	--	23.07.83	5	--	--	11.12.07	AYYPP8759R	643	B=17,244/- G=27,892/-
	07	Miss N. A. Pande	Lecturer	Instrumentation	--	--	01.06.88	3			01.07.11	BBZPP5111Q	723	B=15,600 G=21,600
	08	V.K. Patil	Lecturer	Electrical	--	--	01/02/89	3	--	--	01.07.11		724	30000/- Cons.
	09	S. S. Nagarnaik	Lecturer	Electrical			03.10.89	2	--	--	14.07.12	AKPPN5672G	772	30000/- Cons.
B) Additional Faculty Appointed														
	10	N. S. Mahajan	Lecturer	Electrical	EPS		17.05.86	2	--	--	01.12. 12	BEAPM7927M	807	30000/- Cons.
	11	S. D. Mahale	Lecturer	Electrical	--	--	28.07.91	0	--	--	01.12. 12	BVCPM0036F	805	30000/- Cons.
	12	M. R. Rade	Lecturer	Electrical	--	--	09.03.90	0	--	--	01.12. 12	BEACPR8485F	799	30000/- Cons.
	13	L. Y. Patil	Lecturer	Electrical	--	--	07.10.90	0	--	--	01.12. 12	CCNPP6769G	806	30000/- Cons.
	14	K. L. Deshmukh	Lecturer	Electrical	--	--	06.11.90	0	--	--	01.12. 12	ASWPD0835E	800	30000/- Cons.
	15	Prem Shankar	Lecturer	Electrical	--	--	12.11.89	0	--	--	01.12. 12	EAXPS3706J	801	30000/- Cons.
	16	J. N. Chitte	Lecturer	Electrical	--	--	05.02.89	0	--	--	01.12. 12	AQOPC1814C	802	30000/- Cons.
	17	S. R. Shaikh	Lecturer	Electrical	--	--	23.07.88	0	--	--	01.12. 12	DEBPS0885F	803	30000/- Cons.
	18	S. N. Patil	Lecturer	Electrical	--	--	05.02.90	0	--	--	01.12. 12	BXIPP6201L	804	30000/- Cons.
	19	Ms.Vindhya V. Sinha	Lecturer	B.E. Electrical	--	--	27/06/88	2	--	--	01.12. 12	--	--	30000/- Cons.

Name of the Course	Sr. No.	Name (S) of the teaching faculty	Design-ation (Lecturer/ Asstt.Prof. Professor)	Qualifications with field of Specialization			Date of Birth	Experience a)Teaching b)Industry c) Reserch			Date of Joining of the institute	Pan. No.	Pf. No. MH5 0148/	Basic Pay +AGP& Gross Salary pay as on 31.12.2012
				UG	PG	PhD.		A	B	C				
PG Level MBA	01	Shantnu Vasishth	Asso. Prof	B.Sc. (Geology)	MBA	--	05.01.75	5	5	--	01.07.09	ACZPV6442L	697	B=32960 G=41200
	02	V.S.Rana	Lecturer	B.Com	MBA	--	15.12.80	4	--	--	01.07.08		661	B=23786 G=29733
	03	Pankaj Anawade	Lecturer	B.E.	MBA	--	05.07.83	4	--	--	01.07.08		662	B=22557 G=25941
	04	Hahshal Salunke	Lecturer	B.Com	MBA	--	28.07.85	4	--	--	01.07.09		732	B=21600 G=21600
	05	Ms.Richa Modiyani	Lecturer	BBA	MBA	--	30.04.87	4	--	--	16.07.09		733	B=21600 G=21600
B) Additional Faculty Appointed														
	06	Ms.Deepa R .Matani	Lecturer	BBA	M.B.A. HRM	--	15/07/87	0.1	--	--	02.07.12		735	30000/- Cons.
	07	Mukesh B.Ahirrao	Lecturer	BBA	M.B.A. Finance M.Com	--	24/06/84	0.1	--	--	02/07/12		757	30000/- Cons.
	08	Ms.Faroza A. kazi	Lecturer	BBA	M.B.A. (H.R) MPM (H.R.)	--	16.02.75	0.0	--	--	01/12/12		631	30000/- Cons.
	09	Dr. Saroj B. Patil;	Lecturer	BBA	M.C.M.	Ph.D.	28.05.74	0.0	--	--	01/12/12		514	30000/- Cons.

FIRST YEAR ENGG.

Name of the Course	Sr. No.	Name (S) of the teaching faculty	Design-ation (Lecturer/ Asstt.Prof. Professor)	Qualifications with field of Specialization			Date of Birth	Experience a)Teaching b)Industry c) Research			Date of Joining of the institute	Pan. No.	Pf. No. MH5 0148/	Basic Pay +AGP& Gross Salary pay as on 31.12.2012
				UG	PG	PhD.		A	B	C				
UG Level Humanities and Science	01	Dr.Motilal N. Panigrahi	Professor	**B.Sc. Mathematics**	**M.Sc. Mathematics** **M.Phil Mathematics**	Ph.D. Mathematics	27.06.71	22	--	--	22/08/2011	ADOPP8889R	744	B=54590 G=88982
	02	Mr. K. S. Patil	**Asstt.Prof**	B.Sc. (Phy)	MSc.(Phy)	---	14.05.74	12	--	--	05.07.00	AJXPP 8679G	420	B=30862 G=47836
	03	Mr. Y. K. Chitte	**Asstt.Prof**	B.A.(English)	MA (English)	--	01.06.69	10	--	--	02.06.02	--	359	B=25235 G=39115
	04	Mahendra B. Patil	**Asstt.Prof**	B.Sc. (Physics)	M.Sc. (Physics)	--	01/06/85	05			27/07/10	--	696	B=21600 G=21600
	05	Ms. S. S. Patil	**Asstt.Prof**	B.Sc. (Math)	MSc(Math)	--	12.05.75	12	--	--	07.09.00	AJXPP 8619A	472	B=30174 G=46769
	06	Mahendra T. Shirude	**Asstt.Prof**	B.Sc. (Math)	M.Sc.(Math)	--	21/08/76	10			17/12/12		817	B=30174 G=46769
	07	C.U. Nikam	**Asstt.Prof**	B.Sc. Physics	M.Sc. Physics	--	05.06.73	5	--	--	25.08.08		652	B=23244 G=29055
	08	Ms. Deepmala Desai	**Asstt.Prof**	B.Sc. Chemistry	M.Sc. Chemistry	--	06.10.79	5	--	--	25.08.08		664	B=23244 G=29055
	09	Ms. Meera Deshpande	**Asstt.Prof**	B.Sc. (Math)	M.Sc.Maths M.Phil	--	10.06.75	9.6	---	--	16.07.07		605	B=22248 G=27810
	10	J.J.Patil	**Asstt.Prof**	B.Sc. (Math)	M.Sc.(Math)	--	03.10.84	5	---	--	15.09.09		686	B=22557 G=25941
	11	Nago Bhika Bhoi	Lecturer	B.A. (English)	M.A. (English)	--	22/06/86	0.6	--	--	02/07/12		746	30000/- Cons
	12	Mali Anil Raju	Lecturer	B.Sc. (Chemistry)	M.Sc. (Chemistry)	--	17/10/87	0.6	--	--	02/07/12		747	30000/- Cons
	13	Ms. Afrin Anjum Ansari	Lecturer	B. Sc. (Maths)	M. Sc. (Maths)	--	09/03/88	0.6	--	--	02/07/12		775	30000/- Cons
	14	Ujawalsing T. Patil	Lecturer	B.Sc. (Org. Chemistry)	M.Sc. (Org. Chemistry)	--	10/07/85	0.6	--	--	02/07/12		774	30000/- Cons

Three persons as named above of Computer Engg. Dept have been selected for First year Engineering Introduction to Computing Subject, which is to be taught from January 2010.

BIODATA OF PRINCIPAL

1) Full Name: Kishor S Wani

2) Date of Birth: 24/9/1959

3) Age as on Date: 53 Years

4) Gender: Male

5) Nationality: Indian

6) Category: OBC

7) Address for Correspondence: 31/2, "Annapurna", Gandharva Colony, Jalgaon-425001.

8) E-mail ID: wani.kishor@gmail.com

9) Telephones: 0257 2252989

10) Mobile No: 9422787643

11) Permanent Address: 31/2, Annapurna, Gandharva Colony, Jalgaon 425001

12) Qualification: M Tech: Chemical Technology
Ph. D : Biotechnology

Sr.	Exam Passed	Name of Institute	Name of University/ Board	Year of Passing	% Division
1.	**SSC/ Class X**	SB High School Aurangabad	SSC Board Aurangabad	1974	79.28%
2.	**HSC/Inter-science**	Govt Arts Science College, Aurangabad	Marathwada University, Aurangabad	1976	58.15%
3.	**B Sc**	Balbhim College, Beed	Marathwada University, Aurangabad	1980	73.25 %
4.	**B Sc Tech**	LIT, Nagpur	Nagpur University, Nagpur	1983	70.90 %
5	**M Tech**	LIT, Nagpur	Nagpur University, Nagpur	1985	70.88%
6	**D B M**	Bhartiya Vidya Bhawan, RPI of Communication and Management, Bombay, Nagpur Chapter	Bhartiya Vidya Bhawan, RPI of Communication and Management, Bombay, Nagpur Chapter	1984	55.30 %
7.	**Ph. D.**	School of Life Science, NMU, Jalgaon	North Maharashtra University, Jalgaon	2006	--
8.	**Others**	--	--	--	--

13) M Tech Dissertation: A) Supervised By: Dr (Mrs) P N Shastri
Topic: "Studies on the proteins of processed cereals and legumes"

14) Ph. D. Thesis: A) Supervised By: Dr S B Chincholkar
B) Topic: "Biotechnology of polysaccharide and pigment production by *Chryseobacterium indologones"*

15) Experience: Total: 27 Years & 4 months , As a PG Teacher: 5 years

Sr.	Designation	Employer	From	To	Scale	Basic
1	Lecturer	Shree SM IT Jalgaon	1985	1994	2200-220-4000	
2	Principal	Shree SM IT Jalgaon	1994	1997	4500-150-5700-200-6300	4800/-
3	Lecturer	SSBT'S COET Bambhori, Jalgaon	1997	1998	2200-220-4000	3000/-
4	Assistant Professor	SSBT'S COET Bambhori, Jalgaon	1998	2002	3700-125-4950-150-5700	3700/-
5	Lecturer (approved w.e.f. Feb.2002)	SSBT'S COET Bambhori, Jalgaon	Feb 2002	Dec 2002	8000-275-13500	11300/-
5	Assistant Professor (approved w.e.f. July 2006)	SSBT'S COET Bambhori, Jalgaon	Dec 2002	July 2007	12000-420-18300	16200/-
6	Professor (at college level)	SSBT'S COET Bambhori, Jalgaon	Aug 2007	Till date	16400-450-20900-500-22400	16850/-
7	Professor (approved w.e.f.13.10.2011) & Principal w.e.f.14.10.2011	SSBT'S COET Bambhori, Jalgaon	Aug 2010 Oct.2011	April 2011 Till today	37400-67000	58663/-

A) As Lecturer or equivalent: 11 years

B) Principal(At SMIT): 2.5 years

C) Experience as 'Assistant Professor': 8.5 years
D) As 'Professor or equivalent: 4 Years 2 months
E) As a Principal: 1 Year & 2 months

16) Current Employment:

A) Present Job & Scale: Professor & Principal
37400-67000

17) Job Responsibility: Contribution in Administration

Teaching, Research, General Administration

1. Working as Principal since 14th October, 2011.
2. Ph.D. Guide

Worked as

1. Head, Chemical Engg. Dept
3. Chairman, Antiragging Committee
4. Chairman, Library Committee
5. Chairman, Vice Chairman & Co ordinator, Admission Committee
6. Co ordinator: Academics & R&D
7. Member, Proctoral Board
8. Organizing Secretary of National Level Seminar on "Nanotechnology: Perspectives & Future", (8.3.2008)
9. Co ordinator: Training Programme on Disater Management", 23.01.2010

18) Membership of Professional Bodies:

a. Member of Board of Studies of Chemical Engineering and Technology, North Maharashtra University, Jalgaon.
b. Life Member of ISTE.
c. Life Member of AFST.
d. Fellow Member of OTAI
e. Life Member of BRSI

19) List of Research Work and Publications:

PATENT:

First & true inventor of the patent (dated 2/01/2006) on "A Method for production of orange colored aliphatic pigment by *Chry*seobacterium *Indologenes* (Patent No. 196509 of 16/12/2003, A-MU/0865).

International Publications

1.V.S.Patil, J.D.Dhake, **K.S.Wani.** "Development of Acetylation Technique for chemical modification of cellulose fiber using baggase, bamboo & pad pulps" , published in "Oriental Journal of Chemistry" ,Vol 19,No.3,2003

2.**K.S.Wani**, B.S.Naphade, B.L.Chaudhari & S.B.Chincholkar. "Pigment Production" published in ,"Concise Encyclopedia of Bioresource Technology",Haworth press publication, New York , 1st April 2004, Page no. 645 to 652.

3.S.S.Sonawane, G.A.Usmani, V.R.Parate, V.S.Patil, **K.S.Wani.** " Mass transfer and kinetic studies of antacids in acetic acid and its modeling simulation", published in "Material Science and Research India". Vol.5(1), 2008.

4.S.S.Sonawane, G.A.Usmani, V.R.Parate, **K.S.Wani** and S.J.Wagh. "Study the kinetics of catalytic esterification reaction between n-Butanol and Acetic acid", published in "Material Science and Research India". Vol.5(1), 2008.

5.Priti N Chaudhari, **Kishor S Wani**, Bhushan L Chaudhari and Sudhir B Chincholkar. " Characteristics of Sulfobacin A from a soil isolate *Chryseobacterium gleum*", published in "Applied Biochemistry and Biotechnology" DOI 10 1007/s12010-008-8417-7, Nov.2008.

6. Sharanappa A., **K.S.Wani**, Pallavi Patil. "Bioprocessing of Food Industrial Waste for Alpha Amylase Production by Solid State Fermentation", published in "International Journal of Advanced Biotechnology and Research". Vol 2, Issue 4, pp 473-480,2011.

7. A.R.Lokhande, V.S.Patil, **Wani K.S**. "Preparation of greases from metal soaps of non traditional oil using waste lubricating oil", published in "International Journal of Chemical Engineering Research". Volume 4,Number 1 (2012), pp. 1-7.

8. M. Husain, **K.S.Wani** and S.P.Pawar. "Pollution Control: A Techno-Spiritual Perspective", published in "Pratibha: International Journal of Science, Spirituality, Business and Technology", Vol.1, No. 1, March 2012, pp.82-85.

Papers Communicated in National Journals

1. N.Y.Ghare, **K.S.Wani**, V.S.Patil. " A Review on Methods of Recovery of Acid(s) from Spent Pickle Liquor of Steel Industry", communicated to "Journal of Institution of Engineers".

PUBLICATIONS:

In National Seminar

1.**K.S.Wani** "Microbial Pigments and its applications". Published in National level Seminar on " Emerging facets of Chemical Engineering & Biotechnology held on September 28-29,2005 at Laxminarayan Institute of Technology, Nagpur.

2. Sharanappa A, **K.S.Wani "**Molecular Dynamics Simulation: An Aid to Predict Nanobehavior of Biological System". Published in National level Seminar on "Nanotechnology" held on March 08, 2008 at S.S.B.T's, COET, Bambhori. Jalgaon.

In INTERNATIONAL CONFERENCE

1.**Kishor S Wani**, Priti N Chaudhari, Bhushan L Chaudhari and Sudhir B Chincholkar. "Production of new sulfonolipid and some important enzymes by alkaliphilic *Chryseobacterium sp.*" Published in International Conference on " New Horizons in Biotechnology and 4th BRSI Convention" held on November 26-29,2007, organized by The Biotech Research Society[BRSI] and National Institute for Interdisciplinary Science and Technology[NIIST], Trivandrum.

2.Sharanappa A., **K.S.Wani** and Pallavi Patil. " Bioprocessing of food industrial waste for value added product by solid state fermentation". Published in International Conference on "Innovative Science and Engineering and Technology (ICISET-2011)" held on 8th & 9th April,2011, organized by V.V.P. Engineering College, Rajkot (Gujarat).

3. A.R.Lokhande, **K.S.Wani** and V.S.Patil. "Study of lubricating greases from mahua oil fatty acids using waste lubricating oil". Published in "International Congress of Chemistry and Environment (ICCE-2011)" held on 27-29, May-2011 at Dickson, Malaysia.

In NATIONAL CONFERENCES

1. V.P.Sangore, S.A.Thakur, V.R.Diware and **K.S.Wani.** " Impact of Global Economic Recession on Indian Chemical Industries", Published in U.G.C. Sponsored National Level Conference on " Global Economic Recession : An Opportunity to India" held on 16th and 17th December, 2009, organized by B.G.E. Society's Smt. Laxmibai Radhakisan Toshniwal College of Commerce, Akola.

2. Sharanappa A., **K.S.Wani** and Pallavi Patil. " Biotechnology of Solid State Fermentation", Published in National Conference on " Biochemical Engineering: Present Scenario and Future Perspective" held on 12th and 13th March, 2010, organized by Department of Chemical Engineering, G.H.Patel College of Engineering and Technology, Vallabh Vidyanagar, Gujarat.

3.V.P.Sangore, S.A.Thakur, V.R.Diware and **K.S.Wani.** " Recovery of Bisphenol-A through Depolymerization of Commercial Compact Disc Waste by Alkaline Methanolysis", Published in National Conference on " Emerging Trends in Engineering, Technology and Management", held on 29th March 2010, organized by SSBT's C.O.E.T.,Bambhori, Jalgaon.

4. N.Y.Ghare, **K.S.Wani** and V.S.Patil. "Recovery of Hydrochloric Acid from Spent Pickle Liquor of Steel Industry", Published in National Conference on " Emerging Trends in Engineering, Technology and Management", held on 29th March 2010, organized by SSBT's C.O.E.T.,Bambhori, Jalgaon.

5. A.R.Lokhande, **K.S.Wani** and V.S.Patil. "Study of Metallic Soaps from Non-Traditional Oil and their Applications as Lubricating Greases and Drier in Paints", Published in National Conference on " Emerging Trends in Engineering, Technology and Management", held on 29th March 2010, organized by SSBT's C.O.E.T.,Bambhori, Jalgaon.

6. A.R.Lokhande, **K.S.Wani** and V.S.Patil. "Study of Lubricating Grease from Mahua Oil Fatty Acids", Published in National Conference on "Recent Innovations in Oil and Food Technology (RIOFT-2010)", held on August 23, 2010, organized by Division of Oils, Fats and Waxes Technology and Division of Food Technology, Department of Chemical Technology, North Maharashtra University, Jalgaon-425001.

7. N.Y.Ghare, V.S.Patil and **K.S.Wani.** "Analysis and recovery of sulfuric acid from spent liquor of electroplating industry", Published in National Conference on "Environmental Innovations for Resource Sustainability (EIRS-2011)", held on 21st &22nd January 2011, organized by School of Environmental & Earth Sciences, North Maharashtra University, Jalgaon.

8. L.Mahajan and **K.S.Wani**." Study of Adsorption Capacity of Fly Ash for Removal of Lignin", Published in National Conference on "Recent Advances in Chemical Engineering (RACE-2012)",held on 4th February, 2012, organized by University Department of Chemical Technology, North Maharashtra University, Jalgaon.

9.Kishor B. Deshmukh, V.P.Sangore and **K.S.Wani**. "UASBR Technology for Treating Waste Water", Published in National Level Conference on "Green and Clean Technology", held on 11th March 2012, organized by SSBT's College of Engineering and Technology, Bambhori, Jalgaon.

List of a) Conferences/ Seminars b) Workshops/ Symposium c) Winter School/ Summer School attended:

1.National Symposium on "Recent Trends in Biotechnology of Yeast and Fungi" held at School of Life Sciences, N.M.U., Jalgaon during 13-14th March 1997.

2. Workshop on syllabus framing for S.E. to B.E. NMU Jalgaon conducted at COET , Bambhori, Jalgaon on 06/09/1998.

3.Seminar on "Quality Engineering Education" organised by SSBT's COET, Jalgaon, N.M.U., Jalgaon and Engineering Education Foundation, Pune on Dec. 26th Dec. 1998.

4. QIP short term course on "Recent Developments in Fermentation and Enzyme Technology", conducted at IIT, Bombay during May 8-12, 2000.

5. Workshop on "Paper Setting & Evaluation" conducted At J. T. Mahajan College of Engineering, Faizpur on Sept.22,2002.
6. "Workshop : Insight into Accreditation" conducted at Goa on April 16–17, 2003.

7. Five day SERC school on "Recent Advances In Design And Analysis of Biotechnological Processes" conducted at IIT Bombay during May 13-17,2003.

8. "Orientation Programme for Engineering College Teachers" jointly Organised by SSBT's COET, Jalgaon and Engineering Education Foundation, Pune at COET Bambhori on July 11-13,2003.

9. Workshop on "Matlab & Simulink" conducted by India Soft & Cranes in July 2003 at SSBT's COET , Bambhori, Jalgaon.

10. Workshop on "Intellectual Property Rights with special reference to Patents". Sponsored by TIFAC, DST (Govt. of India) and S&T Cell (Govt. of Maharashtra)held on Jan 9,2004 at N.M.U. Jalgaon.

11.National symposium on " Developments in Biotechnology: Emerging Trends and Challenges". First BRSI Convention, held on November 25-27, 2004 at N.M.U. Jalgaon.

12. National seminar on "Low Cost Automation" held on April 21, 2007 at SSBT's College of Engineering and Technology, Bambhori, Jalgaon.

13. National seminar on "NANOTECHNOLOGY" held on March, 8 , 2008 at SSBT's College of Engineering and Technology, Bambhori, Jalgaon.

14.International workshop on "Digital Governance and Hotspot Geoinformatics" directed by Dr.G.P.Patil, Penn State University, U.S.A. and organised by K.C.E.Society's JalaSRI-Watershed Surveillance and Research Institute, Moolji Jaitha College, Jalgaon, during 5 - 7 June, 2009.

15. Three days teachers' training workshop "SHRAM SADHANA", held on 9th, 10th and 11th July, 2009, jointly organized by SSBT's College of Engineering and Technology, Bambhori, Jalgaon and Deepstambh Foundation, Jalgaon.

16. In-plant Training Programme on "Disaster Management" held at the SSBT's College of Engineering and Technology, Bambhori, Jalgaon, on 23rd January 2010, organized by "National Safety Council, Mumbai chapter.

17. National Level Workshop on "Research Methodology" , held at the SSBT's College of Engineering and Technology, Bambhori, Jalgaon from 17th to 19th October 2011, jointly organized by Department of Mechanical Engineering and Department of Business Administration.

18. National conference on "Recent Advances in Chemical Engineering", held at University Department of Chemical Technology, North Maharashtra University, Jalgaon on 4th Feb.2012 organized by U.D.C.T., N.M.U., Jalgaon.

Any Other:

i. Recognized Ph.D. guide in Chemical Engineering & Technology of N.M.U., Jalgaon

ii. Guide for five Ph.D. students--

Topics:

1. " Studies of Alkanolamides and Metalic Soaps from Non Traditional Oils".
2. " Evaluation of Recovery of Different Inorganic Acids from Waste Water".
3. " Antimicrobial Activities and Phytochemical Analysis of some Selected Medicinal Flora for its Application as Bacterioside and Fungicide".
4. " Studies on Wax Deposition Control in Crude Oil".
5. " Studies on Separation in Chemical Processes by Using Porous Membranes".

iii. Guided M.E.Projects : 06 No.s

Topics:

1."Use of Fly Ash as a Soil Nourishing Agent for Tomato Crop". (P.A.Shirule)
2." Use of Fly Ash as a Soil Nourishing Agent".(Jyoti R. Mali)
3."Design of Overhead Tank and Distribution System for Premises of College of Engineering and Technology, Bambhori, Jalgaon.(K.P.Wankhede)
4."Comparative Studies of Adsorption Capacity of Fly Ash and Coconut Husk for Removal of Lignin" (Lomesh Mahajan)
5. "Bio processing of Vegetables, Agricultural and Food Industry Wastes for Value Added Products by Solid State Fermentation".(Sharanappa A.)
6. "Waste Water Treatment using Constructed Wetlands" (Pawar Shantanu N.)

I solemnly declare that the information given above is true to the best of my knowledge.

(Dr. K.S.Wani)

DEPARTMENT OF APPLIED SCIENCE

1.Name:-Dr. Motilal Panighrahi.
2.Date of Birth.:-27/06/1971
3.Educational Qualification :-M.Sc(Mathematics),Ph.D,
M.Phil, NET, NBHM.

4.Work Experience : 15
- Teaching :- 15years
- Research :- 08 Years
- Industry : --
- Others : --

5.Area of Specializations : ---
6.Subjects teaching at Under Graduate Level :
1) Engineering Math I 2)Engineering Math II 3)Engineering Math III
4) Probability Statistics 5) Numerical Analysis 6) Simulation and Modeling
7) Discrete Mathematics 8) Linear Algebra 9) Complex Analysis

Post Graduate Level : --
7.Research guidance : Not Applicable

Masters's
Ph.D.

No. of papers published in
- National Journals 03
-International Journals04
- Conferences 32

8.Projects Carried out : - -
9.Patents : - -
10.Technology Transfer : - -
11.Research Publications :
i) International Journals:--

12.No. of Books published with details : - 1)Engg. Maths –I Prakash Publication

Signature

DEPARTMENT OF APPLIED SCIENCE

For each Faculty give a page covering
Name: KIRAN SAHEBRAO PATIL

1. Date of Birth: 14th MAY 1974
2. Educational Qualification: M. Sc.(PHYSICS.)

3. Work Experience :
   - Teaching --13 yrs
   - Research -----
   - Industry -- --
   - Others -----
4. Area of Specializations: - Physics with Electronics
5. Subjects teaching at Under Graduate Level:
   i) Engineering Physics-I ii) Engineering Physics-II
   iii)Environmental Studies.
   Post Graduate Level: --
6. Research guidance: Not Applicable

   Master's
   Ph.D.

   No. of papers published in
   - National Journals
   -International Journals 04
   - Conferences 01

Projects Carried out :
Patents :

7. Technology Transfer : - -

8. Research Publications : --
   i) International Journals :

9.No. of Books published with details : --
11.Research Publications : --
   i) International Journals

12.No. of Books published with details : - -

Signature

DEPARTMENT OF APPLIED SCIENCE

1.Name:SUNITA SAHEBRAO PATIL
2.Date of Birth : 12TH MAY 1975
3.Educational Qualification : M.Sc.(Maths.) B.Ed.M.Phil

4.Work Experience :
- Teaching -- 13 years
- Research --
- Industry
- Others --

5.Area of Specializations :
6.Subjects teaching at Under Graduate Level :
i) Engineering Maths-I ii) Engineering Maths-II
iii) Engineering Maths-III iv) NACM

Post Graduate Level : --
7.Research guidance : Not Applicable

Masters's
Ph.D.

No. of papers published in
- National Journals
-International Journals 04
- Conferences 03

8.Projects Carried out : - -
9.Patents : - -
10.Technology Transfer : - -
11.Research Publications : --
i) International Journals

12.No. of Books published with details : -

Signature

DEPARTMENT OF APPLIED SCIENCE

For each Faculty give a page covering

Name: CHANDRASHEKHAR. UTTAMRAO. NIKAM.

1. Date of Birth: 05/06/1973
2. Educational Qualification: M.Sc.(Physics), B.Ed,
3. Work Experience : 8 Years
   - Teaching 8 Years
   - Research -----
   - Industry -- --
   - Others -----
4. Area of Specializations: - Nuclear Physics
   Subjects teaching at Under Graduate Level:- i) Engineering Physics-I ii) Engineering Physics-II iii)Environmental Studies. iv) Optics v) Quantum mech., vi)Mathematical Phy., vii) Nuclear Physics.
   Post Graduate Level: - Nuclear Physics
5. Research guidance: Not Applicable

   Master's
   Ph.D.

   No. of papers published in
   - National Journals
   - International Journals
   - Conferences 01

   Projects Carried out :
   Patents :

6. Technology Transfer : - -
7. Research Publications : --
   i) International Journals :

9. No. of Books published with details : --
11. Research Publications : --
    i) International Journals

12. No. of Books published with details : - -

Signature

DEPARTMENT OF APPLIED SCIENCE

For each Faculty give a page covering

Name: PATIL JITENDRASING JAYSING

8. Date of Birth: 03\10\1984
9. Educational Qualification: M.Sc.(Maths)

10. Work Experience :
    - Teaching 3.6Years
    - Research -----
    - Industry -- --
    - Others -----
11. Area of Specializations: - Computational Mathematics
12. Subjects teaching at Under Graduate Level:
    Post Graduate Level: --
13. Research guidance: Not Applicable

	No. of papers published in
Master's	- National Journals
Ph.D.	- International Journals
	- Conferences

Projects Carried out :
Patents :

14. Technology Transfer : - -

15. Research Publications : --
    i) International Journals :

9.No. of Books published with details : --
11.Research Publications : --
    i) International Journals

12.No. of Books published with details : - -

Signature

DEPARTMENT OF APPLIED SCIENCE

For each Faculty give a page covering
Name: Ms DEEPMALA ISHVARLAL DESAI

16. Date of Birth: 06/10/1979
17. Educational Qualification: M.Sc, B.Ed, M Phil
18. Work Experience :
    - Teaching -- 4 years
    - Research -----
    - Industry -- --
    - Others -----
19. Area of Specializations: - Iorganic Chemistry
20. Subjects teaching at Under Graduate Level: Engg. Chemistry-I, Engg. Chemistry-II,
    Post Graduate Level: --
    Research guidance: Not Applicable

	No. of papers published in
Master's	- National Journals
Ph.D.	- International Journals
	Conferences :-02

Projects Carried out :
Patents :

21. Technology Transfer : - -

22. Research Publications : --
    i) International Journals :

9.No. of Books published with details : --
11.Research Publications : --
    i) International Journals

12.No. of Books published with details : - -

Signature

DEPARTMENT OF APPLIED SCIENCE

1.Name:-Deshpande Meera Vilas
2.Date of Birth.:-10/06/1975
3.Educational Qualification :-M.Sc(Mathematics),B.Ed,M.Phil.

4.Work Experience : 11
- Teaching :- 11years
- Research :---
- Industry : --
- Others : --

5.Area of Specializations : ---
6.Subjects teaching at Under Graduate Level :
1) Engineering Math I 2)Engineering Math II 3)Engineering Math III
4)F.Y.Bsc I,II,III 5)S.Y.Bsc I,II,III
Post Graduate Level : --
7.Research guidance : Not Applicable

Masters's
Ph.D.

No. of papers published in
- National Journals
- International Journals
- Conferences

8.Projects Carried out : - -
9.Patents : - -
10.Technology Transfer : - -
11.Research Publications :
i) International Journals:--

12.No. of Books published with details : - -

Signature

DEPARTMENT OF APPLIED SCIENCE

For each Faculty give a page covering
Name: Yeshwant Kondusing Chitte

1. Date of Birth: 2nd June 1969
2. Educational Qualification: M.A.(English), L.L.B., B.C.J.

3. Work Experience :
   - Teaching --14 yrs
   - Research -----
   - Industry -- --
   - Others -----
4. Area of Specializations: - English Literature
5. Subjects teaching at Under Graduate Level:
   i) Professional Communication
   Post Graduate Level: --
6. Research guidance: Not Applicable

	No. of papers published in
Master's	- National Journals
Ph.D.	- International Journals
	- Conferences

Projects Carried out :
Patents :

7. Technology Transfer : - -

8 Research Publications : --
   i) International Journals :

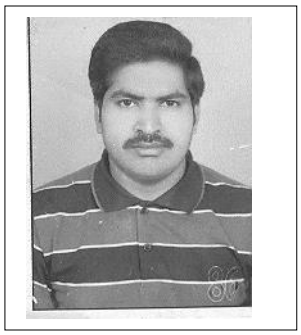
9. No. of Books published with details : --
10. Research Publications : --
    i) International Journals

11.No. of Books published with details : - -

Signature

DEPARTMENT OF APPLIED SCIENCE

For each Faculty give a page covering



Name: MAHENDRA BALU PATIL

01. Date of Birth: 01ST JUNE 1985
02. Educational Qualification: M. Sc. (PHYSICS.)

03. Work Experience:
    - Teaching --03 yrs
    - Research -----
    - Industry -- --
    - Others -----
04. Area of Specializations: - ENERGY STUDIES
05. Subjects teaching at Under Graduate Level:
    i) Engineering Physics-I ii) Engineering Physics-II
    iii)Environmental Studies.
    Post Graduate Level: --
06. Research guidance: Not Applicable

Master's
Ph.D.

No. of papers published in
- National Journals
- International Journals
- Conferences

Projects carried out:
Patents :

07. Technology Transfer: - -

08. Research Publications: --
    i) International Journals :

9.No. of Books published with details : --
10. Research Publications : --
    i) International Journals

11.No. of Books published with details : - -

Signature

DEPARTMENT OF APPLIED SCIENCE

For each Faculty give a page covering

Name: Ujwalsing Tryambak Patil

01. Date of Birth: 10th July 1985
02. Educational Qualification: M.Sc. (Chem.)

03. Work Experience:
    - Teaching --01 yrs
    - Research -----
    - Industry -- --06 Month
    - Others -----03 Years
04. Area of Specializations: - Organic Chemistry
05. Subjects teaching at Under Graduate Level:
    i) Engineering Chemistry-I ii) Engineering Chemistry -II
    iii)Environmental Studies.
    Post Graduate Level: --
06. Research guidance: Not Applicable

	No. of papers published in
Master's	- National Journals
Ph.D.	- International Journals
	- Conferences

Projects carried out:
Patents :

07. Technology Transfer: - -

08. Research Publications: --
    i) International Journals :

9.No. of Books published with details : --
10. Research Publications : --
    i) International Journals

11.No. of Books published with details : - -

Signature

DEPARTMENT OF APPLIED SCIENCE

1.Name:-Afrin Anjum Mushtaque Ahmed Ansari.
2.Date of Birth.:-09/03/1988
3.Educational Qualification :-M.Sc(Mathematics),B.Ed,.

4.Work Experience : 2
- Teaching :- 2years
- Research :---
- Industry : --
- Others : --

5.Area of Specializations : ---
6.Subjects teaching at Under Graduate Level :
1) Engineering Math I 2)Engineering Math II 3)Engineering Math III

Post Graduate Level : --
7.Research guidance : Not Applicable

Masters's
Ph.D.

No. of papers published in
- National Journals
- International Journals
- Conferences

8.Projects Carried out : - -
9.Patents : - -
10.Technology Transfer : - -
11.Research Publications :
i) International Journals:--

12.No. of Books published with details : - -

Signature

DEPARTMENT OF APPLIED SCIENCE

For each Faculty give a page covering

Name: Anil Raju Mali

01. Date of Birth: 17th Oct 1987
02. Educational Qualification: M.Sc. (Chem.)

03. Work Experience:
    - Teaching --02 yrs
    - Research -----
    - Industry -- --
    - Others -----
04. Area of Specializations: - Organic Chemistry
05. Subjects teaching at Under Graduate Level:
    i) Engineering Chemistry-I ii) Engineering Chemistry -II
    iii)Environmental Studies.
    Post Graduate Level: --
06. Research guidance: Not Applicable

	No. of papers published in
Master's	- National Journals
Ph.D.	- International Journals
	- Conferences

Projects carried out:
Patents :

07. Technology Transfer: - -

08. Research Publications: --
    i) International Journals :

9.No. of Books published with details : --
10. Research Publications : --
    i) International Journals

11.No. of Books published with details : - -

Signature

DEPARTMENT OF APPLIED SCIENCE

1.Name:-Mahendra Tryambak Shirude.
2.Date of Birth.:-21/08/1976
3.Educational Qualification :-M.Sc(Mathematics),NET.

4.Work Experience : 14
- Teaching :- 14years
- Research :---
- Industry : --
- Others : --

5.Area of Specializations : ---
6.Subjects teaching at Under Graduate Level :
1) Engineering Math I 2)Engineering Math II 3)Engineering Math III

Post Graduate Level : --
7.Research guidance : Not Applicable

Masters's
Ph.D.

No. of papers published in
- National Journals 02
- International Journals
- Conferences 02

8.Projects Carried out : - -
9.Patents : - -
10.Technology Transfer : - -
11.Research Publications :
i) International Journals:--

12.No. of Books published with details : - 1)Engg. Maths –I Vrunda Publication. 2)Engg. Maths –I Prakash Publication 3)Engg. Maths –II Prakash Publication 4)Engg. Maths –III Prakash Publication

Signature

DEPARTMENT OF APPLIED SCIENCE

For each Faculty give a page covering
Name: Nago Bhika Bhoi.

1. Date of Birth: 22nd June 1986
2. Educational Qualification: M.A. English

3. Work Experience :
   - Teaching --2.5 yrs
   - Research -----
   - Industry -- --
   - Others -----
4. Area of Specializations: - English Literature
5. Subjects teaching at Under Graduate Level:
   i) Professional Communication
   Post Graduate Level: --
6. Research guidance: Not Applicable

	No. of papers published in
Master's	- National Journals
Ph.D.	- International Journals
	- Conferences

Projects Carried out :
Patents :

7. Technology Transfer : - -

9 Research Publications : --
   i) International Journals :

9. No. of Books published with details : --
10. Research Publications : --
    i) International Journals

11.No. of Books published with details : - -

Signature

B – BIOTECHNOLOGY

FACULTY PROFILE

1. Name : Dr. INDRASING DAGADU PATIL

2. Date of Birth : 1st June 1972

3. Educational Qualification : M.Sc. (Chem.Tech),
   Ph.D. (Chem. Tech.)

4.Work Experience :

- Teaching 13 yrs
- Research 08 yrs
- Industry Nil
- Others

5.Area of Specializations : Chemical Technology, Polymer Engineering

6.Subjects teaching at Under Graduate Level :

i)) Unit Operation – I (Fluid Mechanics ii) Process Calculations

iii) Mass Transfer – II, iv) Chemical Reaction Engineering.

Post Graduate Level : - -

i) Environmental Engineering Chemistry

7.Research guidance : Not Applicable

No. of papers published in

Masters's - National Journals :02

Ph.D. - International Journals : 01

Conferences : 02

8.Projects Carried out : - -

9.Patents :- -

10.Technology Transfer : - -

11.Research Publications :

i) International Journals : 01

S. Mishra & **I. D. Patil.** 'Application of polyacrylic acid as antiscaling agent in heat exchanger', Chem. Engg. & Tech. Vol. 25, Issue-5, pp-573, 2002.

ii) National Journals :02

1. S. Mishra, **I. D. Patil** and Y.P. Patil. 'Comparative study on polyacrylamide and homo polymer of acrylonitrile as anti scaling agent on Jalgaon ground water', J. Sci. Ind. Res., Vol. 59, pp-44, Jan-2000.
2. S. Mishra, **I. D. Patil** & Dipak Deore. " Study of sodium and potassium salts of polyacrylic acids as corrosion inhibitors" J- Sci. Ind. Res. Vol. 64, PP – 684- 687-2005

12. No.of Books published with details :

Signature

FACULTY PROFILE

1. Name : Sharanappa A
2. Date of Birth : 26th August 1983
3. Educational Qualification : B.E.(Biotech.).
   ME(Biotech & Biochem Engg) pursuing
4. Work Experience :
   - Teaching 03 years
   - Research -----
   - Industry -- --
   - Others -----
5. Area of Specializations: Biotechnology
6. Subjects teaching at Under Graduate Level:

i) Concepts in Biotechnology. ii) Bioprocess Principles. iii) Biological thermodynamics. iv)Immunology. v)Molecular Biology & Genetic Engineering. vi) Bioprocess Modeling & Simulation.

vii) Bioprocess Engineering-I. viii) Biochemical Engineering.

Post Graduate Level : Not Applicable

7. Research guidance : Not Applicable

No. of papers published in

Masters's	-	National Journals
Ph.D.	-	International Journals
	-	Conferences

8. Projects Carried out : College project – Biological Data warehousing for Karnataka Milk Federation.
9. Technology Transfer : - -
10. Research Publications :
11. No.of Books published with details :

Signature

FACULTY PROFILE

1. Name : Mr. Shamkant Bhaskar Badgujar
2. Date of Birth : 21st April 1983
3. Educational Qualification : M.Sc. (Biotechnology)

   PAT (Maharashtra State Ph.D. Aptitude Test)

   Ph. D. (Biotechnology) Pursuing
4. Work Experience :
   - Teaching 0 4 yrs
   - Research 0 2 yrs
   - Industry -- --
   - Others -----
5. Area of Specialization: **Biotechnology**
6. Subjects teaching at

   Under Graduate Level:--

   i) Microbiology, ii) Biochemistry, iii) Enzyme Engineering,

   iv) Plant Tissue Culture and Plant Biotechnology

   v) Fermentation Biotechnology I
7. Research guidance : Not Applicable

   No. of papers published in

   Masters's
   - National Journals: 03

   Ph.D.
   - International Journals 03
   - Conferences 05
8. Projects carried out: ----------
9. Technology Transfer: ----------
10. Research Publications: 06

i) International Journals: 03

1. **Badgujar S. B.** and Mahajan R. T. "Evaluation of Nematicidal properties of some Laticiferous plants" Green Farming, 2009, 2 (10): 680-684.
2. **Badgujar S. B.,** Mahajan R. T. and Kosalge S. B., "Traditional Practice for Oral Health Care in Nandurbar District of Maharashtra, India", Ethnobotanical Leaflets, 2008, 12: 1137-1144.
3. Mahajan R. T. and **Badgujar S. B.**, "Phytochemical Investigations of some Laticiferous Plants belonging to Khandesh Region of Maharashtra", Ethnobotanical Leaflets, 2008, 12: 1145-1152.

ii) National Journals: 03

1. **Badgujar S. B.** and Patil M. B., "Ethnomedicine for Jaundice from tribal areas in North Maharashtra", Natural Product Radiance, 2008, 7 (1):.79-81.
2. Mahajan R. T. and **Badgujar S. B.** "Ethnomedicinal values of Laticiferous plants used by tribal people of North Maharashtra, India", Research Link. 2008, 55, VII (8): 20-23.
3. **Badgujar S. B.** and Mahajan R. T. "Haemostatic Activity of Some Laticiferous Plants Belonging to Khandesh Region of Maharashtra, India" Journal of Biotechnology and Bioinformatics, 2009, 1 (1): 184-188.

11. No. of Books published with details: ----------

Signature

FACULTY PROFILE

1. Name : Mrs. Sarika Madhukar Badgujar
2. Date of Birth : 15th Jan 1982
3. Educational Qualification : B.Tech . (Chemical Engg.)
   GATE qualified (All India Rank 327)

   M.Tech (Chemical Engg.) Pursuing
4. Work Experience :
   - Teaching 2.8 yrs
   - Research ---
   - Industry -- --
   - Others -----
5. Area of Specialization: Chemical Engg.
6. Subjects teaching at
   Under Graduate Level:--
   i) Mass transfer-I, ii) Fluid Flow And Solid Handling
7. Research guidance : Not Applicable

   No. of papers published in

   Masters's
   - National Journals: --

   Ph.D.
   - International Journals --
   - Conferences ----
8. Projects carried out: ----------
9. Technology Transfer: ----------
10. Research Publications: ----------
11. No. of Books published with details: ----------

Signature

FACULTY PROFILE

1. Name : Ms. Pallavi Pandey
2. Date of Birth : 21st May 1984
3. Educational Qualification : B.Tech . (Biotechnology)

4. Work Experience :
   - Teaching 04 Months
   - Research ---
   - Industry -- --
   - Others -----
5. Area of Specialization: Biotechnology
6. Subjects teaching at

   Under Graduate Level:--

   i) Molecular Biology & Genetic Engg., ii) Fermentation Biotechnology II

7. Research guidance : Not Applicable

No. of papers published in

Masters's - National Journals: --

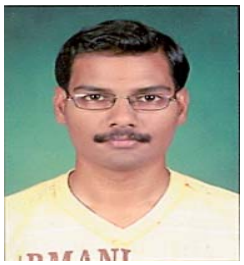
Ph.D. - International Journals --

- Conferences ----

8. Projects carried out: ----------
9. Technology Transfer: ----------
10. Research Publications: ----------
11. No. of Books published with details: ----------

Signature

FACULTY PROFILE



1. Name : Mr. Jayant P.Parpalliwar
2. Date of Birth : 22nd July 1986
3. Educational Qualification : B.Tech . (Biotechnology)
   ME(Biotech & Biochem Engg) pursuing
4. Work Experience :
   - Teaching 1.3Year
   - Research ---
   - Industry -- --
   - Others -----
5. Area of Specialization: Biotechnology
6. Subjects teaching at
   Under Graduate Level:--
   i) Concepts in Biotechnology., ii) Bioseparation Processes

7. Research guidance : Not Applicable

No. of papers published in

Masters's - National Journals: --

Ph.D. - International Journals --

- Conferences ----

8. Projects carried out: ----------
9. Technology Transfer: ----------
10. Research Publications: ----------
11. No. of Books published with details: ----------

Signature

CIVIL ENGINEERING DEPARTMENT

FACULTY PROFILE

1. Name – Dr. M.Husain
2. Date of Birth -5-12-1969
3. Educational Qualification - Ph.D.
4. Work Experience –

   Teaching – 16 Yrs. (UG), 6 years PG (inclusive)

   Research – 16 Yr (inclusive)

   Industry – six months

   Others - Nil

5. Area of Specialization – Environmental Engg.
6. Subject teaching at under graduate level –1. Environmental Engg I

   2 Environmental Engg II.

   3. Elements of Civil Engg.

   At post graduate level –1. Environmental Engineering

   Microbiology,

   Environmental Sanitation

7. Research guidance –

   Masters - 10

   Ph.D. - 06

8. Projects carried out – Project Titled Experimental Investigations on Salt Gradient Solar Pond costing 125000/- under Shram Sadhana Research Promotion Scheme
9. Patents – Nil
10. Technology Transfer – Nil
11. Research Publication –

    National Journals – nil

    International Journals - 10

    Conferences - 15

12. No. of books published with details - 1 (Everest publication Elements of Civil Engg.)

Signature

FACULTY PROFILE

1. Name – Shivraj L. Patil
2. Date of Birth –1-1-1962
3. Educational Qualification - M.Sc. (Tech)
   Ph. D.
4. Work Experience –
   Teaching – 25 Yrs.
   Research – 3 years (inclusive)
   Industry – Nil
   Others - Nil
5. Area of Specialization – Applied Geology
6. Subject teaching at under graduate level –1.Engineering Geology
   2.Watershed management
   3.Elements of Civil Engg.
   4. Surveying I
   At post graduate level – Watershed management
7. Research guidance –
   Masters - 02
   Ph.D. - Nil
8. Projects carried out – Guided to final year students in projects &seminars, paper presentation
9. Patents – Nil
10. Technology Transfer – Nil
11. Research Publication –
    National Journals - Nil
    International Journals - 03
    Conferences - 10
12. No. of books published with details - 1 (Everest Publication, Pune, Elements of Civil Engg.)

FACULTY PROFILE

1.Name - Sudhakar Bhika Pawar

1. Date of Birth – 5-10-1966
2. Educational Qualification – M.E. (Civil)
3. Work Experience –

   Teaching – 22 Yrs.

   Research – Nil

   Industry – 1.5 Yrs.

   Others - Nil
4. Area of Specialization – Civil (Construction)
5. Subject teaching at under graduate level –1.Surveying I 2. Surveying II

   3.Building Drawing & Town Planning

   4. Transportation Engineering.

   At post graduate level –

   1. Design Operation and maintenance of wtare supply and sewerage systems
7. Research guidance – Nil

   Masters - 01

   Ph.D. - Nil

8. Projects carried out – Working as site engineer & has been laboratory in charge of Survey lab
9. Patents – Nil
10. Technology Transfer – Nil
11. Research Publication – National Journals - Nil

    International Journals - 01

    Conferences - 1
12. No. of books published with details - Nil

Signature

FACULTY PROFILE

1. Name - Pravin Ashok Shirule.
2. Date of Birth – 07-6-1973
3. Educational Qualification - M .E. (Civil)
4. Work Experience –

   Teaching – 14 Yrs.

   Research – Nil

   Industry – 1

   Others - Nil

5. Area of Specialization – Environmental Engineering
6. Subject teaching at under graduate level –1.Engineering Mechanics

   2. Strength of materials

   At post graduate level –

   1. Environmental Engineering Chemistry
   2. Design Operation and maintenance of water supply and sewerage systems

7. Research guidance – --Nil

   Masters - 06

   Ph.D. - Nil

8. Projects carried out – Nil
9. Patents – Nil
10. Technology Transfer – Nil
11. Research Publication –

National Journals - Nil

International Journals - Nil

Conferences - one

12. No. of books published with details – One

On “Elements of civil engineering” Vrinda Publications.

Signature

FACULTY PROFILE

1. Name - Farooq I. Chavan
2. Date of Birth – 13-5-1974
3. Educational Qualification - M.E. (Civil)
4. Work Experience –

   Teaching – 14 Yrs.

   Research – Nil

   Industry – Nil

   Others - Nil

5. Area of Specialization – Environmental Engineering
6. Subject teaching at under graduate level –1. Engineering Mechanics

   2. Strength of materials

   3. Water resources engineering II

   3.Fluid Mechanics I

   4.Engg. Mechanics

   At post graduate level – Air Pollution

7. Research guidance –

   Masters - 04l

   Ph.D. - Nil

8. Projects carried out – Nil
9. Patents – Nil
10. Technology Transfer – Nil
11. Research Publication – Nil

    National Journals - Nil

    International Journals - Nil

    Conferences - 1

12. No. of books published with details - Nil

Signature

FACULTY PROFILE

1. Name – Jayant N.Kale
2. Date of Birth – 25th Dec 1965
3. Educational Qualification - B.E. (Civil Engineering)
   M E (Construction Technology)
4. Work Experience –
   Teaching – $1^1/_2$ years.
   Research – Nil
   Industry – 18 yrs
   Others - Nil
5. Area of Specialization – Construction technology
6. Subject teaching at under graduate level –1. Engineering Mechanics
   2. Construction Management

   At post graduate level – Nil
7. Research guidance –
   Masters - Nil
   Ph.D. - Nil
8. Projects carried out – Nil
9. Patents – Nil
10. Technology Transfer – Nil
11. Research Publication – National Journals - Nil
    International Journals - Nil
    Conferences - Nil
12. No. of books published with details - Nil

Signature

FACULTY PROFILE

1Name – Sonali B Patil

2. Date of Birth – 28-11-1979

3. Educational Qualification - B.E. Civil

M E (Environmental Engineering)

4. Work Experience –

Teaching – 6 Yrs.

Research – Nil

Industry – Nil

Others - Nil

5. Area of Specialization – Environmental Engineering

6. Subject teaching at under graduate level – 1.Water Resources Engineering I

2. Fluid Mechanics II

At post graduate level –

1. Advanced Water Treatment Technology
2. Advanced wastewater Treatment Technology

7. Research guidance –

Masters - 04

Ph.D. - Nil

8. Projects carried out – Nil

9. Patents – Nil

10. Technology Transfer – Nil

11. Research Publication – Nil

National Journals - Nil

International Journals - Nil

Conferences - One

12. No. of books published with details - Nil

FACULTY PROFILE

1. Name – Jyoti Raghunath Mali.
2. Date of Birth – 23-04-1971
3. Educational Qualification - M.E. Civil
4. Work Experience –

   Teaching – 4 years.

   Research – Nil

   Industry – Nil

   Others - Nil
5. Area of Specialization – Environmental engineering
6. Subject teaching at under graduate level –1. Engineering Mechanics
   2. Concrete technology
   3. Theory of structures I
   4. Theory of structures II

   At post graduate level –
   1. Solid waste management
7. Research guidance –

   Masters - 04

   Ph.D. - Nil
8. Projects carried out – Nil
9. Patents – Nil
10. Technology Transfer – Nil
11. Research Publication – National Journals - Nil
    International Journals - Nil
    Conferences - 02l
12. No. of books published with details - Nil

Signature

FACULTY PROFILE

1. Name – Shinde Bhusahan Vilas
2. Date of Birth – 3-07-1986
3. Educational Qualification - M.Tech
   Geotechnical Engineering
4. Work Experience –
   Teaching – 1 years.
   Research – Nil
   Industry – 1.5
   Others - Nil
5. Area of Specialization – Geotechnical engineering
6. Subject teaching at under graduate level –
   1. Theory of Structures II
   2. Geotechnical Engineering I
   3. Geotechnical Engineering II

   At post graduate level – Nil

7. Research guidance –
   Masters - 01
   Ph.D. - Nil
8. Projects carried out – Nil
9. Patents – Nil
10. Technology Transfer – Nil
11. Research Publication – National Journals - Nil
    International Journals - Nil
    Conferences - 0l
12. No. of books published with details - Nil

Signature

FACULTY PROFILE

1. Name –Durgesh Gulabsing Pardeshi.
2. Date of Birth – 04/01/1989
3. Educational Qualification - B.E. Civil
4. Work Experience –

   Teaching – Nil years.

   Research – Nil

   Industry – Nil

   Others - Nil
5. Area of Specialization –
6. Subject teaching at under graduate level –

   1. Building Design and Drawing
   2. Fluid Mechanics I
   3. Testing of Materials

   At post graduate level –

7. Research guidance –

   Masters - 0

   Ph.D. - Nil
8. Projects carried out – Nil
9. Patents – Nil
10. Technology Transfer – Nil
11. Research Publication – National Journals - Nil

    International Journals - Nil

    Conferences - 0
12. No. of books published with details - Nil

Signature

FACULTY PROFILE

1. Name – Jitendra Govinda Kachre.
2. Date of Birth – 13/2/1991
3. Educational Qualification - B E. Civil
4. Work Experience –

   Teaching – Nil

   Research – Nil

   Industry – Nil

   Others - Nil

5. Area of Specialization –
6. Subject teaching at under graduate level –

   1. Industrial water Pollution Control Engineering
   2. Structural Design and Drawing II
   3. Structural design and drawing III

   At post graduate level –

7. Research guidance –

   Masters - 0

   Ph.D. - Nil

8. Projects carried out – Nil
9. Patents – Nil
10. Technology Transfer – Nil
11. Research Publication – National Journals - Nil

    International Journals - Nil

    Conferences - 0

12. No. of books published with details - Nil

Signature

FACULTY PROFILE

1. Name – Tejaswini Dilip Patil
2. Date of Birth – 02/04/1991
3. Educational Qualification - B.E. Civil
4. Work Experience –

   Teaching – six months

   Research – Nil

   Industry – Nil

   Others - Nil
5. Area of Specialization – Nil
6. Subject teaching at under graduate level –1. Transportation Engineering I
   2. Elements of civil engineering and Engineering Mechanics
   3. Theory of structures II
   4. Computer Graphics

   At post graduate level –

   Nil
7. Research guidance –

   Masters - 0

   Ph.D. - Nil
8. Projects carried out – Nil
9. Patents – Nil
10. Technology Transfer – Nil
11. Research Publication – National Journals - Nil
    International Journals - Nil
    Conferences - 0l
12. No. of books published with details - Nil

Signature

FACULTY PROFILE

1Name – Swami Suman

2. Date of Birth – 03/10/1989

3. Educational Qualification - B.E. Civil

4. Work Experience –

Teaching – 6 Months

Research – Nil

Industry – Nil

Others - Nil

5. Area of Specialization – Nil

6. Subject teaching at under graduate level –

1.Numerical Methods in Civil Engineering

2. Elements of civil Engineering and engineering mechanics

3. Transportation Engineering II

At post graduate level –

Nil

7. Research guidance –

Masters - 0

Ph.D. - Nil

8. Projects carried out – Nil

9. Patents – Nil

10. Technology Transfer – Nil

11. Research Publication –

National Journals - Nil

International Journals - 02

Conferences – Nil

12. No. of books published with details - Nil

B – CHEMICAL ENGINEERING

FACULTY PROFILE

1.Name : VIJAY RAMKRISHNA DIWARE

2.Date of Birth : 10th October 1965

3.Educational Qualification : B.Tech. (Chemical),

Ph.D (Chemical Technology)

PGDPM

4.Work Experience

- Teaching 15 yrs
- Research 0 6 yrs
- Industry 0 8 yrs
- Others

5.Area of Specializations : Chemical Technology

6.Subjects teaching at Under Graduate Level :

i) Chemical Reaction Engineering – II ii) Chemical Plant Design and Project Engineering iii) Process Equipment Design & Drawing – I and II

Post Graduate Level : --

7.Research guidance : Not Applicable

No. of papers published in

Masters's : - - - National Journals : ---

Ph.D.: - - -International Journals : 09

-Conferences : 14

8.Projects Carried out : - -

9.Patents : - -

10.Technology Transfer : - -

11.Research Publications : 09

12.No. of Books published with details : - -

Signature

FACULTY PROFILE

1.Name: SANDEEP AVINASH THAKUR

2.Date of Birth : 17th September 1968

3.Educational Qualification : B.Tech. (Chemical)

MBA

4.Work Experience :

- Teaching: 14 yrs
- Research 04 yrs
- Industry: 08 yrs
- Others -- -

5.Area of Specializations : Chemical Engineering and Management

6.Subjects teaching at Under Graduate Level :

i) Process Dynamics & Control ii) Mass Transfer – I iii) Mathematical Methods in Chemical Engineering iv) Industrial Economics & Management

Post Graduate Level : --

7. Research guidance : Not Applicable

No. of papers published in

Masters: - - - National Journals: 01

Ph.D: - - -International Journals: 07

-Conferences : 14

8.Projects Carried out : - -

9.Patents : - -

10.Technology Transfer : - -

11.Research Publications : 08

12.No. of Books published with details : - -

1. **Thakur S.A.** and Gupta R.H. (2011), "Customer Satisfaction and Role of Agents in Life Insurance Industry: A Special Reference to Jalgaon and Akola City of Maharashtra State", Nurturing Service Industry for Economic Development, Himalaya Publishing House, ISBN: 978-93-5024-768-6, Page 274-280.

Signature

FACULTY PROFILE

1.Name : VIJAY PRABHAKAR SANGORE

2.Date of Birth : 29th December 1972

3.Educational Qualification : M.Sc. (Poly. Chemistry)

4.Work Experience

- Teaching -15 yrs
- Research – 04 year
- Industry - ---
- Others -- --

5.Area of Specializations: Polymer Chemistry

6.Subjects teaching at Under Graduate Level :

i)Instrumentation & Instrumental Analysis ii) Chemical Processes-I

iii) Chemistry –I iv) Chemistry-II v) Chemistry-III

Post Graduate Level : - -

7.Research guidance : Not Applicable

No. of papers published in

Masters's : - - National Journals: - -

Ph.D.: - - International Journals: - -

Conferences: 09

8.Projects Carried out : - -

9.Patents : - -

10.Technology Transfer : - -

11.Research Publications : - -

12.No. of Books published with details: - -

Signature

FACULTY PROFILE

1 Name : NIKHIL YESHWANT GHARE

2. Date of Birth : 14 January 1968

3. Educational Qualification : B.Tech. (Chem. Engg.)

M.E (Chem. Engg.)

4. Work Experience :

- Teaching: 10 yrs Research :10 yrs
- Industry :05 yrs Others : 01 yrs

5. Area of Specializations : Chemical Engineering, Waste Water Engineering

6 Subjects teaching at Under Graduate Level

i) Transport Phenomenon ii) Chemical Engineering Thermodynamics

iii) Mass Transfer-II iv) Process Calculation

Post Graduate Level : - -

7. Research guidance : Not Applicable

No. of papers published in

Masters's: - - National Journals : 02

Ph.D: - - International Journals : 02

Conferences :03

8.Projects Carried out : 02

i)College Level : Recovery of Hydrochloric Acid from Pickling Waste Water

ii) IEI Sponsored : Recovery of Acids(Sulphuric/Nitric Acid) from Industrial Waste Water

9. Patents : -- --

10. Technology Transfer : - -

11. Research Publications : 04

12.No of Books published with details : - -

Signature

FACULTY PROFILE

1. Name : A.R.LOKHANDE
2. Date of Birth : 18th October 1959
3. Educational Qualification : M.Tech.(Chem. Tech) ,D.B.M.
   D.C.A. MIE.(Chem)

Work Experience :

- Teaching: 11yrs
- Research :05 yrs
- Industry : 16.5 Years
- Others : 01 Year

4. Area of Specializations: Solvent Extraction Plant, Vegetable Oil Refinery
5. Subjects teaching at Under Graduate Level:

i) Energy Engineering. ii) Computer aided Process Equipment Design , Modeling and Simulation iii) Computer Applications iv) Process Heat Transfer v)Unit operation-II

Post Graduate Level : -- -

7. Research guidance : Not Applicable

No. of papers published in

Masters : - -

Ph.D.: -- -

- National Journals :08
- International Journals : 01
- Conferences : 01

8. Projects Carried out : Chemical Investigation Of Non-Traditional Oils
9. Patents : - -
10. Technology Transfer : - -
11. AICTE Fund:- Received Travel grant from AICTE
12. Sponsership:-IEDC sanctioned Rs.1 lakh for project entitled, "Preparation Of Greases From Non-Traditional Oils

13.Research Publications : 09

14. No.of Books published with details : - -

Signature

FACULTY PROFILE

1.Name : Miss. SAPANA S. MADAN

2.Date of Birth : 14/08/1989

3.Educational Qualification :B.E.(Chemical Engineering)
M.Tech (Chemical Engineering)

4.Work Experience:

- Teaching : 06 months
- Research : -- --
- Industry : - - -
- Others : ----

5.Area of Specializations: Chemical Engineering

6.Subjects teaching at Under Graduate Level:

i) Unit Operation –I ii) Chemical Processes –II iii) Industrial Pollution and Control iv) Chemical Processes –I

Post Graduate Level: - -

7.Research guidance: Not Applicable

No. of papers published in

Bachelor	- National Journals: -- --
Masters's	- National Journals : -- --
Ph.D.	-International Journals : ---
	- Conferences : 04

8.Projects Carried out : - -

9.Patents :- -

10.Technology Transfer : - -

11.Research Publications :

i) International Journals :

ii) National Journals :

12.No of Books published with details : - -

Signature

FACULTY PROFILE

1.Name : Miss. SHRADDHA V. PANDE

2.Date of Birth : 17/07/1987

3.Educational Qualification :B.E.(Chemical Engineering)

4.Work Experience:

- Teaching : 02 Years
- Research : -- --
- Industry : - - -
- Others : ----

5.Area of Specializations: Chemical Engineering

6.Subjects teaching at Under Graduate Level:

i) Process engineering Economics and Costing

Post Graduate Level: - -

7.Research guidance: Not Applicable

No. of papers published in

Bachelor	-	National Journals: -- --
Masters's	-	National Journals : 01
Ph.D.		-International Journals : ---
		- Conferences : -- --

8.Projects Carried out : - -

9.Patents :- -

10.Technology Transfer : - -

11.Research Publications :

i) International Journals :

ii) National Journals :

12.No of Books published with details : - -

Signature

COMPUTER ENGGINEERING DEPARTMENT
FACULTY PROFILE

1.	Name	: Krishnakant Prabhudas Adhiya.
2.	Date Of Birth	: 07-12-1968
3.	Educational Qualification	: M.E. (Computer Science & Engg.) B.E. (Computer Engineering)
4.	Work Experience	:
	- Teaching	: 21 Years 05 Months
	- Research	: Nil
	- Industry	: Nil
5.	Area of Specialization	: Computer Engineering
6.	Subject Taught at P.G. level	: Distributed Systems
	Subject Taught at U.G. level	: Advanced Unix programming, 8085 Microprocessor, Computer Fundamental Programming lab-I , Digital System Design, Computer Peripherals , & Interfacing , Computer Organization, Microprocessor-I, Operating System, Advanced Computer Architecture , Embedded System.
7.	Research guidance at	
	- Masters's level	: 09
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: 02
	- International Journals	: 08
	- National Conferences	: 28
	- International Conferences	: 08
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: 10
12.	No. of books published with details	: 06 (1. Software Engg, 2. Computer Organization 3. Computer Network 4. Embedded Systems 5. Microprocessor-III 6. Advanced Computer Architecture)

Signature

FACULTY PROFILE

1.	Name	: Manoj Eknath Patil
2.	Date Of Birth	: 06/10/1975
3.	Educational Qualification	: M.Tech. (Computer Science & Engineering) B. E. (Computer Engineering.)
4.	Work Experience	:
	- Teaching	: 10 Years
	- Research	: Nil
	- Industry	: 01 Year 10 Month
5.	Area of Specialization	: Computer Science and Engineering
6.	Subject Taught at P.G. level	: Software Project Management, STQA
	Subject Taught at U.G. level	: Instrumentation and Diagnostic Tools, System Programming, Software Engineering, Software Metrics and Quality Assurance, 8086 Microprocessor, Embedded System.
7.	Research guidance at	
	- Masters's level	: 12
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: 02
	- International Journals	: 05
	- National Conferences	: 07
	- International Conferences	: 10
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: 07
12.	No. of books published with details	: 02 (Database Management Systems, Software Metrics and Quality Assurance)

Signature

FACULTY PROFILE

1.	Name	: Sandeep Shankarrao Patil
2.	Date of Birth	: 20/01/1980
3.	Educational Qualification	: M. Tech. Computer Science & Engineering : B.E. Computer Engineering : Ph. D. (Pursuing)
4.	Work Experience	:
	- Teaching	: 10 Years 07 months
	- Research	: 02 Years
	- Industry	: Nil
5.	Area of Specialization	: Soft Computing
6.	Subject Taught at P.G. level	: Advanced Software Engineering
	Subject Taught at U.G. level	: Artificial Intelligence, System Programming, Microprocessor-III, Advanced Computer Architecture, Database Management System
7.	Research guidance at	
	- Masters's level	: 08
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: 09
	- National Conferences	: 15
	- International Conferences	: 07
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: 04
12.	No. of books published with details	: 04 (System Programming, Artificial Intelligence & Neural Networks, Software Matrices & Quality Assurance, Computer Programming, Advanced Computer Architecture.)

Signature

FACULTY PROFILE

1.	Name	:	Ashish Tryambak Bhole
2.	Date Of Birth	:	12/09/1976
3.	Educational Qualification	:	M. Tech. in CSE, B.E. in Computer Engineering, Pursuing Ph.D. in CSE.
4.	Work Experience	:	
	- Teaching	:	10 Years 3 Months
	- Research	:	3 Years
	- Industry	:	2 Years
5.	Area of Specialization	:	Computer Science & Engineering
6.	Subject Taught at P.G. level	:	Network Centric Computing, Web Engg.
	Subject Taught at U.G. level	:	Advanced Computer Networks, Computer Networks, Software Engineering, Software Metrics & Quality Assurance, Microprocessor-III, Internet Security, E-Commerce, Advanced Computer Architecture, Microprocessor-II.
7.	Research guidance at		
	- Masters's level	:	12
	- Ph.D. level	:	Nil
	No. of papers published in		
	- National Journals	:	01
	- International Journals	:	08
	- National Conferences	:	08
	- International Conferences	:	06
8.	Projects carried out	:	Nil
9.	Patents	:	Nil
10.	Technology Transfer	:	Nil
11.	Research publications	:	09
12.	No. of books published with details	:	Nil

Signature

FACULTY PROFILE

1.	Name	: Sanjay Sadhashio Gharde
2.	Date Of Birth	: 14/09/1979
3.	Educational Qualification	: B. E. Computer Technology M. Tech. Information Technology
4.	Work Experience	:
	- Teaching	: 09 Years and 05 Months
	- Research	: 03 Years
	- Industry	: 02 Years
5.	Area of Specialization	: Information Technology
6.	Subject Taught at P.G. level	: Applied Algorithms, Advanced DBMS
	Subject Taught at P.G. level	: Compiler Construction, Object Oriented Modeling and Design, Theory of Computer Science, Management Information system, Database Management System, Data warehousing And Mining
7.	Research guidance at	
	- Masters's level	: 07
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: 04
	- National Conferences	: 16
	- International Conferences	: 04
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: 04
12.	No. of books published with details	: 06 (Support Vector Machine (International, Lap Lambert, Germany), Object Oriented Modeling & Design, Theory of Computer Science, DBMS, Data Warehousing and Mining, Software Engineering,)

Signature

FACULTY PROFILE

1.	Name	: Miss. Nilima Prakash Patil
2.	Date Of Birth	: 21/10/1981
3.	Educational Qualification	: M.E.(Computer Science & Engineering)
		.
4.	Work Experience	:
	- Teaching	: 6 years
	- Research	: Nil
	- Industry	: 1 year
5.	Area of Specialization	: B.E.Computer Engineering,
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Computer Science-I, Computer Science-II. Programming Lab-I, Programming Lab-II, Microprocessor-I, Computer Graphics
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: 4
	- National Conferences	: 4
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: 4
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: Mr. Nitin Yashwant Suryavanshi
2.	Date Of Birth	: 27/01/1981
3.	Educational Qualification	: M.E.(Computer Science & Engineering)
4.	Work Experience	:
	- Teaching	: 7 Years 4 Months
	- Research	: Nil
	- Industry	: Nil
5.	Area of Specialization	: Computer Science And Engineering
6.	Subject Taught at P.G. level	:Nil
	Subject Taught at U.G. level	: Mobile Network, Theory of Computation, Analysis & Design of Algorithm
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: 01
	- National Conferences	: 03
	- International Conferences	: 01
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: 01
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: Smt.Yogeshwari S. Borse
2.	Date Of Birth	: 01/06/1979
3.	Educational Qualification	: M.Tech CSE
4.	Work Experience	:
	- Teaching	: 3 Years 8 Months
	- Research	: Nil
	- Industry	: Nil
5.	Area of Specialization	: Computer Engineering
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Computer Network, Programming Lab-II, Introduction to computing, Artificial Intelligence, Operating System, Database Management System
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: 02
	- National Conferences	: 03
	- International Conferences	: 02
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1. Name : Dinesh Dagadu Puri

2. Date Of Birth : 15/04/1982

3. Educational Qualification : M.Tech in Computer Engg.

4. Work Experience :
   - Teaching : 08Years and 3 Months
   - Research : Nil
   - Industry : NIL

5. Area of Specialization : Computer science and Engineering

6. Subject Taught at P.G. level : Software Architecture
   Subject Taught at P.G. level : Data Communication, Computer network, Distributed System, Mobile computing, Management and information system, System operation and Maintenance

7. Research guidance at
   - Masters's level : Nil
   - Ph.D. level : Nil

   No. of papers published in
   - National Journals : Nil
   - International Journals : Nil
   - National Conferences : 02
   - International Conferences : 02

8. Projects carried out : Nil

9. Patents : Nil

10. Technology Transfer : Nil

11. Research publications : Nil

12. No. of books published with details : NIL

Signature

FACULTY PROFILE

1. Name : Shital Abhimanyu Patil

2. Date Of Birth : 12/10/1982

3. Educational Qualification : B.E.Computer Engineering

4. Work Experience :
   - Teaching : 08 Years 04 Months
   - Research : Nil
   - Industry : Nil

5. Area of Specialization : ----

6. Subject Taught at P.G. level : Nil

   Subject Taught at U.G. level : Computer Graphics,
   Data Structure & files,
   Discrete structure and graph theory,
   Application Development Tools Laboratory
   Programming Lab-I ,
   Programming Lab-II,
   Analysis and design of algorithm,
   Introduction to computing

7. Research guidance at
   - Masters's level : Nil
   - Ph.D. level : Nil

   No. of papers published in
   - National Journals : Nil
   - International Journals : 01
   - National Conferences : 03
   - International Conferences : Nil

8. Projects carried out : Nil

9. Patents : Nil

10. Technology Transfer : Nil

11. Research publications : 01

12. No. of books published with details : Nil

Signature

FACULTY PROFILE

1.	Name	: Atul Vasudev Dusane
2.	Date Of Birth	: 23/06/1987
3.	Educational Qualification	: M.E. (Computer Science & Engg.) : B.E. (Computer Engg.)
4.	Work Experience	:
	- Teaching	: 02Years and 11 Months
	- Research	: Nil
	- Industry	: 07 Months
5.	Area of Specialization	: Computer science and Engineering
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Computer network, Advanced Computer Network, Microprocessor-I, Industrial Management and Economics. Programming Lab-I.
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: 02
	- National Conferences	: 00
	- International Conferences	: 01
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: 03
12.	No. of books published with details	: NIL

Signature

FACULTY PROFILE

1.	Name	:Miss Priti R.Sharma
2.	Date Of Birth	: 18/06/82
3.	Educational Qualification	: B.E.Computer Engineering
4.	Work Experience	:
	- Teaching	: 4 Years 11 Months
	- Research	: Nil
	- Industry	: Nil
5.	Area of Specialization	: ---
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	:,Discreate structure & Files, Microprocessor -1, Theory of computer Science,Digital System & Microprocessor, Advanced Development Tool Laboratory, Computer Graphics,Operating System,Software Engineering ,Data Warehouse & Mining, Advanced Computer Architecture.
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	:02
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: Dipak Devachand Bage
2.	Date Of Birth	: 01/02/1982
3.	Educational Qualification	: B.E. Computer Engineering, Diploma in Computer Technology.
4.	Work Experience	:
	- Teaching	: 4 year 5 months
	- Research	: Nil
	- Industry	: Nil
5.	Area of Specialization	: B.E. Computer Engineering
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Microprocessor-II, Microprocessor-III, Embedded Systems.
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: 05
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. of books published with details	: 02 (1. Microprocessor-III, 2. Embedded Systems.)

Signature

FACULTY PROFILE

1.	Name	: Satpalsing D. Rajput
2.	Date Of Birth	: 06/07/1985
3.	Educational Qualification	: B.E.Computer Engineering
4.	Work Experience	:
	- Teaching	: 3 Years
	- Research	: Nil
	- Industry	: 1 Year 2 months
5.	Area of Specialization	: B.E.Computer Engineering
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Introduction to Computing(TH), Industrial Management and Economics(TH), Digital System Design(TH), ITC(PR), ADTL (PR), Computer Graphics (PR), PL-I (PR), Software Engineering (PR)
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: 02
	- International Conferences	: 01
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: Mr. Mangale Chittaranjan Sharad
2.	Date Of Birth	: 12/02/1983
3.	Educational Qualification	: B.E. (Computer Engineering)
4.	Work Experience	:
	- Teaching	: 4 Years 3 Months
	- Research	: Nil
	- Industry	: Nil
5.	Area of Specialization	: B.E. (Computer Engineering)
6.	Subject Taught in P.G. Level	: Nil
	Subject Taught at U.G. level	: Digital Systems & Microprocessor, Database Management Systems, System Programming, and Discrete Structures & Graph Theory.
7.	Research guidance at	
	- Masters' level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: Nil
	- International Conferences	: 01
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: Manojkumar Lotan Mahajan
2.	Date of Birth	: 17/11/1984
3.	Educational Qualification	: B.E. Information Technology Engineering
4.	Work Experience	:
	- Teaching	: 4 Years
	- Research	: Nil
	- Industry	: 1 Year
5.	Area of Specialization	: B.E. Information Technology Engineering
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Data Structure and Files, Programming Lab-II, Computer Programming, Data Warehouse and Mining, Artificial Intelligence(PR).
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: Nil
	- International Conferences	: 01
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: 01
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: Vijay Arun Kotkar
2.	Date Of Birth	: 26/11/1985
3.	Educational Qualification	: B.E. Computer Engineering Diploma in Computer Engineering
4.	Work Experience	:
	- Teaching	: 2 Year 11 Months
	- Research	: Nil
	- Industry	: 6 months
5.	Area of Specialization	: B.E. Computer Engineering
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	:Microprocessor – II, Operating System, Advanced Unix Programming, Data Warehouse and Mining (PR), Enterprise Resource Planning, Programming Lab-I, Introduction to Computing.
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: 04
	- International Conferences	: 01
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: Ingle Vijay Shrikisan
2.	Date Of Birth	: 01/05/1984
3.	Educational Qualification	: B.E. Information Technology
4.	Work Experience	:
	- Teaching	: 2year 5 months
	- Research	: Nil
	- Industry	: 1 year
5.	Area of Specialization	: Information Technology.
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Microprocessor – I, Microprocessor – II, Microprocessor – III, Advanced Development Tools & Laboratory, Compiler Construction, Advanced Computer Architecture, Operating System, Embedded System.
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: 01
	- International Journals	: Nil
	- National Conferences	: Nil
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: 01
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1. Name : Mr. Babulal Darbar Rathod

2. Date Of Birth : 28/11/1985

3. Educational Qualification : B.Tech. (Information Technoly)

4. Work Experience :
   - Teaching : 2 Year 6 Month
   - Research : Nil
   - Industry : Nil

5. Area of Specialization : : B.Tech. (Information Technoly)

6. Subject Taught in P.G. Level : Nil.

   Subject Taught at U.G. level :
   Programming Laboratory I,
   Programming Laboratory II,
   Data Structure and Files.

7. Research guidance at
   - Masters's level : Nil
   - Ph.D. level : Nil

   No. of papers published in
   - National Journals : Nil
   - International Journals : Nil
   - National Conferences : Nil
   - International Conferences : Nil

8. Projects carried out : Nil

9. Patents : Nil

10. Technology Transfer : Nil

11. Research publications : Nil

12. No. of books published with details : Nil

Signature

FACULTY PROFILE

1.	Name	: Patil Avinash Pitambar
2.	Date Of Birth	: 23/01/1989
3.	Educational Qualification	: B.E. Computer Engineering
4.	Work Experience	:
	- Teaching	: 2year 5 months
	- Research	: Nil
	- Industry	: Nil
5.	Area of Specialization	: Computer Engineering.
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	:Introduction to computing(PR) Data Communication(TH) System Programming(PR) Advanced Unix Programming(TH) Advanced Unix Programming (PR) Operating System(PR) Embedded System(PR)
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: 01
	- National Conferences	: Nil
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: 01
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1. Name : Sushant Sudhakar Bahekar
2. Date of Birth : 14-06-1990
3. Educational Qualification : B.E. Computer Engineering
4. Work Experience :
   - Teaching : 1 Year 6 Months
   - Research : Nil
   - Industry : Nil
5. Area of Specialization : Artificial Intelligence
6. Subject Taught at P.G. level : Nil

   Subject Taught at U.G. level : Introduction to Computing,
   Software Engineering,
   Compiler Construction
   Computer programming
   Computer Graphics.
7. Research guidance at
   - Master's level : Nil
   - Ph.D. level : Nil

   No. of papers published in
   - National Journals : Nil
   - International Journals : 01
   - National Conferences : 01
   - International Conferences : Nil
8. Projects carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publications : Nil
12. No. of books published with details : 02 (Computer Programming, Embedded System.)

Signature

FACULTY PROFILE

1.	Name	: Kalyan Kailas Dani
2.	Date Of Birth	: 06-04-1988
3.	Educational Qualification	: B.E. Computer Engineering
4.	Work Experience	:
	- Teaching	: 1 Years
	- Research	: Nil
	- Industry	: Nil
5.	Area of Specialization	: Computer Engineering
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Introduction to computer, Computer programming
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: Nil
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1. Name : Jitendra Ranjitsing Patil
2. Date of Birth : 04-10-1984
3. Educational Qualification : B.E. Information Technology
4. Work Experience :
   - Teaching : 1 Year
   - Research : Nil
   - Industry : 8 Months
5. Area of Specialization : Information Technology
6. Subject Taught at P.G. level : Nil

   Subject Taught at U.G. level : Software Metrics & Quality Assurance, Computer programming
7. Research guidance at
   - Master's level : Nil
   - Ph.D. level : Nil

   No. of papers published in
   - National Journals : Nil
   - International Journals : Nil
   - National Conferences : 01
   - International Conferences : Nil
8. Projects carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publications : Nil
12. No. of books published with details : Nil

Signature

FACULTY PROFILE

1.	Name	: Nutan Devidas Khadse.
2.	Date of Birth	: 07-09-1989
3.	Educational Qualification	: B.E. Computer Engineering
4.	Work Experience	:
	- Teaching	: 1 Year
	- Research	: Nil
	- Industry	: Nil
5.	Area of Specialization	: Computer Engineering
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	:Introduction to Computer, Advanced Unix Programming, Micrpprocessor-II
7.	Research guidance at	
	- Master's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: Nil
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: Ravikumar Rajkumar Ahuja
2.	Date of Birth	: 06-04-1990
3.	Educational Qualification	: B.E. Computer Engineering
4.	Work Experience	:
	- Teaching	: 6 month
	- Research	: Nil
	- Industry	: Nil
5.	Area of Specialization	: Computer Engineering
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Computer Programming, Data Structures and Files
7.	Research guidance at	
	- Master's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: 01
	- National Conferences	: Nil
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: 01
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1. Name : Mayuri Ravindra Patil
2. Date of Birth : 15-12-1989
3. Educational Qualification : B.E. Computer Engineering
4. Work Experience :
   - Teaching : 6 Months
   - Research : Nil
   - Industry : Nil
5. Area of Specialization Computer Engineering
6. Subject Taught at P.G. level : Nil

   Subject Taught at U.G. level : Artificial Intelligence, Computer Graphics
7. Research guidance at
   - Master's level : Nil
   - Ph.D. level : Nil

   No. of papers published in
   - National Journals : Nil
   - International Journals : Nil
   - National Conferences : Nil
   - International Conferences : Nil
8. Projects carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publications : Nil
12. No. of books published with details : Nil

Signature

FACULTY PROFILE

1.	Name	: Patil Ashish Kailas
2.	Date of Birth	: 13-11-1989
3.	Educational Qualification	: B.E. Computer Engineering
4.	Work Experience	:
	- Teaching	: 5 month
	- Research	: Nil
	- Industry	: Nil
5.	Area of Specialization	: Computer Engineering
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Theory of Computer Science, Programming Lab.-I
7.	Research guidance at	
	- Master's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: Nil
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: Ravi Nihalchand Mulchandani
2.	Date of Birth	: 08-05-1991
3.	Educational Qualification	: B.E. Computer Engineering
4.	Work Experience	:
	- Teaching	: 1 month
	- Research	: Nil
	- Industry	: Nil
5.	Area of Specialization	: Computer Engineering
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Programming Laboratory-II
7.	Research guidance at	
	- Master's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: 01
	- National Conferences	: Nil
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: 01
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1. Name : Miss. Chitra J. Patil.
2. Date Of Birth : 03/12/1990
3. Educational Qualification : B.E. Computer Engineering
   Diploma in Information Technology.
4. Work Experience :
   - Teaching : 1 month
   - Research : Nil
   - Industry : Nil
5. Area of Specialization : B.E.(Computer Engineering)
6. Subject Taught at P.G. level :Nil

   Subject Taught at U.G. level : Operating System(PR)
   Compiler Construction(PR)
7. Research guidance at
   - Masters's level : Nil
   - Ph.D. level : Nil

   No. of papers published in
   - National Journals : Nil
   - International Journals : Nil
   - National Conferences : Nil
   - International Conferences : Nil
8. Projects carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publications : Nil
12. No. of books published with details : Nil

Signature

FACULTY PROFILE

1. Name : Miss. Shruti N. Pardeshi

2. Date Of Birth : 18/02/1988

3. Educational Qualification : B.E. Computer Engineering,

   Diploma in Information Technology.

4. Work Experience :
   - Teaching : 3 Years 4 Months
   - Research : Nil
   - Industry : Nil

5. Area of Specialization : B.E. (Computer Engineering)

6. Subject Taught at P.G. level : Nil

   Subject Taught at U.G. level : Data Communication, Data Structures, Database Management System. Operating System, Internet Technology and Network Management, Computer System Organization, Java Programming, Object Oriented Programming,

7. Research guidance at
   - Masters's level : Nil
   - Ph.D. level : Nil

   No. of papers published in
   - National Journals : Nil
   - International Journals : Nil
   - National Conferences : Nil
   - International Conferences : Nil

8. Projects carried out : Nil

9. Patents : Nil

10. Technology Transfer : Nil

11. Research publications : Nil

12. No. of books published with details : Nil

Signature

ELECTRICAL ENGINEERING DEPARTMENT

PROFILE OF FACULTY

1. Name : Dineshkumar Uttamrao Adokar
2. Date of Birth: 31/03/1965
3. Educational Qualification: M.E. (Electronics)
4. Work Experienced:
   - a. Teaching : 24 Years
   - b. Research : Nil
   - c. Industry : Nil
   - d. Other : Nil
5. Area of Specialization : Electronics
   Subjects teaching at UG level: MPMC, A&D
   Subjects teaching at PG level: DSD
6. Research's Guidance Master's : 01
   PhD : Nil
7. No. of paper published in
   - a. National journal : 08
   - b. Internal national journal : 02
   - c. International Conference : Nil
   - d. National Conference : 07
8. Project carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publication : 10
12. No. of book published with detail: Nil

Signature

PROFILE OF FACULTY

1. Name : Vijay S Pawar
2. Date of Birth: 08/04/1971
3. Educational Qualification: BE Electrical, ME (Power System)
4. Work Experienced:
   - a. Teaching : 18Years
   - b. Research : Nil
   - c. Industry : Nil
   - d. Other : Nil
5. Area of Specialization: Electrical Power System

   Subjects teaching at UG level: CS, PSDP, IEE, ACCT

   Subjects teaching at PG level: Nil
6. Research's Guidance Master's : Nil

   PhD : Nil
7. No. of paper published in
   - a. National journal : Nil
   - b. Internal national journal : Nil
   - c. International Conference : 05
   - d. National Conference : 03
8. Project carried out : Nil
9. Patents : Nil
10. Technology Transfer: Nil
11. Research publication: Nil
12. No. of book published with detail: Nil

Signature

PROFILE OF FACULTY

1. Name : M Mujtahid Ansari
2. Date of Birth : 11/10/1973
3. Educational Qualification: BE Electrical, ME (EPS)
4. Work Experienced:
    a. Teaching : 10 Years
    b. Research : Nil
    c. Industry : 02 Year, 8 Month
    d. Other
5. Area of Specialization : Electrical
    Subjects teaching at UG level : EM/C-I, EM/CS-II , PSS, PSOC & EAC
    Subjects teaching at PG level : Nil
6. Research's Guidance Master's : Nil
    PhD : Nil
7. No. of paper published in
    a. National journal : Nil
    b. Internal national journal : 01
    c. Internal national Conference : 02
    d. National Conference : 02
8. Project carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publication : 03
12. No. of book published with detail : 01, Element of Electrical Engineering
    Vrinda Publication, Jalgaon.

Signature

PROFILE OF FACULTY

1. Name : Suhas Manohar Shembekar
2. Date of Birth: 31/08 /1976
3. Educational Qualification: BE Electrical, ME (EPS)
4. Work Experienced:
   a. Teaching : 13 Years
   b. Research : Nil
   c. Industry : Nil
   d. Other : Nil
5. Area of Specialization : Electrical
6. Subjects teaching at UG : PS-II, ACCT, PSOC, SGP, PSDP

   Subjects teaching at PG level : Nil
7. Research's Guidance Master's : Nil

   PhD : Nil

   No . of paper published in
   a. National journal : 04
   b. Internal national journal : 02
   c. Internal national Conference: 01
   d. National Conference : 02

8. Project carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publication : 06
12. No. of book published with detail: Nil

Signature

PROFILE OF FACULTY

1. Name : Dhanesh S. Patil
2. Date of Birth: 23 /07 /1983
3. Educational Qualification: BE Electrical
4. Work Experienced:
   - a. Teaching : 05 Year
   - b. Research : Nil
   - c. Industry : Nil
   - d. Other : Nil
5. Area of Specialization : Electrical

   Subjects teaching at UG level: EEM, PS-I, PS-II, IOM, EAC

   Subjects teaching at PG level: Nil
6. Research's Guidance Master's : Nil

   PhD : Nil
7. No . of paper published in
   - a. National journal : Nil
   - b. Internal national journal : Nil
   - c. Internal national Conference : Nil
   - d. National Conference : Nil
8. Project carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publication : Nil
12. No. of book published with detail: Nil

Signature

PROFILE OF FACULTY

1. Name : Namarta Ashok Pande
2. Date of Birth: 01/06/1988
3. Educational Qualification: BE (Instrumentation)
4. Work Experienced:
   - a. Teaching : 2.5Year
   - b. Research : Nil
   - c. Industry : Nil
   - d. Other : Nil
5. Area of Specialization : Instrumentation

   Subjects teaching at UG level: EM-I, IDC, IOM, EWS.

   Subjects teaching at PG level: Nil
6. Research's Guidance Master's : Nil

   PhD : Nil
7. No. of paper published in
   - a. National journal : Nil
   - b. Internal national journal : Nil
   - c. Internal national Conference : Nil
   - d. National Conference : Nil

8. Project carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publication : Nil
12. No. of book published with detail: Nil

Signature

PROFILE OF FACULTY

1. Name : Patil Vishal Kesharasing
2. Date of Birth: 01/02/1989
3. Educational Qualification: BE Electrical
4. Work Experienced:
   - a. Teaching : 1.4 Year
   - b. Research : Nil
   - c. Industry : Nil
   - d. Other : Nil
5. Area of Specialization : Electrical

   Subjects teaching at UG level: EMD, EIED, EMIE.

   Subjects teaching at PG level: Nil
6. Research's Guidance Master's : Nil

   PhD : Nil
7. No. of paper published in
   - a. National journal : Nil
   - b. Internal national journal : Nil
   - c. Internal national Conference : Nil
   - d. National Conference : Nil
8. Project carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publication : Nil
12. No. of book published with detail: Nil

Signature

PROFILE OF FACULTY

1. Name : Shrikant S.Nagarnaik
2. Date of Birth: 03/10/1989
3. Educational Qualification: BE Electrical
4. Work Experienced:
   - a. Teaching : 6 Month
   - b. Research : Nil
   - c. Industry : 01 year
   - d. Other : Nil
5. Area of Specialization : Electrical

   Subjects teaching at UG level: HV.

   Subjects teaching at PG level: Nil
6. Research's Guidance Master's : Nil

   PhD : Nil
7. No . of paper published in
   - a. National journal : Nil
   - b. Internal national journal : Nil
   - c. Internal national Conference : Nil
   - d. National Conference : Nil
8. Project carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publication : Nil
12. No. of book published with detail: Nil

Signature

PROFILE OF FACULTY

1. Name : Mahajan Nilesh Suresh
2. Date of Birth: 17/05/1986
3. Educational Qualification: BE Electrical, M.E. (EPS)
4. Work Experienced:
   - a. Teaching : 1.6 Year
   - b. Research : Nil
   - c. Industry : 06 Months
   - d. Other : Nil
5. Area of Specialization : Electrical Power System

   Subjects teaching at UG level: EEE, PS II, PE

   Subjects teaching at PG level: Nil
6. Research's Guidance Master's : Nil

   PhD : Nil
7. No. of paper published in
   - a. National journal : Nil
   - b. Internal national journal : 02
   - c. Internal national Conference : Nil
   - d. National Conference : 02
8. Project carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publication : 02
12. No. of book published with detail: Nil

Signature

PROFILE OF FACULTY

1. Name : Kalpesh Deshmukh
2. Date of Birth: 06/11/1990
3. Educational Qualification: B.E. (Electrical)
4. Work Experienced:
    a. Teaching : 5 Month
    b. Research: Nil
    c. Industry : Nil
    d. Other : Nil
5. Area of Specialization Electrical
    Subjects teaching at UG level: ADE
    Subjects teaching at PG level: Nil
6. . Research's Guidance Master's : Nil
    PhD : Nil
7. No. of paper published in
    a. National journal : Nil
    b. Internal national journal : Nil
    c. International Conference : Nil
    d. National Conference : Nil
8. Project carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publication : Nil
12. No. of book published with detail: Nil

Signature

PROFILE OF FACULTY

1. Name : Jagadish N Chitte
2. Date of Birth: 05/02/1989
3. Educational Qualification: B.E. (Electrical)
4. Work Experienced:
    a. Teaching : 3 Month
    b. Research : Nil
    c. Industry : 03 Month
    d. Other : Nil
5. Area of Specialization: Electrical
    Subjects teaching at UG level: EMD & EDS
    Subjects teaching at PG level: Nil
6. . Research's Guidance Master's : Nil
    PhD : Nil
7. No. of paper published in
    a. National journal : Nil
    b. Internal national journal : Nil
    c. International Conference : Nil
    d. National Conference : Nil
8. Project carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publication : Nil
12. No. of book published with detail: Nil

Signature

PROFILE OF FACULTY

1. Name : Sameer Shaikh
2. Date of Birth: 23/07/1988
3. Educational Qualification: B.E. (Electrical)
4. Work Experienced:
    a. Teaching : 2 Month
    b. Research : Nil
    c. Industry : 03 Month
    d. Other : Nil
5. Area of Specialization: Electrical
    Subjects teaching at UG level: SGP & EM-I
    Subjects teaching at PG level: Nil
6. Research's Guidance Master's : Nil
    PhD : Nil
7. No. of paper published in
    a. National journal : Nil
    b. Internal national journal: Nil
    c. International Conference - Nil
    d. National Conference - Nil
8. Project carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publication : Nil
12. No. of book published with detail: Nil

Signature

PROFILE OF FACULTY

1. Name : Sidhhant N Patil
2. Date of Birth: 05/02/1990
3. Educational Qualification: B.E. (Electrical)
4. Work Experienced:
    a. Teaching : 5 Month
    b. Research : Nil
    c. Industry : Nil
    d. Other : Nil
5. Area of Specialization Electrical
    Subjects teaching at UG level: EMIE.
    Subjects teaching at PG level: Nil
6. Research's Guidance Master's : Nil
    PhD : Nil
7. No. of paper published in
    a. National journal : Nil
    b. Internal national journal : Nil
    c. International Conference : Nil
    d. National Conference : Nil
8. Project carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publication : Nil
12. No. of book published with detail: Nil

Signature

PROFILE OF FACULTY

1. Name : Prem Shankar
2. Date of Birth : 12/11/1989
3. Educational Qualification: B.E. (Electrical)
4. Work Experienced:
    a. Teaching : Nil
    b. Research : Nil
    c. Industry : 3 Month
    d. Other : Nil
5. Area of Specialization Electrical

    Subjects teaching at UG level: IDC & EWS

    Subjects teaching at PG level: Nil
6. Research's Guidance Master's : Nil

    PhD : Nil
7. No. of paper published in
    a. National journal : Nil
    b. Internal national journal : Nil
    c. International Conference : Nil
    d. National Conference : Nil
8. Project carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publication : Nil
12. No. of book published with detail: Nil

Signature

PROFILE OF FACULTY

1. Name : Miss. Minal Rade
2. Date of Birth: 09/03/1990
3. Educational Qualification: B.E. (Electrical)
4. Work Experienced:
    a. Teaching : 3 Month
    b. Research : Nil
    c. Industry : Nil
    d. Other : Nil
5. Area of Specialization Electrical
    Subjects teaching at UG level: CS-I
    Subjects teaching at PG level: Nil
6. Research's Guidance Master's : Nil
    PhD : Nil
7. No. of paper published in
    a. National journal : Nil
    b. Internal national journal : Nil
    c. International Conference : Nil
    d. National Conference : Nil
8. Project carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publication : Nil
12. No. of book published with detail: Nil

Signature

PROFILE OF FACULTY

1. Name : Miss. Snehal Mahale
2. Date of Birth : 28/07/1991
3. Educational Qualification: B.E. (Electrical)
4. Work Experienced:
    a. Teaching : 3 Month
    b. Research : Nil
    c. Industry : Nil
    d. Other : Nil
5. Area of Specialization Electrical
    Subjects teaching at UG level: PSS & DCTP
    Subjects teaching at PG level: Nil
6. Research's Guidance Master's : Nil
    PhD : Nil
7. No. of paper published in
    a. National journal : Nil
    b. Internal national journal : Nil
    c. International Conference : Nil
    d. National Conference : Nil
8. Project carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publication : Nil
12. No. of book published with detail: Nil

Signature

PROFILE OF FACULTY

1. Name : Miss. Lalita Patil
2. Date of Birth : 07/10/1990
3. Educational Qualification: B.E. (Electrical)
4. Work Experienced:
    a. Teaching : 2 Month
    b. Research : Nil
    c. Industry : Nil
    d. Other : Nil
5. Area of Specialization Electrical

    Subjects teaching at UG level: EM-II & DCTP

    Subjects teaching at PG level: Nil
6. Research's Guidance Master's : Nil

    PhD : Nil
7. No. of paper published in
    a. National journal : Nil
    b. Internal national journal : Nil
    c. International Conference : Nil
    d. National Conference : Nil
8. Project carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publication : Nil
12. No. of book published with detail: Nil

Signature

FACULTY PROFILE

Electronics & Telecommunication

1. NAME : **Suralkar S. R.**

2. Date Of Birth : 28/10/1966

3. Educational Qualification : BE (Electronics)
   ME (Control & Instru.)

4. Work Experience :
   - Teaching : 19 Yrs
   - Research : -
   - Industry : -
   - Others : -

5. Area Of Specializations : Control & Instrumentation.

6. Subject Teaching At
   - Under graduation Level : Electronics Measurement, Electronics Instrumentation.
   - Post Graduate Level : Advanced Instrumentation System

7. Research Guidance :
   - ❖ Master's : -
   - ❖ Ph.D. : -
   - No. of paper published in :-
     - ❖ National Journals : -
     - ❖ International Journals : 01
     - ❖ Conference : 11

8. Projects Carried Out : -

9. Patents : -

10. Technology Transfer : -

11. Research Publications : 02

12. No. Of Books Published - With Details : -

Signature

FACULTY PROFILE

1. NAME : **Deshmukh M.P.**

2. Date Of Birth : 20/06/1966.

3.Educational Qualification : BE (Etx),
ME (Control & Instru.)

4. Work Experience :
   - Teaching : 19 Yr.s
   - Research : -
   - Industry : -
   - Others : -

5. Area Of Specializations : Control & Instru.

6. Subject Teaching At
   - Under graduation Level : AE, ECD, EEE,ECM
   - Post Graduate Level : -

7. Research Guidance :
   - ❖ Master's : -
   - ❖ Ph.D. : -
   - No. of paper published in :-
     - ❖ National Journals : -
     - ❖ International Journals : -
     - ❖ Conference : -

8. Projects Carried Out : -

9. Patents : -

10.Technology Transfer : -

11. Research Publications : -

12. No. Of Books Published - With Details :

Signature

FACULTY PROFILE

1. NAME : **SHAH P. J.**

2. Date Of Birth : 11/08/1967

3. Educational Qualification :B.E.(Industrial Electronics), M.E.(Power Electronics)

4. Work Experience :
   - Teaching : -19.5 Yrs
   - Research : -
   - Industry : -01 year
   - Others : -7 Yrs (Visiting lecturer)

5. Area Of Specializations : Power Electronics, VLSI Design
6. Subject Teaching At
   - Under graduation Level : V.L.S.I. Design, Power Electronics, EEE Power Electronics – I & II
   - Post Graduate Level : -

7. Research Guidance :
   - ❖ Master's : -
   - ❖ Ph.D. : -
   - No. of paper published in :-
     - ❖ National Journals :-
     - ❖ International Journals :- 04
     - ❖ Conference :- 15

8. Projects Carried Out : -

9. Patents : -

10. Technology Transfer : -

11. Research Publications : -

12. No. Of Books Published - With Details :

Signature

FACULTY PROFILE

1. NAME : **DESHMUKH V. M.**

2. Date Of Birth : 17/06/1965

3. Educational Qualification : B.E.(Electronics),
   M.E.(Control Systems)

4. Work Experience :
   - Teaching : - 18 Yrs
   - Research : -
   - Industry : -
   - Others : - 7 Yrs (Visiting lecturer)

5. Area Of Specializations : Electromagnetic & signal system

6. Subject Teaching At
   a. Under graduation Level : Optical Fiber Communication, EME,FCS,NL,SAS Circuit & Machine
   b. Post Graduate Level : -

7. Research Guidance :
   - ❖ Master's : -
   - ❖ Ph.D. : -
   - No. of paper published in :-
     - ❖ National Journals : -
     - ❖ International Journals : -
     - ❖ Conference : - 14

8. Projects Carried Out : -

9. Patents : -

10. Technology Transfer : -

11. Research Publications : -

12. No. Of Books Published - With Details :

Signature

FACULTY PROFILE

1. NAME : Prashant.V.Thakre

2. Date Of Birth : 19th July 1970

3. Educational Qualification : M Tech,

4. Work Experience :
   - Teaching : - 14 years
   - Research : -
   - Industry : -
   - Others : -
   -

5. Area Of Specializations :- - Energy engineering , communications

6.Subject Teaching At
   - Under graduation Level : DSP,satellite comm, optical comm., digital comm. Basic electronics
   - Post Graduate Level :

7. Research Guidance :
   - ❖ Master's :
   - ❖ Ph.D. :

No. of paper published in :-
- ❖ National Journals : -
- ❖ International Journals : -
- ❖ Conference : - National – 03. International – 02

8. Projects Carried Out : - 01

9. Patents : -

10.Technology Transfer : -

11. Research Publications : -

12. No. Of Books Published With Details : -

Signature

FACULTY PROFILE

1. NAME : **Nyati SUNIL U.**

2. Date Of Birth : 10/01/1972

3. Educational Qualification : BE (E & TC)
   ME (Electronics & Communication)

4. Work Experience :
   - Teaching : - 9 Yrs.
   - Research : -
   - Industry : - 2 Yrs.
   - Others : -

5. Area Of Specializations : - Advanced Communication & Network Analysis & Synthesis

6. Subject Teaching At
   - Under graduation Level : C.S. I, C.S. II, N.A.S., N.A., D.C.,ITCT,Satellite Comm.
   - Post Graduate Level : -

7. Research Guidance :
   - ❖ Master's : -
   - ❖ Ph.D. : -
   - No. of paper published in :-
     - ❖ National Journals : -
     - ❖ International Journals : -
     - ❖ Conference : 09

8. Projects Carried Out : -

9. Patents : -

10. Technology Transfer : -

11. Research Publications : -

12. No. Of Books Published - With Details : -

Signature

FACULTY PROFILE

1. NAME : **Kazi Nafees Ahmad M.**

2. Date Of Birth : 22/06/1972

3. Educational Qualification : B.E(Electronics),
ME (Electronics)

4. Work Experience :
   - Teaching : -11 Yr.s
   - Research : -
   - Industry : - 2 Yrs
   - Others : -

5. Area Of Specializations : T.V. Engg.

6. Subject Teaching At
   - Under graduation Level : T.V. Engg. ,Consumer Elecronics, ECII,Optoelectronics,AICA
   - Post Graduate Level : -

7. Research Guidance :
   - ❖ Master's : -
   - ❖ Ph.D. : -

No. of paper published in :-
- ❖ National Journals : -
- ❖ International Journals : -
- ❖ Conference : - 11

8. Projects Carried Out : -

9. Patents : -

10. Technology Transfer : -

11. Research Publications : -

12. No. Of Books Published - -
With Details :

Signature

FACULTY PROFILE

1. NAME : **Wani Amol C.**

2. Date Of Birth : 30/07/1976

3. Educational Qualification : B.E.(Electronics),
M.E. (Electronics)

4. Work Experience :
   - Teaching : - 8.5 Yr.s
   - Research : -
   - Industry : -
   - Others : - 1 Yr Visiting Lecturership

5. Area Of Specializations : Basic Electronics, Design and Communication.

6. Subject Teaching At
   - Under graduation Level : EDC -I, SDC, ECA, ECD, AE, EEE etc.
   - Post Graduate Level : -

7. Research Guidance :
   - ❖ Master's : -
   - ❖ Ph.D. : -

   No. of paper published in :-
   - ❖ National Journals : -
   - ❖ International Journals : -
   - ❖ Conference : -01

8. Projects Carried Out : -

9. Patents : -

10. Technology Transfer : -

11. Research Publications : -

12. No. Of Books Published With Details : - 01 Elements of Electronics Engineering. Vrinda Publication

Signature

FACULTY PROFILE

1. NAME : **Karode Atul H.**

2. Date Of Birth : 01/06/1976

3 Educational Qualification : B.E (Electronics),

4. Work Experience :
   - Teaching : 7.5 Yrs.
   - Research : -
   - Industry : - 2Yrs
   - Others : -

5. Area Of Specializations : - Digital Electronics

6 Subject Teaching At
   - Under graduation Level : Digital Electronics, Electronics Instrumentation, EM.
   - Post Graduate Level : -

7. Research Guidance :
   - ❖ Master's : -
   - ❖ Ph.D. : -
   - No. of paper published in :-
     - ❖ National Journals : -
     - ❖ International Journals : -
     - ❖ Conference : 03

8. Projects Carried Out : -

9. Patents : -

10.Technology Transfer : -

11. Research Publications : -

12. No. Of Books Published - With Details :

Signature

FACULTY PROFILE

1. NAME : **Zope Pankaj H.**

2. Date Of Birth : 24/06/1975

3. Educational Qualification : ME (Digital Electronics),
   B.E(Indust. Electronics),
   C-DAC

4. Work Experience :
   - Teaching : 7.5 Yr.s
   - Research : -
   - Industry : 01
   - Others : -

5. Area Of Specializations : Digital Electronics

6 Subject Teaching At
   - Under graduation Level : MMS,Microprocessor Tech, Microprocessor, MIP, MPMC , EEE
   - Post Graduate Level : Parallel Computing

7. Research Guidance :
   - ❖ Master's : -
   - ❖ Ph.D. : -

   No. of paper published in :-
   - ❖ National Journals : -
   - ❖ International Journals : 04
   - ❖ Conference : 14

8. Projects Carried Out : -

9. Patents : -

10.Technology Transfer : -

11. Research Publications : -

12. No. Of Books Published - With Details :

Signature

FACULTY PROFILE

1. NAME : Surendra P.Ramteke.

2. Date Of Birth : 31.03.1979
3. Educational Qualification : B.E (E&TC.)

4. Work Experience :
   - Teaching : - 6 Yr.s
   - Research : -
   - Industry : -
   - Others : -

5. Area Of Specializations : Digital Electronics.

6 Subject Teaching At
   - Under graduation Level : Radiation&Microwave Techniques ,Signal Conditioners & Data converters,Analog Communication,Digital Electronics
   - Post Graduate Level : -

7. Research Guidance :
   - ❖ Master's : -
   - ❖ Ph.D. : -

No. of paper published in :-
   - ❖ National Journals : -
   - ❖ International Journals : -
   - ❖ Conference : - 04

8. Projects Carried Out : -

9. Patents : -

10.Technology Transfer : -

11. Research Publications : -

12. No. Of Books Published - With Details :

Signature

FACULTY PROFILE

1. NAME : Sunil K. Khode

2. Date Of Birth : 01.01.1979

3. Educational Qualification :

B.E(Electronics&Telecomm.)

4. Work Experience :

- Teaching : - 04 yrs
- Research : -
- Industry : -
- Others : -

5. Area Of Specializations : Digital Electronics

6 Subject Teaching At

Under graduation Level : Analog & Digital Electronics,IED,Digital Communication,Information Theory & Coding Tech.,NL

- Post Graduate Level : -

7. Research Guidance :

- ❖ Master's : -
- ❖ Ph.D. : -

No. of paper published in :-

- ❖ National Journals : -
- ❖ International Journals : -
- ❖ Conference : 01

8. Projects Carried Out : -

9. Patents : -

10.Technology Transfer : -

11. Research Publications : -

12. No. Of Books Published With Details :

Signature

FACULTY PROFILE

1. NAME : Patil Mayuri J.

2. Date Of Birth : 23-09-84

3. Educational Qualification : B.E(electronics and telecommunication)

4. Work Experience :
   - Teaching : -2.7 Yrs
   - Research : -
   - Industry : -
   - Others : -
   -

5. Area Of Specializations :- -

6.Subject Teaching At
   - Under graduation Level : Telimatics,EMC,EEE
   - Post Graduate Level :

7. Research Guidance :
   - ❖ Master's :
   - ❖ Ph.D. :

No. of paper published in :-
   - ❖ National Journals : - Nil
   - ❖ International Journals : - Nil
   - ❖ Conference : - Nil

8. Projects Carried Out : -

9. Patents : -

10.Technology Transfer : -

11. Research Publications : -

12. No. Of Books Published -
With Details :

Signature

FACULTY PROFILE

1. NAME : Pooja R Oza

2. Date Of Birth : 18/01/1985

3. Educational Qualification : B.E(E & TC)
4. Work Experience :
- Teaching : - 2 year 2 months
- Research : -
- Industry : -
- Others : -

5. Area Of Specializations :- -
6.Subject Teaching At
- Under graduation Level : FCS,EEE
- Post Graduate Level : -

7. Research Guidance :
- ❖ Master's : -
- ❖ Ph.D. : -

No. of paper published in :-
- ❖ National Journals : -
- ❖ International Journals : -
- ❖ Conference : -

8. Projects Carried Out : -

9. Patents : -

10.Technology Transfer : -

11. Research Publications : -

12. No. Of Books Published -
With Details :

Signature

FACULTY PROFILE

1. NAME : Kiran S Mantri

2. Date Of Birth : 26-01-83

3. Educational Qualification : B.E(electronics and telecommunication)
M.E appearing

4. Work Experience :

- Teaching : - 3 Year
- Research : -
- Industry : -
- Others : -

5. Area Of Specializations :- -

6.Subject Teaching At

- Under graduation Level : D.C.L.D,M.T,MIP,EEE,EMC,AE,R.M.T
- Post Graduate Level :

7. Research Guidance :

- ❖ Master's :
- ❖ Ph.D. :

No. of paper published in :-

- ❖ National Journals : - Nil
- ❖ International Journals : - Nil
- ❖ Conference : - Nil

8. Projects Carried Out : -

9. Patents : -

10.Technology Transfer : -

11. Research Publications : -

12. No. Of Books Published -
With Details :

Signature

FACULTY PROFILE

1. NAME : Mr.Ashish R Bari

2. Date Of Birth : 26-04-81

3. Educational Qualification : B.E(Electronics)

4 Work Experience :

- Teaching : - 2.2 Yrs
- Research : -
- Industry : -
- Others : -
-

5. Area Of Specializations :- -

6.Subject Teaching At

- Under graduation Level : EEE , ECM
- Post Graduate Level :

7. Research Guidance :

- ❖ Master's :
- ❖ Ph.D. :

No. of paper published in :-

- ❖ National Journals : - Nil
- ❖ International Journals : - Nil
- ❖ Conference : - Nil

8. Projects Carried Out : -

9. Patents : -

10.Technology Transfer : -

11. Research Publications : -

12. No. Of Books Published With Details : -

Signature

FACULTY PROFILE

1. NAME : **Amrita Ashok Pande.**

2. Date Of Birth : 04/06/1986

3.Educational Qualification : B.E.(E&TC)

4. Work Experience :

- Teaching : - 2.2 Yrs.
- Research : -
- Industry : -
- Others : -

5. Area Of Specializations : -

6.Subject Teaching At

Under graduation Level : Analog & Digital Electronics., EEE, Software Application- I, Software Application-II

- Post Graduate Level : -

7. Research Guidance :

- ❖ Master's : -
- ❖ Ph.D. : -

- No. of paper published in :-
  - ❖ National Journals : -Nil
  - ❖ International Journals : - Nil
  - ❖ Conference : - Nil

8. Projects Carried Out : -

9. Patents : -

10.Technology Transfer : -

11. Research Publications : -

12. No. Of Books Published - With Details :

Signature

FACULTY PROFILE

1. NAME : Miss Dahake Kiran Ramdas

2. Date Of Birth : 17 / 07 / 1986

3. Educational Qualification : B.E(E&TC)

4 Work Experience :

- Teaching : - 1 year 4 months
- Research : -
- Industry : -
- Others : -
-

5. Area Of Specializations :- -

6.Subject Teaching At

- Under graduation Level : Microprocessor and Microcontroller,EEE
- Post Graduate Level :

7. Research Guidance :

- ❖ Master's :
- ❖ Ph.D. :

No. of paper published in :-

- ❖ National Journals : - Nil
- ❖ International Journals : - Nil
- ❖ Conference : - Nil

8. Projects Carried Out : -

9. Patents : -

10.Technology Transfer : -

11. Research Publications : -

12. No. Of Books Published -
With Details :

Signature

FACULTY PROFILE

1. NAME :PRAJAKTA PRADIP KHARUL

2. Date Of Birth : 28/04/1987

3. Educational Qualification : B.E.(E&TC)

4. Work Experience :

- Teaching : - 4 months
- Research : - -
- Industry : - 1 year
- Others : - -

5. Area Of Specializations : -

6.Subject Teaching At

Under graduation Level :,EEE, Network analysis & synthesis

Post Graduate Level : -

7. Research Guidance :

- ❖ Master's : -
- ❖ Ph.D. : -

- No. of paper published in :-
  - ❖ National Journals : -Nil
  - ❖ International Journals : - Nil
  - ❖ Conference : - Nil

8. Projects Carried Out : -

9. Patents : -

10.Technology Transfer : -

11. Research Publications : -

12. No. Of Books Published - With Details :

Signature

FACULTY PROFILE

1. NAME : Dipeeka R. Patil

2. Date Of Birth : 25-06-1981

3. Educational Qualification : B.E(Elex),

4. Work Experience :

- Teaching : - 3.5 years
- Research : -
- Industry : - 1.5 years
- Others : -

5. Area Of Specializations : -

6.Subject Teaching At

Under graduation Level :, FCS, CCN, EEE

- Post Graduate Level : -

7. Research Guidance :

- ❖ Master's : -
- ❖ Ph.D. : -

- No. of paper published in :-
  - ❖ National Journals : -Nil
  - ❖ International Journals : - Nil
  - ❖ Conference : - Nil

8. Projects Carried Out : -

9. Patents : -

10.Technology Transfer : -

11. Research Publications : -

12. No. Of Books Published - With Details :

Signature

FACULTY PROFILE

1. NAME : Mrs. Mangala R. Dhotre.

2. Date Of Birth : 17/11/1981

3. Educational Qualification : B.E (E & TC)

4. Work Experience :

- Teaching : - 4.5 years
- Research : -

- Industry : -
- Others : -

5. Area Of Specializations : -

6. Subject Teaching At
   Under graduation Level :, NAS, NL, FOC, Telematics, RMT,,EEE, MMS
   Post Graduate Level : -

7. Research Guidance :
   - ❖ Master's : -
   - ❖ Ph.D. : -
   - No. of paper published in :-
     - ❖ National Journals : -Nil
     - ❖ International Journals : - Nil
     - ❖ Conference : - 01

8. Projects Carried Out : -

9. Patents : -

10. Technology Transfer : -

11. Research Publications : -

12. No. Of Books Published - With Details :

Signature

FACULTY PROFILE

1. NAME :Priyanka M. Shanbhag

2. Date Of Birth :30/ 04/ 1988

3. Educational Qualification :BE (E&TC)
4. Work Experience :

- Teaching : - 4 months
- Research : -
- Industry : -
- Others : -

5. Area Of Specializations : -

6. Subject Teaching At
Under graduation Level :, EEE
Post Graduate Level : -

7. Research Guidance :
   - ❖ Master's : -
   - ❖ Ph.D. : -
- No. of paper published in :-
   - ❖ National Journals : -Nil
   - ❖ International Journals : - Nil
   - ❖ Conference : - Nil

8. Projects Carried Out : -

9. Patents : -

10.Technology Transfer : -

11. Research Publications : -

12. No. Of Books Published -
With Details :

Signature

FACULTY PROFILE

1. NAME :PRITI JAGATSING RAJPUT

2. Date Of Birth : 21/11/1987

3. Educational Qualification : B.E.(E&TC)

4. Work Experience :

- Teaching : - 2 month
- Research : -
- Industry : -
- Others : -

5. Area Of Specializations : -

6.Subject Teaching At

Under graduation Level :,EEE

- Post Graduate Level : -

7. Research Guidance :

- ❖ Master's : -
- ❖ Ph.D. : -

- No. of paper published in :-
  - ❖ National Journals : Nil
  - ❖ International Journals : Nil
  - ❖ Conference : 2

8. Projects Carried Out : -

9. Patents : -

10.Technology Transfer : -

11. Research Publications : -

12. No. Of Books Published -
With Details :

Signature

FACULTY PROFILE

1.	Name	: Archana K. Bhavsar
2.	Date of Birth	: 22/02/1977
3.	Educational Qualification	: **M. Tech (CSE),** **B.E. (Computer Engg.)**
4.	Work Experience	:
	- Teaching	: 9 Years 6 Months
		: 3 Years 4 Months as a Programmer
	- Research	: Nil
	- Industry	: Nil
5.	Area Specialization	: Computer Science & Engg.
6.	Subject Taught at P.G. level	: Parallel Computing
	Subject Taught at U.G. level	: Object Oriented Modeling & Design , Software Engineering, Programming Paradigm & Methodology,
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. papers published in	
	- National Journals	: Nil
	- International Journal	: 01
	- National Conferences	: 03
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. books published with details	: 03
	Title -	: Object Oriented Modeling and Design
	Publications	: Prakash Publication, Jalgaon
	Title -	: Software Engineering
	Publications	: Prakash Publication, Jalgaon
	Title -	: Computer Network
	Publications	: Prakash Publication, Jalgaon

Signature

FACULTY PROFILE

1. Name : Sandeep Jagannath Patil

2. Date of Birth : 16/09/1980

3. Educational Qualification : **ME (CSE)**
   BE (IT)

4. Work Experience :
   - Teaching : 8 Years 6 Months
   - Research : Nil
   - Industry : Nil

5. Area of Specialization : Computer science and Engg.

6. Subject Taught at P.G. level : Nil
   Subject Taught at U.G. level : Internet Security, Computer Networks, E-Commerce, Programming Paradigm & Methodology, Web Design

7. Research guidance at
   - Master's level : Nil
   - Ph.D. level : Nil

   No. Papers published in
   - National Journals : Nil
   - International Journals : 03
   - National Conferences : 03
   - International Conferences : Nil

8. Projects carried out : Nil

9. Patents : Nil

10. Technology Transfer : Nil

11. Research publications : 06

12. No. of books published with details : 02
    1. Title - : Computer Network
       Publications: Prakash Publication, Jalgaon
    2. Title - : Advanced Computer Network
       Publications: Prakash Publication, Jalgaon

Signature

FACULTY PROFILE

1.	Name	: Mr. Nitin Pundlik Jagtap
2.	Date of Birth	: 31/05/80
3.	Educational Qualification	: **M.E. (CSE)** B.E. (I T)
4.	Work Experience	:
	- Teaching	: 5 years 6 Months
	- Research	: Nil
	- Industry	: 2 years 5 month.
5.	Area Specialization	: Computer Science and Engg.
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Enterprise Resource Planning, Industrial Management and Economics Database Management System, Information Theory, Management Information System, System Programming, Artificial intelligence and Neural Network, Embedded System, Data ware housing and Mining, Programming Paradigm and Methodology
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. Papers published in	
	- National Journals	: 04
	- International Journal	: 04
	- National Conferences	: 01
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: 09
12.	No. of Books published with details	: 01) Implementation of Data watcher for Data Leakage Detection system Lambert Publication, Germany 02) Data ware house and Mining Prakash Publication

Signature

FACULTY PROFILE

1.	Name	: Mr. S.H.Rajput
2.	Date of Birth	: 26/10/1984
3.	Educational Qualification	: **M.E. (CSE)** B.E. (Computer)
4.	Work Experience	:
	- Teaching	: 4 Year 4 Months
	- Research	: Nil
	- Industry	: Nil
5.	Area Specialization	: Computer Engineering
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Digital System and Microprocessor, Theory of Computer Science, Software Metrics and Quality Assurance, Microprocessor-I (8086).
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. papers published in	
	- National Journals	: Nil
	- International Journals	: 02
	- National Conferences	: 03
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: Mr. Rohidas B.Sangore
2.	Date of Birth	: 18/09/1985
3.	Educational Qualification	: B.E. Information Technology
4.	Work Experience	:
	- Teaching	: 3 Years 5 Months
	- Research	: Nil
	- Industry	: 3 Months
5.	Area Specialization	: Information Technology
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Multimedia Technique, E-commerce, Operating System, Data Communication, And Industrial Management and Economics
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
No.	Papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: 02
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. Books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: Prashant Chandrakant Harne
2.	Date of Birth	: 12/01/1988
3.	Educational Qualification	: B.E. (CSE)
4.	Work Experience	:
	- Teaching	: 3 years
	- Research	: Nil
	- Industry	: Nil.
5.	Area Specialization	: Computer Science and Engg.
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: System Programming Management Information System Artificial Intelligence & Neural Network Enterprise Resource Planning
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. Papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: Nil
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. Books published with details	: 01(Software Engg- Prakash Publication)

Signature

FACULTY PROFILE

1.	Name	: Mr. Baljeet S. Kalsi
2.	Date of Birth	: 13/10/88
3.	Educational Qualification	: B.E.(Computer)
4.	Work Experience	:
	- Teaching	: 2 years 6 Months
	- Research	: Nil
	- Industry	: Nil.
5.	Area Specialization	: Computer Science and Engg.
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Advanced UNIX Programming ,Enterprise Resource Planning, Database Management System, Information Theory, Data ware housing and Mining, Programming Paradigm and Methodology
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. Papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: Nil
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. Books published with details	:

Signature

FACULTY PROFILE

1.	Name	: Ms. Ankita Punjabi
2.	Date of Birth	: 31/12/89
3.	Educational Qualification	: B.E. (CSE)
4.	Work Experience	:
	- Teaching	: 1 year 6 Months
	- Research	: Nil
	- Industry	: Nil.
5.	Area Specialization	: Computer Science and Engg.
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Programming Lab-I, Advance Development Tool Laboratory, Programming Lab-II, Data Structure and Files, Artificial Intelligence and Neural Network.
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. Papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: Nil
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. Books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: Mrs. Shirin Shafique Pinjari
2.	Date of Birth	: 08/09/89
3.	Educational Qualification	: B.E. (CSE)
4.	Work Experience	:
	- Teaching	: 6 Months
	- Research	: Nil
	- Industry	: 1 Year 7 Months.
5.	Area Specialization	: Computer Science and Engg.
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Computer Graphics, Enterprise Resource Planning, Computer Organization, and Database Management System.
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. Papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: Nil
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. Books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: Ms. Tejashri S. Joshi
2.	Date of Birth	: 14/12/1990
3.	Educational Qualification	: B.E. (CSE)
4.	Work Experience	:
	- Teaching	: 6 Months
	- Research	: Nil
	- Industry	: Nil
5.	Area Specialization	: Computer Science and Engg.
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Data Structure and Graph Theory, Computer Network, Programming Lab-I, Programming Lab-II and Internet Security.
7.	Research guidance at	
	- Masters's level	: Nils
	- Ph.D. level	: Nil
	No. Papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: Nil
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. Books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: Shambhu Kumar Singh
2.	Date of Birth	: 14/09/1990
3.	Educational Qualification	: **B.E. (I.T)**
4.	Work Experience	:
	- Teaching	: 1 Month
	- Research	: Nil
	- Industry	: 5 months
5.	Area Specialization	: Information Technology.
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Microprocessor-1 and Web Design
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. Papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: Nil
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. Books published with details	: Nil

Signature

FACULTY PROFILE

1. Name : Sachin Bansilal Patil
2. Date of Birth : 14/09/1990
3. Educational Qualification : **B.E. (I.T)**
4. Work Experience :
   - Teaching : 5 Months
   - Research : Nil
   - Industry : Nil
5. Area Specialization : Information Technology.
6. Subject Taught at P.G. level : Nil
   Subject Taught at U.G. level : Programming Lab-I and Web Design
7. Research guidance at
   - Masters's level : Nil
   - Ph.D. level : Nil

   No. Papers published in
   - National Journals : Nil
   - International Journals : Nil
   - National Conferences : Nil
   - International Conferences : Nil
8. Projects carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publications : Nil
12. No. Books published with details : Nil

Signature

FACULTY PROFILE

1.	Name	: Snehal A. Dhumale
2.	Date of Birth	: 01/08/1989
3.	Educational Qualification	: **B.E. (I.T)**
4.	Work Experience	:
	- Teaching	: 1 Year 1 Month
	- Research	: Nil
	- Industry	: Nil
5.	Area Specialization	: Information Technology.
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Data Structure and Files and Software Engineering
7.	Research guidance at	
	- Masters' level	: Nil
	- Ph.D. level	: Nil
	No. Papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: Nil
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. Books published with details	: Nil

Signature

MECHANICAL ENGGINEERING DEPARTMENT

FACULTY PROFILE

1.	Name	: **Jitendra Rupsing Chaudhari**.
2.	Date of Birth	: 01/11/1966
3.	Educational Qualification	: M.Tech (Metallurgical Engg) M B A (Marketing) P.hD Pursing
4.	Work Experience	:
	- Teaching	: 22 Years
	- Research	: 03
	- Industry	: Nil
5.	Area of Specialization	: Metallurgical Engg
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Material Science, Engineering Metallurgy, Engg. Graphics, Engg Thermodynamics, Engg Mechanics.
7.	Research guidance at	
	- Masters's level	: 05
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: 02
	- International Journals	: 02
	- National Conferences	: 02
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: 04
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: **Dr. Dheeraj Sheshrao Deshmukh**.
2.	Date of Birth	: 10/09/1974
3.	Educational Qualification	: Ph.D. in Mechanical Engineering
4.	Work Experience	:
	- Teaching	: 14 .6 Years
	- Research	: 02 Years
	- Industry	: Nil
5.	Area of Specialization	: Thermal Engineering
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Engg. Graphics, EME, Fluid Mechanics. Applied Thermodynamics, Heat Transfer, Turbo Machines, Automobile Engineering, RAC
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: 08
	- National Conferences	: 03
	- International Conferences	: 06
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: 08
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: **Er. N. K. Patil**.
2.	Date of Birth	: 23/09/1969
3.	Educational Qualification	: M. Tech (Energy Mgt.), M.E. (Machine Design) M B A (Marketing) Ph.D Pursing
4.	Work Experience	:
	- Teaching	: 20 Years
	- Research	: 01 Years
	- Industry	: 02 Years
5.	Area of Specialization	: Design, Thermal, Management
6.	Subject Taught at P.G. level	: MTD, CMMD
	Subject Taught at U.G. level	: Engg. Graphics, Mechanics, EME, TOM-I, MMM, OR.
7.	Research guidance at	
	- Masters's level	: 08
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: 02
	- National Conferences	: 04
	- International Conferences	: 04
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: 02
12.	No. of books published with details	: 03

Signature

FACULTY PROFILE

1.	Name	: **Krishna Shrivastava**.
2.	Date of Birth	: 07 / 11 / 1973
3.	Educational Qualification	: M.E. Mech. Engg. (Thermal Power)
4.	Work Experience	:
	- Teaching	: 15 Years
	- Research	: Nil
	- Industry	: Nil
5.	Area of Specialization	: Thermal
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Engg. Graphics, EME, HTMT, Turbo Machinery's, RAC.
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: 08
	- International Conferences	: 03
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. of books published with details	: 01

Signature

FACULTY PROFILE

1.	Name	: **Sanjay Pratapsingh Shekhawat**.
2.	Date of Birth	: 03/ 05/74
3.	Educational Qualification	: M. E. (M/c Design)
4.	Work Experience	:
	- Teaching	: 12 Years
	- Research	: Nil
	- Industry	: Nil
5.	Area of Specialization	: Design
6.	Subject Taught at P.G. level	: IACS, Mechatronics
	Subject Taught at U.G. level	: EME, Theory of Mechanics-I, Theory of Mechanics-II, Automobile Eng.
7.	Research guidance at	
	- Masters's level	: 06
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: 01
	- National Conferences	: 07
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: 01
12.	No. of books published with details	: 01

Signature

FACULTY PROFILE

1. Name : **P.G. Damle**.
2. Date of Birth : 08 / 10 / 1973
3. Educational Qualification : M. E. (M/c Design)
4. Work Experience :
   - Teaching : 13 Years
   - Research : Nil
   - Industry : 01
5. Area of Specialization : Design
6. Subject Taught at P.G. level : Vibration Engg., DSM

   Subject Taught at U.G. level : Engg. Graphics, Machine Design-I, Machine Design-II.
7. Research guidance at
   - Masters's level : 06
   - Ph.D. level : Nil

   No. of papers published in
   - National Journals : Nil
   - International Journals : 02
   - National Conferences : 04
   - International Conferences : Nil
8. Projects carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publications : 02
12. No. of books published with details : 01

Signature

FACULTY PROFILE

1.	Name	: **Devendra B. Sadaphale**.
2.	Date of Birth	: 01 / 07 / 76
3.	Educational Qualification	: M. E. (M/c Design)
4.	Work Experience	:
	- Teaching	: 12 Years
	- Research	: Nil
	- Industry	: 01
5.	Area of Specialization	: Design
6.	Subject Taught at P.G. level	: AMED,OTD, MTD
	Subject Taught at U.G. level	: Fluid Mechanics, Material science, Applied Thermodynamics, Engg. Metallurgy.
7.	Research guidance at	
	- Masters's level	: 06
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: 05
	- International Conferences	: 01
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: **Prashant N. Ulhe**.
2.	Date of Birth	: 09/ 03/1974
3.	Educational Qualification	: M. E. (M/c Design)
4.	Work Experience	:
	- Teaching	: 10Years
	- Research	: Nil
	- Industry	: 05
5.	Area of Specialization	: Design
6.	Subject Taught at P.G. level	: Tribology, OTD
	Subject Taught at U.G. level	: Engg. Graphics, Strength of Material, Mechanical Vibration, Machine Design-II.
7.	Research guidance at	
	- Masters's level	: 06
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: 05
	- International Conferences	: 01
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: **Mahesh Vedprakash Rawlani**
2.	Date of Birth	: 7th June1970
3.	Educational Qualification	: M.E. (Mech) (APS)
4.	Work Experience	:
	- Teaching	: 18Years
	- Research	: Nil
	- Industry	: Nil
5.	Area of Specialization	: Advance Production System
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Engg. Graphics, Engg. Thermodynamics, PBM, NACM,IE, OR.
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: 05
	- International Conferences	: 02
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. of books published with details	: 08

Signature

FACULTY PROFILE

1.	Name	: **Pradeep M. Solanki**
2.	Date of Birth	: 06/10/81
3.	Educational Qualification	: M.E. Mechanical (CAD/CAM)
4.	Work Experience	:
	- Teaching	: 07Years
	- Research	: Nil
	- Industry	: Nil
5.	Area of Specialization	: CAD/CAM
6.	Subject Taught at P.G. level	: CMMD, Robotics
	Subject Taught at U.G. level	: Engg. Graphics, Engg. Thermodynamic, NACM, CAD/CAM, Robotics.
7.	Research guidance at	
	- Masters's level	: 04
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: 05
	- International Conferences	: 04
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: **Bornare Prashant Pandit**
2.	Date of Birth	: 01/06/1979.
3.	Educational Qualification	: Ph.D (Management**)** B.E. Mech. MBA (Marketing & HRD)
4.	Work Experience	:
	- Teaching	: 06Years
	- Research	: Nil
	- Industry	: 03 Years
5.	Area of Specialization	: Management
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Internal combustion Engine, MMM, PBM, Automobile Engineering.
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: 03
	- International Journals	: Nil
	- National Conferences	: Nil
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: 03
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: **Ajay Bhardwaj**
2.	Date of Birth	: 05 / 07 / 1968
3.	Educational Qualification	: B.E. Production ME Mechanical (Machine Design) Pursing
4.	Work Experience	:
	- Teaching	: 06 Years
	- Research	: Nil
	- Industry	: 07 Years
5.	Area of Specialization	: Production
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Manufacturing Engineering-I, Manufacturing Engineering-II.
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: 01
	- National Conferences	: Nil
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: 01
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: **P. D. Patil**
2.	Date of Birth	: 30 / 04 / 1980.
3.	Educational Qualification	: M. E. Mechanical (CAD/CAM)
4.	Work Experience	:
	- Teaching	: 07Years
	- Research	: Nil
	- Industry	: Nil
5.	Area of Specialization	: CAD/CAM
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Engg. Graphics, Engg. Thermodynamics, CAD/CAM, FEA.
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: Nil
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1. Name : **Chandan Krishna Mukherjee**

2. Date of Birth : 09th. March, 1963.

3. Educational Qualification : B.Sc. Engg. (Mechanical Engineering)

4. Work Experience :
   - Teaching : 04Years
   - Research : Nil
   - Industry : 05 Years

5. Area of Specialization : Mechanical
6. Subject Taught at P.G. level : Nil

   Subject Taught at U.G. level : Engg. Thermodynamics, NACM,IE, PBM.

7. Research guidance at
   - Masters's level : Nil
   - Ph.D. level : Nil

   No. of papers published in
   - National Journals : Nil
   - International Journals : Nil
   - National Conferences : Nil
   - International Conferences : Nil

8. Projects carried out : Nil

9. Patents : Nil

10. Technology Transfer : Nil

11. Research publications : Nil

12. No. of books published with details : Nil

Signature

FACULTY PROFILE

1.	Name	: **Shinde Dinesh Subhash**
2.	Date of Birth	: 29/08/1988.
3.	Educational Qualification	: B.E (mechanical)
4.	Work Experience	:
	- Teaching	: 02.06Years
	- Research	: Nil
	- Industry	: Nil
5.	Area of Specialization	: Mechanical
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Fluid Mechanics, Theory of Mechanics-II, Turbo Machinary.
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: 02
	- International Conferences	: 01
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: **Jeevan Laxman Chaudhari**
2.	Date of Birth	: 05/12/1988.
3.	Educational Qualification	: B.E (mechanical)
4.	Work Experience	:
	- Teaching	: 06Month
	- Research	: Nil
	- Industry	: Nil
5.	Area of Specialization	: Mechanical
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Nil
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: Nil
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: **Muzammil Iqbal Shaikh**
2.	Date of Birth	: 20/09/1990.
3.	Educational Qualification	: B.E (mechanical)
4.	Work Experience	:
	- Teaching	: 01Month
	- Research	: Nil
	- Industry	: 02 Months
5.	Area of Specialization	: Mechanical
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Nil
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: Nil
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: **Viki Ashok Revaskar**
2.	Date of Birth	: 10/04/1989.
3.	Educational Qualification	: B.E (mechanical)
4.	Work Experience	:
	- Teaching	: 01Month
	- Research	: Nil
	- Industry	: Nil
5.	Area of Specialization	: Mechanical
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Nil
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: Nil
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: **Mahesh V Kulkarni**
2.	Date of Birth	: 23/07/1979.
3.	Educational Qualification	: M.Tech. (Heat Power Engg)
4.	Work Experience	:
	- Teaching	: 04 Years
	- Research	: Nil
	- Industry	: 03 Years
5.	Area of Specialization	: Thermal
6.	Subject Taught at P.G. level	: Advance Thermal
	Subject Taught at U.G. level	: Engg. Thermodynamics, Applied Thermodynamics, Turbo machinery, RAC
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: Nil
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: Dipak Chandrakant Talele
2.	Date of Birth	: 19/06/1987.
3.	Educational Qualification	: M.Tech. (Cad/Cam)
4.	Work Experience	:
	- Teaching	: 01Month
	- Research	: Nil
	- Industry	: Nil
5.	Area of Specialization	: CAD/CAM
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Nil
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: Nil
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: **Jagruti Ramesh Surange**
2.	Date of Birth	: 20/11/1982.
3.	Educational Qualification	: B.E. (Production s/w)
4.	Work Experience	:
	- Teaching	: 01 Year
	- Research	: Nil
	- Industry	: 01 Year
5.	Area of Specialization	: Production
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Manufacturing Engg.-I, Manufacturing Engg.-II.
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: Nil
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: **Patil Devidas Ramkrishna**
2.	Date of Birth	: 01/09/1986.
3.	Educational Qualification	: B.E (mechanical)
4.	Work Experience	:
	- Teaching	: 02.6 Years
	- Research	: Nil
	- Industry	: Nil
5.	Area of Specialization	: Mechanical
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Internal Combustion Engine, Mechatronics, Robotics.
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: 02
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: **Jadhav Pankaj S**
2.	Date of Birth	: 02/08/1984.
3.	Educational Qualification	: B.E (mechanical)
4.	Work Experience	:
	- Teaching	: 01.5 Years
	- Research	: Nil
	- Industry	: 2.5 Years
5.	Area of Specialization	: Mechanical
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: AT, FEA, EG..
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: 01
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: **Saindane Vikas Kalidas**
2.	Date of Birth	: 04/06/1989.
3.	Educational Qualification	: B.E (mechanical)
4.	Work Experience	:
	- Teaching	: 02.6 Years
	- Research	: Nil
	- Industry	: Nil
5.	Area of Specialization	: Mechanical
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: A.T., Mechatronics, Tribology.
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: 02
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: **Mukesh Dnyandeo Hadpe**
2.	Date of Birth	: 29/04/1986.
3.	Educational Qualification	: B.E (mechanical), M.B.A. (Operation)
4.	Work Experience	:
	- Teaching	: 02Years
	- Research	: Nil
	- Industry	: 01 Year
5.	Area of Specialization	: Mechanical
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: MMM, AE-I,A.T.,
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: 02
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: **Chaudhari Sandip Bhika**
2.	Date of Birth	: 16/03/1988
.		
3.	Educational Qualification	: B.E (mechanical)
4.	Work Experience	:
	- Teaching	: 02Years
	- Research	: Nil
	- Industry	: Nil
5.	Area of Specialization	: Mechanical
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: A.T.,
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: 02
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: **Dhiraj Deepakrao Patil**
2.	Date of Birth	: 17/07/1981.
3.	Educational Qualification	: B.E (mechanical)
4.	Work Experience	:
	- Teaching	: 02Years
	- Research	: Nil
	- Industry	: 01 Year
5.	Area of Specialization	: Mechanical
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Mechatronics, Robotics.
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: 04
	- International Conferences	: Nil
8.	Projects carried out	: 02
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: **Dhanke Milind D.**
2.	Date of Birth	: 15/07/1983
3.	Educational Qualification	: B.E (mechanical)
4.	Work Experience	:
	- Teaching	: 03Years
	- Research	: Nil
	- Industry	: 1.6 Years
5.	Area of Specialization	: Mechanical
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Mechatronics, Tribology.
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: Nil
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: **Bauskar Nileshkumar**
2.	Date of Birth	: 24/05/1983
3.	Educational Qualification	: B.E (mechanical)
4.	Work Experience	:
	- Teaching	: 01 Month
	- Research	: Nil
	- Industry	: 05Years
5.	Area of Specialization	: Mechanical
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Nil
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: Nil
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. of books published with details	: Nil

Signature

FACULTY PROFILE

1.	Name	: **Jagruti D Rane**
2.	Date of Birth	: 12/02/1991
3.	Educational Qualification	: B.E (mechanical)
4.	Work Experience	:
	- Teaching	: 01 Month
	- Research	: Nil
	- Industry	: Nil
5.	Area of Specialization	: Mechanical
6.	Subject Taught at P.G. level	: Nil
	Subject Taught at U.G. level	: Nil
7.	Research guidance at	
	- Masters's level	: Nil
	- Ph.D. level	: Nil
	No. of papers published in	
	- National Journals	: Nil
	- International Journals	: Nil
	- National Conferences	: Nil
	- International Conferences	: Nil
8.	Projects carried out	: Nil
9.	Patents	: Nil
10.	Technology Transfer	: Nil
11.	Research publications	: Nil
12.	No. of books published with details	: Nil

Signature

DEPARTMENT OF BUSINESS ADMINISTRATION (M.B.A)

FACULTY PROFILE

1. Name : Vishal S.Rana

2. Date of Birth: 15/12/1980

3. Educational Qualification: M.Com, M.B.A (Marketing)

4. Work Experienced:

    1. Teaching : 6.5Years
    2. Research : Nil
    3. Industry : 0.7 Months
    4. Other : Nil

5. Area of Specialization: Marketing

6. Subjects teaching at UG level: Advertising & Sales Promotion, Principles of Management, Marketing Management

   Subjects teaching at PG level: Organizational Behavior, Entrepreneurship Development, Industrial Relations & Trade Unions, Business Research Methods, Cases in Human Resource Management, IT for Managers, Marketing Mgmt.

7 Research's Guidance Master's : Nil

Ph.D : Nil

No. Of paper published in a. National journal : 01

b. International journal : 04

c. National Conference : 10

d. International Conference: 04

8. Project carried out : Nil

9. Patents : Nil

10. Technology Transfer : Nil

11. Research publication : 14

12. No. of book published with detail: Nil

Signature

DEPARTMENT OF BUSINESS ADMINISTRATION (M.B.A)

FACULTY PROFILE

1. Name : Pankajkumar Ambadas Anawade

2. Date of Birth: 05/07/1982

3. Educational Qualification: B.E (Mech), M.B.A (Mktg)

4. Work Experienced:

    1. Teaching : 03 Years and 06 Months
    2. Research : Nil
    3. Industry : 2.5 Years
    4. Other : Nil

5. Area of Specialization: Marketing

6. Subjects teaching at UG level: NIL

    Subjects teaching at PG level: Introduction to Operation Management, Quantitative Techniques, Legal Aspects Of Business, Service Marketing, Global Marketing Management, Indian Commercial Laws, Supply Chain Management.

7 Research's Guidance Master's : Nil

Ph.D : Nil

No. Of paper published in a. National journal : 04
b. International journal: 01
c. National Conference : 04
d. International Conference : NIL

08. Project carried out : Nil
09. Patents : Nil
10. Technology Transfer : Nil
11. Research publication : 04
12.No. of book published with detail: Nil

Signature

DEPARTMENT OF BUSINESS ADMINISTRATION (M.B.A)

FACULTY PROFILE

1. Name : Shantanu R.Vasishtha

2. Date of Birth: 05/01/1975

3. Educational Qualification: B.Sc (Geo), M.B.A (Mktg)

4. Work Experienced:

    1. Teaching : 03 Years and 06 Months
    2. Research : Nil
    3. Industry : 10 Years
    4. Other : Nil

5. Area of Specialization: Marketing

6. Subjects teaching at UG level: NIL

   Subjects teaching at PG level: Promotion Management, Labour Economics & Costing, Management Science, Operations Management.

7 Research's Guidance Master's : Nil

Ph.D : Nil

No. Of paper published in a. National journal : Nil
b. Internal national journal : Nil
c. National Conference : 03
d. International Conference : 03

08. Project carried out : Nil

09. Patents : Nil

10. Technology Transfer : Nil

11. Research publication : 06

12. No. of book published with detail : Nil

Signature

DEPARTMENT OF BUSINESS ADMINISTRATION (M.B.A)

FACULTY PROFILE

1. Name : Ms.Richa A.Modiyani

2. Date of Birth: 30/04/1987

3. Educational Qualification: B.B.S, M.B.A (Fin)

4. Work Experienced:

    1. Teaching : 03 Years and 06 Months
    2. Research : Nil
    3. Industry : Nil
    4. Other : Nil

5. Area of Specialization: Finance

6. Subjects teaching at UG level: NIL

    Subjects teaching at PG level: Financial Management, Accounting for Managers, Managerial Economics

7 Research's Guidance Master's : Nil

Ph.D : Nil

No. Of paper published in a. National journal : Nil

b. Internal national journal: Nil

c. Conference : Nil

08. Project carried out : Nil

09. Patents : Nil

10. Technology Transfer : Nil

11. Research publication : Nil

12.No. of book published with detail: Nil

Signature

DEPARTMENT OF BUSINESS ADMINISTRATION (M.B.A)

FACULTY PROFILE

1. Name : Harshal A.Salunkhe

2. Date of Birth: 28/07/1985

3. Educational Qualification: B.Sc (Chem), M.B.A (Fin)

4. Work Experienced:

    1. Teaching : 04 Year 06 Months
    2. Research : Nil
    3. Industry : Nil
    4. Other : Nil

5. Area of Specialization: Finance

6. Subjects teaching at UG level: Financial Management, Financial Accounting, Management Science.

   Subjects teaching at PG level: Financial Management, Corporate Social Responsibility, Tax Management, Family Business Management, Financial Derivatives, Bank Management, International Financial Management

7 Research's Guidance Master's : Nil

Ph.D : Nil

No. Of paper published in a. National journal : 01
b. International journal: 02
c. National Conference : 07
d. International Conference : 03

08. Project carried out : Nil
09. Patents : Nil
10. Technology Transfer : Nil
11. Research publication : 10
12.No. of book published with detail: Nil

Signature

DEPARTMENT OF BUSINESS ADMINISTRATION (M.B.A)

FACULTY PROFILE

1. Name : Mukesh Bhaskar Ahirrao

2. Date of Birth : 24/06/1984

3. Educational Qualification : M.Com, M.B.A (Finance)

4. Work Experienced:

    1. Teaching : 1 Year
    2. Research : Nil
    3. Industry : 2.3 Months
    4. Other : Nil

5. Area of Specialization : Finance

6. Subjects teaching at UG level: Nil

Subjects teaching at PG level: Entrepreneurship Development, Global Economic Scenario, Management Information System, Managerial Economics, Marketing Research, Retail Management And Consumer Behavior, Investment & Portfolio Management.

7	Research's Guidance	Master's	: Nil
		Ph.D	: Nil
No. Of paper published in		a. National journal	: Nil
		b. International journal	: Nil
		c. Conference	: Nil

12. Project carried out : Nil
13. Patents : Nil
14. Technology Transfer : Nil
15. Research publication : Nil
12. No. of book published with detail : Nil

Signature

DEPARTMENT OF BUSINESS ADMINISTRATION (M.B.A)

FACULTY PROFILE

1. Name: Faroza A. Kazi

2. Date of Birth: 16/02/1975

3. Educational Qualification: M.P.M, M.B.A (HRM)

4. Work Experienced:

    1. Teaching : 1 month
    2. Research : Nil
    3. Industry :
    4. Other : Nil

5. Area of Specialization: HRM

6. Subjects teaching at UG level:

    Subjects teaching at PG level:

- IR & TU
- IT
- HR Legislations
- Labour Welfare
- MIS
- E-commerce
- Case Study in HRM
- PA & Compensation

7 Research's Guidance Master's : Nil

Ph.D : Nil

No. Of paper published in a. National journal : Nil

b. International journal : Nil

c. National Conference : 02

d. International Conference : 02

16. Project carried out : Nil
17. Patents : Nil
18. Technology Transfer : Nil
19. Research publication : 04
12. No. of book published with detail: Nil

Signature

DEPARTMENT OF BUSINESS ADMINISTRATION (M.B.A)

FACULTY PROFILE

1. Name : Deepa. R. Matani

2. Date of Birth: 15/07/1987

3. Educational Qualification: B.Com, M.B.A (Human Resources), DLL&LW

4. Work Experienced:

    1. Teaching : 1.6Years
    2. Research : Nil
    3. Industry : Nil
    4. Other : Nil

5. Area of Specialization: Human Resources

6. Subjects teaching at PG level: Management science, Organizational Behavior, HR Legislations, International Human Resource Management, Performance and compensation management.

7 Research's Guidance Master's : Nil

Ph.D : Nil

No. Of paper published in a. National journal : Nil

b. International journal : Nil

c. National Conference: 01

d. . International Conference : 03

20. Project carried out : Nil

21. Patents : Nil

22. Technology Transfer : Nil

23. Research publication : 04

12. No. of book published with detail: Nil

Signature

VIII. FEE

A) Details of fee, as approved by Shikshan Shulka Samiti, for the Institution.

2012-2013

Sr.	Branch	Tuition Fee
	UG Courses	
1	Chemical Engineering	Rs.56607
2	Civil Engineering	Rs.56607
3	Computer Engineering	Rs.56607
4	Mechanical Engineering	Rs.56607
5	Electrical Engg.	Rs.56607
6	Electronics and Tele-comm. Engg.	Rs.56607
7	Information Technology	Rs.56607
8	Bio-Technology	Rs.56607
	PG Courses	
01	ME Civil Engg. (Environmental)	Rs.56607
02	ME Mechanical Engg. (Machine Design)	Rs.56607
03	ME E&TC (Digital)	Rs.56607
04	ME Computer Sci. Engg.	Rs.56607
05	M.B.A.	Rs.56607

B) Time schedule for payment of fee for the entire programme.

As per Admission rule Government of Maharashtra all fees for the entire programme should be remitted at the time of admission.

Tuition Fee Waiver Scheme shall be implemented as follows:

- The admission to these additional seats will be done along with the admission to Maharashtra
  state seats available for CAP by the competent Authority during allotment rounds.
- All Such additional seats shall be treated as TFWS seats of Maharashtra state quota. These additional seats will be filled as State Level seats and will be made available to eligible candidates as a separate choice.
- The candidate opting for admission against these additional seats under this scheme is exempted from paying the tuition fees for the allotted course.
- Candidates willing to opt. For these additional TFWS seats will have to specify their willingness in the option form as a separate choice code.
- Only Maharashtra State Candidates (on the basis of score of MHT-CET-2013) will be admitted under such addition seats.
- In the event of non-availability of students in this category the same shall not be given to any other category of applicants and it will remain vacant.
- The waiver is limited to the tuition fee as approved by Shikshan shulka Samiti for unaided institutes and by the Government for Govt./Govt. Aided/Autonomous Institute /University Department/University Managed institutes. All other fees except

tuition fees will have to be paid by the beneficiary for the entire duration of the course.

- The institution should publish in their brochure and web site the number of tuition fees waivers available in each category in each course/division.
- The Competent Authority will prepare merit list of applicants from eligible students and will effect admission strictly on merit basis.
- A letter in this respect shall be issued by the competent Authority for admission to each beneficiary.
- Students admitted under this scheme shall be not be allowed to changed Institution/course under any circumstances.
- The Complement Authority and Institutions will Display the information regarding admitted candidates in their respective web sites for information to the students other stakeholders.
- Institution will not charge tuition fees for the entire duration of the course to the beneficiaries irrespective of the total number of enrollment in each year of the course.
- Candidates willing to opt. For these additional TFWS seats will have to submit income certificate stating that his/her parent's annual income is less than Rs. 4.50 Lakhs from all sources from the appropriate competent authority of the maharshatra state.
- These seats shall be filled only through Round-I, and II of CAP processes on the basis of score of MHT-CET-2013.
- TFWS seats shall not be available for the courses conducted in the Second Shift.

C) No. of Fee waivers granted with amount and name of students.

Year-2012-13

Sr. No.	Branch	Name of Students	Fees
1)	Civil Engg.	Lakhwani Rahul Ranvindra	Rs.8136/-
2)	Civil Engg.	Mahajna Ashutosh Pramod	Rs.8136/
3)	Civil Engg.	Wallecha Nikhil Vijay kumar	Rs.8136/
4)	Chemical Engg.	Pandit Pritam Rajesh	Rs.8136/
5)	Chemical Engg.	Ansari Faizal Husain Mahemood	Rs.8136/
6)	Computer Engg.	Patil Rohan Keshav	Rs.8136/
7)	Computer Engg.	Bhave Chetan Hemant	Rs.8136/
8)	Computer Engg.	Patil Sayali Sunil	Rs.8136/
9)	Computer Engg.	Patil Sonal Shivaji	Rs.8136/
10)	Computer Engg.	Miskin Vishal Gajanan	Rs.8136/
11)	Info-Tech. Engg	Wankhede Swata VIjay	Rs.8136/
12)	Info-Tech. Engg	Wagh Pooja Vijay	Rs.8136/
13)	Info-Tech. Engg	Shinde Tejaswini Ranindra	Rs.8136/
14)	Electrical Engg.	Patil Prashant Rajendra	Rs.8136/
15)	Electronics & Tele. Engg.	Kulkarni Sanket Sunil	Rs.8136/
16)	Electronics & Tele. Engg.	Patil Rahul Ganesh	Rs.8136/
17)	Electronics & Tele. Engg.	Bordiya Kilol Bipin	Rs.8136/
18)	Electronics & Tele. Engg.	Bhavsar Divya Shrish	Rs.8136/
19)	Electronics & Tele. Engg.	Patil Amol Pandurang	Rs.8136/

20)	Electronics & Tele. Engg.	Dudani Maheshkumar Nandalal	Rs.8136/
21)	Mechanical Engg.	Shakib Anwar Shaikh Iqbal	Rs.8136/
22)	Mechanical Engg.	Bhutada Madhukar Manmohan	Rs.8136/
23)	Mechanical Engg.	Patil Kamlesh Jagatrao	Rs.8136/
24)	Mechanical Engg.	Patil Aniket Ashok	Rs.8136/
25)	Mechanical Engg.	Lade Shubham Kiran	Rs.8136/
26)	Mechanical Engg.	Tayade Nakul Subhash	Rs.8136/
27)	Biotechology.	Singh Sangeeta Sanjay	Rs.8136/
28)	Biotechology.	Pandit Mukesh Vijay	Rs.8136/

D) Number of scholarship offered by the institute, duration and amount

NA

E) Criteria for fee waivers/scholarship.

As Per Government Rule

F) Estimated cost of Boarding and Lodging in Hostels.

Rs. 27000/- for lodging and boarding both yearly.

IX. ADMISSION

A) Number of seats sanctioned with the year of approval.

Sr.	Branch	Year		
		2010-11	2011-12	2012-13
1	Chemical Engineering	30	30	30
2	Civil Engineering	60	60	60
3	Computer Engineering	120	120	120
4	Mechanical Engineering	120	120	120
5	Electrical Engg.	60	60	60
6	Electronics and Tele-comm. Engg.	120	120	120
7	Information Technology	60	60	60
8	Bio-Technology	30	30	30
	Total	**600**	**600**	**600**
	PG Courses			
01	ME Civil Engg. (Environmental)	18	18	18
02	ME Mechanical Engg. (Machine Design)	18	18	18
03	ME E&TC (Digital Electronics)	**18**	18	18
04	ME Computer Sci. & Engg.	**18**	18	18
05	M.B.A.	**60**	60	60
	Total	**132**	**132**	**132**

B) Number of students admitted under various categories each year in the last three years.

	PG	UG									
Year	PG	Open	SC	ST	NT1	NT2	NT3	VJ	OBC	SBC	Total
2010-2011	132	241	65	21	09	12	15	10	197	11	591
2011-2012	132	217	64	17	17	14	08	12	255	08	612
2012-2013	123	175	59	16	18	13	09	17	249	17	607

C) Number of applications received during last two years for admission under Management Quota and number admitted.

Sr.	Year	Application received	Admitted Number
1	2010-2011	262	111
2	2011-2012	138	123
3	2012-2013	175	98

X. Admission Procedure (UG COURSES)

A) Mention the admission test being followed, name and address of the Test Agency and its URL (website).

Sr.	Admission Test	Name and Address of Test Agency	URL (Website)
1	MHT-CET	Director of Technical Education, Maharashtra State 3, Mahapalika Marg, Mumbai -1	www.dte.org.in
2	AIEEE	CBSE, New Delhi	

B) Number of seats allotted to different Test Qualified candidates separately [AIEEE/CET (State conducted test/University tests)/Association conducted test]

2012-2013

Sr.	MHT-CET State Conducted test	AIEEE	Management Quota
1	65% (390 Seats)	15% (90 Seats)	20%

C) Calendar for admission against management/vacant seats 2012-13

Particular	Institute level Seats
Sale of Information Broacher	26/06/2012
Last date for submission of application.	11/07/2012
Date & Timing of CET	15/07/2012
Release of admission list (main list and waiting list should be announced on the same day)	13/07/2012
Date for acceptance by the candidate (time given should in no case be less than 15 days)	25/07/2012
Last date for closing of admission.	31/08/2012
Starting of the Academic session.	01/08/2012
The waiting list should be activated only on the expiry of date of main list.	31/08/2012

X. Admission Procedure (PG COURSES)

Rules and Regulations for M.E. in (----------)

1. The post graduate degree in engineering consisting of 2 years (4 terms) shall be designated as Master of Engineering in **(----------)**.

2. A candidate may be permitted to register him/her self for the M.E. degree in **(--- -------)** under the faculty of engineering & technology of North Maharashtra University Jalgaon ,only if the candidate holds a bachelor's degree in Engineering & technology of North Maharashtra University , Jalgaon or its equivalent in Appropriate/ Allied branch , recognized by AICTE/UGC & North Maharashtra University , Jalgaon.

3. The student shall be admitted to First Year Term II if his/her Term I is granted.

4. Student can start his/her project work of second year, if both the terms of first

5. Every student will be required to produce a record of laboratory work in the form of journal, duly certified for satisfactory completion of the term work by the concerned teacher & head of the department.

6. A student whose term is not granted on account of less attendance (Minimum 80%) or non-submission of term work is required to repeat the term.

7. Any approved guide will not be allowed to guide more than 6 students in a particular batch.

8. Each student is required to present Seminar-I in the First Year Term I on any related state of the art topic of his own choice approved by the department.

9. The term-work & presentation of the Seminar-I will be evaluated by departmental committee consisting of guide and two faculty members of the department appointed by Director/Principal of the college as per the recommendation of the Head of the Department.

10. Each student is required to present Seminar-II in the First Year Term II on any related state of the art topic of his own choice approved by the department.

11. The term-work & presentation of the Seminar-II will be evaluated by departmental committee consisting of guide and two faculty members of the department appointed by Director/Principal of the college as per the recommendation of the Head of the Department.

12. Each student is required to present Seminar-III in the Second Year Term I on special topic. The topic should be on any of the area not included in the regular year are granted.

before clearing all heads of passing. Student will have to work on his/her project for But student will not be allowed to submit the Thesis / Dissertation minimum 1 (one) year after taking admission in second year curriculum. The report should include detailed study of specific concept (i.e. analysis, design & implementation.). This can be a theoretical study or practical implementation approved by the department/guide.

13. Guidelines for the Dissertation Seminar-III in Second Year Term I:

1. Seminar-III should be conducted at the end of Second Year Term I.

2. The term-work of the Seminar-III will be evaluated by departmental committee consisting of guide and two faculty members of the department appointed by Director/Principal of the college as per the recommendation of the Head of the Department.

3. The Seminar-III presentation will be evaluated by examiners appointed by University, one of which should be the guide.

4. Student must submit the Seminar Report in the form of soft bound copy

5. The marks of Seminar-III should be submitted at the end of Second Year Term I to the University.

14. Guidelines for the Progress Seminar in Second Year Term II:

• Progress Seminar should be conducted in the middle of Second Year Term II.

• The Progress Seminar Term-Work will be evaluated by departmental committee consisting of guide and two faculty members of the department appointed by Director/Principal of the college as per the recommendation of the Head of the Department.

• Student must submit the progress report in the form of soft bound copy.

• The marks of progress seminar should be submitted along with the marks of Project Stage-II.

15. Minimum passing marks for all Theory shall be 40% and for Term work and Oral shall be 50%.

16.He/she has to present/publish atleast one paper in reputed National/International Journal/Conference on his/her Project work before submission of his/her Thesis/Dissertation.

17. The Term Work of Project Stage –II will be assessed jointly by the pair of Internal and External examiner along with oral examination of the same.

18. The class will be awarded on the basis of aggregate marks of all four terms, giving equal weightage to all terms as shown below:

a) Less than 50% : Fail

b) 50% to less than 60% : Second Class

a) 60% to less than 70% : First Class

b) 70% & above : First Class with Distinction.

19. Each student is required to complete his/her master's degree within **Five** academic years from the date of admission, failing which he/she will be required to take fresh admission in first year.

20. The ME Project Topic should be approved by the panel which will consist:

1. HOD of concerned Department

2. ME Coordinator

3. Project Guide to be selected in consultation with the concerned

4. Subject Expert from outside the Institute BOS Chairman

The policy of refund of the fee, in case of withdrawal, should be clearly notified.

The candidate who has been provisionally admitted may cancel admission by submitting as application in duplicate, in the prescribed pro forma – O and may request for refund of fees. The refund of fees as applicable shall be made in due course. It is made clear that such application for cancellation will be considered if and only if the admission is confirmed by paying the prescribed tuition fee and other fees in full and by submitting the original documents. Refund shall be made after deduction of the cancellation charges as shown below:

1. In the event of student/candidate withdrawing before the starting of the course, the waitlisted candidates should be given admissions against the vacant seat. The entire fee collected from the student, after a deduction of the processing fee of not more than Rs. 1000/- (Rupees one thousand only) shall be refunded and returned by the Institution/University to the student/candidate withdrawing from the programme.
2. Should a student leave after joining the course and if the seat consequently falling vacant has been filled by another candidate by the last date of admission, the Institution must return the fee collected with proportionate deductions of monthly fee and proportionate hostel rent, where applicable.

XI. CRITERIA AND WEIGHTAGES FOR ADMISSION

A) Each criteria with its respective weightages i.e. Admission Test, marks in qualifying examination etc.

2 Eligibility Criteria:

2.1 Eligibility criteria for Maharashtra State Candidate and Outside Maharashtra State Candidate:

Candidate should be an Indian National and should have passed the HSC (Std.XII) examination of Maharashtra State Board of Secondary and Higher Secondary Education or its equivalent examination with subjects English, Physics, Chemistry and Mathematics **AND** Secured minimum **45 % marks** (minimum **40 % marks** in case of candidates of Backward class categories and Physically Handicapped belonging only to Maharashtra State) in **the subjects Physics, Chemistry and Mathematics** added together **AND** Obtained a **non zero score** in subjects Physics, Chemistry and Mathematics added together at **MHT-CET 2012**.

(Note: -Refer Rule No 2.11 regarding Rounding off of percentage of marks for deciding the eligibility, if applicable.)

2.2 Eligibility Criteria for All India (Paper-I of AIEEE-2012 qualified) Candidates:

Candidate should be an Indian National and should have passed the HSC (Std.XII) examination of Maharashtra State Board of Secondary and Higher Secondary Education or its equivalent examination with subjects English, Physics, Chemistry and Mathematics **AND** secured minimum **45% marks** (minimum **40% marks** in case of candidates of Backward class categories and Physically Handicapped belonging only to Maharashtra State) in the subjects Physics, Chemistry and Mathematics added together **AND** Candidate should have a valid AIEEE Score (i.e. total score should be positive) for the year 2012-2013.

Note: Maharashtra Candidates having valid AIEEE score and appearing for MHT-CET 2012 will be required to submit single Application and Option form for the CAP. Such candidates will be given single allotment through CAP as per inter-se-merit.

(Note: -Refer Rule No 2.11 regarding Rounding off of percentage of marks for deciding the eligibility, if applicable.)

2.3 Eligibility Criteria for Foreign National/Foreign Student/ PIO/Children of Indian workers in the Gulf countries/ Children of NRI

Candidate should have passed the HSC (Std.XII) examination of Maharashtra State Board of Secondary and Higher Secondary Education or its equivalent examination with subjects English, Physics, Chemistry and Mathematics and secured minimum 45% marks in the subjects Physics, Chemistry and Mathematics added together.

- **The eligibility of the candidates passing the HSC (Std. XII) equivalent examination from a school/college/Examination Board situated outside India shall be further decided by the University Authorities to which the candidate is admitted. Hence such candidates are advised to get their eligibility verified by the respective University Authorities before seeking admission to the Engineering courses in the State of Maharashtra.**
- **The candidate belonging to this type is not required to appear for the MHT-CET 2012/AIEEE 2012.**

(Note: -Refer Rule No 2.11 regarding Rounding off of percentage of marks for deciding the eligibility, if applicable.)

2.4 Eligibility criteria for GoI Nominees:

Candidate should be an Indian National and should have passed the HSC (Std.XII) examination of Maharashtra State Board of Secondary and Higher Secondary Education or its equivalent examination with subjects English, Physics, Chemistry and Mathematics and secured minimum 45% marks (minimum 40% marks in case of candidates of Backward class categories) in the subjects Physics, Chemistry and Mathematics added together.

- **The candidate belonging to this type is not required to appear for the MHT-CET 2012/AIEEE 2012.**

(Note: -Refer Rule No 2.11 regarding Rounding off of percentage of marks for deciding the eligibility, if applicable.)

2.5 Eligibility criteria for J & K Migrant candidates:

Candidate should be an Indian National and should have passed the HSC (Std.XII) examination of Maharashtra State Board of Secondary and Higher Secondary Education or its equivalent examination with subjects English, Physics, Chemistry and Mathematics and secured minimum 45% marks in the subjects Physics, Chemistry and Mathematics added together.

- **The candidate belonging to this type is not required to appear for the MHT-CET 2012/AIEEE 2012.**

(Note: -Refer Rule No 2.11 regarding Rounding off of percentage of marks for deciding the eligibility, if applicable.)

2.6 Eligibility criteria for MKB candidates:

In addition to the basic eligibility criterion mentioned in rule no. 2.1, candidates who have appeared & obtained a non zero score in the MHT-CET 2012 and belonging to the Maharashtra Karnataka Disputed Border Area are required to fulfil following additional eligibility criterions.

- Candidates should be from such villages/towns, from the Maharashtra Karnataka disputed border areas, on which Maharashtra puts its claim.
- The candidate should produce the certificate that his/her father/mother/candidate himself/herself is a domicile of Karnataka in the disputed border area as specified in the Proforma G1/G2 OR The candidate should produce the domicile certificate of his/her father/mother/candidate himself/herself stating that he/she is a resident of a village.
- The candidate should have passed SSC (or equivalent) and/or HSC (or equivalent) from an Institution situate in the disputed border area. The candidate must produce a certificate from the Principal/Head Master of the College/School stating that the candidate has passed SSC/HSC (or equivalent) Examination from that Institution.
- Mother tongue of the candidate must be Marathi. The candidate must produce a certificate from the Principal/Head Master of the School from which he/she has passed the SSC (or equivalent) Examination, stating that the candidate's Mother tongue is Marathi as per the original School record.

- Candidate should have passed SSC or HSC (or equivalent) Examination with Marathi as one of the subject.

2.7 Eligibility criteria for Candidates who are sons/daughters of Defence Service personnel:

In addition to the basic eligibility criterion mentioned in rule no.2.1, candidates who have appeared & obtained a non zero score in the MHT-CET 2012 and satisfying any one of the following criteria as are eligible to seek admission against seats for sons/daughters of defence service personnel.

- Candidate is a son/daughter of ex-service personnel who is domiciled in Maharashtra State (Def-1).
- Candidate is a son/daughter of active service personnel who is domiciled in Maharashtra State (Def-2).
- Candidate is a son/daughter of active service personnel (Def -3)
  - Who is transferred to Maharashtra State but is not domiciled in Maharashtra State
  - Who is not domiciled in Maharashtra State but his/her family is stationed in Maharashtra State under the provision of retention of family accommodation at the last duty station on the grounds of childrens' education, provided further that, such candidate should have appeared and passed the HSC (Std.XII) examination of Maharashtra State Board of Secondary and Higher Secondary Education or its equivalent examination from a school/college situated in the State of Maharashtra.

Note:

This provision is NOT available to the children of CIVILIAN STAFF who is working/ who has worked with the Indian Defence Services.

2.8 Eligibility criteria for Candidates who are Physically Handicapped:

In addition to the basic qualification mentioned in rule no. 2.1, candidate who has appeared & obtained a non zero score in the MHT-CET 2012 and suffering from any one of the following permanent disability is eligible to seek admission against seats for Physically Handicapped candidates

- Candidate who is visually impaired (blind) candidate (type P1)
- Candidate who is speech & hearing impaired (deaf & dumb) candidate (type P2)
- Candidate who is with orthopedic disorders, learning disabilities, Dyslexia, Dyscalculia, Dysgraphica, Spastic (type P3)

Note:

The certificate (Proforma F/F-1) should clearly state that the extent of disability is more than 40% and the disability is permanent in nature.

2.9 Other eligibility criteria for specialized branches of Engineering/ Technology:

Candidates seeking admission to some special courses or under some special provisions have to fulfill the following additional eligibility criteria.

- **Admission to Bio- Medical/Bio-Tech Engineering course :**

  Candidates seeking admission to Biomedical/Bio-Tech Engineering course should have passed in the subject of Biology in the qualifying examination in addition to fulfilling the Eligibility criteria as mentioned in rule no. 2.1.

- **Admission to Mining Engineering course:**

  Female candidates are **not eligible** for admission to Mining Engineering course.

2.10 Eligibility criteria of Candidates who have passed Diploma in Engineering/Technology and seeking admission to First Year of Engineering/Technology in Unaided Institutes:

Diploma holders should have passed the Diploma course in Engineering/Technology with minimum of 45% marks (40% marks in case of candidates of Backward class categories and Physically Handicapped belonging only to Maharashtra State) and medium of instruction as English from the AICTE approved Diploma Institutes affiliated to State Boards of technical Education.

Note:

1. To resolve a tie i.e. more than one candidate securing equal aggregate marks in Final year of the Diploma exam, following order of preference shall be adopted: marks in Maths at SSC, Grand Total at SSC.
2. Eligible Diploma candidates (rule 2.10) shall be considered for Admission against the Institute level seats in **Unaided Private Institutes only**. The details of the admission process for filling seats is specified in Annexure-II.
3. Such Diploma candidates (rule 2.10) are not eligible to appear for the MHT-CET 2012.

Institute Level Seat and Vacant Seat.

1) Candidate passing the HSC (Std. XII) or its equivalent examination with subjects English, Physics, Chemistry and Mathematics and should have secured minimum 45% marks in General Category and reserve Category 40% marks in Physics, Chemistry and Mathematics added together.

2) Candidates passing Diploma in Engg. / Technology course from Maharashtra State:

Diploma holders who have passed the diploma course in Engineering/Technology with minimum of 50% marks from the Polytechnics affiliated to MSBTE or AICTE approved autonomous Polytechnics in Maharashtra State.

B) Minimum level of acceptance, if any.

The candidate should have Passed the HSC (Std. XII) examination of Maharashtra State Board of Secondary and Higher Secondary Education or its equivalent examination with subjects English, Physics, Chemistry and Mathematics and secured minimum 45% marks i.e. 135 marks out of 300 marks (40% marks i.e. 120 marks out of 300 marks for backward class category candidates from Maharashtra) in the Subjects Physics, Chemistry and Mathematics added together in HSC (Std. XII) or its equivalent examination.

C) **The cut-off levels of percentage & percentile scores of the candidates in the admission test for the last three years.**

Sr.	Branch	2010-2011		2011-2012		2012-13	
		CET	AIEEE	CET	AIEEE	CET	AIEEE
1	Civil	66	55	60	31	54	43
2	Chemical	52	59	52	53	49	25
3	Computer	48	50	42	45	39	26
4	Electrical	63	52	54	45	42	34
5	Electronics & Tele.	46	58	55	45	56	35
6	Information Technology	58	45	45	32	50	13
7	Mechanical	47	64	48	61	50	54
8	Bio-Tech.	52	32	45	13	46	08

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510408210] - Bio Technology

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 30

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	30633	18	EN12174634	MB4403450	BATTE SHWETA DOMAJI	Female	OBC	Gondwana	NA	NA	55.66	AI	34668	24/7/2012	24/7/2012 2:08PM	Round 1	No
2.	32756	8	EN12129388	MB2201146	MISHRA DIKSHA SHRI RAKESH KUMAR	Female	Open	Pune	NA	NA	62.66	AI	61200	23/7/2012	23/7/2012 11:39AM	Round 1	No
3.	90928	58	EN12189531	MB2201096	GHULE SACHIN EKNATH	Male	NT 3 (NT-D)	Pune	NA	NA	63.33	GNT1O	8136	24/7/2012	24/7/2012 6:41PM	Round 1	No
4.	69314	67	EN12235921	MB1900400	KADAM SHUBHAM MADHAVRAO	Male	OBC	North Maharashtra	NA	NA	61.66	GOBCH	34668	24/7/2012	24/7/2012 5:17PM	Round 1	No
5.	57548	72	EN12213299	MB1702457	PATIL GANESH ARUN	Male	OBC	North Maharashtra	NA	NA	52	GOPENH	34668	22/7/2012	22/7/2012 10:53AM	Round 1	No
6.	59754	71	EN12180972	MB1801033	SONAWANE TUSHAR NANASAHEB	Male	OBC	North Maharashtra	NA	NA	49.33	GOPENH	34668	25/7/2012	25/7/2012 3:04PM	Round 1	No
7.	61618	70	EN12190564	MB1703535	VISPUTE PRATIK RAJENDRA	Male	OBC	North Maharashtra	NA	NA	66.33	GOPENH	34668	22/7/2012	22/7/2012 12:57PM	Round 1	No
8.	63868	69	EN12148349	MB1701769	MALI RITESH SANTOSH	Male	OBC	North Maharashtra	NA	NA	51	GOPENH	34668	23/7/2012	23/7/2012 6:02PM	Round 1	No
9.	82046	62	EN12103967	MB2213502	SAYYAD KASHIFAHMED WASEAHMED	Male	Open	Pune	NA	NA	68	GOPENO	61200	25/7/2012	25/7/2012 3:02PM	Round 1	No
10.	109653	48	EN12133231	MB1701936	SONAWANE KAMINI YASHAWANT	Female	SC	North Maharashtra	NA	NA	54.66	GSCH	8136	23/7/2012	23/7/2012 2:09PM	Round 1	No
11.	106397	50	EN12109208	MB3601922	MANDVE RAHUL PRAKASHRAO	Male	SC	Amravati	NA	NA	42	GSCO	8136	23/7/2012	23/7/2012 4:26PM	Round 1	No
12.	81731	62	EN12208208	MB1702124	JADHAV MAYURI DEVENDRASINGH	Female	DT/VJ	North Maharashtra	NA	NA	46.66	GVJH	8136	24/7/2012	24/7/2012 5:22PM	Round 1	No

Printed On : 9/1/2013 4:59:02 PM **Seal of the Institute** **Signature of the Director/Principal**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510408210] - Bio Technology

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 30

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
13.	78734	63	EN12250656	MB1704230	PATIL BHAGYASHRI BALASAHEB	Female	OBC	North Maharashtra	NA	NA	51	LOBCH	34668	24/7/2012	24/7/2012 2:25PM	Round 1	No
14.	75426	64	EN12170451	MB1701709	PATIL NEHA PRADIP	Female	OBC	North Maharashtra	NA	NA	51	LOPENH	34668	24/7/2012	24/7/2012 6:13PM	Round 1	No
15.	57768	72	EN12220764	MB2000182	PATIL KOMAL DNYANESHWAR	Female	OBC	Pune	NA	NA	62.66	LOPENO	20000	24/7/2012	24/7/2012 6:18PM	Round 1	No
16.	22979	34	EN12211317	MB1102163	MENON GOKUL PRADEEP	Male	Open	Mumbai	NA	NA	65.33	AI	61200	5/8/2012	5/8/2012 4:46PM	Round 2	No
17.	91532	58	EN12119821	MB1903220	SURYAVANSHI MAHESH DHANRAJ	Male	OBC	North Maharashtra	NA	NA	58	GNT3H	34668	4/8/2012	4/8/2012 2:34PM	Round 2	No
18.	76095	64	EN12112691	MB1703932	PATIL MAHESH RAJU	Male	OBC	North Maharashtra	NA	NA	47	GOPENH	34668	8/8/2012	8/8/2012 2:50PM	Round 2	No
19.	111233	46	EN12251790	MB1702105	SATPUTE PRASHANT BHASKAR	Male	SC	North Maharashtra	NA	NA	74	GSCH	4000	6/8/2012	6/8/2012 4:14PM	Round 2	No
20.	95466	56	EN12247909	MB1700690	SONAWANE PREETI GULAB	Female	OBC	North Maharashtra	NA	NA	58.33	GOPEN	19668	16/8/2012	16/8/2012 1:44PM	Round 3	No

Printed On : 9/1/2013 4:59:02 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 2/2**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510408210] - Bio Technology

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Admitted Against CAP

Quota : 10

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	93	49	EN12824397	MB1703943	PATIL VISHAL TUKARAM	Male	Open	North Maharashtra	NA	NA	62	ACAP	15000	4/9/2012	4/9/2012 2:46PM	Institute Level	Yes

Printed On : 9/1/2013 4:59:02 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 1/1**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

Summary of Admitted Candidates for the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Sr. No.	Admission Details	Admitted / Reported Before Cut Off Date	Admitted / Reported After Cut Off Date	Total Admitted
1.	CAP Admitted	20	0	20
2.	Institute Level Admitted	0	0	0
3.	Minority Admitted	0	0	0
4.	J&K Admitted	0	0	0
5.	Against CAP Admitted	0	1	1
6.	NRI Admitted	0	0	0
7.	GOI Admitted	0	0	0
8.	FNS Admitted	0	0	0
9.	PIO Admitted	0	0	0
10.	Over and Above Admitted	0	0	0
	Total	**20**	**1**	**21**

Last Date of Admission : 31/08/2012

Last Date of Reporting : 05/09/2012

Printed On : 9/1/2013 4:59:02 PM **Seal of the Institute** **Signature of the Director/Principal**

For Regional Office Use Only

Seal of the Regional Office **Signature of the Regional Officer**

For DTE Use Only

Seal of the DTE **Signature of the Director**

Print

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510408211] - Bio Technology [TFWS]

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 2

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	57035	72	EN12123588	MB1206470	SANGEETA SANJAY SINGH	Female	Open	Mumbai	NA	NA	75.33	TFWS	8136	23/7/2012	23/7/2012 1:01PM	Round 1	No
2.	84529	61	EN12239456	MB4106406	PANDIT MUKESH VIJAY	Male	Open	Nagpur	NA	NA	68.33	TFWS	8136	4/8/2012	4/8/2012 12:25PM	Round 2	No

Printed On : 9/1/2013 4:59:31 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 1/1**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

Summary of Admitted Candidates for the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Sr. No.	Admission Details	Admitted / Reported Before Cut Off Date	Admitted / Reported After Cut Off Date	Total Admitted
1.	CAP Admitted	2	0	2
2.	Institute Level Admitted	0	0	0
3.	Minority Admitted	0	0	0
4.	J&K Admitted	0	0	0
5.	Against CAP Admitted	0	0	0
6.	NRI Admitted	0	0	0
7.	GOI Admitted	0	0	0
8.	FNS Admitted	0	0	0
9.	PIO Admitted	0	0	0
10.	Over and Above Admitted	0	0	0
	Total	**2**	**0**	**2**

Last Date of Admission : 31/08/2012
Last Date of Reporting : 05/09/2012

Printed On : 9/1/2013 4:59:32 PM **Seal of the Institute** **Signature of the Director/Principal**

For Regional Office Use Only

Seal of the Regional Office **Signature of the Regional Officer**

For DTE Use Only

Seal of the DTE **Signature of the Director**

Print

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510419110] - Civil Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 48

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	8271	75	EN12240686	MB1900925	VASAVE PURVANJALI NARAYAN	Female	ST	North Maharashtra	NA	NA	66.66	AI	8136	25/7/2012	25/7/2012 1:06PM	Round 1	No
2.	11230	63	EN12135543	MB1703808	VADNERE JAGRUTI PRALHAD	Female	OBC	North Maharashtra	NA	NA	47.33	AI	34668	24/7/2012	24/7/2012 12:42PM	Round 1	No
3.	11523	62	EN12145762	MM1753609	INGALE SHUBHAM DINKAR	Male	OBC	North Maharashtra	NA	NA	66	AI	34668	25/7/2012	25/7/2012 1:35PM	Round 1	No
4.	14028	55	EN12235943	MM1752052	ROHIT PATIL	Male	OBC	North Maharashtra	NA	DEF1	57	AI	34668	23/7/2012	23/7/2012 12:33PM	Round 1	No
5.	15647	51	EN12160621	MB1704306	PUSHKAR AJAY MAHAJAN	Male	Open	North Maharashtra	NA	NA	47	AI	61200	23/7/2012	23/7/2012 3:33PM	Round 1	No
6.	16436	49	EN12196011	MM1751117	RATHOD PRAVIN DHANRAJ	Male	DT/VJ	North Maharashtra	NA	NA	58.33	AI	8136	25/7/2012	25/7/2012 1:17PM	Round 1	No
7.	18176	45	EN12255340	MM1750142	MANOJKUMAR SURAJMAL KUMAWAT	Male	Open	North Maharashtra	NA	NA	52	AI	61200	21/7/2012	21/7/2012 1:26PM	Round 1	No
8.	22703	35	EN12221864	MM1753323	NEEL SANJAY CHAUDHARI	Male	OBC	North Maharashtra	NA	NA	43	AI	34668	25/7/2012	25/7/2012 10:54AM	Round 1	No
9.	55535	73	EN12205797	MB1701239	SAWALE GAURAV NAMDEO	Male	NT 2 (NT-C)	North Maharashtra	NA	NA	43.66	GNT2H	8136	23/7/2012	23/7/2012 2:14PM	Round 1	No
10.	57589	72	EN12124776	MB1702052	CHAUDHARY PRATIK BALKRUSHNA	Male	OBC	North Maharashtra	NA	NA	62.66	GOBCH	34668	22/7/2012	22/7/2012 2:46PM	Round 1	No
11.	59633	71	EN12185672	MM1750929	KULKARNI VAIBHAV NARENDRA	Male	Open	North Maharashtra	NA	NA	68	GOBCH	61200	22/7/2012	22/7/2012 4:39PM	Round 1	No
12.	60450	70	EN12115110	MB1704616	CHAUDHARI ABHISHEK DILIP	Male	OBC	North Maharashtra	NA	DEF1	46.66	GOBCH	34668	23/7/2012	23/7/2012 11:13AM	Round 1	No

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510419110] - Civil Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 48

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
13.	63311	69	EN12106577	MB1800377	KOTHAWADE SURAJ RAVINDRA	Male	OBC	North Maharashtra	NA	NA	77.33	GOBCH	34668	23/7/2012	23/7/2012 2:44PM	Round 1	No
14.	59561	71	EN12251695	MM2261873	PATIL KALPESH VIJAY	Male	OBC	Pune	NA	NA	62	GOBCO	34668	22/7/2012	22/7/2012 1:58PM	Round 1	No
15.	66830	68	EN12254342	MB2801325	SAWANT PARAG VASANT	Male	OBC	B.A.M.U.	NA	NA	45.66	GOBCO	22000	24/7/2012	24/7/2012 4:12PM	Round 1	No
16.	36609	85	EN12249559	MM1750832	KADECHA DARSHAN SURESH	Male	Open	North Maharashtra	NA	NA	55.66	GOPENH	61200	24/7/2012	24/7/2012 3:54PM	Round 1	No
17.	43554	80	EN12247966	MB1701186	PATIL VIRENDRA RAJUBHAI	Male	OBC	North Maharashtra	NA	NA	51	GOPENH	34668	24/7/2012	24/7/2012 1:33PM	Round 1	No
18.	44515	79	EN12185240	MM1752206	CHAUDHARI KETAN LILADHAR	Male	OBC	North Maharashtra	NA	NA	64	GOPENH	34668	23/7/2012	23/7/2012 12:37PM	Round 1	No
19.	47094	77	EN12245663	MM1750364	KUSHAL GOPAL AGRAWAL	Male	Open	North Maharashtra	NA	NA	52.66	GOPENH	61200	23/7/2012	23/7/2012 1:33PM	Round 1	No
20.	50926	75	EN12185554	MB1901636	SONAWANE AKASH PANDHARINATH	Male	Open	North Maharashtra	NA	NA	77.33	GOPENH	61200	23/7/2012	23/7/2012 3:44PM	Round 1	No
21.	53175	74	EN12200258	MB1903116	CHANDEKAR SANKET SUNIL	Male	Open	North Maharashtra	NA	NA	71.33	GOPENH	40000	25/7/2012	25/7/2012 2:53PM	Round 1	No
22.	53963	74	EN12162037	MB1703006	TAMBOLI UTKARSHA DEEPAK	Female	Open	North Maharashtra	NA	NA	54.33	GOPENH	61200	23/7/2012	23/7/2012 3:13PM	Round 1	No
23.	54949	73	EN12265451	MM1750353	PATIL SURAJ LAXMAN	Male	OBC	North Maharashtra	NA	NA	42	GOPENH	34668	24/7/2012	24/7/2012 11:41AM	Round 1	No
24.	50893	75	EN12198601	MB2902394	NAGARGOJE NITIN DNYANOBA	Male	NT 3 (NT-D)	B.A.M.U.	NA	NA	56.33	GOPENO	8136	24/7/2012	24/7/2012 1:42PM	Round 1	No

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510419110] - Civil Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 48

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
25.	56592	72	EN12213822	MB3503407	PATIL CHETAN VILAS	Male	NT 3 (NT-D)	Amravati	NA	NA	57	GOPENO	8136	24/7/2012	24/7/2012 3:10PM	Round 1	No
26.	59178	71	EN12267568	MB2700976	PANDHARE BHUSHAN DEEPAK	Male	NT 2 (NT-C)	B.A.M.U.	NA	NA	49	GOPENO	8136	24/7/2012	24/7/2012 1:18PM	Round 1	No
27.	73045	65	EN12231261	MB1700591	SONAWANE VAIBHAV YUVARAJ	Male	SC	North Maharashtra	NA	NA	54.33	GSCH	8136	22/7/2012	22/7/2012 5:14PM	Round 1	No
28.	75623	64	EN12252877	MB1700201	NAGARDHANE GANESH MANGAL	Male	SC	North Maharashtra	NA	DEF1	47.66	GSCH	8136	24/7/2012	24/7/2012 3:59PM	Round 1	No
29.	74654	64	EN12163914	MB1900153	GAVIT AVINASH SHANTARAM	Male	ST	North Maharashtra	NA	NA	40	GSTH	8136	22/7/2012	22/7/2012 4:05PM	Round 1	No
30.	73662	65	EN12280964	MB3501378	NILESH GOKUL CHOPADE	Male	OBC	Amravati	NA	NA	41.66	GSTO	34668	24/7/2012	24/7/2012 5:13PM	Round 1	No
31.	70863	66	EN12106485	MB1900240	RATHOD PRAKASH RANJEET	Male	DT/VJ	North Maharashtra	NA	NA	53.66	GVJH	8136	24/7/2012	24/7/2012 4:29PM	Round 1	No
32.	72937	65	EN12266556	MM1752962	MORE SUJIT BHIMRAO	Male	NT 1 (NT-B)	North Maharashtra	NA	NA	42	LNT1H	8136	21/7/2012	21/7/2012 5:35PM	Round 1	No
33.	67074	68	EN12193035	MB2704239	SAIYYAD SAMEER SAIYYAD SHAUKAT	Male	Open	B.A.M.U.	NA	NA	50	LNT2O	31200	25/7/2012	25/7/2012 4:50PM	Round 1	No
34.	99158	54	EN12116808	MB1903504	GAVATE GAURAV KAILAS	Male	NT 3 (NT-D)	North Maharashtra	NA	NA	68.66	LNT3H	8136	23/7/2012	23/7/2012 3:00PM	Round 1	No
35.	66475	68	EN12161575	MM1752527	NARKHEDE SHITAL ANIL	Female	OBC	North Maharashtra	NA	NA	46.33	LOBCH	34668	21/7/2012	21/7/2012 4:48PM	Round 1	No
36.	37287	84	EN12157660	MB1703184	MAHAJAN DNYANESHWARI SHRIKANT	Female	OBC	North Maharashtra	NA	NA	69.33	LOPENH	34668	24/7/2012	24/7/2012 12:53PM	Round 1	No

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510419110] - Civil Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 48

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
37.	39740	82	EN12150798	MB1700297	BARHATE VARSHA SHARAD	Female	OBC	North Maharashtra	NA	NA	67	LOPENH	34668	22/7/2012	22/7/2012 2:16PM	Round 1	No
38.	88794	59	EN12213658	MM1751247	BHARSAKE PRIYANKA GAUTAM	Female	SC	North Maharashtra	NA	NA	41.66	LSCH	8136	23/7/2012	23/7/2012 2:28PM	Round 1	No
39.	89695	59	EN12214682	MB1902558	TADVI NEHA AKBAR	Female	ST	North Maharashtra	NA	NA	46.66	LSTH	8136	24/7/2012	24/7/2012 11:51AM	Round 1	No
40.	63649	69	EN12157733	MM1751469	MENE VIVEK SUNIL	Male	OBC	North Maharashtra	NA	NA	40.33	PHCH	34668	22/7/2012	22/7/2012 4:13PM	Round 1	No
41.	45769	78	EN12162540	MM1851262	BAFNA HEMANT DILEEP	Male	Open	North Maharashtra	NA	NA	62	GOPENH	61200	3/8/2012	3/8/2012 4:59PM	Round 2	No
42.	32490	88	EN12241595	MM3650463	SONTAKKE ATHARVA SANDIP	Male	Open	Amravati	NA	NA	56	GOPENO	31200	3/8/2012	3/8/2012 3:26PM	Round 2	No
43.	45950	78	EN12113100	MM4155825	CHOUDHARY MANAV ASHOK	Male	Open	Nagpur	NA	NA	48.33	GOPENO	61200	5/8/2012	5/8/2012 12:57PM	Round 2	No
44.	57051	72	EN12118508	MM1752418	PAWAR UMESH KISAN	Male	DT/VJ	North Maharashtra	NA	NA	49.66	LOPENH	8136	6/8/2012	6/8/2012 1:36PM	Round 2	No
45.	77023	63	EN12216312	MB2703038	CHAVAN AMOL RAMESHRAO	Male	OBC	B.A.M.U.	NA	NA	39.66	LOPENO	24668	5/8/2012	5/8/2012 2:29PM	Round 2	No
46.	66808	68	EN12226137	MB3102026	BHOYEWAR LAXMAN MARIBA	Male	SC	S.R.T.M.U.	NA	NA	41.33	LSCO	8136	5/8/2012	5/8/2012 1:30PM	Round 2	No
47.	93005	57	EN12135885	MB1704012	AGRAWAL MOHIT YOGESH	Male	Open	North Maharashtra	NA	NA	68.66	GOPEN	19000	16/8/2012	16/8/2012 1:35PM	Round 3	No
48.	100657	54	EN12119161	MB1702341	KHATIK AARIZGUL MOHD IRFAN	Male	OBC	North Maharashtra	NA	NA	40.33	GOPEN	5000	14/8/2012	14/8/2012 5:25PM	Round 3	No

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510419110] - Civil Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Jammu-Kashmir Quota

Quota : 1

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	824	59.33	EN12135127	NA	RAJNISH KUMAR	Male	NA	NA	NA	NA	59.33	JK	27130	3/8/2012	3/8/2012 4:39PM	J & K Counseling	No

Printed On : 9/1/2013 4:59:53 PM **Seal of the Institute** **Signature of the Director/Principal**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510419110] - Civil Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Institute Level Quota

Quota : 12

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	24	69	EN12823836	MB1801974	PATIL ROHAN DEVIDAS	Male	OBC	North Maharashtra	NA	NA	44.66	IL	61200	5/8/2012	4/9/2012 11:48AM	Institute Level	No
2.	30	67	EN12823871	MB1704199	JAIN SAGAR PRAFFULKUMAR	Male	Open	North Maharashtra	NA	NA	52.66	IL	30000	6/8/2012	4/9/2012 11:56AM	Institute Level	No
3.	37	66	EN12823867	MB1701341	GHAYAL MAYUR SHIVAJI	Male	OBC	North Maharashtra	NA	NA	49	IL	31200	25/7/2012	4/9/2012 11:55AM	Institute Level	No
4.	43	63	EN12823831	MM1750903	PAWAR RUSHIKESH VIJAYANAND	Male	Open	North Maharashtra	NA	NA	56	IL	30000	5/8/2012	4/9/2012 11:47AM	Institute Level	No
5.	61	59	EN12823843	MB1702335	AKASH INGLE	Male	Open	North Maharashtra	NA	NA	64.66	IL	30000	4/8/2012	4/9/2012 11:50AM	Institute Level	No
6.	79	55	EN12823854	MB1403383	PATIL SAGAR RAJU	Male	Open	Mumbai	NA	NA	50.33	IL	30000	4/8/2012	4/9/2012 11:52AM	Institute Level	No
7.	83	54	EN12823876	MB1800939	AGRAWAL RITESH DILIP	Male	Open	North Maharashtra	NA	NA	58.66	IL	61500	25/7/2012	4/9/2012 11:57AM	Institute Level	No
8.	110	80	EN12823900	NA	SALUNKE ROHIT DNYNESHWAR	Male	Open	North Maharashtra	NA	NA	80	IL	30000	13/8/2012	4/9/2012 12:02PM	Institute Level	No
9.	120	56.66	EN12823917	NA	SUROSHI VAIBHAV BALARAM	Male	Open	North Maharashtra	NA	NA	56.66	IL	30000	14/8/2012	4/9/2012 12:06PM	Institute Level	No
10.	121	55	EN12823984	NA	PATIL GIRISH MILIND	Male	Open	North Maharashtra	NA	NA	55	IL	30000	24/7/2012	4/9/2012 12:20PM	Institute Level	No
11.	125	65.96	EN12823936	NA	UPASANI DNYANESH VITTHALRAY	Male	NA	OHU	NA	NA	65.96	IL	25000	24/7/2012	4/9/2012 12:09PM	Institute Level	No
12.	152	70.66	EN12823963	NA	ABID ALI ANSARI	Male	NA	OHU	NA	NA	70.66	IL	30000	7/8/2012	4/9/2012 12:14PM	Institute Level	No

Printed On : 9/1/2013 4:59:53 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 1/1**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510419110] - Civil Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Government Of India Quota

Quota : 1

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	11	64.66	EN12803965	NA	HAISAKARU HADEM	Female	NA	OHU	NA	NA	64.66	GOI	27130	22/8/2012	22/8/2012 11:54AM	Institute Level	No

Printed On : 9/1/2013 4:59:53 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 1/1**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

Summary of Admitted Candidates for the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Sr. No.	Admission Details	Admitted / Reported Before Cut Off Date	Admitted / Reported After Cut Off Date	Total Admitted
1.	CAP Admitted	48	0	48
2.	Institute Level Admitted	12	0	12
3.	Minority Admitted	0	0	0
4.	J&K Admitted	1	0	1
5.	Against CAP Admitted	0	0	0
6.	NRI Admitted	0	0	0
7.	GOI Admitted	1	0	1
8.	FNS Admitted	0	0	0
9.	PIO Admitted	0	0	0
10.	Over and Above Admitted	0	0	0
	Total	**62**	**0**	**62**

Last Date of Admission : 31/08/2012

Last Date of Reporting : 05/09/2012

Printed On : 9/1/2013 4:59:53 PM **Seal of the Institute** **Signature of the Director/Principal**

For Regional Office Use Only

Seal of the Regional Office **Signature of the Regional Officer**

For DTE Use Only

Seal of the DTE **Signature of the Director**

Print

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510419111] - Civil Engineering [TFWS]

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 3

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	28126	93	EN12196135	MM1752944	LAKHWANI RAHUL RAVINDRA	Male	Open	North Maharashtra	NA	NA	73	TFWS	8136	24/7/2012	24/7/2012 5:57PM	Round 1	No
2.	30016	91	EN12188005	MM1751166	MAHAJAN ASHUTOSH PRAMOD	Male	OBC	North Maharashtra	NA	NA	82	TFWS	8136	23/7/2012	23/7/2012 12:19PM	Round 1	No
3.	32290	88	EN12193629	MM1753276	WALLECHA NIKHIL VIJAYKUMAR	Male	Open	North Maharashtra	NA	NA	62.66	TFWS	8136	24/7/2012	24/7/2012 5:55PM	Round 1	No

Printed On : 9/1/2013 5:00:15 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 1/1**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

Summary of Admitted Candidates for the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Sr. No.	Admission Details	Admitted / Reported Before Cut Off Date	Admitted / Reported After Cut Off Date	Total Admitted
1.	CAP Admitted	3	0	3
2.	Institute Level Admitted	0	0	0
3.	Minority Admitted	0	0	0
4.	J&K Admitted	0	0	0
5.	Against CAP Admitted	0	0	0
6.	NRI Admitted	0	0	0
7.	GOI Admitted	0	0	0
8.	FNS Admitted	0	0	0
9.	PIO Admitted	0	0	0
10.	Over and Above Admitted	0	0	0
	Total	**3**	**0**	**3**

Last Date of Admission : 31/08/2012

Last Date of Reporting : 05/09/2012

Printed On : 9/1/2013 5:00:15 PM **Seal of the Institute** **Signature of the Director/Principal**

For Regional Office Use Only

Seal of the Regional Office **Signature of the Regional Officer**

For DTE Use Only

Seal of the DTE **Signature of the Director**

Print

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510450710] - Chemical Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 27

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	23383	34	EN12248629	MB1700101	JADHAV PAVAN MADHUKAR	Male	OBC	North Maharashtra	NA	NA	45.33	AI	34668	24/7/2012	24/7/2012 2:33PM	Round 1	No
2.	24815	30	EN12213182	MB1901006	GIRASE KISHOR RANJITSING	Male	Open	North Maharashtra	NA	NA	48.33	AI	61200	23/7/2012	23/7/2012 5:51PM	Round 1	No
3.	25053	30	EN12246838	MB2704816	SIRSATH VILAS SAHEBRAO	Male	Open	B.A.M.U.	NA	NA	64.66	AI	61200	24/7/2012	24/7/2012 6:23PM	Round 1	No
4.	27546	25	EN12259450	MB1701335	MORE SAGAR VIVEK	Male	OBC	North Maharashtra	NA	NA	47.33	AI	34668	24/7/2012	24/7/2012 1:14PM	Round 1	No
5.	67085	68	EN12128965	MB4400301	WASNIK LOKESH MANOHAR	Male	SC	Gondwana	NA	NA	54.33	DEF	8136	24/7/2012	24/7/2012 12:27PM	Round 1	No
6.	108237	49	EN12165450	MB1702530	PURI AJAY PRAKASH	Male	NT 1 (NT-B)	North Maharashtra	NA	NA	65.33	GNT1H	8136	23/7/2012	23/7/2012 5:53PM	Round 1	No
7.	77753	63	EN12211734	MB1703857	DHANKE NANDKUMAR RAJARAM	Male	NT 2 (NT-C)	North Maharashtra	NA	NA	62	GNT2H	8136	23/7/2012	23/7/2012 4:04PM	Round 1	No
8.	60895	70	EN12123379	MB4000559	GAIKWAD PRATIKSHA SIDDHARTH	Female	SC	Nagpur	NA	NA	63.66	GOBCH	8136	22/7/2012	22/7/2012 4:09PM	Round 1	No
9.	70120	66	EN12244270	MB1703802	BADGUJAR JAVAHARLAL ARUN	Male	OBC	North Maharashtra	NA	NA	44.66	GOBCH	34668	24/7/2012	24/7/2012 4:54PM	Round 1	No
10.	65816	68	EN12196853	MM1751503	PATIL SUNIL ANANT	Male	OBC	North Maharashtra	NA	NA	54.33	GOPENH	10000	23/7/2012	23/7/2012 7:11PM	Round 1	No
11.	67434	67	EN12188630	MM1752329	THAKUR HARSHAL MADHAVRAO	Male	Open	North Maharashtra	NA	NA	52.66	GOPENH	61200	24/7/2012	24/7/2012 3:01PM	Round 1	No
12.	69534	66	EN12244674	MB1702598	GORE SANDIP PRABHAKAR	Male	OBC	North Maharashtra	NA	NA	45.66	GOPENH	34668	25/7/2012	25/7/2012 1:40PM	Round 1	No

Printed On : 9/1/2013 5:03:08 PM **Seal of the Institute** **Signature of the Director/Principal**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510450710] - Chemical Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 27

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
13.	77173	63	EN12106490	MB1903406	MALI VISHAL BHARAT	Male	OBC	North Maharashtra	NA	NA	73.33	GSTH	34668	24/7/2012	24/7/2012 1:47PM	Round 1	No
14.	96791	55	EN12265850	MB4101679	PAJAI ASHWINI NARAYAN	Female	DT/VJ	Nagpur	NA	NA	60	GVJO	8136	24/7/2012	24/7/2012 12:06PM	Round 1	No
15.	82558	61	EN12250749	MB1703108	KATE MAHENDRA SUBHASH	Male	OBC	North Maharashtra	NA	NA	54.66	LOBCH	34668	24/7/2012	24/7/2012 2:29PM	Round 1	No
16.	79090	63	EN12252701	MB4000719	LONDHE PRIYANKA PURUSHOTTAMRAO	Female	OBC	Nagpur	NA	NA	56.33	LOBCO	34668	23/7/2012	23/7/2012 12:17PM	Round 1	No
17.	80882	62	EN12264376	MB1702466	DEORE POOJA PRAMOD	Female	OBC	North Maharashtra	NA	NA	58.66	LOPENH	34668	22/7/2012	22/7/2012 4:56PM	Round 1	No
18.	78402	63	EN12100981	MM1750112	CHAUDHARI LALIT NILKANTH	Male	OBC	North Maharashtra	NA	NA	41	LSCH	34668	22/7/2012	22/7/2012 3:13PM	Round 1	No
19.	75153	64	EN12204111	MB1901271	GIRASE NILESH PARBHATSING	Male	Open	North Maharashtra	NA	NA	59	PHCH	61200	23/7/2012	23/7/2012 3:23PM	Round 1	No
20.	16750	49	EN12253856	MM2750256	GORADE SARANGDHAR SHIVAJI	Male	Open	B.A.M.U.	NA	NA	47.33	AI	30000	4/8/2012	4/8/2012 3:17PM	Round 2	No
21.	84343	61	EN12269314	MB1200174	JOSHI MAHESH HEMRAJ	Male	Open	Mumbai	NA	NA	47.33	GOPENO	31000	5/8/2012	5/8/2012 1:01PM	Round 2	No
22.	91312	58	EN12262847	MB1701276	PATIL SWAPNIL NAGRAJ	Male	OBC	North Maharashtra	NA	NA	61	GSCH	34668	4/8/2012	4/8/2012 3:34PM	Round 2	No
23.	102743	53	EN12164731	MM4450689	PATIL SWAPNIL DILIP	Male	SC	Gondwana	NA	NA	40	GSCO	8136	6/8/2012	6/8/2012 3:48PM	Round 2	No
24.	91434	58	EN12256930	MM1752252	CHAVAN CHETAN KRISHNARAO	Male	OBC	North Maharashtra	NA	NA	55.33	LOPENH	34668	3/8/2012	3/8/2012 5:07PM	Round 2	No

Printed On : 9/1/2013 5:03:08 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 2/2**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510450710] - Chemical Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Admitted Against CAP

Quota : 3

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	66	58	EN12824359	MM1750474	SALUNKE VIVEK CHANDRAKANT	Male	OBC	North Maharashtra	NA	NA	43.33	ACAP	20000	4/9/2012	4/9/2012 2:35PM	Institute Level	Yes

Printed On : 9/1/2013 5:03:08 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 1/1**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510450710] - Chemical Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Institute Level Quota

Quota : 3

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	73	56	EN12824326	MB1700312	SHAIKH MOHAMMED AKRAM RAZA AYNUDDIN	Male	Open	North Maharashtra	NA	NA	46	IL	10000	4/9/2012	4/9/2012 2:23PM	Institute Level	Yes
2.	140	62.66	EN12824318	NA	PAWAR RAJAT RAJENDRA	Male	NA	OHU	NA	NA	62.66	IL	10000	4/9/2012	4/9/2012 2:19PM	Institute Level	Yes
3.	147	74	EN12824297	NA	AIJAZ HUSSAIN	Male	NA	OHU	NA	NA	74	IL	10000	4/9/2012	4/9/2012 2:10PM	Institute Level	Yes

Printed On : 9/1/2013 5:03:08 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 1/1**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

Summary of Admitted Candidates for the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Sr. No.	Admission Details	Admitted / Reported Before Cut Off Date	Admitted / Reported After Cut Off Date	Total Admitted
1.	CAP Admitted	24	0	24
2.	Institute Level Admitted	0	3	3
3.	Minority Admitted	0	0	0
4.	J&K Admitted	0	0	0
5.	Against CAP Admitted	0	1	1
6.	NRI Admitted	0	0	0
7.	GOI Admitted	0	0	0
8.	FNS Admitted	0	0	0
9.	PIO Admitted	0	0	0
10.	Over and Above Admitted	0	0	0
	Total	**24**	**4**	**28**

Last Date of Admission : 31/08/2012
Last Date of Reporting : 05/09/2012

Printed On : 9/1/2013 5:03:08 PM **Seal of the Institute** **Signature of the Director/Principal**

For Regional Office Use Only

Seal of the Regional Office **Signature of the Regional Officer**

For DTE Use Only

Seal of the DTE **Signature of the Director**

Print

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510450711] - Chemical Engineering [TFWS]

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 2

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	24870	97	EN12121165	MM1752810	PANDIT PRITAM RAJESH	Male	Open	North Maharashtra	NA	NA	76	TFWS	8136	23/7/2012	23/7/2012 11:21AM	Round 1	No
2.	29057	92	EN12211784	MB1802215	ANSARI FAISAL HUSAIN MAHEMOOD	Male	OBC	North Maharashtra	NA	NA	74	TFWS	8136	25/7/2012	25/7/2012 4:48PM	Round 1	No

Printed On : 9/1/2013 5:03:25 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 1/1**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

Summary of Admitted Candidates for the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Sr. No.	Admission Details	Admitted / Reported Before Cut Off Date	Admitted / Reported After Cut Off Date	Total Admitted
1.	CAP Admitted	2	0	2
2.	Institute Level Admitted	0	0	0
3.	Minority Admitted	0	0	0
4.	J&K Admitted	0	0	0
5.	Against CAP Admitted	0	0	0
6.	NRI Admitted	0	0	0
7.	GOI Admitted	0	0	0
8.	FNS Admitted	0	0	0
9.	PIO Admitted	0	0	0
10.	Over and Above Admitted	0	0	0
	Total	**2**	**0**	**2**

Last Date of Admission : 31/08/2012
Last Date of Reporting : 05/09/2012

Printed On : 9/1/2013 5:03:25 PM **Seal of the Institute** **Signature of the Director/Principal**

For Regional Office Use Only

Seal of the Regional Office **Signature of the Regional Officer**

For DTE Use Only

Seal of the DTE **Signature of the Director**

Print

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510424510] - Computer Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 106

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	11786	61	EN12193785	MM1753383	WANI TEJASHREE SANTOSH	Female	OBC	North Maharashtra	NA	NA	66	AI	34668	24/7/2012	24/7/2012 1:08PM	Round 1	No
2.	16732	49	EN12103496	MM1851008	PRATIKSHA M PATIL	Female	Open	North Maharashtra	NA	NA	88	AI	61200	21/7/2012	21/7/2012 1:18PM	Round 1	No
3.	17865	46	EN12192250	MM1752198	DHANDE GHANAHASYAM YASHAWANT	Male	OBC	North Maharashtra	NA	NA	51.66	AI	34668	22/7/2012	22/7/2012 2:08PM	Round 1	No
4.	17871	46	EN12138878	MB1801141	BHALERAO AMOL SANJAY	Male	SC	North Maharashtra	NA	NA	65	AI	8136	24/7/2012	24/7/2012 2:31PM	Round 1	No
5.	18006	46	EN12267498	MM1753312	PATIL HARSHA PURUSHOTTAM	Female	OBC	North Maharashtra	NA	NA	46	AI	34668	24/7/2012	24/7/2012 6:08PM	Round 1	No
6.	21890	37	EN12173996	MM1751159	DEVEN PATIL	Male	OBC	North Maharashtra	NA	NA	67.66	AI	34668	23/7/2012	23/7/2012 2:51PM	Round 1	No
7.	22027	37	EN12226628	MB1701243	SHAIKH NAUMAN SHAIKH HUSAIN	Male	OBC	North Maharashtra	NA	NA	51.33	AI	20000	25/7/2012	25/7/2012 1:26PM	Round 1	No
8.	22072	36	EN12116472	MM1752779	CHOPDE CHETANA GOPAL	Female	OBC	North Maharashtra	NA	NA	47	AI	34668	23/7/2012	23/7/2012 12:22PM	Round 1	No
9.	22782	35	EN12168231	MM1751098	SONAWANE SNEHAL SAHEBRAO	Female	OBC	North Maharashtra	NA	NA	50.33	AI	34668	23/7/2012	23/7/2012 5:27PM	Round 1	No
10.	23832	33	EN12159017	MB1702047	PANDE VINAL ANIL	Female	Open	North Maharashtra	NA	NA	64	AI	61200	25/7/2012	25/7/2012 12:43PM	Round 1	No
11.	24046	32	EN12164048	MM1753528	DAHAD KETKI SATISH	Female	Open	North Maharashtra	NA	NA	71	AI	50000	23/7/2012	23/7/2012 1:47PM	Round 1	No
12.	25383	29	EN12196124	MB1700636	JADHAV CHETAN DILIP	Male	OBC	North Maharashtra	NA	NA	43.66	AI	36868	23/7/2012	23/7/2012 3:30PM	Round 1	No

Printed On : 9/1/2013 5:00:33 PM **Seal of the Institute** **Signature of the Director/Principal**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510424510] - Computer Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 106

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
13.	26059	28	EN12162785	MB3503722	PATIL VISHAKHA ARUN	Female	OBC	Amravati	NA	NA	73.66	AI	34668	23/7/2012	23/7/2012 1:52PM	Round 1	No
14.	26474	27	EN12104937	MB1902931	PATIL ANJALI VIJAY	Female	OBC	North Maharashtra	NA	NA	77	AI	34668	23/7/2012	23/7/2012 5:43PM	Round 1	No
15.	26846	26	EN12125649	MB1802759	PATIL ASHWINI RAVINDRA	Female	OBC	North Maharashtra	NA	NA	47	AI	34668	24/7/2012	24/7/2012 5:09PM	Round 1	No
16.	65558	68	EN12249425	MB1700264	CHAUDHARI JAYSHRI VASUDEV	Female	OBC	North Maharashtra	NA	DEF1	53.33	DEF	34668	23/7/2012	23/7/2012 5:19PM	Round 1	No
17.	73006	65	EN12236779	MM1752720	PAWAR AMIT SUDHIR	Male	NT 1 (NT-B)	North Maharashtra	NA	NA	44.66	GNT1H	8136	25/7/2012	25/7/2012 2:18PM	Round 1	No
18.	88416	59	EN12107188	MB1700079	TORE GAURAVKUMAR VILAS	Male	NT 2 (NT-C)	North Maharashtra	NA	NA	58.66	GNT2H	8136	23/7/2012	23/7/2012 2:21PM	Round 1	No
19.	65819	68	EN12238155	MB1802909	PATIL SOMNATH ISHWAR	Male	OBC	North Maharashtra	NA	NA	56.33	GNT3H	34668	24/7/2012	24/7/2012 1:28PM	Round 1	No
20.	63853	69	EN12239029	MM1751747	SONAWANE HEENA MOHANCHAND	Female	SBC	North Maharashtra	NA	NA	61.66	GNT3O	8136	23/7/2012	23/7/2012 5:25PM	Round 1	No
21.	56568	72	EN12176210	MM1750424	CHAUDHARI AKASH VINOD	Male	OBC	North Maharashtra	NA	NA	49.33	GOBCH	34668	22/7/2012	22/7/2012 4:00PM	Round 1	No
22.	57880	72	EN12238218	MM1750812	KULKARNI NIMISH SATISH	Male	Open	North Maharashtra	NA	NA	62.66	GOBCH	61200	24/7/2012	24/7/2012 4:58PM	Round 1	No
23.	58256	71	EN12252089	MB1704362	JAYATI RAKSHITA SHAILENDRASING	Female	OBC	North Maharashtra	NA	NA	51.66	GOBCH	34668	24/7/2012	24/7/2012 3:30PM	Round 1	No
24.	61093	70	EN12135670	MM1753251	MAHAJAN SHUBHAM MADHUKAR	Male	OBC	North Maharashtra	NA	NA	47	GOBCH	34668	23/7/2012	23/7/2012 4:32PM	Round 1	No

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510424510] - Computer Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 106

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
25.	61391	70	EN12103979	MB1701549	PATIL RUCHA JANARDAN	Female	OBC	North Maharashtra	NA	NA	73.66	GOBCH	34668	23/7/2012	23/7/2012 1:18PM	Round 1	No
26.	61942	70	EN12189816	MM1750932	PATIL AJAY PRABHAKAR	Male	OBC	North Maharashtra	NA	NA	54	GOBCH	34668	23/7/2012	23/7/2012 4:58PM	Round 1	No
27.	62046	70	EN12120351	MB1703295	CHAUDHARI UPASANA GOPAL	Female	OBC	North Maharashtra	NA	NA	62.33	GOBCO	34668	23/7/2012	23/7/2012 12:15PM	Round 1	No
28.	65103	68	EN12235908	MB1700091	KOLI ROSHANI JAGANNATH	Female	SBC	North Maharashtra	NA	NA	48.33	GOBCO	8136	23/7/2012	23/7/2012 4:12PM	Round 1	No
29.	86618	60	EN12280202	MB3501339	BHALE SHUBHANGI GANESHRAO	Female	Open	Amravati	NA	NA	45	GOBCO	61200	24/7/2012	24/7/2012 1:51PM	Round 1	No
30.	37778	84	EN12147107	MM1750588	PATIL HARSHAL SUNIL	Male	Open	North Maharashtra	NA	NA	68	GOPENH	61200	25/7/2012	25/7/2012 1:03PM	Round 1	No
31.	40733	82	EN12107876	MB1703904	MULEY AKSHAY SUHAS	Male	Open	North Maharashtra	NA	NA	68.66	GOPENH	61200	21/7/2012	21/7/2012 2:25PM	Round 1	No
32.	45430	78	EN12113301	MM1751909	FIRAKE YUGANDHARA RAVINDRA	Female	OBC	North Maharashtra	NA	NA	67	GOPENH	34668	22/7/2012	22/7/2012 2:32PM	Round 1	No
33.	47814	77	EN12137303	MM1750957	BONDE GUNJAN SANJAY	Female	OBC	North Maharashtra	NA	NA	54	GOPENH	34668	22/7/2012	22/7/2012 1:05PM	Round 1	No
34.	47904	77	EN12189004	MM1751661	PAWAR SAYALI BASTILAL	Female	Open	North Maharashtra	NA	NA	67.66	GOPENH	61200	21/7/2012	21/7/2012 2:49PM	Round 1	No
35.	48082	77	EN12200179	MM1751912	BANCHHOD PALLAVI SANJAY	Female	OBC	North Maharashtra	NA	NA	53	GOPENH	34668	24/7/2012	24/7/2012 3:32PM	Round 1	No
36.	48907	76	EN12112711	MM1752130	IYER VIJAYKUMAR RANGANATHAN	Male	Open	North Maharashtra	NA	NA	45.33	GOPENH	61200	21/7/2012	21/7/2012 2:28PM	Round 1	No

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510424510] - Computer Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 106

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
37.	49094	76	EN12191907	MB1703034	KUDE KALYANI MADHUKAR	Female	Open	North Maharashtra	NA	NA	50	GOPENH	35000	23/7/2012	23/7/2012 5:47PM	Round 1	No
38.	49759	76	EN12228811	MM1752058	RAKA PRITESH ANILKUMAR	Male	Open	North Maharashtra	NA	NA	45.66	GOPENH	61200	22/7/2012	22/7/2012 3:51PM	Round 1	No
39.	51400	75	EN12270144	MM1751822	PATIL DISHA UDAY	Female	OBC	North Maharashtra	NA	NA	69.33	GOPENH	34668	21/7/2012	21/7/2012 4:26PM	Round 1	No
40.	51654	75	EN12129890	MM1851326	RAJPUT ARATI KOMALSING	Female	DT/VJ	North Maharashtra	NA	NA	59.66	GOPENH	8136	21/7/2012	21/7/2012 1:04PM	Round 1	No
41.	52888	74	EN12229761	MB1701005	MANOJ SUKDEV UBHALE	Male	OBC	North Maharashtra	NA	NA	62.33	GOPENH	34668	23/7/2012	23/7/2012 4:11PM	Round 1	No
42.	53352	74	EN12258654	MB1701041	PATIL SWATI SANTOSH	Female	OBC	North Maharashtra	NA	NA	47.66	GOPENH	34668	22/7/2012	22/7/2012 4:16PM	Round 1	No
43.	50510	75	EN12143578	MM3650640	SUNKARWAR SAURABH NAGORAO	Male	SBC	Amravati	NA	NA	47	GOPENO	8136	22/7/2012	22/7/2012 5:00PM	Round 1	No
44.	62492	69	EN12209849	MM3151022	DESHMUKH GAURAV ASHOKRAO	Male	Open	S.R.T.M.U.	NA	NA	62.33	GOPENO	61200	22/7/2012	22/7/2012 2:41PM	Round 1	No
45.	72808	65	EN12257854	MB3503593	KATE MANGESH ASHOK	Male	OBC	Amravati	NA	NA	48	GOPENO	30000	24/7/2012	24/7/2012 3:05PM	Round 1	No
46.	73001	65	EN12138267	MM3650506	SHUBHAM VIJAY SURWADE	Male	SC	Amravati	NA	NA	58	GOPENO	8136	24/7/2012	24/7/2012 3:36PM	Round 1	No
47.	73164	65	EN12150600	MB3500251	KOLTE NISHANT ASHOK	Male	OBC	Amravati	NA	NA	47.66	GOPENO	34668	22/7/2012	22/7/2012 3:42PM	Round 1	No
48.	81856	62	EN12241919	MB3601267	RALE SACHIN DILIP	Male	OBC	Amravati	NA	NA	73	GOPENO	34668	25/7/2012	25/7/2012 12:46PM	Round 1	No

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510424510] - Computer Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 106

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
49.	84974	60	EN12177575	MM3550438	FUTANE PRASAD RAGHUNATH	Male	OBC	Amravati	NA	NA	63.66	GOPENO	34668	22/7/2012	22/7/2012 12:38PM	Round 1	No
50.	63677	69	EN12237641	MB1801457	PATIL SOMNATH SURESH	Male	OBC	North Maharashtra	NA	NA	52.33	GSCH	34668	24/7/2012	24/7/2012 1:24PM	Round 1	No
51.	98769	55	EN12275142	MB1803507	SAINDANE MAHESH AANAND	Male	SC	North Maharashtra	NA	NA	60	GSCH	8136	25/7/2012	25/7/2012 5:04PM	Round 1	No
52.	106868	50	EN12111344	MB1704502	AHIRE SAGAR RAMESH	Male	SC	North Maharashtra	NA	NA	51.33	GSCH	8136	23/7/2012	23/7/2012 3:03PM	Round 1	No
53.	110606	47	EN12216041	MM1751136	GADHE ROSHAN RAMESH	Male	SC	North Maharashtra	NA	NA	57.66	GSCH	8136	22/7/2012	22/7/2012 1:31PM	Round 1	No
54.	110937	47	EN12120972	MB1704610	SAVKARE NIKITA SURESH	Female	SC	North Maharashtra	NA	NA	53	GSCH	8136	22/7/2012	22/7/2012 12:48PM	Round 1	No
55.	97503	55	EN12226732	MB3200367	PANDIT ANKUSH BABASAHEB	Male	SC	S.R.T.M.U.	NA	NA	47.66	GSCO	8136	24/7/2012	24/7/2012 12:37PM	Round 1	No
56.	63395	69	EN12161849	MM1752134	ZAWARE SAGAR DNYANESHWAR	Male	OBC	North Maharashtra	NA	NA	47	GSTH	34668	24/7/2012	24/7/2012 5:06PM	Round 1	No
57.	92003	58	EN12247459	MB1900859	PADAVI GAUTAM JAHANGIR	Male	ST	North Maharashtra	NA	NA	60	GSTH	8136	24/7/2012	24/7/2012 3:34PM	Round 1	No
58.	97883	55	EN12253329	MB4104163	MAHAJAN MAMTA PURUSHOTTAM	Female	OBC	Nagpur	NA	NA	50.33	GSTO	34668	21/7/2012	21/7/2012 4:37PM	Round 1	No
59.	91620	58	EN12140513	MB1700936	BAWANE DHANASHREE VIKAS	Female	NT 1 (NT-B)	North Maharashtra	NA	NA	73	LNT1H	8136	22/7/2012	22/7/2012 3:23PM	Round 1	No
60.	93114	57	EN12203087	MB3501463	WASATKAR SANDEEP SHREEDHAR	Male	NT 2 (NT-C)	Amravati	NA	NA	58.33	LNT2O	8136	23/7/2012	23/7/2012 2:35PM	Round 1	No

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510424510] - Computer Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 106

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
61.	54010	74	EN12170721	MM1751276	SINKAR SAYALI PUNDLIK	Female	OBC	North Maharashtra	NA	NA	61.66	LOBCH	34668	23/7/2012	23/7/2012 2:57PM	Round 1	No
62.	55254	73	EN12189983	MM1751794	PAWAR RENUKA SURESH	Female	OBC	North Maharashtra	NA	NA	64.66	LOBCH	34668	24/7/2012	24/7/2012 3:08PM	Round 1	No
63.	56396	72	EN12265552	MM1751473	LALWANI PRIYANKA JAGDISH	Female	Open	North Maharashtra	NA	NA	64.66	LOBCH	61200	25/7/2012	25/7/2012 3:51PM	Round 1	No
64.	92553	57	EN12163351	MB3503475	WANKHADE ASHWINI WASUDEO	Female	OBC	Amravati	NA	NA	56.66	LOBCO	34668	23/7/2012	23/7/2012 1:51PM	Round 1	No
65.	32876	88	EN12166717	MM1752873	KABRA NIKITA SANDEEP	Female	Open	North Maharashtra	NA	NA	71.33	LOPENH	61200	23/7/2012	23/7/2012 1:48PM	Round 1	No
66.	34549	86	EN12192538	MB1702415	CHAUDHARI ASWINI DNYANDEO	Female	OBC	North Maharashtra	NA	NA	62.33	LOPENH	34668	23/7/2012	23/7/2012 1:09PM	Round 1	No
67.	37072	84	EN12136679	MM1752866	PATIL PRACHI HAIBATRAO	Female	OBC	North Maharashtra	NA	NA	53.33	LOPENH	34668	22/7/2012	22/7/2012 4:35PM	Round 1	No
68.	40543	82	EN12199769	MM1752197	NAGRANI KIRAN KANAHIYALAL	Female	Open	North Maharashtra	NA	NA	54.66	LOPENH	61200	24/7/2012	24/7/2012 2:38PM	Round 1	No
69.	41290	81	EN12107596	MB1704597	ZAWAR KALYANI MANOJKUMAR	Female	Open	North Maharashtra	NA	NA	80.33	LOPENH	50000	23/7/2012	23/7/2012 3:39PM	Round 1	No
70.	44346	79	EN12162436	MM1751802	DESHMUKH YAMINI PRALHAD	Female	OBC	North Maharashtra	NA	NA	56.66	LOPENH	34668	21/7/2012	21/7/2012 5:44PM	Round 1	No
71.	50101	76	EN12152819	MB3602828	WARADE VISHAKHA PRAKASH	Female	OBC	Amravati	NA	NA	59.33	LOPENO	34668	22/7/2012	22/7/2012 4:50PM	Round 1	No
72.	64072	69	EN12135369	MB3500257	CHOPADE DIPTI PRAKASH	Female	OBC	Amravati	NA	NA	61.66	LOPENO	34668	25/7/2012	25/7/2012 1:16PM	Round 1	No

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510424510] - Computer Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 106

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
73.	77140	63	EN12271640	MB3200617	GODADE PRIYANKA SUBHASH	Female	SBC	S.R.T.M.U.	NA	NA	42	LOPENO	8136	24/7/2012	24/7/2012 2:40PM	Round 1	No
74.	86371	60	EN12263116	MB3501299	NARKHEDE MINAL RAVINDRA	Female	OBC	Amravati	NA	NA	48	LOPENO	34668	22/7/2012	22/7/2012 3:37PM	Round 1	No
75.	112068	45	EN12210103	MB3101759	SAWANT VIKRANT AMBADAS	Male	SC	S.R.T.M.U.	NA	NA	40.33	LSCO	8136	25/7/2012	25/7/2012 12:50PM	Round 1	No
76.	63644	69	EN12111493	MM1752045	SHIRSATH BHAVNA PRAKASH	Female	SBC	North Maharashtra	NA	NA	48.66	LSTH	8136	22/7/2012	22/7/2012 4:28PM	Round 1	No
77.	62465	69	EN12133139	MM1753288	SNEHAL SOMWANSHI	Male	Open	North Maharashtra	NA	NA	59.33	PH1H	61200	23/7/2012	23/7/2012 7:04PM	Round 1	No
78.	64133	69	EN12200574	MM1753614	WARKE RUPALI MADHUKAR	Female	OBC	North Maharashtra	NA	NA	50	PH2H	34668	22/7/2012	22/7/2012 4:43PM	Round 1	No
79.	64408	69	EN12236273	MB1702691	SURYAWANSHI MANGESH ARUN	Male	OBC	North Maharashtra	NA	NA	46.66	PH3H	34668	22/7/2012	22/7/2012 11:38AM	Round 1	No
80.	17731	46	EN12209419	MB1901906	NANKANI PREM ASHOK	Male	Open	North Maharashtra	NA	NA	62	AI	40000	3/8/2012	3/8/2012 4:45PM	Round 2	No
81.	21436	38	EN12265918	MB1701927	PATIL KUNDAN LAXMIKANT	Male	OBC	North Maharashtra	NA	NA	56.66	AI	34668	4/8/2012	4/8/2012 2:37PM	Round 2	No
82.	40170	82	EN12109515	MM1751179	KALE PRASAD UDAY	Male	Open	North Maharashtra	NA	NA	50	GOPENH	61200	3/8/2012	3/8/2012 4:43PM	Round 2	No
83.	50184	76	EN12233163	MB1901320	NAIK GAJANAN KESARSING	Male	DT/VJ	North Maharashtra	NA	NA	73.33	GOPENH	8136	5/8/2012	5/8/2012 2:23PM	Round 2	No
84.	52691	74	EN12109838	MM1751896	MAHAJAN KISHOR PRATAP	Male	OBC	North Maharashtra	NA	NA	54	GOPENH	34668	3/8/2012	3/8/2012 5:43PM	Round 2	No

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510424510] - Computer Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 106

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
85.	46437	78	EN12139806	MB3102384	UCCHEKAR MANOJ MADHAVRAO	Male	OBC	S.R.T.M.U.	NA	NA	51	GOPENO	34668	4/8/2012	4/8/2012 4:22PM	Round 2	No
86.	88707	59	EN12149921	MM4450468	RAMTEKE HARSHAL VINOD	Male	SC	Gondwana	NA	NA	47.66	GSCO	8136	4/8/2012	4/8/2012 2:31PM	Round 2	No
87.	109555	48	EN12219193	MB1901614	VASAVE USHA YASHVANT	Female	ST	North Maharashtra	NA	NA	53.33	GSTH	8136	6/8/2012	6/8/2012 3:50PM	Round 2	No
88.	81838	62	EN12147910	MM1752232	GOPAL DEEPAK BHAVSING	Male	NT 1 (NT-B)	North Maharashtra	NA	NA	63.33	GVJH	8136	3/8/2012	3/8/2012 5:18PM	Round 2	No
89.	99738	54	EN12130106	MM2750261	BELDAR SHUBHAM TANAJIRAO	Male	NT 1 (NT-B)	B.A.M.U.	NA	NA	53	GVJO	8136	5/8/2012	5/8/2012 1:27PM	Round 2	No
90.	102102	53	EN12213815	MB1700303	CHARTHAL SAUKHYANI DINESH	Female	NT 2 (NT-C)	North Maharashtra	NA	NA	64	LNT2H	8136	6/8/2012	6/8/2012 4:02PM	Round 2	No
91.	40939	82	EN12164559	MB1900814	SHARMA POOJA SANTOSH	Female	Open	North Maharashtra	NA	NA	77.66	LOPENH	35000	3/8/2012	3/8/2012 6:56PM	Round 2	No
92.	114658	39	EN12129327	MB1902905	PAWARA NILESH VASANT	Male	ST	North Maharashtra	NA	NA	63.33	LSCH	8136	6/8/2012	6/8/2012 3:52PM	Round 2	No
93.	62953	69	EN12265317	MM1753666	RAMJAN SHAKUR PATHAN	Male	Open	North Maharashtra	NA	NA	55	PHCH	10000	6/8/2012	6/8/2012 3:53PM	Round 2	No

Printed On : 9/1/2013 5:00:33 PM **Seal of the Institute** **Signature of the Director/Principal**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510424510] - Computer Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Jammu-Kashmir Quota

Quota : 1

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	687	64.00	EN12106923	NA	VIBHUTI RAINA	Female	NA	NA	NA	NA	64	JK	27130	3/8/2012	3/8/2012 3:21PM	J & K Counseling	No

Printed On : 9/1/2013 5:00:33 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 1/1**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510424510] - Computer Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Admitted Against CAP

Quota : 13

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	4	82	EN12825118	MB1701179	VIJAYSHREE NIPANE	Male	Open	North Maharashtra	NA	NA	71	ACAP	46996	30/8/2012	4/9/2012 5:04PM	Institute Level	No
2.	34	49	EN12825136	MB1703743	KABRA SAURABH SANJAY	Male	Open	North Maharashtra	NA	NA	57.33	ACAP	30000	25/8/2012	4/9/2012 5:06PM	Institute Level	No
3.	99	64	EN12826608	NA	NIKAM VAIBHAV VISHWAS	Male	Open	North Maharashtra	NA	NA	64	ACAP	21500	25/8/2012	5/9/2012 3:39PM	Institute Level	No
4.	112	69	EN12825105	NA	PATIL VIPLAV PRADEEP	Male	NA	OHU	NA	NA	69	ACAP	60770	25/6/2012	4/9/2012 4:59PM	Institute Level	No
5.	119	59	EN12825152	NA	BADGE SWAPNIL SANDEEP	Male	Open	North Maharashtra	NA	NA	59	ACAP	10000	25/8/2012	4/9/2012 5:10PM	Institute Level	No
6.	138	78.33	EN12824766	NA	AKASH RODHE	Male	Open	North Maharashtra	NA	NA	78.33	ACAP	30000	20/8/2012	4/9/2012 3:53PM	Institute Level	No
7.	148	79.33	EN12824801	NA	KAPIL PANDEY	Male	NA	OHU	NA	NA	79.33	ACAP	30000	27/8/2012	4/9/2012 3:59PM	Institute Level	No
8.	172	56.66	EN12825220	NA	SACHIN YADAV	Male	NA	OHU	NA	NA	56.66	ACAP	29000	28/8/2012	4/9/2012 5:27PM	Institute Level	No

Printed On : 9/1/2013 5:00:33 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 1/1**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510424510] - Computer Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Institute Level Quota

Quota : 14

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	21	70	EN12824437	MM1750299	KALINGE POONAM SANTOSH	Female	Open	North Maharashtra	NA	NA	60.66	IL	10000	14/8/2012	4/9/2012 2:55PM	Institute Level	No
2.	26	68	EN12824485	MM1752009	BHANGALE KUNTAL VIJAY	Female	Open	North Maharashtra	NA	NA	58	IL	30000	22/7/2012	4/9/2012 3:03PM	Institute Level	No
3.	38	65	EN12824500	MM1751668	NARKHEDE VIDYADEVI NANDKISHOR	Female	Open	North Maharashtra	NA	NA	50.66	IL	61200	23/7/2012	4/9/2012 3:06PM	Institute Level	No
4.	56	60	EN12824478	MB1704098	DESHPANDE BHAGYASHREE PRADEEP	Female	Open	North Maharashtra	NA	NA	58.66	IL	10000	21/7/2012	4/9/2012 3:02PM	Institute Level	No
5.	58	59	EN12824528	MM1752487	SOHEL AHMED SHAIKH AMINUDDIN	Male	Open	North Maharashtra	NA	NA	45.33	IL	5000	4/9/2012	4/9/2012 3:11PM	Institute Level	Yes
6.	75	55	EN12824430	MB1804262	RAJPUT KULDIPSINH ANILSINH	Male	Open	North Maharashtra	NA	NA	60.33	IL	1000	17/8/2012	4/9/2012 2:53PM	Institute Level	No
7.	80	55	EN12824515	MB1703539	SAINI SANGITA BHAGIRATH	Female	Open	North Maharashtra	NA	NA	45	IL	30000	20/7/2012	4/9/2012 3:09PM	Institute Level	No
8.	95	49	EN12824622	MB1704357	SARDA AARYA AVINASH	Female	Open	North Maharashtra	NA	NA	50	IL	30000	6/7/2012	4/9/2012 3:29PM	Institute Level	No
9.	98	48	EN12824454	MM1751392	PATIL KAMLAKAR ISHWAR	Male	Open	North Maharashtra	NA	NA	59	IL	10000	7/8/2012	4/9/2012 2:58PM	Institute Level	No
10.	104	45	EN12824443	MM1753033	WAGH DHANANJAY KAILAS	Male	OBC	North Maharashtra	NA	NA	39.66	IL	40000	7/8/2012	4/9/2012 2:56PM	Institute Level	No
11.	128	69	EN12824560	MM1851082	SHAH VILOK LAXMIKANT	Male	Open	North Maharashtra	NA	NA	89.33	IL	30000	24/7/2012	4/9/2012 3:18PM	Institute Level	No
12.	123	47.33	EN12824676	NA	BARHATE SAILI BHASKAR	Female	Open	North Maharashtra	NA	NA	47.33	IL	35000	27/7/2012	4/9/2012 3:39PM	Institute Level	No

Printed On : 9/1/2013 5:00:33 PM **Seal of the Institute** **Signature of the Director/Principal**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510424510] - Computer Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Institute Level Quota

Quota : 14

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
13.	126	58.33	EN12824645	NA	BODADE PAWAN VIJAY	Male	Open	North Maharashtra	NA	NA	58.33	IL	1000	27/8/2012	4/9/2012 3:34PM	Institute Level	No
14.	154	67.66	EN12824733	NA	AMRIT ANAND	Male	Open	North Maharashtra	NA	NA	67.66	IL	15000	17/8/2012	4/9/2012 3:48PM	Institute Level	No

Printed On : 9/1/2013 5:00:33 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 2/2**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510424510] - Computer Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Government Of India Quota

Quota : 1

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	2	47.33	EN12813003	NA	VARTHA KULDEEP KASHIRAM	Male	NA	OHU	NA	NA	47.33	GOI	27130	30/8/2012	30/8/2012 1:31PM	Institute Level	No

Printed On : 9/1/2013 5:00:33 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 1/1**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

Summary of Admitted Candidates for the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Sr. No.	Admission Details	Admitted / Reported Before Cut Off Date	Admitted / Reported After Cut Off Date	Total Admitted
1.	CAP Admitted	93	0	93
2.	Institute Level Admitted	13	1	14
3.	Minority Admitted	0	0	0
4.	J&K Admitted	1	0	1
5.	Against CAP Admitted	8	0	8
6.	NRI Admitted	0	0	0
7.	GOI Admitted	1	0	1
8.	FNS Admitted	0	0	0
9.	PIO Admitted	0	0	0
10.	Over and Above Admitted	0	0	0
	Total	**116**	**1**	**117**

Last Date of Admission : 31/08/2012

Last Date of Reporting : 05/09/2012

Printed On : 9/1/2013 5:00:33 PM **Seal of the Institute** **Signature of the Director/Principal**

For Regional Office Use Only

Seal of the Regional Office **Signature of the Regional Officer**

For DTE Use Only

Seal of the DTE **Signature of the Director**

Print

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510424511] - Computer Engineering [TFWS]

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 6

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	1643	161	EN12210979	MB1703465	ROHAN KESHAV PATIL	Male	OBC	North Maharashtra	NA	NA	85.33	TFWS	8136	21/7/2012	21/7/2012 1:34PM	Round 1	No
2.	24194	97	EN12136521	MB1702273	BHAVE CHETAN HEMANT	Male	Open	North Maharashtra	NA	NA	75.66	TFWS	8136	22/7/2012	22/7/2012 3:45PM	Round 1	No
3.	36275	85	EN12217828	MM1750769	PATIL SAYALI SUNIL	Female	OBC	North Maharashtra	NA	NA	58.66	TFWS	8136	21/7/2012	21/7/2012 5:50PM	Round 1	No
4.	37422	84	EN12255942	MM1751891	PATIL SONAL SHIVAJI	Female	OBC	North Maharashtra	NA	NA	52.33	TFWS	8136	24/7/2012	24/7/2012 2:42PM	Round 1	No
5.	28000	93	EN12257881	MB3400200	MISKIN VISHAL GAJANAN	Male	OBC	S.R.T.M.U.	NA	NA	80.66	TFWS	8136	5/8/2012	5/8/2012 3:18PM	Round 2	No

Printed On : 9/1/2013 5:00:55 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 1/1**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

Summary of Admitted Candidates for the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Sr. No.	Admission Details	Admitted / Reported Before Cut Off Date	Admitted / Reported After Cut Off Date	Total Admitted
1.	CAP Admitted	5	0	5
2.	Institute Level Admitted	0	0	0
3.	Minority Admitted	0	0	0
4.	J&K Admitted	0	0	0
5.	Against CAP Admitted	0	0	0
6.	NRI Admitted	0	0	0
7.	GOI Admitted	0	0	0
8.	FNS Admitted	0	0	0
9.	PIO Admitted	0	0	0
10.	Over and Above Admitted	0	0	0
	Total	**5**	**0**	**5**

Last Date of Admission : 31/08/2012

Last Date of Reporting : 05/09/2012

Printed On : 9/1/2013 5:00:55 PM **Seal of the Institute** **Signature of the Director/Principal**

For Regional Office Use Only

Seal of the Regional Office **Signature of the Regional Officer**

For DTE Use Only

Seal of the DTE **Signature of the Director**

Print

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510429310] - Electrical Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 52

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	14552	54	EN12187422	MM1752358	PATIL NIKHIL DILIP	Male	OBC	North Maharashtra	NA	NA	51	AI	34668	21/7/2012	21/7/2012 4:33PM	Round 1	No
2.	18579	44	EN12237998	MB1703422	PATIL NISHANT SANJIV	Male	OBC	North Maharashtra	NA	NA	53	AI	34668	23/7/2012	23/7/2012 5:33PM	Round 1	No
3.	20115	41	EN12261189	MB4402084	SHUBHAM KUSHABRAO LONARE	Male	SC	Gondwana	NA	NA	40.33	AI	8136	23/7/2012	23/7/2012 5:01PM	Round 1	No
4.	20907	39	EN12135253	MM4451245	DHOLE LEKHA DIMESHWAR	Female	OBC	Gondwana	NA	NA	49.33	AI	34668	24/7/2012	24/7/2012 3:52PM	Round 1	No
5.	21242	39	EN12154497	MB1802629	MOHAMMED RAFE FAROOQUE AHMED	Male	OBC	North Maharashtra	NA	NA	49.33	AI	26000	25/7/2012	25/7/2012 2:08PM	Round 1	No
6.	21313	39	EN12180287	MM1752567	PATIL DIPAK RAVINDRA	Male	OBC	North Maharashtra	NA	NA	40.66	AI	34668	21/7/2012	21/7/2012 3:48PM	Round 1	No
7.	21617	38	EN12241906	MM4153628	BARAPATRE SHUBHAM MADHUKAR	Male	SBC	Nagpur	NA	NA	62.66	AI	8136	23/7/2012	23/7/2012 4:06PM	Round 1	No
8.	22466	35	EN12266731	MB1702045	DESHMUKH MO SAIF MO IQBAL	Male	Open	North Maharashtra	NA	NA	53.33	AI	61200	24/7/2012	24/7/2012 2:09PM	Round 1	No
9.	22917	34	EN12152094	MM1850298	SONAWANE RAHUL MADHUKAR	Male	SBC	North Maharashtra	NA	NA	41.66	AI	8136	24/7/2012	24/7/2012 3:26PM	Round 1	No
10.	112146	45	EN12146757	MB1703080	DEVRAJ ROHIT VIJAY	Male	SC	North Maharashtra	NA	DEF1	60.66	DEF	8136	22/7/2012	22/7/2012 2:03PM	Round 1	No
11.	75395	64	EN12217512	MM1751341	BHOI SACHIN ANANDA	Male	NT 1 (NT-B)	North Maharashtra	NA	NA	62	GNT1H	8136	24/7/2012	24/7/2012 11:49AM	Round 1	No
12.	79980	62	EN12159903	MB1702423	GHUGE POOJA RAMESH	Female	NT 3 (NT-D)	North Maharashtra	NA	NA	45	GNT3H	8136	21/7/2012	21/7/2012 5:53PM	Round 1	No

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510429310] - Electrical Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 52

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
13.	48605	77	EN12113745	MM1752054	PATIL SHUBHAM RAMESH	Male	Open	North Maharashtra	NA	NA	73.66	GOBCH	61200	23/7/2012	23/7/2012 2:23PM	Round 1	No
14.	51775	75	EN12241495	MM1752347	PATIL RITESH MANIKRAO	Male	OBC	North Maharashtra	NA	NA	55.33	GOBCH	34668	25/7/2012	25/7/2012 11:30AM	Round 1	No
15.	52265	74	EN12185189	MM1750195	BHARAMBE AKSHAY SANJAY	Male	OBC	North Maharashtra	NA	NA	60.33	GOBCH	34668	22/7/2012	22/7/2012 4:03PM	Round 1	No
16.	53890	74	EN12140261	MB1701304	BHOLE KAMALESH GAJANAN	Male	OBC	North Maharashtra	NA	NA	68.66	GOBCH	34668	24/7/2012	24/7/2012 4:47PM	Round 1	No
17.	57851	72	EN12153039	MM1750147	DHANDE ROHIT VILAS	Male	OBC	North Maharashtra	NA	NA	77	GOBCO	34668	22/7/2012	22/7/2012 1:55PM	Round 1	No
18.	38979	83	EN12211831	MM1751245	RANE SURAJ GOPAL	Male	OBC	North Maharashtra	NA	NA	70.33	GOPENH	34668	23/7/2012	23/7/2012 2:41PM	Round 1	No
19.	39326	83	EN12237736	MB1700012	JADHAV VIKI BAPU	Male	OBC	North Maharashtra	NA	NA	55.66	GOPENH	34668	25/7/2012	25/7/2012 3:15PM	Round 1	No
20.	39774	82	EN12154645	MM1751763	TIKATE NIRANJAN VASANT	Male	Open	North Maharashtra	NA	NA	46	GOPENH	61200	21/7/2012	21/7/2012 2:53PM	Round 1	No
21.	40077	82	EN12145834	MM1751658	RAISONI GAURAV SUBHASH	Male	Open	North Maharashtra	NA	NA	66.66	GOPENH	61200	23/7/2012	23/7/2012 3:31PM	Round 1	No
22.	42831	80	EN12100946	MB1801925	JAGTAP RAHUL TULSHIRAM	Male	OBC	North Maharashtra	NA	NA	75.66	GOPENH	34668	24/7/2012	24/7/2012 1:57PM	Round 1	No
23.	43972	79	EN12207948	MM1752616	BAVISKAR NILESH HEMRAJ	Male	SBC	North Maharashtra	NA	NA	40.33	GOPENH	8136	24/7/2012	24/7/2012 1:46PM	Round 1	No
24.	45122	79	EN12265052	MM1753687	PATIL AMOL VIKAS	Male	OBC	North Maharashtra	NA	NA	76.33	GOPENH	34668	23/7/2012	23/7/2012 1:41PM	Round 1	No

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510429310] - Electrical Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 52

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
25.	45508	78	EN12160765	MB2705232	PARMAR PRANAVSINGH CHANDRASINGH	Male	Open	B.A.M.U.	NA	NA	46.33	GOPENO	61200	24/7/2012	24/7/2012 4:55PM	Round 1	No
26.	53562	74	EN12135815	MM4350289	GOSWAMI SUCHITPURI HANSAPURI	Male	NT 1 (NT-B)	Nagpur	NA	NA	76.33	GOPENO	8136	23/7/2012	23/7/2012 2:47PM	Round 1	No
27.	54386	73	EN12109445	MM3550246	KHARCHE NIKHIL MANOHAR	Male	OBC	Amravati	NA	NA	64.33	GOPENO	18000	25/7/2012	25/7/2012 12:41PM	Round 1	No
28.	61662	70	EN12135441	MM3650159	NISANG AKSHAY ARVIND	Male	OBC	Amravati	NA	NA	63	GOPENO	34668	25/7/2012	25/7/2012 11:56AM	Round 1	No
29.	75280	64	EN12133481	MM1751633	BARHE SWAPNIL ASHOK	Male	SC	North Maharashtra	NA	NA	56.33	GSCH	8136	23/7/2012	23/7/2012 3:11PM	Round 1	No
30.	87157	60	EN12178722	MM1751355	BAVISKAR YOGESH BHIMRAO	Male	SC	North Maharashtra	NA	NA	51.33	GSCH	8136	24/7/2012	24/7/2012 3:56PM	Round 1	No
31.	77112	63	EN12132219	MB2702561	RAJPUT LALITNARAYAN VITTHALSING	Male	DT/VJ	B.A.M.U.	NA	NA	58.33	GVJO	8136	23/7/2012	23/7/2012 3:41PM	Round 1	No
32.	68893	67	EN12117958	MB1703297	JAISWAL ROSHANI ISHWARLAL	Female	OBC	North Maharashtra	NA	NA	57.66	LOBCH	34668	23/7/2012	23/7/2012 3:10PM	Round 1	No
33.	74076	65	EN12254962	MB1703221	BAVISKAR POOJA ASHOK	Female	SBC	North Maharashtra	NA	NA	48	LOBCH	6000	22/7/2012	22/7/2012 4:53PM	Round 1	No
34.	53001	74	EN12272991	MB1703942	GONDHALE KIRAN SHENAFADU	Male	OBC	North Maharashtra	NA	NA	58.33	LOBCO	34668	25/7/2012	25/7/2012 5:00PM	Round 1	No
35.	38984	83	EN12121868	MM1752987	RAJOLE JAYASHRI VITTHAL	Female	OBC	North Maharashtra	NA	NA	46.33	LOPENH	34668	21/7/2012	21/7/2012 4:04PM	Round 1	No
36.	51580	75	EN12186215	MB1702297	DHANRALE YOGESHWARI KISAN	Female	NT 1 (NT-B)	North Maharashtra	NA	NA	62	LOPENH	8136	23/7/2012	23/7/2012 6:36PM	Round 1	No

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510429310] - Electrical Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 52

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
37.	60598	70	EN12244357	MM1752875	SARODE ASHWINI JANARDAN	Female	OBC	North Maharashtra	NA	NA	56.66	LOPENH	34668	23/7/2012	23/7/2012 2:15PM	Round 1	No
38.	58482	71	EN12217159	MM3550721	MAHAKAL SAMRUDDHI DNYANDEO	Female	OBC	Amravati	NA	NA	41.33	LOPENO	34668	25/7/2012	25/7/2012 12:00PM	Round 1	No
39.	70369	66	EN12265843	MM1752315	WANKHEDE SWATI DIGAMBAR	Female	SC	North Maharashtra	NA	NA	52.33	LSCH	8136	23/7/2012	23/7/2012 6:45PM	Round 1	No
40.	98611	55	EN12198329	MB1900640	KOKANI MANSING KAUTIK	Male	ST	North Maharashtra	NA	NA	66.66	LSTH	8136	23/7/2012	23/7/2012 4:00PM	Round 1	No
41.	49095	76	EN12125302	MB3504209	CHAUDHARI SAGAR PRAKASH	Male	OBC	Amravati	NA	NA	40.66	GOPENO	18000	4/8/2012	4/8/2012 1:35PM	Round 2	No
42.	88311	59	EN12172838	MM1752821	CHANDALE NARENDRA VISHNU	Male	SC	North Maharashtra	NA	NA	43	GSCH	8136	6/8/2012	6/8/2012 4:11PM	Round 2	No
43.	70913	66	EN12188400	MM3550068	KONDE PAVAN ATMARAM	Male	OBC	Amravati	NA	NA	53.66	GSCO	17000	5/8/2012	5/8/2012 5:07PM	Round 2	No
44.	101834	53	EN12255114	MB1704470	WAGH AKASH MANOJ	Male	SC	North Maharashtra	NA	NA	49.66	GSCO	8136	4/8/2012	4/8/2012 5:19PM	Round 2	No
45.	113860	42	EN12255815	MB1900877	PATLE GORAKH AATYA	Male	ST	North Maharashtra	NA	NA	56.66	GSTH	8136	4/8/2012	4/8/2012 5:35PM	Round 2	No
46.	60724	70	EN12146456	MB1703771	MAHAJAN TUSHAR SANJAY	Male	OBC	North Maharashtra	NA	NA	67	PHCH	34668	3/8/2012	3/8/2012 4:27PM	Round 2	No
47.	62321	70	EN12148215	MB1701261	PATIL PANKAJ SANTOSH	Male	OBC	North Maharashtra	NA	NA	57.66	PHCH	34668	3/8/2012	3/8/2012 6:00PM	Round 2	No

Printed On : 9/1/2013 5:01:50 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 4/4**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510429310] - Electrical Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Admitted Against CAP

Quota : 5

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	118	60.33	EN12824403	NA	BIRARI NILESH SHASHIKANT	Male	Open	North Maharashtra	NA	NA	60.33	ACAP	20000	27/7/2012	4/9/2012 2:48PM	Institute Level	No
2.	161	62.33	EN12824334	NA	SADDAM HUSAIN	Male	NA	OHU	NA	NA	62.33	ACAP	61500	9/8/2012	4/9/2012 2:26PM	Institute Level	No
3.	168	53.66	EN12824290	NA	SHUBHAM SINGH	Male	Open	North Maharashtra	NA	NA	53.66	ACAP	10000	20/7/2012	4/9/2012 2:08PM	Institute Level	No
4.	169	53	EN12824380	NA	SANDEEP KUMAR	Male	NA	OHU	NA	NA	53	ACAP	61500	21/8/2012	4/9/2012 2:43PM	Institute Level	No

Printed On : 9/1/2013 5:01:50 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 1/1**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510429310] - Electrical Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Institute Level Quota

Quota : 8

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	5	80	EN12824198	MB1700915	SARAF SHRIKANT PRAMOD	Male	OBC	North Maharashtra	NA	NA	47.33	IL	20000	14/8/2012	4/9/2012 1:34PM	Institute Level	No
2.	28	67	EN12824216	MB1801451	THAKARE RUSHIKESH VASANT	Male	Open	North Maharashtra	NA	NA	82.33	IL	20000	3/8/2012	4/9/2012 1:39PM	Institute Level	No
3.	46	62	EN12824242	MB1701717	PATIL BHUSHAN PRABHAKAR	Male	Open	North Maharashtra	NA	NA	55.66	IL	20000	23/6/2012	4/9/2012 1:47PM	Institute Level	No
4.	60	59	EN12824249	MM1752785	KUMAVAT MAKARAND SHIVAJI	Male	Open	North Maharashtra	NA	NA	66	IL	20000	16/7/2012	4/9/2012 1:49PM	Institute Level	No
5.	86	53	EN12824221	MM1751344	PATIL AMIT PRAKASH	Male	Open	North Maharashtra	NA	NA	48.66	IL	30000	21/7/2012	4/9/2012 1:41PM	Institute Level	No
6.	89	52	EN12824189	MB1701560	KUMAWAT UMESH SHIVKUMAR	Male	Open	North Maharashtra	NA	NA	53.66	IL	30000	14/7/2012	4/9/2012 1:29PM	Institute Level	No
7.	106	41	EN12824209	MB4106531	SHARMA MOHIT HANUMAN	Male	Open	Nagpur	NA	NA	47.66	IL	61200	8/8/2012	4/9/2012 1:37PM	Institute Level	No
8.	151	70.66	EN12824268	NA	SARVESH PATHAK	Male	NA	OHU	NA	NA	70.66	IL	30000	27/8/2012	4/9/2012 1:58PM	Institute Level	No

Printed On : 9/1/2013 5:01:50 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 1/1**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

Summary of Admitted Candidates for the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Sr. No.	Admission Details	Admitted / Reported Before Cut Off Date	Admitted / Reported After Cut Off Date	Total Admitted
1.	CAP Admitted	47	0	47
2.	Institute Level Admitted	8	0	8
3.	Minority Admitted	0	0	0
4.	J&K Admitted	0	0	0
5.	Against CAP Admitted	4	0	4
6.	NRI Admitted	0	0	0
7.	GOI Admitted	0	0	0
8.	FNS Admitted	0	0	0
9.	PIO Admitted	0	0	0
10.	Over and Above Admitted	0	0	0
	Total	**59**	**0**	**59**

Last Date of Admission : 31/08/2012
Last Date of Reporting : 05/09/2012

Printed On : 9/1/2013 5:01:50 PM **Seal of the Institute** **Signature of the Director/Principal**

For Regional Office Use Only

Seal of the Regional Office **Signature of the Regional Officer**

For DTE Use Only

Seal of the DTE **Signature of the Director**

Print

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510429311] - Electrical Engineering [TFWS]

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 3

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	32638	88	EN12162400	MM1752494	PATIL PRASHANT RAJENDRA	Male	OBC	North Maharashtra	NA	NA	61.66	TFWS	8136	23/7/2012	23/7/2012 2:32PM	Round 1	No

Printed On : 9/1/2013 5:02:09 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 1/1**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

Summary of Admitted Candidates for the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Sr. No.	Admission Details	Admitted / Reported Before Cut Off Date	Admitted / Reported After Cut Off Date	Total Admitted
1.	CAP Admitted	1	0	1
2.	Institute Level Admitted	0	0	0
3.	Minority Admitted	0	0	0
4.	J&K Admitted	0	0	0
5.	Against CAP Admitted	0	0	0
6.	NRI Admitted	0	0	0
7.	GOI Admitted	0	0	0
8.	FNS Admitted	0	0	0
9.	PIO Admitted	0	0	0
10.	Over and Above Admitted	0	0	0
	Total	**1**	**0**	**1**

Last Date of Admission : 31/08/2012
Last Date of Reporting : 05/09/2012

Printed On : 9/1/2013 5:02:09 PM **Seal of the Institute** **Signature of the Director/Principal**

For Regional Office Use Only

Seal of the Regional Office **Signature of the Regional Officer**

For DTE Use Only

Seal of the DTE **Signature of the Director**

Print

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510437210] - Electronics and Telecommunication Engg

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 108

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	7040	82	EN12250763	MB1701340	KSHIRSAGAR SHUBHANGI VIKAS	Female	OBC	North Maharashtra	NA	NA	66.33	AI	34668	23/7/2012	23/7/2012 7:07PM	Round 1	No
2.	9555	70	EN12271771	MM1751312	JOSHI MANDAR MUKESH	Male	Open	North Maharashtra	NA	NA	49	AI	62100	24/7/2012	24/7/2012 2:57PM	Round 1	No
3.	13677	56	EN12148110	MB1702030	PATIL SAYALI KHEMCHANDRA	Female	OBC	North Maharashtra	NA	NA	74.66	AI	34668	23/7/2012	23/7/2012 12:39PM	Round 1	No
4.	14637	54	EN12266175	MM1753577	SHINDE PRIYANKA DIPAK	Female	OBC	North Maharashtra	NA	NA	73.33	AI	34668	23/7/2012	23/7/2012 6:05PM	Round 1	No
5.	16358	49	EN12156437	MB1703250	WARKE SARIKA SUNIL	Female	OBC	North Maharashtra	NA	NA	59.33	AI	34668	23/7/2012	23/7/2012 1:07PM	Round 1	No
6.	17656	47	EN12162577	MB4000459	CHETAN V GAKHARE	Male	OBC	Nagpur	NA	NA	77.33	AI	34668	23/7/2012	23/7/2012 2:24PM	Round 1	No
7.	17895	46	EN12280045	MB1704984	PATIL AKSHAY SANJAY	Male	OBC	North Maharashtra	NA	NA	41	AI	34668	23/7/2012	23/7/2012 7:13PM	Round 1	No
8.	19080	44	EN12253560	MB1803597	PATIL PRAMOD DEVRAM	Male	OBC	North Maharashtra	NA	NA	52.66	AI	25000	25/7/2012	25/7/2012 2:05PM	Round 1	No
9.	19586	42	EN12257607	MM1752999	BALKAR MANJIRI BHASKAR	Female	OBC	North Maharashtra	NA	NA	78	AI	34668	24/7/2012	24/7/2012 12:09PM	Round 1	No
10.	19597	42	EN12164798	MB4002077	AKSHAY M SHELKE	Male	SC	Nagpur	NA	NA	64.66	AI	8136	23/7/2012	23/7/2012 3:02PM	Round 1	No
11.	19923	41	EN12243877	MB3101664	JADHAV NILESH SAMBHAJI	Male	Open	S.R.T.M.U.	NA	NA	46	AI	30000	25/7/2012	25/7/2012 3:24PM	Round 1	No
12.	20145	41	EN12150520	MB1800255	JOSHI BHALCHANDRA DHUNDIRAJ	Male	Open	North Maharashtra	NA	NA	57	AI	61200	21/7/2012	21/7/2012 3:15PM	Round 1	No

Printed On : 9/1/2013 5:02:32 PM **Seal of the Institute** **Signature of the Director/Principal**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510437210] - Electronics and Telecommunication Engg

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 108

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
13.	20248	40	EN12200621	MB3502240	HIWRALE AVINASH TEJRAO	Male	SC	Amravati	NA	NA	45.66	AI	8136	24/7/2012	24/7/2012 6:20PM	Round 1	No
14.	20762	39	EN12240319	MM1751742	KALPESH WAGH	Male	OBC	North Maharashtra	NA	NA	42.33	AI	34668	22/7/2012	22/7/2012 2:43PM	Round 1	No
15.	21259	39	EN12136428	MB3504447	DHAMODKAR POOJA BABURAO	Female	Open	Amravati	NA	NA	52	AI	61200	25/7/2012	25/7/2012 1:10PM	Round 1	No
16.	21710	37	EN12192092	MM3353652	SWAMI SAGAR GURUNATH	Male	OBC	S.R.T.M.U.	NA	NA	54.66	AI	34668	22/7/2012	22/7/2012 12:12PM	Round 1	No
17.	22238	36	EN12257936	MM1753438	PATIL SWAPNIL SUBHASH	Male	OBC	North Maharashtra	NA	NA	52.66	AI	34668	24/7/2012	24/7/2012 1:30PM	Round 1	No
18.	22425	35	EN12115479	MB1803781	PATIL CHETAN CHUDAMAN	Male	OBC	North Maharashtra	NA	NA	61.66	AI	34668	21/7/2012	21/7/2012 3:13PM	Round 1	No
19.	72666	65	EN12150793	MB1700020	TAYADE MEGHA DURYODHAN	Female	SC	North Maharashtra	NA	DEF1	54.33	DEF	8136	23/7/2012	23/7/2012 1:13PM	Round 1	No
20.	60324	70	EN12276642	MM1753125	LOHAR RAHUL VISHNU	Male	NT 1 (NT-B)	North Maharashtra	NA	NA	43	GNT1H	8136	23/7/2012	23/7/2012 2:54PM	Round 1	No
21.	67267	67	EN12171602	MB1704322	PATIL UMESH BHAGWAN	Male	NT 2 (NT-C)	North Maharashtra	NA	NA	45.33	GNT2H	8136	23/7/2012	23/7/2012 6:11PM	Round 1	No
22.	56977	72	EN12157059	MB1700505	WAGH DIPAK ASHOK	Male	OBC	North Maharashtra	NA	NA	45.33	GOBCH	34668	22/7/2012	22/7/2012 1:22PM	Round 1	No
23.	57499	72	EN12140489	MM1752230	KALPESH SALUNKHE	Male	OBC	North Maharashtra	NA	NA	53.66	GOBCH	34668	21/7/2012	21/7/2012 4:40PM	Round 1	No
24.	58287	71	EN12134164	MB1705028	AGRAWAL PAWANKUMAR GAJANAN	Male	Open	North Maharashtra	NA	NA	58.33	GOBCH	61200	24/7/2012	24/7/2012 3:03PM	Round 1	No

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510437210] - Electronics and Telecommunication Engg

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 108

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
25.	59741	71	EN12160549	MB3902968	RATHOD SANDIP SAHADEO	Male	DT/VJ	Amravati	NA	NA	63.66	GOBCH	8136	24/7/2012	24/7/2012 1:32PM	Round 1	No
26.	62208	70	EN12119756	MB1901660	PATEL KUNAL NAROTTAM	Male	Open	North Maharashtra	NA	NA	61	GOBCH	61200	23/7/2012	23/7/2012 3:35PM	Round 1	No
27.	63040	69	EN12161613	MB1702910	SNEHAL SHIRISH PATIL	Female	OBC	North Maharashtra	NA	NA	58.66	GOBCH	34668	23/7/2012	23/7/2012 10:53AM	Round 1	No
28.	63116	69	EN12238281	MB1700145	ZAMBARE LALIT NILKANTH	Male	OBC	North Maharashtra	NA	NA	58.33	GOBCH	34668	24/7/2012	24/7/2012 11:53AM	Round 1	No
29.	59390	71	EN12135386	MM3651290	RAO RAJAT HARGOVIND	Male	Open	Amravati	NA	NA	66	GOBCO	34668	24/7/2012	24/7/2012 3:44PM	Round 1	No
30.	59700	71	EN12238830	MM2850243	PALASKHEDKAR GAURAV KACHRU	Male	OBC	B.A.M.U.	NA	NA	46.66	GOBCO	34668	22/7/2012	22/7/2012 5:52PM	Round 1	No
31.	63739	69	EN12261169	MM3550622	TALOLE SAGAR PRABHAKAR	Male	OBC	Amravati	NA	NA	67	GOBCO	34668	22/7/2012	22/7/2012 12:41PM	Round 1	No
32.	39208	83	EN12111721	MM1851198	DESHMUKH VAIBHAV HIRALAL	Male	OBC	North Maharashtra	NA	NA	56.33	GOPENH	34668	22/7/2012	22/7/2012 4:25PM	Round 1	No
33.	39490	83	EN12260335	MM1750272	VATYANI RAJESH ASHOKKUMAR	Male	Open	North Maharashtra	NA	NA	57	GOPENH	61200	23/7/2012	23/7/2012 4:50PM	Round 1	No
34.	40594	82	EN12168438	MB1700608	SENAPATI DIPENDU DILIP	Male	Open	North Maharashtra	NA	NA	56.33	GOPENH	61200	23/7/2012	23/7/2012 5:40PM	Round 1	No
35.	43347	80	EN12251570	MM1752126	MALI GAYATRI RAJENDRA	Female	OBC	North Maharashtra	NA	NA	73.66	GOPENH	34668	22/7/2012	22/7/2012 1:29PM	Round 1	No
36.	43737	80	EN12223801	MM1751664	SARODE YOGESH PREMCHAND	Male	OBC	North Maharashtra	NA	NA	55	GOPENH	34668	21/7/2012	21/7/2012 2:45PM	Round 1	No

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510437210] - Electronics and Telecommunication Engg

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 108

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
37.	44706	79	EN12265609	MM1750132	PATIL RAHUL ARUN	Male	SBC	North Maharashtra	NA	NA	48.33	GOPENH	8136	24/7/2012	24/7/2012 3:00PM	Round 1	No
38.	47708	77	EN12160364	MM1750534	BADGUJAR PRATIKSHA PRAKASH	Female	OBC	North Maharashtra	NA	NA	65.33	GOPENH	34668	23/7/2012	23/7/2012 6:38PM	Round 1	No
39.	48961	76	EN12155989	MM1752586	PATIL SHITAL VISHNU	Female	OBC	North Maharashtra	NA	NA	60.33	GOPENH	34668	21/7/2012	21/7/2012 2:34PM	Round 1	No
40.	49557	76	EN12140949	MM1750055	GHODKE AMIT SATISH	Male	OBC	North Maharashtra	NA	NA	55.33	GOPENH	34668	21/7/2012	21/7/2012 3:08PM	Round 1	No
41.	49901	76	EN12152075	MM1750134	SHINDE PAVAN RAMESH	Male	Open	North Maharashtra	NA	NA	51.66	GOPENH	61200	24/7/2012	24/7/2012 4:03PM	Round 1	No
42.	50651	75	EN12251238	MB1700818	NIKHIL GOPAL ATRAWALKAR	Male	OBC	North Maharashtra	NA	NA	50	GOPENH	34668	21/7/2012	21/7/2012 3:44PM	Round 1	No
43.	51509	75	EN12193923	MM1752000	DEORE ANKITA RAVINDRA	Female	OBC	North Maharashtra	NA	NA	63	GOPENH	34668	21/7/2012	21/7/2012 2:42PM	Round 1	No
44.	51562	75	EN12249877	MM1750866	PATIL ANIKET DHAIRYASHIL	Male	OBC	North Maharashtra	NA	NA	56	GOPENH	34668	24/7/2012	24/7/2012 5:27PM	Round 1	No
45.	52217	74	EN12113915	MB1703608	MALI KAVITA BHASKAR	Female	Open	North Maharashtra	NA	NA	63.66	GOPENH	61200	22/7/2012	22/7/2012 3:31PM	Round 1	No
46.	55572	73	EN12106698	MM1851296	PATIL GAURAV DHARMRAJ	Male	OBC	North Maharashtra	NA	NA	67.66	GOPENH	20000	21/7/2012	21/7/2012 5:12PM	Round 1	No
47.	38071	84	EN12225568	MB1207268	SAH GANESH DWARIKLAL REETA	Male	Open	Mumbai	NA	NA	58.66	GOPENO	61200	25/7/2012	25/7/2012 1:08PM	Round 1	No
48.	45705	78	EN12146880	MM3151552	LATHKAR NAGESH BASWARAJ	Male	Open	S.R.T.M.U.	NA	NA	67	GOPENO	61200	23/7/2012	23/7/2012 2:11PM	Round 1	No

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510437210] - Electronics and Telecommunication Engg

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 108

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
49.	49341	76	EN12210308	MM4051495	JOGAWE ACHYUT GHANSHYAMJI	Male	OBC	Nagpur	NA	NA	77	GOPENO	34668	23/7/2012	23/7/2012 5:21PM	Round 1	No
50.	52004	75	EN12118810	MB2903156	LAVHARE TEJESHKUMAR JOTIBA	Male	NT 3 (NT-D)	B.A.M.U.	NA	NA	63	GOPENO	8136	22/7/2012	22/7/2012 12:08PM	Round 1	No
51.	53485	74	EN12194429	MM3150572	PHATKE VISHWAS VIJAYKUMAR	Male	OBC	S.R.T.M.U.	NA	NA	57	GOPENO	34668	23/7/2012	23/7/2012 12:12PM	Round 1	No
52.	56471	72	EN12140335	MM3550372	SONONE PRASHANT SHRIHARI	Male	SBC	Amravati	NA	NA	56.66	GOPENO	8136	23/7/2012	23/7/2012 12:57PM	Round 1	No
53.	59018	71	EN12195525	MM3851139	ARBAT KAILAS NAMDEV	Male	OBC	Amravati	NA	NA	64.66	GOPENO	34668	24/7/2012	24/7/2012 5:36PM	Round 1	No
54.	78035	63	EN12107740	MB1901694	SAWLEKAR JAGRUTI RAJENDRA	Female	SC	North Maharashtra	NA	NA	68.66	GSCH	8136	23/7/2012	23/7/2012 2:19PM	Round 1	No
55.	82224	61	EN12238916	MB1703476	RUTUJA MESHRAM	Female	SC	North Maharashtra	NA	NA	48.66	GSCH	8136	22/7/2012	22/7/2012 4:46PM	Round 1	No
56.	89370	59	EN12126703	MM1750149	SHIRSATH VIKAS DILIP	Male	SC	North Maharashtra	NA	NA	46.33	GSCH	8136	24/7/2012	24/7/2012 12:51PM	Round 1	No
57.	92560	57	EN12134695	MB1902712	PIMPALE MAHESH SUDAM	Male	SC	North Maharashtra	NA	NA	60	GSCH	8136	24/7/2012	24/7/2012 4:27PM	Round 1	No
58.	97043	55	EN12202351	MB1701325	SURWADE NITIN SUBHASH	Male	SC	North Maharashtra	NA	NA	43.66	GSCH	8136	23/7/2012	23/7/2012 3:05PM	Round 1	No
59.	78485	63	EN12100885	MB3502150	INGLE VAIBHAV NIMBAJI	Male	SC	Amravati	NA	NA	64.66	GSCO	8136	21/7/2012	21/7/2012 5:14PM	Round 1	No
60.	82732	61	EN12129273	MM3550091	PAWAR SUMIT ANILRAO	Male	SC	Amravati	NA	NA	44	GSCO	8136	22/7/2012	22/7/2012 4:49PM	Round 1	No

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510437210] - Electronics and Telecommunication Engg

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 108

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
61.	56239	72	EN12166094	MB1703116	GUJARATHI SEJAL HEMANT	Female	Open	North Maharashtra	NA	NA	76	GSTH	61200	23/7/2012	23/7/2012 12:48PM	Round 1	No
62.	64775	68	EN12136467	MB1700504	FUSE PRIYANKA RAMDAS	Female	OBC	North Maharashtra	NA	NA	65.33	GSTH	34668	24/7/2012	24/7/2012 3:23PM	Round 1	No
63.	107072	50	EN12116051	MB1704535	CHIMKAR VIVEK MADHUKAR	Male	SC	North Maharashtra	NA	NA	54	GSTH	8136	24/7/2012	24/7/2012 4:05PM	Round 1	No
64.	56477	72	EN12225968	MM1752426	RAJPUT SHARADSING SHANKARSING	Male	DT/VJ	North Maharashtra	NA	NA	43.66	GVJH	8136	22/7/2012	22/7/2012 3:39PM	Round 1	No
65.	85298	60	EN12221228	MM1750585	CHAVAN KANCHAN CHANDRAKANT	Female	NT 2 (NT-C)	North Maharashtra	NA	DEF1	46	LNT2H	8136	24/7/2012	24/7/2012 2:21PM	Round 1	No
66.	64937	68	EN12204799	MM1751669	JAIN KUSHAL RAJENDRA	Male	Open	North Maharashtra	NA	NA	65.33	LNT3O	61200	22/7/2012	22/7/2012 2:49PM	Round 1	No
67.	58017	72	EN12164631	MB1700061	NANNAWARE KARISHMA BHAGIRATH	Female	SBC	North Maharashtra	NA	NA	61	LOBCH	8136	23/7/2012	23/7/2012 1:56PM	Round 1	No
68.	58083	71	EN12197223	MB1704311	RANE NIKITA TULASHIRAM	Female	OBC	North Maharashtra	NA	NA	39.66	LOBCH	34668	22/7/2012	22/7/2012 12:52PM	Round 1	No
69.	58557	71	EN12112354	MM1751944	CHAUDHARI KIRAN BHANUDAS	Female	OBC	North Maharashtra	NA	NA	54.66	LOBCH	34668	23/7/2012	23/7/2012 7:09PM	Round 1	No
70.	75323	64	EN12263055	MB3503419	NARKHEDE POONAM VISHWASRAO	Female	OBC	Amravati	NA	NA	45	LOBCO	34668	24/7/2012	24/7/2012 12:47PM	Round 1	No
71.	27901	93	EN12165249	MB1704857	SAPKAL PUJA DEVIDAS	Female	SBC	North Maharashtra	NA	NA	65.33	LOPENH	8136	22/7/2012	22/7/2012 2:35PM	Round 1	No
72.	28356	92	EN12117936	MB1700973	JAIN ISHITA AJIT	Female	Open	North Maharashtra	NA	NA	76.66	LOPENH	6000	23/7/2012	23/7/2012 2:02PM	Round 1	No

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510437210] - Electronics and Telecommunication Engg

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 108

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
73.	29341	91	EN12165896	MM1750706	OZA DIVYA MAHESH	Female	Open	North Maharashtra	NA	NA	57.66	LOPENH	61200	24/7/2012	24/7/2012 4:08PM	Round 1	No
74.	36245	85	EN12124647	MM1750778	JALANKAR ASHWINI DINESH	Female	OBC	North Maharashtra	NA	NA	71	LOPENH	34668	23/7/2012	23/7/2012 12:53PM	Round 1	No
75.	36449	85	EN12258538	MM1750663	BAGUL ASHWINI DILIP	Female	OBC	North Maharashtra	NA	NA	64	LOPENH	20000	25/7/2012	25/7/2012 12:08PM	Round 1	No
76.	37496	84	EN12233610	MM1750004	JAWALE POOJA PUNDLIK	Female	OBC	North Maharashtra	NA	NA	45	LOPENH	34668	22/7/2012	22/7/2012 4:36PM	Round 1	No
77.	50238	76	EN12223096	MB1103166	PATIL SHAILA SURESH	Female	Open	Mumbai	NA	NA	48.66	LOPENO	61200	24/7/2012	24/7/2012 2:01PM	Round 1	No
78.	60848	70	EN12252860	MM3750129	MAKODE SONU PANDURANG	Female	SC	Amravati	NA	NA	70.33	LOPENO	8136	22/7/2012	22/7/2012 4:37PM	Round 1	No
79.	73216	65	EN12263360	MM3550059	PATIL KANCHAN RAJENDRA	Female	OBC	Amravati	NA	NA	59.33	LOPENO	34668	23/7/2012	23/7/2012 12:44PM	Round 1	No
80.	67568	67	EN12149368	MB1700911	WAGH VARSHA SANTOSH	Female	SC	North Maharashtra	NA	NA	47.66	LSCH	8136	21/7/2012	21/7/2012 5:23PM	Round 1	No
81.	70326	66	EN12166314	MM1752835	THOSARE PRIYA SUNIL	Female	SC	North Maharashtra	NA	NA	51.33	LSCH	8136	22/7/2012	22/7/2012 12:46PM	Round 1	No
82.	102791	53	EN12180269	MM1751302	SAPKALE RIYA SANJAY	Female	SC	North Maharashtra	NA	NA	49.66	LSTH	8136	24/7/2012	24/7/2012 1:01PM	Round 1	No
83.	84090	61	EN12267920	MB1702443	PAWAR JYOTI SOMALAL	Female	DT/VJ	North Maharashtra	NA	NA	46	LVJH	8136	23/7/2012	23/7/2012 5:05PM	Round 1	No
84.	56966	72	EN12221681	MB1703982	LAMBA AMANPREET KAUR BHAGWANT SINGH	Female	Open	North Maharashtra	NA	NA	54.33	PH1H	61200	24/7/2012	24/7/2012 1:20PM	Round 1	No

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510437210] - Electronics and Telecommunication Engg

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 108

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
85.	60699	70	EN12153962	MM1752796	NAIK SOMESH VILAS	Male	Open	North Maharashtra	NA	NA	47.66	PH2H	61200	24/7/2012	24/7/2012 4:43PM	Round 1	No
86.	63604	69	EN12262943	MB1703079	PATIL DIPALI PRALHAD	Female	Open	North Maharashtra	NA	NA	68.33	PH3H	61200	22/7/2012	22/7/2012 5:01PM	Round 1	No
87.	79366	63	EN12205443	MB2903307	BHONDWE ATUL KESHAV	Male	NT 2 (NT-C)	B.A.M.U.	NA	NA	60	GNT1O	8136	3/8/2012	3/8/2012 5:05PM	Round 2	No
88.	71078	66	EN12153141	MB1700526	PATIL RITESH SATISH	Male	OBC	North Maharashtra	NA	NA	60.33	GNT3H	34668	5/8/2012	5/8/2012 1:22PM	Round 2	No
89.	68142	67	EN12244963	MB1702186	NAIK ANKUSH PANDIT	Male	DT/VJ	North Maharashtra	NA	NA	53	GOPENH	8136	4/8/2012	4/8/2012 3:53PM	Round 2	No
90.	80838	62	EN12139053	MB4301691	KANOJE PRANAY PREM	Male	OBC	Nagpur	NA	NA	64.66	GSTO	34668	6/8/2012	6/8/2012 1:29PM	Round 2	No
91.	95888	56	EN12204387	MB4402463	MADAVI AKSHAY MAROTI	Male	ST	Gondwana	NA	NA	49.66	GSTO	8136	5/8/2012	5/8/2012 1:18PM	Round 2	No
92.	90521	58	EN12163075	MM4050667	MAHENDRA G CHATUR	Male	SC	Nagpur	NA	NA	60.33	LSCO	8136	4/8/2012	4/8/2012 6:36PM	Round 2	No

Printed On : 9/1/2013 5:02:32 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 8/8**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510437210] - Electronics and Telecommunication Engg

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Jammu-Kashmir Quota

Quota : 1

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	666	64.67	EN12158437	NA	NIKHIL RAINA	Male	NA	NA	NA	NA	64.66	JK	27130	3/8/2012	3/8/2012 3:55PM	J & K Counseling	No

Printed On : 9/1/2013 5:02:32 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 1/1**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510437210] - Electronics and Telecommunication Engg

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Admitted Against CAP

Quota : 16

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	96	42	EN12824887	NA	MAHAJAN VAIBHAV SHASHIKANT	Male	OBC	North Maharashtra	NA	NA	42	ACAP	60000	4/9/2012	4/9/2012 4:15PM	Institute Level	Yes
2.	107	69	EN12824679	NA	BOROLE RUPESH SURESH	Male	Open	North Maharashtra	NA	NA	69	ACAP	5000	4/9/2012	4/9/2012 3:40PM	Institute Level	Yes
3.	116	63.33	EN12824856	NA	PATIL AKASH DHANAJI	Male	Open	North Maharashtra	NA	NA	63.33	ACAP	30000	4/9/2012	4/9/2012 4:10PM	Institute Level	Yes
4.	127	47.66	EN12824756	NA	BABHULKAR NIKHIL DNYANDEORAO	Male	Open	North Maharashtra	NA	NA	47.66	ACAP	10000	4/9/2012	4/9/2012 3:52PM	Institute Level	Yes
5.	157	64	EN12824837	NA	RAKESH KUMAR	Male	NA	OHU	NA	NA	64	ACAP	18000	4/9/2012	4/9/2012 4:05PM	Institute Level	Yes
6.	162	60.33	EN12824803	NA	NAZIA HAJI	Male	NA	OHU	NA	NA	60.33	ACAP	5000	4/9/2012	4/9/2012 3:59PM	Institute Level	Yes
7.	175	57.66	EN12824729	NA	ALAM MD AFTAB	Male	NA	OHU	NA	NA	57.66	ACAP	5000	4/9/2012	4/9/2012 3:47PM	Institute Level	Yes
8.	176	50.66	EN12824926	NA	DIPU KUMAR	Male	NA	OHU	NA	NA	50.66	ACAP	49826	4/9/2012	4/9/2012 4:22PM	Institute Level	Yes

Printed On : 9/1/2013 5:02:32 PM **Seal of the Institute** **Signature of the Director/Principal**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510437210] - Electronics and Telecommunication Engg

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Institute Level Quota

Quota : 12

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	33	66	EN12824570	MM1750545	BADHE KOMAL VILAS	Female	Open	North Maharashtra	NA	NA	65	IL	30000	4/9/2012	4/9/2012 3:19PM	Institute Level	Yes
2.	39	65	EN12824487	MM1751135	NEHA JAGDISH CHAUDHARI	Female	OBC	North Maharashtra	NA	NA	40.33	IL	30000	4/9/2012	4/9/2012 3:04PM	Institute Level	Yes
3.	45	62	EN12824457	MM1750715	SAGAR CHANDRAKANT UPASANI	Male	Open	North Maharashtra	NA	NA	58	IL	30000	4/9/2012	4/9/2012 2:59PM	Institute Level	Yes
4.	47	62	EN12824549	MM1752333	MARATHE NEHA ASHOK	Female	Open	North Maharashtra	NA	NA	45.33	IL	30000	4/9/2012	4/9/2012 3:16PM	Institute Level	Yes
5.	81	55	EN12824558	MM1752069	LOKESH SURENDRA TALELE	Male	OBC	North Maharashtra	NA	NA	40.66	IL	31200	4/9/2012	4/9/2012 3:17PM	Institute Level	Yes
6.	87	53	EN12824537	MM1750369	MORE PRADNYA RAJENDRA	Female	SC	North Maharashtra	NA	NA	54	IL	49525	4/9/2012	4/9/2012 3:13PM	Institute Level	Yes
7.	101	46	EN12824527	MB1901247	GIRASE SHASHIKANT UJJAINSING	Male	DT/VJ	North Maharashtra	NA	NA	44.33	IL	10000	4/9/2012	4/9/2012 3:11PM	Institute Level	Yes
8.	103	45	EN12824468	MB1700606	MAYURI VILAS CHAUDHARI	Female	OBC	North Maharashtra	NA	NA	46	IL	30000	4/9/2012	4/9/2012 3:00PM	Institute Level	Yes
9.	129	63	EN12824449	MM1850370	PALOD HARSH GIVIND	Male	NA	OHU	NA	NA	84.66	IL	20000	4/9/2012	4/9/2012 2:57PM	Institute Level	Yes
10.	122	54.66	EN12824614	NA	ANPAT DEVENDRA SUNIL	Male	Open	North Maharashtra	NA	NA	54.66	IL	5000	4/9/2012	4/9/2012 3:27PM	Institute Level	Yes
11.	124	45.33	EN12824633	NA	PATIL MAYUR JIJABRAO	Male	Open	North Maharashtra	NA	NA	45.33	IL	30000	4/9/2012	4/9/2012 3:32PM	Institute Level	Yes
12.	155	66	EN12824654	NA	SHARMA VINEET SHOBHALAL	Male	NA	OHU	NA	NA	66	IL	10000	4/9/2012	4/9/2012 3:35PM	Institute Level	Yes

Printed On : 9/1/2013 5:02:32 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 1/1**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

Summary of Admitted Candidates for the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Sr. No.	Admission Details	Admitted / Reported Before Cut Off Date	Admitted / Reported After Cut Off Date	Total Admitted
1.	CAP Admitted	92	0	92
2.	Institute Level Admitted	0	12	12
3.	Minority Admitted	0	0	0
4.	J&K Admitted	1	0	1
5.	Against CAP Admitted	0	8	8
6.	NRI Admitted	0	0	0
7.	GOI Admitted	0	0	0
8.	FNS Admitted	0	0	0
9.	PIO Admitted	0	0	0
10.	Over and Above Admitted	0	0	0
	Total	**93**	**20**	**113**

Last Date of Admission : 31/08/2012

Last Date of Reporting : 05/09/2012

Printed On : 9/1/2013 5:02:32 PM **Seal of the Institute** **Signature of the Director/Principal**

For Regional Office Use Only

Seal of the Regional Office **Signature of the Regional Officer**

For DTE Use Only

Seal of the DTE **Signature of the Director**

Print

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510437211] - Electronics and Telecommunication Engg [TFWS]

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 6

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	27731	93	EN12264392	MB1704661	SANKET SUNIL KULKARNI	Male	Open	North Maharashtra	NA	NA	56.33	TFWS	8136	21/7/2012	21/7/2012 5:09PM	Round 1	No
2.	29736	91	EN12153697	MM1751996	PATIL RAHUL GANESH	Male	OBC	North Maharashtra	NA	NA	40	TFWS	8136	24/7/2012	24/7/2012 6:10PM	Round 1	No
3.	33035	88	EN12180659	MM1750719	BORDIA KILOL BIPIN	Male	Open	North Maharashtra	NA	NA	58.66	TFWS	8136	23/7/2012	23/7/2012 2:17PM	Round 1	No
4.	34638	86	EN12215526	MM1750761	BHAVSAR DIVYA SHIRISH	Female	OBC	North Maharashtra	NA	NA	63.66	TFWS	8136	22/7/2012	22/7/2012 2:10PM	Round 1	No
5.	35159	86	EN12217718	MM1752996	PATIL AMOL PANDURANG	Male	OBC	North Maharashtra	NA	NA	46	TFWS	8136	23/7/2012	23/7/2012 4:24PM	Round 1	No
6.	35333	86	EN12260233	MM1750659	DUDANI MAHESHKUMAR NANDLAL	Male	Open	North Maharashtra	NA	NA	57	TFWS	8136	23/7/2012	23/7/2012 4:41PM	Round 1	No

Printed On : 9/1/2013 5:02:51 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 1/1**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

Summary of Admitted Candidates for the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Sr. No.	Admission Details	Admitted / Reported Before Cut Off Date	Admitted / Reported After Cut Off Date	Total Admitted
1.	CAP Admitted	6	0	6
2.	Institute Level Admitted	0	0	0
3.	Minority Admitted	0	0	0
4.	J&K Admitted	0	0	0
5.	Against CAP Admitted	0	0	0
6.	NRI Admitted	0	0	0
7.	GOI Admitted	0	0	0
8.	FNS Admitted	0	0	0
9.	PIO Admitted	0	0	0
10.	Over and Above Admitted	0	0	0
	Total	**6**	**0**	**6**

Last Date of Admission : 31/08/2012
Last Date of Reporting : 05/09/2012

Printed On : 9/1/2013 5:02:51 PM **Seal of the Institute** **Signature of the Director/Principal**

For Regional Office Use Only

Seal of the Regional Office **Signature of the Regional Officer**

For DTE Use Only

Seal of the DTE **Signature of the Director**

Print

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510424610] - Information Technology

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 60

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	18192	45	EN12243519	MB1701468	SOVE PUNAM SUBHASH	Female	OBC	North Maharashtra	NA	NA	41.66	AI	34668	21/7/2012	21/7/2012 4:44PM	Round 1	No
2.	20647	40	EN12208132	MB1901705	RAJPUT GOPAL VITTHALSING	Male	Open	North Maharashtra	NA	NA	45.66	AI	30000	25/7/2012	25/7/2012 4:26PM	Round 1	No
3.	30475	18	EN12111068	MB1704453	MAHASHABDE YASHASHRI DINESH	Female	Open	North Maharashtra	NA	NA	58	AI	61200	23/7/2012	23/7/2012 4:34PM	Round 1	No
4.	30746	17	EN12176013	MB3503477	JUNARE RAJKIRAN VIJAY	Male	OBC	Amravati	NA	NA	49	AI	34668	24/7/2012	24/7/2012 4:32PM	Round 1	No
5.	31859	13	EN12151292	MB1703545	PATHAK AJINKYA NITIN	Male	Open	North Maharashtra	NA	NA	48	AI	61200	23/7/2012	23/7/2012 4:46PM	Round 1	No
6.	102809	53	EN12200729	MB1701850	SUSHIR VARSHA SURESH	Female	NT 2 (NT-C)	North Maharashtra	NA	NA	47.33	GNT2H	8136	22/7/2012	22/7/2012 3:34PM	Round 1	No
7.	82274	61	EN12113759	MM1753682	MAHAJAN HEMALATA VISHNU	Female	OBC	North Maharashtra	NA	NA	59	GOBCH	34668	24/7/2012	24/7/2012 11:46AM	Round 1	No
8.	84575	61	EN12170943	MM1752362	CHAVAN SHUBHAM NARAYANSING	Male	Open	North Maharashtra	NA	NA	67	GOBCH	61200	23/7/2012	23/7/2012 3:14PM	Round 1	No
9.	94614	56	EN12204442	MB1702464	PATIL DIVYA RAJARAM	Female	OBC	North Maharashtra	NA	NA	77.33	GOBCH	34668	23/7/2012	23/7/2012 1:23PM	Round 1	No
10.	85872	60	EN12194242	MB1803813	AHIRRAO KIRTI KIRAN	Female	OBC	North Maharashtra	NA	NA	63	GOBCO	34668	24/7/2012	24/7/2012 1:06PM	Round 1	No
11.	86527	60	EN12225939	MM1752091	HIRE MEHULKUMAR SHANTARAM	Male	OBC	North Maharashtra	NA	NA	60.33	GOBCO	34668	25/7/2012	25/7/2012 1:20PM	Round 1	No
12.	56350	72	EN12156246	MM1753603	PATEL BHAGYESH SUNIL	Male	Open	North Maharashtra	NA	NA	61.33	GOPENH	54000	23/7/2012	23/7/2012 4:22PM	Round 1	No

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510424610] - Information Technology

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 60

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
13.	65294	68	EN12209835	MB1801694	MOHITE SAGAR SUBHASH	Male	SC	North Maharashtra	NA	NA	53	GOPENH	8136	23/7/2012	23/7/2012 4:17PM	Round 1	No
14.	68393	67	EN12195083	MM1751555	PAWAR VARSHA KANTILAL	Female	OBC	North Maharashtra	NA	NA	57.33	GOPENH	34668	24/7/2012	24/7/2012 2:35PM	Round 1	No
15.	69781	66	EN12158911	MB1702822	PAWAR SHUBHANGI PRATAP	Female	OBC	North Maharashtra	NA	NA	48	GOPENH	34668	22/7/2012	22/7/2012 3:57PM	Round 1	No
16.	69925	66	EN12197560	MB1702416	PATIL RAVINA SUNIL	Female	OBC	North Maharashtra	NA	NA	54	GOPENH	34668	23/7/2012	23/7/2012 6:51PM	Round 1	No
17.	70943	66	EN12272518	MB1700522	DESHMUKH KIRAN SANJAY	Female	NT 2 (NT-C)	North Maharashtra	NA	NA	45.66	GOPENH	8136	24/7/2012	24/7/2012 3:14PM	Round 1	No
18.	71925	65	EN12221846	MM1752388	SHIRUDE PRIYANKA MADHUKAR	Female	OBC	North Maharashtra	NA	NA	45.33	GOPENH	25000	25/7/2012	25/7/2012 11:45AM	Round 1	No
19.	73870	65	EN12162211	MM1750412	BHARAMBE CHAITALI MADHUKAR	Female	OBC	North Maharashtra	NA	NA	43.66	GOPENH	34668	22/7/2012	22/7/2012 1:00PM	Round 1	No
20.	74570	64	EN12256699	MB1704697	MAHAJAN SAMADHAN POPAT	Male	OBC	North Maharashtra	NA	NA	39.66	GOPENH	34668	25/7/2012	25/7/2012 3:22PM	Round 1	No
21.	76152	64	EN12136365	MM1752158	KOLI SHITAL PUNDLIK	Female	SBC	North Maharashtra	NA	NA	43.33	GOPENH	8136	22/7/2012	22/7/2012 1:11PM	Round 1	No
22.	76190	64	EN12129115	MM1751759	VISHAKA BHOLE	Female	OBC	North Maharashtra	NA	NA	59.33	GOPENH	34668	21/7/2012	21/7/2012 3:36PM	Round 1	No
23.	81683	62	EN12173244	MM2950605	BHUJBAL DATTATRY SUBHASH	Male	SBC	B.A.M.U.	NA	NA	76.66	GOPENO	8136	24/7/2012	24/7/2012 2:17PM	Round 1	No
24.	87535	59	EN12107807	MB3502267	CHOPADE BHUSHAN SATISH	Male	OBC	Amravati	NA	NA	77	GOPENO	34668	23/7/2012	23/7/2012 12:46PM	Round 1	No

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510424610] - Information Technology

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 60

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
25.	93404	57	EN12222156	MM3650579	KATKHEDE PRAJYOT SANJAY	Male	OBC	Amravati	NA	NA	50.66	GOPENO	34668	24/7/2012	24/7/2012 5:41PM	Round 1	No
26.	103297	52	EN12173008	MM3550342	NAPHADE NIKHIL RAMESH	Male	OBC	Amravati	NA	NA	43.33	GOPENO	34668	22/7/2012	22/7/2012 12:29PM	Round 1	No
27.	112945	44	EN12134425	MB3504481	MANWAR SUSHANT NARAYAN	Male	SC	Amravati	NA	NA	48.66	GOPENO	8136	23/7/2012	23/7/2012 2:53PM	Round 1	No
28.	77601	63	EN12270342	MM1752759	PATIL AKSHAYKUMAR RAJARAM	Male	OBC	North Maharashtra	NA	NA	50.66	GSCH	34668	24/7/2012	24/7/2012 6:00PM	Round 1	No
29.	78057	63	EN12199831	MB1703520	ISANE KETAN MANOHAR	Male	SBC	North Maharashtra	NA	NA	53.66	GSCH	8136	23/7/2012	23/7/2012 11:17AM	Round 1	No
30.	78339	63	EN12163505	MM1751460	CHAUDHARI DIMPLE VIJAY	Female	OBC	North Maharashtra	NA	DEF1	65.66	GSCH	34668	24/7/2012	24/7/2012 1:23PM	Round 1	No
31.	89394	59	EN12263962	MM1752411	DHAKE SNEHAL SOPAN	Female	OBC	North Maharashtra	NA	NA	43.66	GSCO	34668	22/7/2012	22/7/2012 1:16PM	Round 1	No
32.	79191	63	EN12118154	MM1750918	SARODE NAMITA RAMKRUSHNA	Female	OBC	North Maharashtra	NA	NA	56.66	GSTH	34668	22/7/2012	22/7/2012 2:25PM	Round 1	No
33.	81255	62	EN12123017	MB1700298	MAHAJAN SWAPNIL VASANT	Male	OBC	North Maharashtra	NA	NA	49.66	GSTH	30000	22/7/2012	22/7/2012 5:09PM	Round 1	No
34.	89860	58	EN12267224	MB1701062	BHOLE KAJAL PRALHAD	Female	OBC	North Maharashtra	NA	NA	47	GSTO	34668	23/7/2012	23/7/2012 3:06PM	Round 1	No
35.	81657	62	EN12187586	MM1752550	MAHAJAN MAMTA SUBHASH	Female	OBC	North Maharashtra	NA	NA	61.66	GVJH	34668	22/7/2012	22/7/2012 5:13PM	Round 1	No
36.	92664	57	EN12143316	MM1751521	BIRPANKAR MOHIT LALCHAND	Male	NT 1 (NT-B)	North Maharashtra	NA	NA	42.66	LNT1O	8136	22/7/2012	22/7/2012 4:11PM	Round 1	No

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510424610] - Information Technology

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 60

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
37.	92405	57	EN12147590	MM1750922	SHINDE VARSHA DILEEP	Female	OBC	North Maharashtra	NA	NA	70.33	LOBCH	34668	23/7/2012	23/7/2012 4:55PM	Round 1	No
38.	92539	57	EN12191451	MB1702115	SONAWANE SANDIP DNYANESHWAR	Male	SBC	North Maharashtra	NA	NA	73.33	LOBCH	8136	21/7/2012	21/7/2012 5:40PM	Round 1	No
39.	83657	61	EN12144414	MB1700709	BHARAMBE POOJA MANOHAR	Female	OBC	North Maharashtra	NA	NA	43.33	LOBCO	34668	23/7/2012	23/7/2012 4:36PM	Round 1	No
40.	48751	76	EN12133294	MM1752489	KAWATE KARISHMA GAJANAN	Female	OBC	North Maharashtra	NA	NA	63.33	LOPENH	34668	23/7/2012	23/7/2012 2:01PM	Round 1	No
41.	66194	68	EN12265632	MM1753566	AMRITKAR VIDYA RAMESH	Female	OBC	North Maharashtra	NA	NA	53.66	LOPENH	34668	23/7/2012	23/7/2012 3:57PM	Round 1	No
42.	66661	68	EN12111001	MB1702245	SONAWANE PRIYANKA SHAMKANT	Female	OBC	North Maharashtra	NA	NA	57	LOPENH	34668	23/7/2012	23/7/2012 12:41PM	Round 1	No
43.	82492	61	EN12105131	MB1704880	SHIVPUJE PAYAL ANIL	Female	Open	North Maharashtra	NA	NA	64.66	LOPENO	31000	24/7/2012	24/7/2012 5:56PM	Round 1	No
44.	101305	53	EN12158633	MM3651741	AGARKAR MONALI UMAKANT	Female	OBC	Amravati	NA	NA	51.33	LOPENO	34668	25/7/2012	25/7/2012 1:12PM	Round 1	No
45.	78028	63	EN12144615	MM1753151	PATIL PUNAM CHANDRAKANT	Female	OBC	North Maharashtra	NA	NA	56	LSCH	34668	24/7/2012	24/7/2012 11:44AM	Round 1	No
46.	102246	53	EN12265648	MB1704181	TAYADE SANGHAPRIYA RAMESH	Female	SC	North Maharashtra	NA	NA	61.33	LSCH	8136	25/7/2012	25/7/2012 4:32PM	Round 1	No
47.	94867	56	EN12245910	MB1703458	BONDARE SWATI BAPURAO	Female	NT 3 (NT-D)	North Maharashtra	NA	NA	57	LSTO	8136	24/7/2012	24/7/2012 5:52PM	Round 1	No
48.	92575	57	EN12159726	MM1751962	NARKHEDE PRASHALI KISHOR	Female	OBC	North Maharashtra	NA	NA	48	LVJH	34668	22/7/2012	22/7/2012 12:15PM	Round 1	No

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510424610] - Information Technology

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 60

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
49.	92612	57	EN12260033	MM1752437	NARA DEEPALI NARESH	Female	Open	North Maharashtra	NA	NA	52.33	PHCH	61200	24/7/2012	24/7/2012 12:14PM	Round 1	No
50.	92856	57	EN12115507	MB1703778	PATIL NILIMA SAHEBRAO	Female	OBC	North Maharashtra	NA	DEF1	46.66	PHCH	34668	22/7/2012	22/7/2012 4:20PM	Round 1	No
51.	85517	60	EN12261382	MB1901506	SAINDANE RONIT ASHOKBHAI	Male	OBC	North Maharashtra	NA	NA	63.33	GOBCH	34668	4/8/2012	4/8/2012 3:28PM	Round 2	No
52.	88295	59	EN12266261	MM1753240	MOTE KOMAL DNYANDEO	Female	OBC	North Maharashtra	NA	NA	53	GOBCH	34668	3/8/2012	3/8/2012 3:50PM	Round 2	No
53.	105803	51	EN12237058	MB1700855	RAUT SUNAYANA SHIVACHARAN	Female	NT 2 (NT-C)	North Maharashtra	NA	NA	46.33	LNT2H	8136	6/8/2012	6/8/2012 1:32PM	Round 2	No
54.	77745	63	EN12231654	MM1750700	WANI TRUPTI DIPAK	Female	OBC	North Maharashtra	NA	NA	73.66	LOPENH	34668	4/8/2012	4/8/2012 5:38PM	Round 2	No
55.	82248	61	EN12148510	MB1704786	GOSAVI DIPALI DILIP	Female	NT 1 (NT-B)	North Maharashtra	NA	NA	58	LOPENO	1000	6/8/2012	6/8/2012 1:58PM	Round 2	No
56.	107135	50	EN12258058	MB1700204	KHAIRNAR SANDIP YUVRAJ	Male	SC	North Maharashtra	NA	NA	50.66	GOPEN	8136	16/8/2012	16/8/2012 2:03PM	Round 3	No

Printed On : 9/1/2013 5:01:11 PM **Seal of the Institute** **Signature of the Director/Principal**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510424610] - Information Technology

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Admitted Against CAP

Quota : 4

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	150	52.77	EN12824243	NA	PATEL PARIMAL CHIMANLAL	Male	NA	OHU	NA	NA	52.77	ACAP	61500	4/9/2012	4/9/2012 1:48PM	Institute Level	Yes
2.	160	46.44	EN12824282	NA	SHARMA SONA SUNIL	Female	NA	OHU	NA	NA	46.44	ACAP	61500	4/9/2012	4/9/2012 2:05PM	Institute Level	Yes

Printed On : 9/1/2013 5:01:11 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 1/1**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

Summary of Admitted Candidates for the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Sr. No.	Admission Details	Admitted / Reported Before Cut Off Date	Admitted / Reported After Cut Off Date	Total Admitted
1.	CAP Admitted	56	0	56
2.	Institute Level Admitted	0	0	0
3.	Minority Admitted	0	0	0
4.	J&K Admitted	0	0	0
5.	Against CAP Admitted	0	2	2
6.	NRI Admitted	0	0	0
7.	GOI Admitted	0	0	0
8.	FNS Admitted	0	0	0
9.	PIO Admitted	0	0	0
10.	Over and Above Admitted	0	0	0
	Total	**56**	**2**	**58**

Last Date of Admission : 31/08/2012

Last Date of Reporting : 05/09/2012

Printed On : 9/1/2013 5:01:11 PM **Seal of the Institute** **Signature of the Director/Principal**

For Regional Office Use Only

Seal of the Regional Office **Signature of the Regional Officer**

For DTE Use Only

Seal of the DTE **Signature of the Director**

Print

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510424611] - Information Technology [TFWS]

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 3

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	45808	78	EN12169772	MM1750994	WANKHEDE SHWETA VIJAY	Female	OBC	North Maharashtra	NA	NA	60	TFWS	8136	23/7/2012	23/7/2012 1:35PM	Round 1	No
2.	54015	74	EN12153069	MB1702177	WAGH PUJA VIJAY	Female	OBC	North Maharashtra	NA	NA	68.33	TFWS	8136	23/7/2012	23/7/2012 5:02PM	Round 1	No
3.	55591	73	EN12192353	MM1851157	SHINDE TEJASWINI RAVINDRA	Female	OBC	North Maharashtra	NA	NA	70.66	TFWS	8136	23/7/2012	23/7/2012 12:51PM	Round 1	No

Printed On : 9/1/2013 5:01:31 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 1/1**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

Summary of Admitted Candidates for the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Sr. No.	Admission Details	Admitted / Reported Before Cut Off Date	Admitted / Reported After Cut Off Date	Total Admitted
1.	CAP Admitted	3	0	3
2.	Institute Level Admitted	0	0	0
3.	Minority Admitted	0	0	0
4.	J&K Admitted	0	0	0
5.	Against CAP Admitted	0	0	0
6.	NRI Admitted	0	0	0
7.	GOI Admitted	0	0	0
8.	FNS Admitted	0	0	0
9.	PIO Admitted	0	0	0
10.	Over and Above Admitted	0	0	0
	Total	**3**	**0**	**3**

Last Date of Admission : 31/08/2012
Last Date of Reporting : 05/09/2012

Printed On : 9/1/2013 5:01:31 PM **Seal of the Institute** **Signature of the Director/Principal**

For Regional Office Use Only

Seal of the Regional Office **Signature of the Regional Officer**

For DTE Use Only

Seal of the DTE **Signature of the Director**

Print

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510461210] - Mechanical Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 96

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	2793	123	EN12164689	MM1752851	AMEY NEVE	Male	OBC	North Maharashtra	NA	NA	69.33	AI	34668	23/7/2012	23/7/2012 6:41PM	Round 1	No
2.	4090	106	EN12200030	MM1753433	SADIQUE RAJU DESHMUKH	Male	Open	North Maharashtra	NA	NA	47	AI	30000	25/7/2012	25/7/2012 12:37PM	Round 1	No
3.	4562	101	EN12244977	MM1261821	PATIL BHUSHAN GULABSING	Male	Open	Mumbai	NA	NA	61.33	AI	61200	24/7/2012	24/7/2012 2:27PM	Round 1	No
4.	5812	90	EN12183320	91103783	SHUBHAM KHANDELWAL	Male	NA	NA	NA	NA	80.33	AI	61200	25/7/2012	25/7/2012 3:10PM	Round 1	No
5.	6302	87	EN12175244	23409680	GAURAV LAD	Male	NA	NA	NA	NA	60.33	AI	61500	24/7/2012	24/7/2012 3:18PM	Round 1	No
6.	7296	80	EN12106555	MM1753545	NIKHIL SANJAY RANE	Male	Open	North Maharashtra	NA	NA	84	AI	61200	21/7/2012	21/7/2012 2:21PM	Round 1	No
7.	9647	69	EN12271417	MB1800401	PATIL YOGESH DILIP	Male	OBC	North Maharashtra	NA	NA	72	AI	34668	23/7/2012	23/7/2012 5:36PM	Round 1	No
8.	10772	65	EN12173585	MM3550624	KALE SAGAR GAJANAN	Male	OBC	Amravati	NA	NA	46.66	AI	34668	23/7/2012	23/7/2012 12:06PM	Round 1	No
9.	10808	64	EN12259994	MB3501562	SHEGOKAR NITIN MADHUKAR	Male	SC	Amravati	NA	NA	53	AI	8136	23/7/2012	23/7/2012 6:07PM	Round 1	No
10.	12214	60	EN12253497	MB1802213	PATIL PRATIK JAGDISH	Male	OBC	North Maharashtra	NA	NA	63	AI	34668	23/7/2012	23/7/2012 5:38PM	Round 1	No
11.	12683	59	EN12104970	MB1903549	KOKANI SWAPNIL KRISHNA	Male	ST	North Maharashtra	NA	NA	47.33	AI	8136	22/7/2012	22/7/2012 12:05PM	Round 1	No
12.	12904	58	EN12168416	MB1903611	YASHRAJ PAWAR	Male	OBC	North Maharashtra	NA	NA	83.33	AI	34668	22/7/2012	22/7/2012 3:17PM	Round 1	No

Printed On : 9/1/2013 5:03:45 PM **Seal of the Institute** **Signature of the Director/Principal**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510461210] - Mechanical Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 96

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
13.	13021	58	EN12130476	MB4400214	SHAMBHARKAR ANUP VIKAS	Male	SC	Gondwana	NA	NA	73	AI	8136	24/7/2012	24/7/2012 1:12PM	Round 1	No
14.	13254	57	EN12229347	MM1850445	PARDESHI GAURAO DIPAK	Male	OBC	North Maharashtra	NA	NA	56.33	AI	34668	24/7/2012	24/7/2012 3:47PM	Round 1	No
15.	14334	54	EN12202434	MM1750797	MAHAJAN PRAFULLA SANJAY	Male	OBC	North Maharashtra	NA	NA	52.33	AI	34668	24/7/2012	24/7/2012 1:41PM	Round 1	No
16.	51986	75	EN12207952	MM1752214	VISHAL PAWAR	Male	Open	North Maharashtra	NA	DEF1	76	DEF	61200	22/7/2012	22/7/2012 5:05PM	Round 1	No
17.	38544	83	EN12157238	MM1751225	CHAVAN ABHINAV AVINASH	Male	NT 1 (NT-B)	North Maharashtra	NA	NA	77	GNT1H	8136	24/7/2012	24/7/2012 1:16PM	Round 1	No
18.	38393	83	EN12117681	MM1752728	PATIL VIKAS KESHAV	Male	NT 2 (NT-C)	North Maharashtra	NA	NA	56.66	GNT2H	8136	23/7/2012	23/7/2012 1:40PM	Round 1	No
19.	65986	68	EN12106299	MB1801929	VARADE KARAN SHIVAJI	Male	NT 3 (NT-D)	North Maharashtra	NA	NA	46.33	GNT3H	8136	23/7/2012	23/7/2012 1:38PM	Round 1	No
20.	32916	88	EN12206556	MB1803462	NANDRE AMOL GOPICHAND	Male	OBC	North Maharashtra	NA	NA	87	GOBCH	34668	23/7/2012	23/7/2012 5:59PM	Round 1	No
21.	32982	88	EN12135247	MM1750806	CHAUDHARI SAMEER EKNATH	Male	OBC	North Maharashtra	NA	NA	78	GOBCH	34668	21/7/2012	21/7/2012 4:11PM	Round 1	No
22.	33006	88	EN12175211	MB1903514	CHAVAN SANKET SANJAYRAO	Male	Open	North Maharashtra	NA	NA	86.66	GOBCH	61200	23/7/2012	23/7/2012 4:08PM	Round 1	No
23.	33459	87	EN12149406	MM1753493	PATIL GOPAL KAILAS	Male	Open	North Maharashtra	NA	NA	63.33	GOBCH	61200	22/7/2012	22/7/2012 4:32PM	Round 1	No
24.	33487	87	EN12251294	MM1753012	MAHAJAN MAYUR RAVINDRA	Male	OBC	North Maharashtra	NA	NA	60.33	GOBCH	34668	22/7/2012	22/7/2012 3:26PM	Round 1	No

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510461210] - Mechanical Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 96

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
25.	33959	87	EN12200620	MB1703448	PATIL VISHAL JIVAN	Male	OBC	North Maharashtra	NA	NA	64.33	GOBCH	34668	24/7/2012	24/7/2012 6:06PM	Round 1	No
26.	35059	86	EN12257009	MM2250798	PATIL BHUSHAN SANJAY	Male	OBC	Pune	NA	NA	49.33	GOBCO	34668	25/7/2012	25/7/2012 4:44PM	Round 1	No
27.	36820	85	EN12210036	MB4201146	PANDAO HIMANSHU ASHOKRAO	Male	OBC	Nagpur	NA	NA	77.66	GOBCO	34668	23/7/2012	23/7/2012 1:04PM	Round 1	No
28.	36996	84	EN12173462	MM3652121	ATTARDE KESHAV ARVIND	Male	OBC	Amravati	NA	NA	53	GOBCO	34668	23/7/2012	23/7/2012 1:15PM	Round 1	No
29.	14998	112	EN12171891	MM1751248	BHAVSAR SANKET SANJAY	Male	OBC	North Maharashtra	NA	NA	57.33	GOPENH	34668	25/7/2012	25/7/2012 4:34PM	Round 1	No
30.	23596	98	EN12219200	MM1751782	DESHMUKH HARSHAL VIJAY	Male	OBC	North Maharashtra	NA	NA	68.66	GOPENH	34668	25/7/2012	25/7/2012 4:19PM	Round 1	No
31.	24095	98	EN12170025	MB1700433	CHAUDHARI CHETAN RAMESH	Male	OBC	North Maharashtra	NA	NA	72.33	GOPENH	34668	24/7/2012	24/7/2012 4:51PM	Round 1	No
32.	27307	94	EN12250942	MB1700581	NILE KIRAN VISHWANATH	Male	NT 2 (NT-C)	North Maharashtra	NA	NA	75	GOPENH	8136	24/7/2012	24/7/2012 1:04PM	Round 1	No
33.	27448	93	EN12216289	MM1751992	PATIL PAVAN PARMESHWAR	Male	OBC	North Maharashtra	NA	NA	46.66	GOPENH	34668	23/7/2012	23/7/2012 5:16PM	Round 1	No
34.	27715	93	EN12216341	MM1750766	JAWARE HARSHVARDHAN VASANTRAO	Male	OBC	North Maharashtra	NA	NA	61.33	GOPENH	34668	24/7/2012	24/7/2012 3:12PM	Round 1	No
35.	27955	93	EN12213664	MM1753064	PATIL NILESH ADHIKAR	Male	OBC	North Maharashtra	NA	NA	42	GOPENH	34668	24/7/2012	24/7/2012 5:32PM	Round 1	No
36.	28397	92	EN12115655	MM1751573	TOKE AMOL CHANDRASEN	Male	OBC	North Maharashtra	NA	NA	77.33	GOPENH	34668	23/7/2012	23/7/2012 1:58PM	Round 1	No

Printed On : 9/1/2013 5:03:45 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 3/8**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510461210] - Mechanical Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 96

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
37.	30121	91	EN12236177	MM1750052	PATIL SANKET ARVIND	Male	OBC	North Maharashtra	NA	NA	57.66	GOPENH	34668	23/7/2012	23/7/2012 4:03PM	Round 1	No
38.	30165	90	EN12168027	MB1702900	SINDHI PAWAN VIJAYKUMAR	Male	Open	North Maharashtra	NA	NA	75.33	GOPENH	61200	24/7/2012	24/7/2012 3:50PM	Round 1	No
39.	30751	90	EN12158206	MM1752564	SHUBHAM SANJAY GUJARATHI	Male	Open	North Maharashtra	NA	NA	58	GOPENH	61200	23/7/2012	23/7/2012 6:43PM	Round 1	No
40.	31962	89	EN12238606	MM1753643	PANJABI YASH RAJKUMAR	Male	Open	North Maharashtra	NA	NA	78.33	GOPENH	61200	24/7/2012	24/7/2012 6:02PM	Round 1	No
41.	32158	89	EN12138325	MB1700917	RANE KUNAL DINESH	Male	OBC	North Maharashtra	NA	NA	65.66	GOPENH	34668	24/7/2012	24/7/2012 2:23PM	Round 1	No
42.	32161	89	EN12233078	MM1850802	PARDESHI ARPIT VINOD	Male	OBC	North Maharashtra	NA	NA	70	GOPENH	34668	21/7/2012	21/7/2012 2:31PM	Round 1	No
43.	32825	88	EN12159227	MB1902714	MAHALE VIKAS KRUSHNA	Male	OBC	North Maharashtra	NA	NA	76.66	GOPENH	34668	21/7/2012	21/7/2012 3:02PM	Round 1	No
44.	23407	98	EN12247189	MM2753318	KAPIL MANDASING KHANDALKAR	Male	Open	B.A.M.U.	NA	NA	60	GOPENO	50000	22/7/2012	22/7/2012 12:23PM	Round 1	No
45.	29672	91	EN12176022	MM2753471	PRAVIN EKNATH PRADHAN	Male	Open	B.A.M.U.	NA	NA	54.66	GOPENO	61200	24/7/2012	24/7/2012 1:35PM	Round 1	No
46.	30359	90	EN12237413	MM3152217	SURYAWANSHI ANIL BHASKAR	Male	Open	S.R.T.M.U.	NA	NA	57	GOPENO	61200	24/7/2012	24/7/2012 6:15PM	Round 1	No
47.	31223	89	EN12137924	MM3651689	DHOOT NIKHIL ANIL	Male	Open	Amravati	NA	NA	72	GOPENO	61	25/7/2012	25/7/2012 3:28PM	Round 1	No
48.	32711	88	EN12232647	MM2753417	AWARE SUDHIR SHRIRAM	Male	Open	B.A.M.U.	NA	NA	67.33	GOPENO	61200	22/7/2012	22/7/2012 1:52PM	Round 1	No

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510461210] - Mechanical Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 96

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
49.	33391	87	EN12192603	MB1400143	SYED ASHIR NAVED SYED ARIF	Male	Open	Mumbai	NA	NA	79.66	GOPENO	61200	24/7/2012	24/7/2012 1:37PM	Round 1	No
50.	38933	83	EN12194548	MM1751737	SURWADE SACHIN SAMADHAN	Male	SC	North Maharashtra	NA	NA	46	GSCH	8136	23/7/2012	23/7/2012 5:54PM	Round 1	No
51.	44029	79	EN12156209	MM1851081	SOMAVANSHI PAWAN DHANRAJ	Male	SC	North Maharashtra	NA	NA	67.66	GSCH	8136	23/7/2012	23/7/2012 6:47PM	Round 1	No
52.	59337	71	EN12134137	MM1750731	WAGH PRAVIN MADHUKAR	Male	SC	North Maharashtra	NA	NA	54.33	GSCH	8136	23/7/2012	23/7/2012 6:49PM	Round 1	No
53.	67246	67	EN12182428	MB1703133	BAVISKAR SWAPNIL SURESH	Male	SC	North Maharashtra	NA	NA	51.33	GSCH	8136	21/7/2012	21/7/2012 4:54PM	Round 1	No
54.	68326	67	EN12152399	MB1701976	SURWADE RAJESH RAVINDRA	Male	SC	North Maharashtra	NA	NA	41.33	GSCH	8136	24/7/2012	24/7/2012 11:58AM	Round 1	No
55.	57036	72	EN12137610	MB4203768	PIYUSH SURESH SHINGADE	Male	SC	Nagpur	NA	NA	73.66	GSCO	8136	23/7/2012	23/7/2012 3:45PM	Round 1	No
56.	95262	56	EN12173087	MB1704085	PAWARA KESHARAM SHOBHARAM	Male	ST	North Maharashtra	NA	NA	49.33	GSTH	8136	23/7/2012	23/7/2012 4:49PM	Round 1	No
57.	97691	55	EN12268193	MB1900384	RAUT MAGAN MOTYA	Male	ST	North Maharashtra	NA	NA	62.66	GSTH	8136	25/7/2012	25/7/2012 4:02PM	Round 1	No
58.	60160	70	EN12217519	MM2751658	SONAWANE DNYANESHWAR DATTU	Male	SC	B.A.M.U.	NA	NA	61.66	GSTO	8136	22/7/2012	22/7/2012 4:31PM	Round 1	No
59.	60106	71	EN12139964	MB1700705	PATIL HARSHAL SANJEEV	Male	DT/VJ	North Maharashtra	NA	DEF2	76.33	GVJH	8136	23/7/2012	23/7/2012 3:55PM	Round 1	No
60.	60948	70	EN12262503	MB1803015	GIRASE AVINASH SURESHSING	Male	DT/VJ	North Maharashtra	NA	NA	68	GVJH	8136	22/7/2012	22/7/2012 2:12PM	Round 1	No

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510461210] - Mechanical Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 96

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
61.	36089	85	EN12203007	MM1751162	HEMAL HITENDRA CHAUDHARI	Male	OBC	North Maharashtra	NA	NA	63.33	LNT3H	34668	22/7/2012	22/7/2012 2:06PM	Round 1	No
62.	33970	87	EN12179419	MM1750116	PHIRKE MAYUR PRAMOD	Male	OBC	North Maharashtra	NA	NA	65	LOBCH	34668	21/7/2012	21/7/2012 2:39PM	Round 1	No
63.	97394	55	EN12254556	MB1702770	KASAR POOJA CHANDRAKANT	Female	OBC	North Maharashtra	NA	NA	74	LOBCH	34668	24/7/2012	24/7/2012 3:29PM	Round 1	No
64.	98668	55	EN12159442	MM1752133	PATIL SUPRIYA SUBHASH	Female	OBC	North Maharashtra	NA	NA	61.66	LOBCH	34668	24/7/2012	24/7/2012 1:26PM	Round 1	No
65.	37333	84	EN12132036	MM4152480	PRATIK DESHMUKH	Male	OBC	Nagpur	NA	NA	90.74	LOBCO	34668	25/7/2012	25/7/2012 1:33PM	Round 1	No
66.	38250	84	EN12261656	MB1800528	MORE SUNAYANA SUNIL	Female	SC	North Maharashtra	NA	NA	81.33	LOPENH	8136	25/7/2012	25/7/2012 2:26PM	Round 1	No
67.	69483	66	EN12213971	MB1702175	CHAVAN GAYTRI RANJEET	Female	Open	North Maharashtra	NA	NA	53.33	LOPENH	61200	23/7/2012	23/7/2012 4:09PM	Round 1	No
68.	81760	62	EN12256827	MB1704474	PATIL PRANJALI VIKAS	Female	OBC	North Maharashtra	NA	NA	82	LOPENH	34668	23/7/2012	23/7/2012 1:55PM	Round 1	No
69.	83018	61	EN12214055	MM1751875	DHANGAR YOGITA HIRALAL	Female	NT 2 (NT-C)	North Maharashtra	NA	NA	42.33	LOPENH	8136	24/7/2012	24/7/2012 1:59PM	Round 1	No
70.	96813	55	EN12130015	MM1750404	MAHAJAN ASHWINI KISHOR	Female	OBC	North Maharashtra	NA	NA	54.33	LOPENH	34668	23/7/2012	23/7/2012 2:38PM	Round 1	No
71.	92181	57	EN12204158	MM2264180	RAYSING KALYANI RAMMURTI	Female	SBC	Pune	NA	NA	57	LOPENO	8136	23/7/2012	23/7/2012 4:38PM	Round 1	No
72.	110797	47	EN12239087	MB4401300	PRIYANKA DHARMENDRA ASKAR	Female	NT 2 (NT-C)	Gondwana	NA	NA	52.33	LOPENO	8136	24/7/2012	24/7/2012 2:44PM	Round 1	No

Printed On : 9/1/2013 5:03:45 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 6/8**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510461210] - Mechanical Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 96

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
73.	68685	67	EN12175425	MM1752457	SALUNKE MAHENDRA SIDDHARTRH	Male	SC	North Maharashtra	NA	NA	54	LSCH	8136	24/7/2012	24/7/2012 6:04PM	Round 1	No
74.	69217	67	EN12158012	MM1752189	VISHVESH BAVISKAR	Male	SC	North Maharashtra	NA	NA	53.66	LSCH	8136	21/7/2012	21/7/2012 5:56PM	Round 1	No
75.	54742	73	EN12253784	MM2850022	SHUBHAM BABURAO PAGARE	Male	SC	B.A.M.U.	NA	NA	66	LSCO	8136	21/7/2012	21/7/2012 5:01PM	Round 1	No
76.	95392	56	EN12257147	MB1703560	TADAVI SHOAB MAHEBUB	Male	ST	North Maharashtra	NA	NA	47	LSTH	8136	25/7/2012	25/7/2012 4:22PM	Round 1	No
77.	37049	84	EN12133963	MB1701101	PATIL VIKKI ARUN	Male	OBC	North Maharashtra	NA	NA	69	PH1H	34668	25/7/2012	25/7/2012 5:08PM	Round 1	No
78.	37910	84	EN12199859	MM1751022	ANURAG PRAMOD BHAMRE	Male	OBC	North Maharashtra	NA	NA	81.66	PH2H	34668	21/7/2012	21/7/2012 5:31PM	Round 1	No
79.	38230	84	EN12206940	MB1703468	MANISH AVINASH KHADKE	Male	OBC	North Maharashtra	NA	NA	55.66	PH3H	34668	23/7/2012	23/7/2012 3:58PM	Round 1	No
80.	39019	83	EN12208585	MB1801168	BHADANE JAYESH RAVINDRA	Male	OBC	North Maharashtra	NA	NA	86.66	PHCH	34668	23/7/2012	23/7/2012 5:30PM	Round 1	No
81.	14080	55	EN12178447	MM1750190	SAINDANE DIPAK SUDHAKAR	Male	OBC	North Maharashtra	NA	NA	50	AI	34668	3/8/2012	3/8/2012 5:22PM	Round 2	No
82.	72924	65	EN12122920	MM3550017	BORSE PURUSHOTTAM DAMODAR	Male	NT 2 (NT-C)	Amravati	NA	NA	43.66	GNT2O	8136	3/8/2012	3/8/2012 1:34PM	Round 2	No
83.	43129	80	EN12174439	MM1753179	PATIL UMESH NARAYAN	Male	OBC	North Maharashtra	NA	NA	69.33	GOBCH	34668	3/8/2012	3/8/2012 4:56PM	Round 2	No
84.	35835	85	EN12222243	MB1803742	NAJMULHASAN MAHEMOODULHASAN	Male	OBC	North Maharashtra	NA	NA	71	GOPENH	34668	4/8/2012	4/8/2012 3:44PM	Round 2	No

Printed On : 9/1/2013 5:03:45 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 7/8**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510461210] - Mechanical Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 96

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
85.	40323	82	EN12171132	MM1850138	PRANAV SUTARIYA	Male	Open	North Maharashtra	NA	NA	55.33	GOPENH	61200	3/8/2012	3/8/2012 5:14PM	Round 2	No
86.	24704	97	EN12121296	MB3501674	TAYADE ANANTA SAMADHAN	Male	OBC	Amravati	NA	NA	84	GOPENO	34668	3/8/2012	3/8/2012 1:27PM	Round 2	No
87.	35197	86	EN12183112	MB1310090	PRASAD NITIN DINESHKUMAR	Male	Open	Mumbai	NA	NA	63.33	GOPENO	61200	4/8/2012	4/8/2012 12:58PM	Round 2	No
88.	65435	68	EN12273144	MM3550379	TASTODE RAJESH MAHADEV	Male	SC	Amravati	NA	NA	50.66	GSCO	8136	5/8/2012	5/8/2012 4:50PM	Round 2	No
89.	48456	77	EN12129767	MM4451442	AMZARE VIPUL SURESH	Male	NT 1 (NT-B)	Gondwana	NA	NA	71	GVJO	8136	4/8/2012	4/8/2012 5:16PM	Round 2	No
90.	47298	77	EN12112523	MM1752117	MAHAJAN RAVINDRA SHALIK	Male	OBC	North Maharashtra	NA	NA	50	LOPENH	34668	3/8/2012	3/8/2012 5:45PM	Round 2	No
91.	37879	84	EN12260007	MB3504334	AKHADE KALYAN VASANTRAO	Male	OBC	Amravati	NA	NA	64.33	LOPENO	34668	4/8/2012	4/8/2012 2:22PM	Round 2	No
92.	87431	59	EN12220157	MB1804290	THAKUR LALIT AMRUT	Male	ST	North Maharashtra	NA	NA	62	LSTH	8136	4/8/2012	4/8/2012 12:48PM	Round 2	No
93.	69078	67	EN12115484	MB4203631	DADEMAL PRANAY DOMAJI	Male	ST	Nagpur	NA	NA	73.66	LSTO	8136	4/8/2012	4/8/2012 1:32PM	Round 2	No
94.	89410	59	EN12116391	MB1803122	PATIL RAKESH ABAJI	Male	NT 2 (NT-C)	North Maharashtra	NA	NA	62.66	GOPEN	1000	16/8/2012	16/8/2012 2:24PM	Round 3	No
95.	106974	50	EN12238211	MM1752675	SAINDANE KAPIL ASHOK	Male	OBC	North Maharashtra	NA	NA	45.66	GOPEN	5000	16/8/2012	16/8/2012 2:07PM	Round 3	No

Printed On : 9/1/2013 5:03:45 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 8/8**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510461210] - Mechanical Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Jammu-Kashmir Quota

Quota : 1

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	655	65.00	EN12229377	NA	LALIT BABU SAXENA	Male	NA	NA	NA	NA	65	JK	27130	4/8/2012	4/8/2012 2:15PM	J & K Counseling	No

Printed On : 9/1/2013 5:03:45 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 1/1**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510461210] - Mechanical Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Admitted Against CAP

Quota : 1

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	163	60.33	EN12823819	NA	SATISH KUMAR	Male	NA	OHU	NA	NA	60.33	ACAP	61500	14/8/2012	4/9/2012 11:44AM	Institute Level	No

Printed On : 9/1/2013 5:03:45 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 1/1**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510461210] - Mechanical Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Institute Level Quota

Quota : 24

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	14	74	EN12822772	MM1751635	AZHAR KHAN NAZIM KHAN	Male	Open	North Maharashtra	NA	NA	69	IL	30000	24/7/2012	3/9/2012 5:00PM	Institute Level	No
2.	15	74	EN12822829	MM1752713	DAYMA KRUSHNA PRAMOD	Male	Open	North Maharashtra	NA	NA	52.66	IL	61200	24/7/2012	3/9/2012 5:12PM	Institute Level	No
3.	18	73	EN12822873	MM1751069	KHODAPE AKSHAY DEVIDAS	Male	OBC	North Maharashtra	NA	NA	66.33	IL	61200	10/8/2012	3/9/2012 5:19PM	Institute Level	No
4.	22	70	EN12822786	MM1752887	PRATIK KAILASH MARATHE	Male	Open	North Maharashtra	NA	NA	55.33	IL	30000	27/7/2012	3/9/2012 5:03PM	Institute Level	No
5.	23	69	EN12822852	MB1701175	SHAIKH MOHD GAZI MOHD FAROOQUE	Male	Open	North Maharashtra	NA	NA	51.33	IL	5000	6/8/2012	3/9/2012 5:17PM	Institute Level	No
6.	29	67	EN12822821	MB3501624	KHARCHE PARAG LAXMAN	Male	OBC	Amravati	NA	NA	56.66	IL	30000	6/8/2012	3/9/2012 5:10PM	Institute Level	No
7.	32	66	EN12822780	MB1701538	SHAIKH KHALID SHAIKH KHALIL	Male	Open	North Maharashtra	NA	NA	71.66	IL	10000	26/7/2012	3/9/2012 5:02PM	Institute Level	No
8.	48	62	EN12822860	MM1750672	KHODAPE PRAVIN SHIVADAS	Male	OBC	North Maharashtra	NA	NA	42	IL	61200	10/8/2012	3/9/2012 5:18PM	Institute Level	No
9.	49	62	EN12822974	MM1751097	PATIL NITIN GULAB	Male	OBC	North Maharashtra	NA	NA	41.66	IL	30000	18/7/2012	3/9/2012 5:44PM	Institute Level	No
10.	50	62	EN12822890	MM1753529	DUSANE PARAG BHARAT	Male	OBC	North Maharashtra	NA	NA	41	IL	31000	31/8/2012	3/9/2012 5:23PM	Institute Level	No
11.	57	60	EN12822848	MB1702970	ARSHAD AHMAD SHAIKH SALIM JHARE	Male	Open	North Maharashtra	NA	NA	54.33	IL	20000	24/7/2012	3/9/2012 5:15PM	Institute Level	No
12.	62	59	EN12822933	MM1750695	PATIL VIVEK PRAKASH	Male	OBC	North Maharashtra	NA	NA	41	IL	30000	15/6/2012	3/9/2012 5:33PM	Institute Level	No

Printed On : 9/1/2013 5:03:45 PM **Seal of the Institute** **Signature of the Director/Principal**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510461210] - Mechanical Engineering

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Institute Level Quota

Quota : 24

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
13.	77	55	EN12822956	MB2703648	SINGH MANISHKUMAR VIJAYNARAYANSINGH	Male	Open	North Maharashtra	NA	NA	51	IL	30000	7/7/2012	3/9/2012 5:38PM	Institute Level	No
14.	78	55	EN12822795	MM1751807	JOSHI ROHIT VIVEK	Male	Open	North Maharashtra	NA	NA	50.33	IL	31200	21/7/2012	3/9/2012 5:05PM	Institute Level	No
15.	100	47	EN12822804	MM1752466	PATIL KAUSTUBH KISHOR	Male	OBC	North Maharashtra	NA	NA	40.33	IL	5000	8/8/2012	3/9/2012 5:07PM	Institute Level	No
16.	102	45	EN12822721	MB1704120	SARTALE SHAILESH PRAKASH	Male	OBC	North Maharashtra	NA	NA	56.66	IL	30000	17/7/2012	3/9/2012 4:49PM	Institute Level	No
17.	109	80.66	EN12823686	NA	PATIL PREMLAL RAMESH	Male	Open	North Maharashtra	NA	NA	80.66	IL	25000	14/7/2012	4/9/2012 11:11AM	Institute Level	No
18.	153	69.33	EN12823798	NA	ASHUTOSH KUMAR	Male	NA	OHU	NA	NA	69.33	IL	61500	14/8/2012	4/9/2012 11:39AM	Institute Level	No
19.	156	64.33	EN12823709	NA	VED PRAKASH	Male	NA	OHU	NA	NA	64.33	IL	30000	6/7/2012	4/9/2012 11:18AM	Institute Level	No
20.	158	63	EN12823775	NA	RAVI PRATAPSINGH	Male	NA	OHU	NA	NA	63	IL	30000	11/7/2012	4/9/2012 11:34AM	Institute Level	No
21.	164	57.66	EN12823671	NA	RAMASHRAYKUSHWAHA	Male	NA	OHU	NA	NA	57.66	IL	1000	27/7/2012	4/9/2012 11:06AM	Institute Level	No
22.	166	56.66	EN12823731	NA	PANKAJKUMAR GUPTA	Male	NA	OHU	NA	NA	56.66	IL	25000	9/7/2012	4/9/2012 11:23AM	Institute Level	No
23.	167	54.33	EN12823749	NA	BANSAL AJAY VINODKUMAR	Male	NA	OHU	NA	NA	54.33	IL	25000	4/9/2012	4/9/2012 11:28AM	Institute Level	Yes
24.	170	56.11	EN12823627	NA	MALI SHAILENDRA GANESH	Male	NA	OHU	NA	NA	56.11	IL	30000	9/7/2012	4/9/2012 10:51AM	Institute Level	No

Printed On : 9/1/2013 5:03:45 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 2/2**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

Summary of Admitted Candidates for the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Sr. No.	Admission Details	Admitted / Reported Before Cut Off Date	Admitted / Reported After Cut Off Date	Total Admitted
1.	CAP Admitted	95	0	95
2.	Institute Level Admitted	23	1	24
3.	Minority Admitted	0	0	0
4.	J&K Admitted	1	0	1
5.	Against CAP Admitted	1	0	1
6.	NRI Admitted	0	0	0
7.	GOI Admitted	0	0	0
8.	FNS Admitted	0	0	0
9.	PIO Admitted	0	0	0
10.	Over and Above Admitted	0	0	0
	Total	**120**	**1**	**121**

Last Date of Admission : 31/08/2012

Last Date of Reporting : 05/09/2012

Printed On : 9/1/2013 5:03:45 PM **Seal of the Institute** **Signature of the Director/Principal**

For Regional Office Use Only

Seal of the Regional Office **Signature of the Regional Officer**

For DTE Use Only

Seal of the DTE **Signature of the Director**

Print

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

[5104] - Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[510461211] - Mechanical Engineering [TFWS]

List of Candidates Admitted to the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

CAP Round

Quota : 6

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Defence Type	12 PCM / Diploma Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	16150	110	EN12227328	MM1750596	SHAKIB ANWAR SHAIKH IQBAL	Male	Open	North Maharashtra	NA	NA	85	TFWS	8136	23/7/2012	23/7/2012 1:45PM	Round 1	No
2.	18102	106	EN12135650	MB3500077	BHUTADA MADHUR MANMOHAN	Male	Open	Amravati	NA	NA	80.33	TFWS	8136	22/7/2012	22/7/2012 12:31PM	Round 1	No
3.	20404	103	EN12254241	MM1850773	PATIL KAMLESH JAGATRAO	Male	OBC	North Maharashtra	NA	NA	77.66	TFWS	8136	22/7/2012	22/7/2012 1:48PM	Round 1	No
4.	21168	101	EN12228453	MB1703974	PATIL ANIKET ASHOK	Male	OBC	North Maharashtra	NA	NA	57	TFWS	8136	23/7/2012	23/7/2012 3:48PM	Round 1	No
5.	22734	99	EN12160030	MB4201369	LADE SHUBHAM KIRAN	Male	SC	Nagpur	NA	DEF1	70.33	TFWS	8136	23/7/2012	23/7/2012 4:01PM	Round 1	No
6.	23215	99	EN12150689	MM1753062	TAYADE NAKUL SUBHASH	Male	SBC	North Maharashtra	NA	NA	70.33	TFWS	8136	22/7/2012	22/7/2012 3:19PM	Round 1	No

Printed On : 9/1/2013 5:04:13 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 1/1**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

Summary of Admitted Candidates for the First Year of Four-Year Full-Time Degree Courses in Engineering / Technology for the Academic Year 2012-2013

Sr. No.	Admission Details	Admitted / Reported Before Cut Off Date	Admitted / Reported After Cut Off Date	Total Admitted
1.	CAP Admitted	6	0	6
2.	Institute Level Admitted	0	0	0
3.	Minority Admitted	0	0	0
4.	J&K Admitted	0	0	0
5.	Against CAP Admitted	0	0	0
6.	NRI Admitted	0	0	0
7.	GOI Admitted	0	0	0
8.	FNS Admitted	0	0	0
9.	PIO Admitted	0	0	0
10.	Over and Above Admitted	0	0	0
	Total	**6**	**0**	**6**

Last Date of Admission : 31/08/2012
Last Date of Reporting : 05/09/2012

Printed On : 9/1/2013 5:04:13 PM **Seal of the Institute** **Signature of the Director/Principal**

For Regional Office Use Only

Seal of the Regional Office **Signature of the Regional Officer**

For DTE Use Only

Seal of the DTE **Signature of the Director**

Print

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[M. B. A.]

List of Candidates Admitted to the First Year of Two-Year Full-Time Post Graduate Courses in MBA/MMS/PGDBA for the Academic Year 2012-2013

CAP Round

Quota : 48

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Graduation Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	8597	67	MB12252482	17040020	VISHAL SURESH LALWANI	Male	Open	North Maharashtra	NA	0.00	AI	63400	14/7/2012	14/7/2012 3:36PM	Round 1	No
2.	9692	62	MB12274925	17020099	PRITESH BHAGCHANDJI SHARMA	Male	Open	North Maharashtra	NA	56.64	AI	30000	14/7/2012	14/7/2012 3:12PM	Round 1	No
3.	10732	55	MB12100735	17020253	VIKRAM SHARAD PATIL	Male	OBC	North Maharashtra	NA	0.00	AI	36868	12/7/2012	12/7/2012 5:25PM	Round 1	No
4.	11005	53	MB12139159	17040321	WANKHEDE BHARATI RAMKRISHNA	Female	SC	North Maharashtra	NA	57.54	AI	10336	13/7/2012	13/7/2012 1:27PM	Round 1	No
5.	11300	50	MB12100817	17020458	MAHESHRI GAURAV RAMESH	Male	OBC	North Maharashtra	NA	66.67	AI	36868	13/7/2012	13/7/2012 3:12PM	Round 1	No
6.	11670	42	MB12252270	17050264	KOLI DIPAK PANDURANG	Male	SBC	North Maharashtra	NA	61.17	AI	10336	14/7/2012	14/7/2012 3:55PM	Round 1	No
7.	22055	67	MB12139546	17050495	LOHAR RAVINDRA HIRAMAN	Male	NT 1 (NT-B)	North Maharashtra	NA	48.36	GNT1H	5000	16/7/2012	16/7/2012 4:55PM	Round 1	No
8.	22021	67	MB12252267	17030303	BAUSKAR RAJESH JAYRAM	Male	SBC	North Maharashtra	NA	57.93	GOBCH	10336	13/7/2012	13/7/2012 4:29PM	Round 1	No
9.	22374	67	MB12283401	17040014	WANI KOMAL PRAMOD	Female	OBC	North Maharashtra	NA	68.29	GOBCH	36868	14/7/2012	14/7/2012 3:03PM	Round 1	No
10.	22870	66	MB12283258	17010100	SHIRSALE VAISHALI SUDHAKAR	Female	OBC	North Maharashtra	NA	0.00	GOBCH	36868	13/7/2012	13/7/2012 2:51PM	Round 1	No
11.	11872	83	MB12139527	17020480	KHATIK IBHRAN ISAQ	Male	OBC	North Maharashtra	NA	0.00	GOPENH	14000	14/7/2012	14/7/2012 4:02PM	Round 1	No
12.	12469	82	MB12252477	17050017	NATHANI PRIYANKA MEHERCHAND	Female	Open	North Maharashtra	NA	0.00	GOPENH	63400	14/7/2012	14/7/2012 3:31PM	Round 1	No

Printed On : 9/1/2013 4:57:55 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 1/4**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[M. B. A.]

List of Candidates Admitted to the First Year of Two-Year Full-Time Post Graduate Courses in MBA/MMS/PGDBA for the Academic Year 2012-2013

CAP Round

Quota : 48

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Graduation Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
13.	16033	75	MB12139171	17020238	NAWALE PRASHANT SUNIL	Male	SBC	North Maharashtra	NA	64.86	GOPENH	10336	13/7/2012	13/7/2012 4:20PM	Round 1	No
14.	16832	74	MB12283442	17030196	JAIN SONAM NATHMAL	Female	Open	North Maharashtra	NA	0.00	GOPENH	63400	13/7/2012	13/7/2012 12:21PM	Round 1	No
15.	17189	74	MB12139807	17040033	PRAJAKTA CHANDRAKANT PATIL	Female	OBC	North Maharashtra	NA	62.75	GOPENH	36868	12/7/2012	12/7/2012 4:12PM	Round 1	No
16.	17404	73	MB12283051	17010041	SAPKAL PRADIP DHANRAJ	Male	NT 2 (NT-C)	North Maharashtra	NA	63.57	GOPENH	10336	13/7/2012	13/7/2012 3:33PM	Round 1	No
17.	20686	69	MB12139169	17050201	SAWALE MAHESH SHIVARAM	Male	NT 2 (NT-C)	North Maharashtra	NA	58.36	GOPENH	10336	13/7/2012	13/7/2012 4:25PM	Round 1	No
18.	24733	64	MB12239237	27040389	THAKARE JAYDEEP SURESH	Male	Open	Pune	NA	69.82	GOPENO	35000	14/7/2012	14/7/2012 2:00PM	Round 1	No
19.	27135	61	MB12241764	18010232	TANGADE NAKUL SUDHAKAR	Male	OBC	Amravati	NA	51.06	GOPENO	20000	14/7/2012	14/7/2012 3:21PM	Round 1	No
20.	31962	56	MB12228224	18010105	LAHUDKAR GUNVANTA WASUDEO	Male	OBC	Amravati	NA	0.00	GOPENO	18468	14/7/2012	14/7/2012 3:46PM	Round 1	No
21.	27715	61	MB12252009	17030306	DOLE CHARUSHILA PRAKASH	Female	SC	North Maharashtra	NA	0.00	GSCH	10338	16/7/2012	16/7/2012 3:30PM	Round 1	No
22.	35262	52	MB12139922	17050609	KAVITA VASANT BANSODE	Female	SC	North Maharashtra	NA	70.80	GSCH	10338	16/7/2012	16/7/2012 3:19PM	Round 1	No
23.	35481	51	MB12100758	17030292	GAVALE RAJENDRA DEVIDAS	Male	SC	North Maharashtra	NA	0.00	GSCH	9000	14/7/2012	14/7/2012 2:11PM	Round 1	No
24.	23584	65	MB12283345	17050500	JADHAO JAGDISH SUDHAKAR	Male	DT/VJ	North Maharashtra	NA	0.00	GVJH	10336	14/7/2012	14/7/2012 3:25PM	Round 1	No

Printed On : 9/1/2013 4:57:55 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 2/4**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[M. B. A.]

List of Candidates Admitted to the First Year of Two-Year Full-Time Post Graduate Courses in MBA/MMS/PGDBA for the Academic Year 2012-2013

CAP Round

Quota : 48

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Graduation Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
25.	9236	64	MB12283376	17030363	BADGUJAR KAPIL DEVIDAS	Male	OBC	North Maharashtra	NA	0.00	AI	36868	23/7/2012	23/7/2012 6:20PM	Round 2	No
26.	19763	70	MB12283046	17030229	MAHAJAN PRASAD RAJENDRA	Male	OBC	North Maharashtra	NA	0.00	GNT2H	36868	24/7/2012	24/7/2012 3:21PM	Round 2	No
27.	22150	67	MB12139172	17040238	WANI MAYUR BHAGWAN	Male	OBC	North Maharashtra	NA	61.14	GOBCO	34668	24/7/2012	24/7/2012 2:05PM	Round 2	No
28.	22731	66	MB12283383	17020397	CHAVHAN MANOJ GOVINDA	Male	OBC	North Maharashtra	NA	0.00	GOBCO	20000	26/7/2012	26/7/2012 3:19PM	Round 2	No
29.	17349	73	MB12283337	17020416	SAYYED SHOEB ALI ABID ALI	Male	Open	North Maharashtra	NA	0.00	GOPENH	30000	25/7/2012	25/7/2012 1:31PM	Round 2	No
30.	18713	71	MB12139450	17010089	BADHE JYOTSNA SURESH	Female	OBC	North Maharashtra	NA	0.00	GOPENH	4000	26/7/2012	26/7/2012 2:10PM	Round 2	No
31.	18903	71	MB12283199	17040082	PATIL RAHUL SHIVAJI	Male	OBC	North Maharashtra	NA	0.00	GOPENH	36868	23/7/2012	23/7/2012 6:22PM	Round 2	No
32.	24492	64	MB12252064	17020085	BADGUJAR KIRAN VASUDEO	Male	OBC	North Maharashtra	NA	0.00	GOPENO	36868	23/7/2012	23/7/2012 6:25PM	Round 2	No
33.	24546	64	MB12283049	17020229	MANGESH SURESH MALI	Male	OBC	North Maharashtra	NA	0.00	GSCO	36868	24/7/2012	24/7/2012 5:20PM	Round 2	No
34.	20843	69	MB12139847	17020018	VIJENDRA THOMBRE	Male	OBC	North Maharashtra	NA	0.00	GSTH	36868	24/7/2012	24/7/2012 11:38AM	Round 2	No
35.	21263	68	MB12283134	17020228	HARSHAD YUVRAJ BADGUJAR	Male	OBC	North Maharashtra	NA	55.42	GSTH	25000	24/7/2012	24/7/2012 4:35PM	Round 2	No
36.	24741	64	MB12247713	17050601	CHITTE AMOL SANTOSH	Male	OBC	North Maharashtra	NA	62.35	GSTO	36868	25/7/2012	25/7/2012 4:57PM	Round 2	No

Printed On : 9/1/2013 4:57:55 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 3/4**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[M. B. A.]

List of Candidates Admitted to the First Year of Two-Year Full-Time Post Graduate Courses in MBA/MMS/PGDBA for the Academic Year 2012-2013

CAP Round

Quota : 48

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Graduation Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
37.	26628	62	MB12100654	17030066	BHAVANA DILIP KOLHE	Female	OBC	North Maharashtra	NA	68.07	GVJO	36868	23/7/2012	23/7/2012 3:27PM	Round 2	No
38.	25085	64	MB12283165	17050205	RUPALI BHARATSING PATIL	Female	Open	North Maharashtra	NA	57.08	PHCH	63400	24/7/2012	24/7/2012 2:12PM	Round 2	No
39.	24899	64	MB12139354	17050088	WAYKOLE GAYATRI ARJUN	Female	OBC	North Maharashtra	NA	0.00	GOPEN	10000	7/8/2012	7/8/2012 3:37PM	Round 3	No
40.	28842	60	MB12283184	17050134	DEEPIKA VISHNU HASWANI	Female	Open	North Maharashtra	NA	0.00	GOPEN	40000	7/8/2012	7/8/2012 3:47PM	Round 3	No
41.	29835	59	MB12139353	17020088	KULKARNI UTTARA KISHOR	Female	Open	North Maharashtra	NA	0.00	GOPEN	20000	7/8/2012	7/8/2012 3:32PM	Round 3	No
42.	31167	57	MB12100601	17030173	PATIL JYOTI DEELIP	Female	OBC	North Maharashtra	NA	62.67	GOPEN	21868	7/8/2012	7/8/2012 2:02PM	Round 3	No
43.	33400	54	MB12139449	17040091	AMRUTKAR KALYANI DEELIP	Female	OBC	North Maharashtra	NA	0.00	GOPEN	5000	7/8/2012	7/8/2012 12:33PM	Round 3	No
44.	34959	52	MB12100748	17050317	PRIYANKA SHANTARAM MAHAJAN	Female	OBC	North Maharashtra	NA	61.21	GOPEN	21868	7/8/2012	7/8/2012 2:12PM	Round 3	No
45.	35357	51	MB12100560	17040172	PATIL HARSHALA ATMARAM	Female	OBC	North Maharashtra	NA	66.00	GOPEN	21868	7/8/2012	7/8/2012 2:09PM	Round 3	No
46.	36280	49	MB12252145	17030133	VARSHA DHRUVA PATIL	Female	OBC	North Maharashtra	NA	47.64	GOPEN	5000	6/8/2012	6/8/2012 4:20PM	Round 3	No
47.	36780	48	MB12139667	17030491	PATIL DINESH BHIKARI	Male	OBC	North Maharashtra	NA	62.57	GOPEN	5000	7/8/2012	7/8/2012 5:08PM	Round 3	No

Printed On : 9/1/2013 4:57:55 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 4/4**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[M. B. A.]

List of Candidates Admitted to the First Year of Two-Year Full-Time Post Graduate Courses in MBA/MMS/PGDBA for the Academic Year 2012-2013

Institute Level Quota

Quota : 12

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Graduation Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time	Round	Admitted / Reported Late
1.	01	101	MB12506881	25104009	SAKINA ABDULLAH SHAKIR	Female	Open	North Maharashtra	NA	66.51852	IL	10000	5/7/2012	26/8/2012 3:51PM	Institute Level	No
2.	02	96	MB12506894	25104001	AGNIHOTRI BHAGYASHRI NANDKUMAR	Female	Open	North Maharashtra	NA	62.57143	IL	30000	18/7/2012	26/8/2012 4:14PM	Institute Level	No
3.	3	80	MB12506875	25104005	PATIL CHETAN PRADIP	Male	Open	North Maharashtra	NA	54.20833	IL	10000	10/7/2012	26/8/2012 3:41PM	Institute Level	No
4.	04	79	MB12506902	25104003	KHANDELKAR SNEHAL SAHEBRAO	Female	Open	North Maharashtra	NA	60.78571	IL	10000	18/7/2012	26/8/2012 4:23PM	Institute Level	No
5.	05	77	MB12506887	51104010	UDALKAR UMESH GOVINDA	Male	Open	North Maharashtra	NA	63.57143	IL	10000	10/7/2012	26/8/2012 4:06PM	Institute Level	No
6.	06	78	MB12506907	25104010	PINTUSINGH SONGARA	Male	Open	North Maharashtra	NA	64.6129	IL	10000	15/6/2012	26/8/2012 4:32PM	Institute Level	No
7.	12	71	MB12506867	17050181	YATEEN NANDANWAR	Male	Open	Nagpur + Gondwana	NA	64.07547	IL	30000	9/7/2012	26/8/2012 3:28PM	Institute Level	No
8.	13	70	MB12506863	17030015	MANDORE ADITYA RADHESHYAM	Male	Open	North Maharashtra	NA	0	IL	63400	21/7/2012	26/8/2012 3:22PM	Institute Level	No
9.	15	65	MB12506860	17010038	BADGUJAR SANDEEP BALUDAS	Male	OBC	North Maharashtra	NA	55.14286	IL	25000	12/7/2012	26/8/2012 3:20PM	Institute Level	No
10.	21	73	MB12506914	2510408	LAHUDKAR DATTATRAY VASANTA	Male	Open	North Maharashtra	NA	49.44444	IL	90000	15/7/2012	26/8/2012 4:43PM	Institute Level	No
11.	28	51	MB12506856	17040061	SWAPNIL ASHOK KULKARNI	Male	Open	North Maharashtra	NA	0	IL	48400	26/7/2012	26/8/2012 3:16PM	Institute Level	No
12.	30	60	MB12506866	17020069	LALWANI AMIT MAHENDRA	Male	Open	North Maharashtra	NA	59.14286	IL	25000	1/7/2012	26/8/2012 3:25PM	Institute Level	No

Printed On : 9/1/2013 4:57:55 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 1/1**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

Summary of Admitted Candidates for First Year of Two-Year Full-Time Post Graduate Courses in MBA/MMS/PGDBA for the academic Year 2012-2013

Sr. No.	Admission Details	Admitted / Reported Before Cut Off Date	Admitted / Reported After Cut Off Date	Total Admitted
1.	CAP Admitted	47	0	47
2.	Institute Level Admitted	12	0	12
3.	Minority Admitted	0	0	0
4.	J&K Admitted	0	0	0
5.	Against CAP Admitted	0	0	0
6.	NRI Admitted	0	0	0
7.	Over and Above Admitted	0	0	0
	Total	**59**	**0**	**59**

Last Date of Admission : 31/08/2012

Last Date of Reporting : 05/09/2012

Printed On : 9/1/2013 4:57:55 PM **Seal of the Institute** **Signature of the Director/Principal**

For Regional Office Use Only

Seal of the Regional Office **Signature of the Regional Officer**

For DTE Use Only

Seal of the DTE **Signature of the Director**

Print

DIRECTORATE OF TECHNICAL EDUCATION, MAHARASHTRA STATE, MUMBAI

3, Mahapalika Marg, Elphinstone Technical Highschool Campus, Mumbai - 400001.

Admission To Direct Second Year of Four Year Degree Courses in Engineering / Technology for the year 2012-13

List of admitted candidates in Civil Engineering(510419110)

CAP Seats : 12

Admitted Candidates List In CAP Rounds

Sr.No.	Round	SLGMN	Application ID	Name	Gender	Category	PH Type/Def Type	Mode of Admission	Diploma/B.Sc. Percentage	Seat Type	Fees Paid (Rs.)	Admission Date	Uploaded Date
1	CAP I	4032	DSE12146189	RAJPUT TUSHAR RAMCHANDRA	Male	OPEN		Diploma [Civil Engineering]	81.01 %	GOPEN	61200/-	27/08/2012	27/08/2012 16:50:17
2	CAP I	7860	DSE12139048	AMRUTKAR HEMANT CHANDRAKANT	Male	OBC-Wani		Diploma [Civil Engineering]	77.52 %	GOPEN	15000/-	30/08/2012	30/08/2012 13:20:44
3	CAP I	8690	DSE12146470	KOLHE BHUSHAN NAMDEO	Male	OBC-Leva Patidar		Diploma [Civil Engineering]	76.85 %	GOPEN	13100/-	27/08/2012	27/08/2012 18:18:37
4	CAP I	9145	DSE12146469	MAHAJAN DHIRAJKUMAR MURLIDHAR	Male	OBC-Leva Patidar		Diploma [Civil Engineering]	76.51 %	GOBC	9100/-	27/08/2012	27/08/2012 18:24:23
5	CAP I	9325	DSE12146221	SONAWANE CHETAN PADMAKAR	Male	OBC-Kunabi		Diploma [Civil Engineering]	76.39 %	PHC	34668/-	28/08/2012	28/08/2012 12:40:53
6	CAP I	9336	DSE12149003	BHANGALE NIKITA PRAVIN	Female	OBC-Leva Patidar		Diploma [Civil Engineering]	76.39 %	LOPEN	29500/-	28/08/2012	28/08/2012 16:02:18
7	CAP I	9505	DSE12146159	JADHAV SANDEEP BHASKAR	Male	OBC-Kunabi		Diploma [Civil Engineering]	76.28 %	DEF	34668/-	27/08/2012	27/08/2012 16:35:05
8	CAP I	11389	DSE12149106	SONAWANE MONIKA PRABHAKAR	Female	OBC-Kunabi		Diploma [Civil Engineering]	75.04 %	LOBC	34668/-	28/08/2012	28/08/2012 13:26:20
9	CAP I	12458	DSE12149005	THOSAR CHARUDATTA PRAKASH	Male	SC-Chambhar		Diploma [Civil Engineering]	74.37 %	GSC	8136/-	27/08/2012	27/08/2012 18:16:31
10	CAP I	16693	DSE12149082	SONAWANE SAPANA KAILAS	Female	NT-C-Dhangar		Diploma [Civil Engineering]	71.89 %	GNTC	8136/-	27/08/2012	27/08/2012 16:25:11
11	CAP I	24581	DSE12149496	CHAUVAN GAURAV PRAVINSINGH	Male	VJDT-Rajput Bhamta		Diploma [Civil Engineering]	67.89 %	GVJDT	8136/-	28/08/2012	28/08/2012 13:36:31
12	CAP I	29707	DSE12146334	BANSOLE SAMARTH	Male	ST-Raj		Diploma [Civil	65.43 %	LST	8136/-	27/08/2012	27/08/2012 16:28:56

				MAHESH				Engineering]						

DIRECTORATE OF TECHNICAL EDUCATION, MAHARASHTRA STATE, MUMBAI

3, Mahapalika Marg, Elphinstone Technical Highschool Campus, Mumbai - 400001.

Admission To Direct Second Year of Four Year Degree Courses in Engineering / Technology for the year 2012-13

List of admitted candidates in Civil Engineering(510419110)

CAP Seats : 12

Admitted Candidates List In Against CAP

Sr.No.	Round	Institute Merit No	Application ID	Name	Gender	Category	PH Type	Mode of Admission	Diploma/B.Sc. Percentage	Seat Type	Fees Paid (Rs.)	Admission Date	Reported Date	Admitted/Reported Late
1	ACAP	3	DSE12501785	PATIL AKSHAYKUMAR RAJENDRA	Male	OPEN		Diploma [Civil Engineering]	75.61 %	ACAP	61200/-	17/09/2012	25/09/2012 13:36:12	**No**

Printed on: 09/01/2013 14:15:39 **Seal of the Institute** **Signature of The Director/Principal** **Page 2/3**

DIRECTORATE OF TECHNICAL EDUCATION, MAHARASHTRA STATE, MUMBAI

3, Mahapalika Marg, Elphinstone Technical Highschool Campus, Mumbai - 400001.

Admission To Direct Second Year of Four Year Degree Courses in Engineering / Technology for the year 2012-13

List of admitted candidates in Civil Engineering(510419110)

Summary

Sr. No.	Admission Details	Admitted Till 25th September 2012	Admitted After 25th September 2012	Total Admitted
1.	CAP Seats	12	0	12
2.	Against CAP Seats	1	0	1
3.	Minority Seats	0	0	0
4.	Against Minority Seats $	0	0	0
5.	Over And Above Seats	0	0	0
Total		13	0	13

Legends -
*-Admitted After Cut-off Date (For eg.25/09/2012 *)
#-Uploaded After Uploading Date (For eg.30/09/2012 #)
SLGMN-State Level General Merit No.
Non-Minority Candidates admitted against minority seat.Permission letters from authority to be attached.
Institute Merit No - institute level admission merit no given to candidate while uploading the candidate.

Printed on: 09/01/2013 14:15:39 **Seal of the Institute** **Signature of The Director/Principal**

For Regional Office Use Only

Seal of the Regional Office **Signature of the Regional Officer**

For DTE Use Only

Seal of the DTE **Signature of The Director**

Printed On: 09/01/2013 14:15:39 **Printed By:**: **Page 3/3**

DIRECTORATE OF TECHNICAL EDUCATION, MAHARASHTRA STATE, MUMBAI

3, Mahapalika Marg, Elphinstone Technical Highschool Campus, Mumbai - 400001.

Admission To Direct Second Year of Four Year Degree Courses in Engineering / Technology for the year 2012-13

List of admitted candidates in Chemical Engineering(510450710)

CAP Seats : 18

Admitted Candidates List In CAP Rounds

Sr.No.	Round	SLGMN	Application ID	Name	Gender	Category	PH Type/Def Type	Mode of Admission	Diploma/B.Sc. Percentage	Seat Type	Fees Paid (Rs.)	Admission Date	Uploaded Date
1	CAP I	20708	DSE12146144	PUROHIT MAYUR SANJAY	Male	OPEN		Diploma [Plastic Technology]	69.81 %	GOPEN	39000/-	29/08/2012	29/08/2012 15:39:41
2	CAP I	33913	DSE12177704	KHAN MOIN AKHTAR	Male	OPEN		Diploma [Chemical Engineering]	63.18 %	GOPEN	61200/-	30/08/2012	30/08/2012 12:17:56
3	CAP I	39431	DSE12177656	SHARAD PRAMOD SAWANT	Male	OPEN		Diploma [Chemical Engineering]	58.94 %	GOPEN	61200/-	30/08/2012	30/08/2012 12:12:35

Printed on: 09/01/2013 14:21:38 **Seal of the Institute** **Signature of The Director/Principal** **Page 1/2**

DIRECTORATE OF TECHNICAL EDUCATION, MAHARASHTRA STATE, MUMBAI

3, Mahapalika Marg, Elphinstone Technical Highschool Campus, Mumbai - 400001.

Admission To Direct Second Year of Four Year Degree Courses in Engineering / Technology for the year 2012-13

List of admitted candidates in Chemical Engineering(510450710)

Summary

Sr. No.	Admission Details	Admitted Till 25th September 2012	Admitted After 25th September 2012	Total Admitted
1.	CAP Seats	3	0	3
2.	Against CAP Seats	0	0	0
3.	Minority Seats	0	0	0
4.	Against Minority Seats $	0	0	0
5.	Over And Above Seats	0	0	0
Total		3	0	3

Legends -
*-Admitted After Cut-off Date (For eg.25/09/2012 *)
#-Uploaded After Uploading Date (For eg.30/09/2012 #)
SLGMN-State Level General Merit No.
Non-Minority Candidates admitted against minority seat.Permission letters from authority to be attached.
Institute Merit No - institute level admission merit no given to candidate while uploading the candidate.

Printed on: 09/01/2013 14:21:38 **Seal of the Institute** **Signature of The Director/Principal**

For Regional Office Use Only

Seal of the Regional Office **Signature of the Regional Officer**

For DTE Use Only

Seal of the DTE **Signature of The Director**

DIRECTORATE OF TECHNICAL EDUCATION, MAHARASHTRA STATE, MUMBAI

3, Mahapalika Marg, Elphinstone Technical Highschool Campus, Mumbai - 400001.

Admission To Direct Second Year of Four Year Degree Courses in Engineering / Technology for the year 2012-13

List of admitted candidates in Computer Engineering(510424510)

CAP Seats : 49

Admitted Candidates List In CAP Rounds

Sr.No.	Round	SLGMN	Application ID	Name	Gender	Category	PH Type/Def Type	Mode of Admission	Diploma/B.Sc. Percentage	Seat Type	Fees Paid (Rs.)	Admission Date	Uploaded Date
1	CAP I	6245	DSE12149108	PATIL MANASI RAJENDRA	Female	OBC-Leva Patidar		Diploma [Computer Engineering]	78.77 %	LOPEN	34668/-	27/08/2012	27/08/2012 13:02:36
2	CAP I	6404	DSE12149150	CHAVAN MEGHANA MOHAN	Female	OPEN		Diploma [Computer Engineering]	78.65 %	LOPEN	28000/-	28/08/2012	28/08/2012 12:38:14
3	CAP I	7454	DSE12149103	BORSE LEENA SURESH	Female	OBC-Kunabi		Diploma [Information Technology]	77.81 %	LOPEN	34668/-	28/08/2012	28/08/2012 15:06:45
4	CAP I	10678	DSE12149192	DHOTE SHITAL BHASKAR	Female	OBC-Kunabi		Diploma [Computer Engineering]	75.48 %	LOPEN	34668/-	28/08/2012	28/08/2012 12:47:24
5	CAP I	10805	DSE12149473	PATIL AARATI RAVINDRA	Female	OBC-Kunabi		Diploma [Information Technology]	75.38 %	LOPEN	34668/-	28/08/2012	28/08/2012 14:15:42
6	CAP I	11176	DSE12149161	PATIL PUNAM ARUN	Female	OBC-Kunabi		Diploma [Computer Engineering]	75.16 %	LOPEN	34668/-	28/08/2012	28/08/2012 12:54:17
7	CAP I	11407	DSE12149431	GURNANI LAXMI MANOHARLAL	Female	OPEN		Diploma [Computer Engineering]	75.03 %	GOPEN	61200/-	27/08/2012	27/08/2012 17:56:49
8	CAP I	13119	DSE12120254	LAD MEERA ASHOK	Female	OBC-Bari		Diploma [Computer Engineering]	73.94 %	GOPEN	34668/-	30/08/2012	30/08/2012 14:16:48
9	CAP I	13765	DSE12149011	AHIRRAV SNEHA ANIL	Female	OBC-Sonar		Diploma [Computer Engineering]	73.55 %	GOPEN	34668/-	27/08/2012	27/08/2012 17:04:15
10	CAP I	13907	DSE12149270	SHIMPI YOGESHWAR DEVIDAS	Male	OBC-Shimpi		Diploma [Computer Engineering]	73.48 %	GOPEN	31000/-	27/08/2012	27/08/2012 16:08:50
				SABALE				Diploma					

11	CAP I	14345	DSE12146328	AMARDIP RAMESH	Male	OPEN		[Computer Engineering]	73.23 %	GOPEN	20000/-	30/08/2012	30/08/2012 13:44:51
12	CAP I	15365	DSE12149457	PATIL SNEHAL CHANDRAKANT	Female	OBC-Kunabi		Diploma [Computer Engineering]	72.65 %	GOPEN	34668/-	29/08/2012	29/08/2012 14:57:59

Printed on: 09/01/2013 14:18:14 **Seal of the Institute** **Signature of The Director/Principal** **Page 1/6**

DIRECTORATE OF TECHNICAL EDUCATION, MAHARASHTRA STATE, MUMBAI

3, Mahapalika Marg, Elphinstone Technical Highschool Campus, Mumbai - 400001.

Admission To Direct Second Year of Four Year Degree Courses in Engineering / Technology for the year 2012-13

List of admitted candidates in Computer Engineering(510424510)

CAP Seats : 49

Admitted Candidates List In CAP Rounds

Sr.No.	Round	SLGMN	Application ID	Name	Gender	Category	PH Type/Def Type	Mode of Admission	Diploma/B.Sc. Percentage	Seat Type	Fees Paid (Rs.)	Admission Date	Uploaded Date
13	CAP I	15474	DSE12149058	BARI DIPALI PRAKASH	Female	OBC-Bari		Diploma [Computer Engineering]	72.58 %	GOPEN	34668/-	27/08/2012	27/08/2012 15:29:33
14	CAP I	15579	DSE12120033	BORSE UMESH WAMAN	Male	NT-C-Dhangar		Diploma [Computer Engineering]	72.52 %	GOPEN	8136/-	28/08/2012	28/08/2012 16:47:15
15	CAP I	15728	DSE12149133	POL NEHAL MUKUND	Female	OBC-Kunabi		Diploma [Computer Engineering]	72.45 %	GOPEN	34668/-	28/08/2012	28/08/2012 16:11:35
16	CAP I	16159	DSE12146019	CHAUDHARI GIRISH PRAKASH	Male	OBC-Leva Patidar		Diploma [Computer Technology]	72.21 %	GOPEN	34668/-	28/08/2012	28/08/2012 16:52:34
17	CAP I	16384	DSE12149222	CHAUDHARI VISHAL CHHABILAL	Male	OBC-Gujar		Diploma [Computer Engineering]	72.06 %	GOPEN	34668/-	28/08/2012	28/08/2012 16:48:49
18	CAP I	17231	DSE12141019	MAHAJAN ARATI SUNIL	Female	OBC-Kunabi		Diploma [Computer Engineering]	71.61 %	GOPEN	20000/-	27/08/2012	27/08/2012 17:14:54
19	CAP I	17473	DSE12149115	BHOLE KAJAL SUNIL	Female	OPEN		Diploma [Computer Engineering]	71.48 %	GOPEN	61200/-	27/08/2012	27/08/2012 13:57:09
20	CAP I	17474	DSE12149148	SNEHAL GAJANAN BARI	Female	OBC-Bari		Diploma [Computer Engineering]	71.48 %	GOPEN	34668/-	29/08/2012	29/08/2012 15:01:16
21	CAP I	17540	DSE12149182	SONGIRKAR MUGDHA AVINASH	Female	OPEN		Diploma [Computer Engineering]	71.45 %	GOPEN	61200/-	27/08/2012	27/08/2012 15:11:11
22	CAP I	17849	DSE12149149	JADHAV SNEHAL MANOJ	Female	OPEN		Diploma [Computer Engineering]	71.29 %	GOPEN	61200/-	27/08/2012	27/08/2012 16:11:45
23	CAP I	17985	DSE12149471	ASMITA BADGUJAR	Female	OBC-Badgujar		Diploma [Computer Engineering]	71.23 %	LOBC	34668/-	28/08/2012	28/08/2012 14:19:29
				OZA				Diploma					

24	CAP I	19083	DSE12146398	MADHUSUDAN MAHESH	Male	OPEN		[Computer Engineering]	70.65 %	PHC	30000/-	29/08/2012	29/08/2012 15:04:18

Printed on: 09/01/2013 14:18:14 **Seal of the Institute** **Signature of The Director/Principal** **Page 2/6**

DIRECTORATE OF TECHNICAL EDUCATION, MAHARASHTRA STATE, MUMBAI

3, Mahapalika Marg, Elphinstone Technical Highschool Campus, Mumbai - 400001.

Admission To Direct Second Year of Four Year Degree Courses in Engineering / Technology for the year 2012-13

List of admitted candidates in Computer Engineering(510424510)

CAP Seats : 49

Admitted Candidates List In CAP Rounds

Sr.No.	Round	SLGMN	Application ID	Name	Gender	Category	PH Type/Def Type	Mode of Admission	Diploma/B.Sc. Percentage	Seat Type	Fees Paid (Rs.)	Admission Date	Uploaded Date
25	CAP I	19432	DSE12141173	MOHAMMAD RIZWAN SHAIKH YUSUF	Male	OPEN		Diploma [Computer Engineering]	70.45 %	PHC	10000/-	27/08/2012	27/08/2012 16:47:57
26	CAP I	19556	DSE12146264	BAVISKAR NAYAN RAJENDRA	Male	OBC-Kunabi		Diploma [Computer Engineering]	70.39 %	GOBC	34668/-	29/08/2012	29/08/2012 14:28:47
27	CAP I	19723	DSE12149102	MAHAJAN LAVHINA WAMANRAO	Female	OBC-Kunabi		Diploma [Information Technology]	70.31 %	LOBC	34668/-	28/08/2012	28/08/2012 15:00:09
28	CAP I	20086	DSE12149458	NANDEDKAR SUHASINI RAVINDRA	Female	OBC-Leva Patidar		Diploma [Information Technology]	70.13 %	GOBC	34668/-	29/08/2012	29/08/2012 13:30:56
29	CAP I	20077	DSE12149111	KHADKE ULKA HEMANT	Female	OBC-Leva Patidar		Diploma [Computer Technology]	70.13 %	LOBC	34668/-	27/08/2012	27/08/2012 17:35:24
30	CAP I	21077	DSE12149053	KOTHAWADE SNEHAL PRAKASH	Female	OBC-Lad Shakhiy Wani		Diploma [Computer Engineering]	69.61 %	GOBC	34668/-	28/08/2012	28/08/2012 15:47:47
31	CAP I	22427	DSE12149066	DHUNDALE PRATIBHA PRAKASH	Female	NT-D-Vanjari		Diploma [Computer Engineering]	68.97 %	GNTD	8136/-	28/08/2012	28/08/2012 15:17:16
32	CAP I	23501	DSE12149120	PATIL SAVITA SHANKAR	Female	OBC-Kunabi		Diploma [Computer Engineering]	68.45 %	GOBC	34668/-	28/08/2012	28/08/2012 14:32:39
33	CAP I	23858	DSE12146385	NIKAM AJAY SANJAY	Male	OBC-Mali		Diploma [Computer Engineering]	68.26 %	GOBC	34668/-	29/08/2012	29/08/2012 12:46:30
34	CAP I	25101	DSE12146430	MORE VAISHALI PANDURANG	Female	SC-Chambhar		Diploma [Computer Engineering]	67.66 %	LSC	8136/-	29/08/2012	29/08/2012 15:32:44
35	CAP I	25851	DSE12120103	PATIL UTKARSH SHRIKRUSHNA	Male	OBC-Kunabi		Diploma [Computer Technology]	67.31 %	GOBC	34668/-	27/08/2012	27/08/2012 16:00:26
				TAYADE MAMTA		SBC-Koli	Ex	Diploma					

36	CAP I	26168	DSE12149132	BHAGWANT	Female	Suryawanshi	servicemen	[Computer Engineering]	67.16 %	DEF	8136/-	28/08/2012	28/08/2012 16:12:58

DIRECTORATE OF TECHNICAL EDUCATION, MAHARASHTRA STATE, MUMBAI

3, Mahapalika Marg, Elphinstone Technical Highschool Campus, Mumbai - 400001.

Admission To Direct Second Year of Four Year Degree Courses in Engineering / Technology for the year 2012-13

List of admitted candidates in Computer Engineering(510424510)

CAP Seats : 49

Admitted Candidates List In CAP Rounds

Sr.No.	Round	SLGMN	Application ID	Name	Gender	Category	PH Type/Def Type	Mode of Admission	Diploma/B.Sc. Percentage	Seat Type	Fees Paid (Rs.)	Admission Date	Uploaded Date
37	CAP I	27665	DSE12149140	PATIL KARISHMA SANJAY	Female	VJDT-Rajput Bhamta		Diploma [Computer Engineering]	66.45 %	GVJDT	8136/-	28/08/2012	28/08/2012 16:09:14
38	CAP I	27943	DSE12149139	PATIL TEJASWINI VIJAYSING	Female	VJDT-Rajput Bhamta		Diploma [Computer Engineering]	66.32 %	GNTB	8136/-	28/08/2012	28/08/2012 16:15:55
39	CAP I	28416	DSE12146483	PATIL RAHUL GANESH	Male	OBC-Kunbi		Diploma [Computer Engineering]	66.07 %	LNTC	34668/-	30/08/2012	30/08/2012 12:22:08
40	CAP I	28619	DSE12146460	BAVISKAR SACHIN SUKDEO	Male	SC-Chambhar		Diploma [Computer Engineering]	66.00 %	GSC	8136/-	29/08/2012	29/08/2012 13:29:02
41	CAP I	28674	DSE12149514	LINGAYAT SAGAR ATMARAM	Male	OBC-Dhobi		Diploma [Computer Engineering]	65.94 %	GSC	34668/-	28/08/2012	28/08/2012 16:55:51
42	CAP I	28867	DSE12146475	PATIL HITESH BHIMRAO	Male	OBC-Teli		Diploma [Computer Engineering]	65.86 %	GSC	34668/-	27/08/2012	27/08/2012 17:40:55
43	CAP I	29442	DSE12124020	BHARAD PRADIP RAMESH	Male	OBC-Mali		Diploma [Computer Engineering]	65.55 %	GSC	34668/-	29/08/2012	29/08/2012 15:49:46
44	CAP I	29934	DSE12149181	PATIL VAISHALI NANA	Female	OBC-Kunabi		Diploma [Computer Engineering]	65.31 %	LSC	34668/-	29/08/2012	29/08/2012 12:44:36
45	CAP I	30255	DSE12146380	SONAWANE VINAYAK SOPAN	Male	SBC-Koli Suryawanshi		Diploma [Computer Engineering]	65.16 %	GST	8136/-	28/08/2012	28/08/2012 15:01:57
46	CAP I	30344	DSE12149466	PARDESHI NITA VIJAYSING	Female	OBC-Pardeshi		Diploma [Computer Engineering]	65.10 %	GST	20000/-	30/08/2012	30/08/2012 14:25:33
47	CAP I	30750	DSE12149464	PATIL BHAGYASHREE PRABHAKAR	Female	OBC-Reva Gujar		Diploma [Computer Engineering]	64.90 %	LST	34668/-	29/08/2012	29/08/2012 15:30:11
				BAVISKAR		SC-		Diploma					

48	CAP I	37042	DSE12149273	VISHAL SAHEBRAO	Male	NavBuddhist		[Computer Engineering]	61.16 %	GSC	5136/-	28/08/2012	28/08/2012 15:22:41

DIRECTORATE OF TECHNICAL EDUCATION, MAHARASHTRA STATE, MUMBAI

3, Mahapalika Marg, Elphinstone Technical Highschool Campus, Mumbai - 400001.

Admission To Direct Second Year of Four Year Degree Courses in Engineering / Technology for the year 2012-13

List of admitted candidates in Computer Engineering(510424510)

CAP Seats : 49

Admitted Candidates List In CAP Rounds

Sr.No.	Round	SLGMN	Application ID	Name	Gender	Category	PH Type/Def Type	Mode of Admission	Diploma/B.Sc. Percentage	Seat Type	Fees Paid (Rs.)	Admission Date	Uploaded Date
49	CAP I	38426	DSE12149404	VIDHATE DIPALI SHRIHARI	Female	NT-B-Joshi		Diploma [Computer Engineering]	60.00 %	LNTB	8136/-	28/08/2012	28/08/2012 16:40:35

Printed on: 09/01/2013 14:18:14 **Seal of the Institute** **Signature of The Director/Principal** **Page 5/6**

DIRECTORATE OF TECHNICAL EDUCATION, MAHARASHTRA STATE, MUMBAI

3, Mahapalika Marg, Elphinstone Technical Highschool Campus, Mumbai - 400001.

Admission To Direct Second Year of Four Year Degree Courses in Engineering / Technology for the year 2012-13

List of admitted candidates in Computer Engineering(510424510)

Summary

Sr. No.	Admission Details	Admitted Till 25th September 2012	Admitted After 25th September 2012	Total Admitted
1.	CAP Seats	49	0	49
2.	Against CAP Seats	0	0	0
3.	Minority Seats	0	0	0
4.	Against Minority Seats $	0	0	0
5.	Over And Above Seats	0	0	0
Total		49	0	49

Legends -
*-Admitted After Cut-off Date (For eg.25/09/2012 *)
#-Uploaded After Uploading Date (For eg.30/09/2012 #)
SLGMN-State Level General Merit No.
Non-Minority Candidates admitted against minority seat.Permission letters from authority to be attached.
Institute Merit No - institute level admission merit no given to candidate while uploading the candidate.

Printed on: 09/01/2013 14:18:14 **Seal of the Institute** **Signature of The Director/Principal**

For Regional Office Use Only

Seal of the Regional Office **Signature of the Regional Officer**

For DTE Use Only

Seal of the DTE **Signature of The Director**

DIRECTORATE OF TECHNICAL EDUCATION, MAHARASHTRA STATE, MUMBAI

3, Mahapalika Marg, Elphinstone Technical Highschool Campus, Mumbai - 400001.

Admission To Direct Second Year of Four Year Degree Courses in Engineering / Technology for the year 2012-13

List of admitted candidates in Electrical Engineering(510429310)

CAP Seats : 12

Admitted Candidates List In CAP Rounds

Sr.No.	Round	SLGMN	Application ID	Name	Gender	Category	PH Type/Def Type	Mode of Admission	Diploma/B.Sc. Percentage	Seat Type	Fees Paid (Rs.)	Admission Date	Uploaded Date
1	CAP I	5688	DSE12149251	BORSE YOGESH TRAMBAK	Male	OBC-Mali		Diploma [Electrical Engineering]	79.29 %	GOPEN	34668/-	29/08/2012	29/08/2012 14:45:00
2	CAP I	6141	DSE12149263	PATIL SAGAR DILIP	Male	OBC-Badgujar		Diploma [Electrical Engineering]	78.88 %	GOPEN	34668/-	28/08/2012	28/08/2012 13:50:21
3	CAP I	6258	DSE12146355	ZOPE DHIRAJ SUNIL	Male	OBC-Leva Patidar		Diploma [Electrical Engineering]	78.76 %	GOPEN	34668/-	27/08/2012	27/08/2012 17:51:06
4	CAP I	6527	DSE12149186	DEORE RAVINA PUNDALIK	Female	OBC-Kunabi		Diploma [Electrical Engineering]	78.53 %	LOPEN	34668/-	28/08/2012	28/08/2012 14:46:56
5	CAP I	6754	DSE12115053	SURYAKUMAR SINGH RAJKISHOR SINGH	Male	OPEN		Diploma [Electrical Engineering]	78.35 %	GOPEN	31200/-	28/08/2012	28/08/2012 15:50:00
6	CAP I	7369	DSE12138858	CHAUDHARI SARANG PRADIP	Male	OBC-Reve Gujar		Diploma [Electrical Engineering]	77.88 %	GOBC	34668/-	28/08/2012	28/08/2012 17:02:34
7	CAP I	7851	DSE12149080	PATIL DIPALI ABHIMANYU	Female	OBC-Kunabi		Diploma [Electrical Engineering]	77.53 %	GOBC	34668/-	29/08/2012	29/08/2012 15:51:55
8	CAP I	11247	DSE12138755	KOKANI ARCHANA KASHINATH	Female	ST-Kokni		Diploma [Electrical Engineering]	75.13 %	LST	8136/-	28/08/2012	28/08/2012 15:55:22
9	CAP I	15649	DSE12149236	SURALKAR PRAVIN UTTAM	Male	SC-Chambhar	Blindness	Diploma [Electrical Engineering]	72.50 %	PHC	8136/-	29/08/2012	29/08/2012 14:41:31
10	CAP I	22391	DSE12139146	VISAVE SWAPNIL NITIN	Male	SC-Chambhar		Diploma [Electrical Engineering]	69.00 %	GSC	8136/-	28/08/2012	28/08/2012 14:43:05

11	CAP I	26032	DSE12146010	SONAWANE RAJENDRA SHIVAJI	Male	SC-Mahar		Diploma [Electrical Engineering]	67.24 %	LSC	8136/-	28/08/2012	28/08/2012 12:50:58
12	CAP I	31215	DSE12149193	SANAP NEHA SURESH	Female	NT-D-Vanjari		Diploma [Electrical Engineering]	64.69 %	GNTD	8136/-	28/08/2012	28/08/2012 16:59:28

Printed on: 09/01/2013 14:20:18 **Seal of the Institute** **Signature of The Director/Principal** **Page 1/3**

DIRECTORATE OF TECHNICAL EDUCATION, MAHARASHTRA STATE, MUMBAI

3, Mahapalika Marg, Elphinstone Technical Highschool Campus, Mumbai - 400001.

Admission To Direct Second Year of Four Year Degree Courses in Engineering / Technology for the year 2012-13

List of admitted candidates in Electrical Engineering(510429310)

CAP Seats : 12

Admitted Candidates List In Against CAP

Sr.No.	Round	Institute Merit No	Application ID	Name	Gender	Category	PH Type	Mode of Admission	Diploma/B.Sc. Percentage	Seat Type	Fees Paid (Rs.)	Admission Date	Reported Date	Admitted/Reported Late
1	ACAP	5	DSE12501799	BORSE SAGAR DHANRAJBHAI	Male	OPEN		Diploma [Electrical Engineering]	73.08 %	ACAP	5000/-	21/09/2012	25/09/2012 14:00:33	**No**

Printed on: 09/01/2013 14:20:18 **Seal of the Institute** **Signature of The Director/Principal** **Page 2/3**

DIRECTORATE OF TECHNICAL EDUCATION, MAHARASHTRA STATE, MUMBAI

3, Mahapalika Marg, Elphinstone Technical Highschool Campus, Mumbai - 400001.

Admission To Direct Second Year of Four Year Degree Courses in Engineering / Technology for the year 2012-13

List of admitted candidates in Electrical Engineering(510429310)

Summary

Sr. No.	Admission Details	Admitted Till 25th September 2012	Admitted After 25th September 2012	Total Admitted
1.	CAP Seats	12	0	12
2.	Against CAP Seats	1	0	1
3.	Minority Seats	0	0	0
4.	Against Minority Seats $	0	0	0
5.	Over And Above Seats	0	0	0
Total		13	0	13

Legends -
*-Admitted After Cut-off Date (For eg.25/09/2012 *)
#-Uploaded After Uploading Date (For eg.30/09/2012 #)
SLGMN-State Level General Merit No.
Non-Minority Candidates admitted against minority seat.Permission letters from authority to be attached.
Institute Merit No - institute level admission merit no given to candidate while uploading the candidate.

Printed on: 09/01/2013 14:20:18 **Seal of the Institute** **Signature of The Director/Principal**

For Regional Office Use Only

Seal of the Regional Office **Signature of the Regional Officer**

For DTE Use Only

Seal of the DTE **Signature of The Director**

DIRECTORATE OF TECHNICAL EDUCATION, MAHARASHTRA STATE, MUMBAI

3, Mahapalika Marg, Elphinstone Technical Highschool Campus, Mumbai - 400001.

Admission To Direct Second Year of Four Year Degree Courses in Engineering / Technology for the year 2012-13

List of admitted candidates in Electronics and Telecommunication Engg(510437210)

CAP Seats : 48

Admitted Candidates List In CAP Rounds

Sr.No.	Round	SLGMN	Application ID	Name	Gender	Category	PH Type/Def Type	Mode of Admission	Diploma/B.Sc. Percentage	Seat Type	Fees Paid (Rs.)	Admission Date	Uploaded Date
1	CAP I	2254	DSE12149154	MARATHE DIPIKA SANJAY	Female	OBC-Kunabi		Diploma [Electronics and Telecommunication]	83.49 %	LOPEN	34668/-	28/08/2012	28/08/2012 15:45:24
2	CAP I	3144	DSE12146462	PATIL SAGAR DILIP	Male	OPEN		Diploma [Electronics and Telecommunication]	82.11 %	GOPEN	61200/-	28/08/2012	28/08/2012 14:40:13
3	CAP I	3646	DSE12149088	CHAUDHARI RITA RAVINDRA	Female	OBC-Leva Patidar		Diploma [Electronics and Telecommunication]	81.49 %	LOPEN	34668/-	28/08/2012	28/08/2012 16:07:26
4	CAP I	5224	DSE12149039	TAYADE SHITAL RAMRAO	Female	OBC-Kunabi		Diploma [Electronics and Telecommunication]	79.71 %	LOPEN	34668/-	28/08/2012	28/08/2012 13:19:02
5	CAP I	5728	DSE12149408	PATIL JAGRUTI EKNATH	Female	SBC-Koli		Diploma [Electronics and Telecommunication]	79.26 %	LOPEN	8136/-	28/08/2012	28/08/2012 15:14:25
6	CAP I	6345	DSE12149046	KABRE CHETANA RAJENDRA	Female	OPEN		Diploma [Electronics and Telecommunication]	78.69 %	LOPEN	32000/-	28/08/2012	28/08/2012 13:54:27
7	CAP I	7188	DSE12146191	CHAUDHARI HARSHAL PRABHAKAR	Male	OBC-Leva Patidar		Diploma [Electronics and Telecommunication]	78.00 %	GOPEN	34668/-	27/08/2012	27/08/2012 14:11:17
8	CAP I	7300	DSE12146177	PATIL SWAPNIL RAMESH	Male	NT-C-Hatkar		Diploma [Electronics and Communication Engineering]	77.94 %	GOPEN	8136/-	28/08/2012	28/08/2012 15:27:43
9	CAP I	8248	DSE12146168	SONI PRAMODKUMAR VEERSINGH	Male	OPEN		Diploma [Electronics and Communication Engineering]	77.20 %	GOPEN	30000/-	29/08/2012	29/08/2012 15:53:20
10	CAP I	8980	DSE12138745	CHAUDHARI SAVITA SURYAKANT	Female	OBC-Teli		Diploma [Electronics and Telecommunication]	76.63 %	LOPEN	34668/-	27/08/2012	27/08/2012 16:39:32
11	CAP I	9912	DSE12141186	CHAVHAN VIKAS KASHINATH	Male	OBC-Navi or Nhavi		Diploma [Electronics and Communication Engineering]	76.00 %	GOPEN	34668/-	30/08/2012	30/08/2012 12:27:54

12	CAP I	10164	DSE12149042	SOMANI GAURAVI SHANTILAL	Female	OPEN		Diploma [Electronics and Telecommunication]	75.83 %	GOPEN	61200/-	27/08/2012	27/08/2012 16:58:09

Printed on: 09/01/2013 14:20:43 **Seal of the Institute** **Signature of The Director/Principal** **Page 1/6**

DIRECTORATE OF TECHNICAL EDUCATION, MAHARASHTRA STATE, MUMBAI

3, Mahapalika Marg, Elphinstone Technical Highschool Campus, Mumbai - 400001.

Admission To Direct Second Year of Four Year Degree Courses in Engineering / Technology for the year 2012-13

List of admitted candidates in Electronics and Telecommunication Engg(510437210)

CAP Seats : 48

Admitted Candidates List In CAP Rounds

Sr.No.	Round	SLGMN	Application ID	Name	Gender	Category	PH Type/Def Type	Mode of Admission	Diploma/B.Sc. Percentage	Seat Type	Fees Paid (Rs.)	Admission Date	Uploaded Date
13	CAP I	10492	DSE12149153	PARDESHI SONAM KAILAS	Female	OBC-Pardeshi		Diploma [Electronics and Telecommunication]	75.60 %	GOPEN	34668/-	28/08/2012	28/08/2012 16:34:45
14	CAP I	11230	DSE12146162	DUSANE VISHAL BHAGAWAN	Male	OBC-Sonar		Diploma [Electronics and Communication Engineering]	75.14 %	GOPEN	34668/-	29/08/2012	29/08/2012 15:55:15
15	CAP I	11671	DSE12149094	THAKUR KIRAN RAGHUNATH	Female	OPEN		Diploma [Electronics and Telecommunication]	74.91 %	GOPEN	61200/-	28/08/2012	28/08/2012 16:25:25
16	CAP I	11746	DSE12149097	CHAUDHARI DHANASHREE SUHAS	Female	OBC-Leva Patidar		Diploma [Electronics and Telecommunication]	74.86 %	GOPEN	34668/-	27/08/2012	27/08/2012 13:53:43
17	CAP I	11812	DSE12149545	SONGIRE PANKAJ GOKUL	Male	OBC-Navi or Nhavi		Diploma [Electronics and Telecommunication]	74.80 %	GOPEN	34668/-	28/08/2012	28/08/2012 15:03:25
18	CAP I	12474	DSE12149093	NARKHEDE DAMINI PADMAKAR	Female	OBC-Leva Patidar		Diploma [Electronics and Telecommunication]	74.34 %	GOPEN	34668/-	28/08/2012	28/08/2012 14:27:47
19	CAP I	13027	DSE12149460	PATIL ANITA DNYANESHWAR	Female	OBC-Kunabi		Diploma [Electronics and Telecommunication]	74.00 %	GOPEN	34668/-	29/08/2012	29/08/2012 12:55:23
20	CAP I	13432	DSE12146048	CHAUDHARI SHAMKANT BHAGWAT	Male	OBC-Reve Gujar		Diploma [Electronics and Telecommunication]	73.77 %	GOPEN	34668/-	28/08/2012	28/08/2012 13:21:54
21	CAP I	14475	DSE12149045	BANG JYOTI RAVINDRA	Female	OPEN		Diploma [Electronics and Telecommunication]	73.14 %	GOPEN	10000/-	30/08/2012	30/08/2012 11:59:53
22	CAP I	15391	DSE12129858	JADHAV SAPNA RAMSING	Female	VJDT-Rajput Bhamta		Diploma [Electronics and Telecommunication]	72.63 %	LVJDT	8136/-	28/08/2012	28/08/2012 17:05:13
23	CAP I	15613	DSE12146401	KOLHE PUSHPAK SOPAN	Male	OBC-Leva Patidar		Diploma [Electronics and Telecommunication]	72.51 %	GOBC	34668/-	27/08/2012	27/08/2012 14:01:02
24	CAP I	15621	DSE12149331	WAGH NILESH VIJAY	Male	OBC-Dhobi	Orthopedic Disorder	Diploma [Electronics and Telecommunication]	72.51 %	PHC	34668/-	28/08/2012	28/08/2012 14:54:01

DIRECTORATE OF TECHNICAL EDUCATION, MAHARASHTRA STATE, MUMBAI

3, Mahapalika Marg, Elphinstone Technical Highschool Campus, Mumbai - 400001.

Admission To Direct Second Year of Four Year Degree Courses in Engineering / Technology for the year 2012-13

List of admitted candidates in Electronics and Telecommunication Engg(510437210)

CAP Seats : 48

Admitted Candidates List In CAP Rounds

Sr.No.	Round	SLGMN	Application ID	Name	Gender	Category	PH Type/Def Type	Mode of Admission	Diploma/B.Sc. Percentage	Seat Type	Fees Paid (Rs.)	Admission Date	Uploaded Date
25	CAP I	15718	DSE12141073	FEGADE NIKHIL SUNIL	Male	OBC-Leva Patidar		Diploma [Electronics and Communication Engineering]	72.46 %	GOBC	10000/-	29/08/2012	29/08/2012 15:57:18
26	CAP I	15717	DSE12130701	SURYAWANSHI SANDEEP VITTHALRAO	Male	OPEN		Diploma [Electronics and Telecommunication]	72.46 %	PHC	61200/-	29/08/2012	29/08/2012 16:04:11
27	CAP I	16066	DSE12146113	MORE PRADIP VISHWANATH	Male	OBC-Kumbhar or Kumhar		Diploma [Electronics and Telecommunication]	72.25 %	GOBC	34668/-	28/08/2012	28/08/2012 15:05:00
28	CAP I	16430	DSE12146429	NARKHEDE CHETAN VIKAS	Male	OBC-Leva Patidar		Diploma [Electronics and Telecommunication]	72.06 %	GOBC	34668/-	28/08/2012	28/08/2012 13:32:04
29	CAP I	16698	DSE12146467	PAKHALE PURUSHOTTAM CHINTAMAN	Male	OBC-Lad Shakhiy Wani		Diploma [Electronics and Telecommunication]	71.89 %	GOBC	34668/-	29/08/2012	29/08/2012 14:26:06
30	CAP I	16911	DSE12149043	SAPKALE MOHINI NATHU	Female	SBC-Koli		Diploma [Electronics and Telecommunication]	71.77 %	LOBC	8136/-	27/08/2012	27/08/2012 17:01:43
31	CAP I	16910	DSE12149461	BHADANE JAGRUTI GORAKHANATH	Female	OBC-Kunabi		Diploma [Electronics and Telecommunication]	71.77 %	LOBC	34668/-	28/08/2012	28/08/2012 15:43:33
32	CAP I	17707	DSE12149119	PATIL DIPALI SANJAY	Female	OBC-Kunabi		Diploma [Electronics and Telecommunication]	71.37 %	GOBC	34668/-	27/08/2012	27/08/2012 15:54:47
33	CAP I	17932	DSE12141041	JANGALE SWATI LILADHAR	Female	OBC-Leva Kunabi		Diploma [Electronics and Telecommunication]	71.26 %	GOBC	34668/-	29/08/2012	29/08/2012 14:04:49
34	CAP I	18079	DSE12146285	PALHAL MANISHA GANGADHAR	Female	NT-C-Dhangar		Diploma [Electronics and Telecommunication]	71.18 %	LNTC	8136/-	28/08/2012	28/08/2012 16:19:01
35	CAP I	19004	DSE12149124	SONAR KARISHMA SANJAY	Female	OBC-Sonar		Diploma [Electronics and Telecommunication]	70.69 %	GSC	34668/-	27/08/2012	27/08/2012 13:08:24
36	CAP I	19523	DSE12149451	ISAI SHRADHA RAJMUKAR	Female	OBC-Shimpi		Diploma [Electronics and Telecommunication]	70.40 %	GSC	34668/-	28/08/2012	28/08/2012 12:44:27

DIRECTORATE OF TECHNICAL EDUCATION, MAHARASHTRA STATE, MUMBAI

3, Mahapalika Marg, Elphinstone Technical Highschool Campus, Mumbai - 400001.

Admission To Direct Second Year of Four Year Degree Courses in Engineering / Technology for the year 2012-13

List of admitted candidates in Electronics and Telecommunication Engg(510437210)

CAP Seats : 48

Admitted Candidates List In CAP Rounds

Sr.No.	Round	SLGMN	Application ID	Name	Gender	Category	PH Type/Def Type	Mode of Admission	Diploma/B.Sc. Percentage	Seat Type	Fees Paid (Rs.)	Admission Date	Uploaded Date
37	CAP I	19533	DSE12146466	GHAYDAR VAIBHAV EKNATH	Male	SBC-Koshti		Diploma [Electronics and Telecommunication]	70.40 %	GSC	8136/-	28/08/2012	28/08/2012 14:29:41
38	CAP I	19643	DSE12146138	MANDEWAL HITESH NARAYAN	Male	OBC-Badgujar		Diploma [Electronics and Telecommunication]	70.34 %	GST	34668/-	27/08/2012	27/08/2012 13:51:18
39	CAP I	20238	DSE12146054	ZOPE SAGAR SHRIRAM	Male	OBC-Leva Patidar		Diploma [Electronics and Telecommunication]	70.06 %	GST	10000/-	30/08/2012	30/08/2012 12:07:43
40	CAP I	20451	DSE12120010	KHARCHE POOJA SHRIKRISHNA	Female	OBC-Kunabi		Diploma [Electronics and Communication Engineering]	69.94 %	GST	34668/-	27/08/2012	27/08/2012 14:07:02
41	CAP I	20681	DSE12149125	RANE MANJUSHA VIVEK	Female	OBC-Leva Patidar		Diploma [Electronics and Telecommunication]	69.83 %	LST	34668/-	27/08/2012	27/08/2012 13:05:43
42	CAP I	21342	DSE12120100	KHONDLE PRAMOD GAJANAN	Male	NT-C-Dhangar		Diploma [Electronics]	69.49 %	GNTC	8136/-	28/08/2012	28/08/2012 15:33:49
43	CAP I	21392	DSE12149030	JADHAV NAMRATA SUDHAKAR	Female	SC-Mahar		Diploma [Electronics and Telecommunication]	69.45 %	LSC	8136/-	28/08/2012	28/08/2012 13:07:31
44	CAP I	21426	DSE12149277	PRACHI VILAS PATIL	Female	OBC-Kunabi		Diploma [Electronics and Telecommunication]	69.43 %	GNTB	34668/-	28/08/2012	28/08/2012 12:25:40
45	CAP I	26336	DSE12146457	PARDESHI DINESHSING INDRASING	Male	VJDT-Rajput Bhamta		Diploma [Electronics and Telecommunication]	67.09 %	GVJDT	34668/-	28/08/2012	28/08/2012 14:24:11
46	CAP I	33176	DSE12146319	POL AVINASH VASANT	Male	SC-Mahar		Diploma [Electronics and Communication Engineering]	63.60 %	GSC	8136/-	29/08/2012	29/08/2012 14:40:15
47	CAP I	37754	DSE12103431	DUDHE SANCHITA KASHINATH	Female	SC-Mahar		Diploma [Electronics and Telecommunication]	60.61 %	LSC	8136/-	28/08/2012	28/08/2012 14:35:39
48	CAP II	3926	DSE12149305	PATIL YOGESH PRABHAKAR	Male	OBC-Leva Patidar		Diploma [Electronics and Telecommunication]	81.14 %	GOPEN	34668/-	09/09/2012	07/09/2012 12:24:21

Printed on: 09/01/2013 14:20:43 **Seal of the Institute** **Signature of The Director/Principal** **Page 4/6**

DIRECTORATE OF TECHNICAL EDUCATION, MAHARASHTRA STATE, MUMBAI

3, Mahapalika Marg, Elphinstone Technical Highschool Campus, Mumbai - 400001.

Admission To Direct Second Year of Four Year Degree Courses in Engineering / Technology for the year 2012-13

List of admitted candidates in Electronics and Telecommunication Engg(510437210)

CAP Seats : 48

Admitted Candidates List In Against CAP

Sr.No.	Round	Institute Merit No	Application ID	Name	Gender	Category	PH Type	Mode of Admission	Diploma/B.Sc. Percentage	Seat Type	Fees Paid (Rs.)	Admission Date	Reported Date	Admitted/Reported Late
1	ACAP	2	DSE12501727	JADHAV PUNAM JALAMSINGH	Female	OPEN		Diploma [Medical Electronics]	61.94 %	ACAP	61200/-	17/09/2012	25/09/2012 12:29:47	**No**
2	ACAP	3	DSE12501761	SURYAWANSHI KAVITA SUNIL	Female	OPEN		Diploma [Electronics and Telecommunication]	73.26 %	ACAP	61200/-	17/09/2012	25/09/2012 13:01:56	**No**

Printed on: 09/01/2013 14:20:43 **Seal of the Institute** **Signature of The Director/Principal** **Page 5/6**

DIRECTORATE OF TECHNICAL EDUCATION, MAHARASHTRA STATE, MUMBAI

3, Mahapalika Marg, Elphinstone Technical Highschool Campus, Mumbai - 400001.

Admission To Direct Second Year of Four Year Degree Courses in Engineering / Technology for the year 2012-13

List of admitted candidates in Electronics and Telecommunication Engg(510437210)

Summary

Sr. No.	Admission Details	Admitted Till 25th September 2012	Admitted After 25th September 2012	Total Admitted
1.	CAP Seats	48	0	48
2.	Against CAP Seats	2	0	2
3.	Minority Seats	0	0	0
4.	Against Minority Seats $	0	0	0
5.	Over And Above Seats	0	0	0
Total		50	0	50

Legends -
*-Admitted After Cut-off Date (For eg.25/09/2012 *)
#-Uploaded After Uploading Date (For eg.30/09/2012 #)
SLGMN-State Level General Merit No.
Non-Minority Candidates admitted against minority seat.Permission letters from authority to be attached.
Institute Merit No - institute level admission merit no given to candidate while uploading the candidate.

Printed on: 09/01/2013 14:20:43 **Seal of the Institute** **Signature of The Director/Principal**

For Regional Office Use Only

Seal of the Regional Office **Signature of the Regional Officer**

For DTE Use Only

Seal of the DTE **Signature of The Director**

Printed On: 09/01/2013 14:20:43 **Printed By:**: **Page 6/6**

DIRECTORATE OF TECHNICAL EDUCATION, MAHARASHTRA STATE, MUMBAI

3, Mahapalika Marg, Elphinstone Technical Highschool Campus, Mumbai - 400001.

Admission To Direct Second Year of Four Year Degree Courses in Engineering / Technology for the year 2012-13

List of admitted candidates in Information Technology(510424610)

CAP Seats : 39

Admitted Candidates List In CAP Rounds

Sr.No.	Round	SLGMN	Application ID	Name	Gender	Category	PH Type/Def Type	Mode of Admission	Diploma/B.Sc. Percentage	Seat Type	Fees Paid (Rs.)	Admission Date	Uploaded Date
1	CAP I	4592	DSE12149441	JETHANI NIKITA RAJKUMAR	Female	OPEN		Diploma [Information Technology]	80.38 %	LOPEN	61200/-	27/08/2012	27/08/2012 17:54:10
2	CAP I	6577	DSE12149105	JOSHI POOJA KAILAS	Female	OPEN		Diploma [Information Technology]	78.50 %	LOPEN	61200/-	27/08/2012	27/08/2012 15:05:52
3	CAP I	14624	DSE12149344	GHODKE KHUSHABU KESHAV	Female	OBC-Shimpi		Diploma [Information Technology]	73.06 %	LOPEN	33100/-	27/08/2012	27/08/2012 18:04:26
4	CAP I	17083	DSE12149100	VIBHANDIK PRAJAKTA DIPAK	Female	OBC-Sonar		Diploma [Information Technology]	71.69 %	LOPEN	34668/-	27/08/2012	27/08/2012 15:00:22
5	CAP I	18325	DSE12149057	DHARMADHIKARI CHARUSHILA ASHOK	Female	OPEN		Diploma [Information Technology]	71.06 %	GOPEN	61200/-	27/08/2012	27/08/2012 16:18:10
6	CAP I	20225	DSE12149200	ANBHORE ASHWINI RAJESH	Female	SC-Mahar		Diploma [Information Technology]	70.06 %	GOPEN	8136/-	29/08/2012	29/08/2012 14:01:05
7	CAP I	22555	DSE12149443	AGHICHA RINKEY AMARLAL	Female	OPEN		Diploma [Computer Engineering]	68.90 %	GOPEN	61200/-	28/08/2012	28/08/2012 14:57:43
8	CAP I	22771	DSE12149571	PATIL HEMANTKUMAR SUBHASH	Male	OBC-Kunbi		Diploma [Information Technology]	68.81 %	GOPEN	34668/-	29/08/2012	29/08/2012 15:45:20
9	CAP I	24360	DSE12149145	CHAUDHARI ASHWINI NARENDRA	Female	OBC-Leva Patidar		Diploma [Information Technology]	68.00 %	GOPEN	31668/-	27/08/2012	27/08/2012 18:21:21
10	CAP I	24357	DSE12149190	DHANRALE PRIYANKA ANIL	Female	NT-B-Bhoi		Diploma [Information Technology]	68.00 %	GOPEN	8136/-	28/08/2012	28/08/2012 17:07:18
				BHAVSAR PRATIK		OBC-		Diploma					

11	CAP I	26511	DSE12146157	PRAKASH	Male	Bhavsar		[Information Technology]	67.00 %	GOPEN	34668/-	27/08/2012	27/08/2012 15:47:55
12	CAP I	27271	DSE12149160	PATIL BHAVANA SANJAYRAV	Female	OBC-Kunbi		Diploma [Information Technology]	66.63 %	GOPEN	24668/-	28/08/2012	28/08/2012 14:02:22

Printed on: 09/01/2013 14:19:05 **Seal of the Institute** **Signature of The Director/Principal** **Page 1/5**

DIRECTORATE OF TECHNICAL EDUCATION, MAHARASHTRA STATE, MUMBAI

3, Mahapalika Marg, Elphinstone Technical Highschool Campus, Mumbai - 400001.

Admission To Direct Second Year of Four Year Degree Courses in Engineering / Technology for the year 2012-13

List of admitted candidates in Information Technology(510424610)

CAP Seats : 39

Admitted Candidates List In CAP Rounds

Sr.No.	Round	SLGMN	Application ID	Name	Gender	Category	PH Type/Def Type	Mode of Admission	Diploma/B.Sc. Percentage	Seat Type	Fees Paid (Rs.)	Admission Date	Uploaded Date
13	CAP I	28426	DSE12136324	AWARE TEJASWINI SHRIRAM	Female	OPEN		Diploma [Information Technology]	66.06 %	GOPEN	61200/-	27/08/2012	27/08/2012 14:15:18
14	CAP I	28684	DSE12149101	KALE KARISHMA PRAMOD	Female	OBC-Leva Patidar		Diploma [Information Technology]	65.94 %	LOBC	20000/-	29/08/2012	29/08/2012 13:02:53
15	CAP I	30244	DSE12135979	VYAVAHARE RAVIRAJ BABURAO	Male	OBC-Teli		Diploma [Computer Engineering]	65.17 %	GOBC	34668/-	29/08/2012	29/08/2012 14:30:34
16	CAP I	31899	DSE12149644	PATIL KALYANI VASANT	Female	OBC-Kunbi		Diploma [Information Technology]	64.31 %	LOBC	34668/-	28/08/2012	28/08/2012 17:11:49
17	CAP I	32127	DSE12149645	CHAUDHARI TUSHAR MANOHAR	Male	OBC-Teli		Diploma [Computer Technology]	64.19 %	GOBC	34668/-	28/08/2012	28/08/2012 16:27:12
18	CAP I	32222	DSE12141071	BARHATE RAKESH SURESH	Male	OBC-Leva Patidar		Diploma [Computer Technology]	64.14 %	GOBC	34668/-	28/08/2012	28/08/2012 16:43:58
19	CAP I	33074	DSE12149360	PATIL MOHIT BAPU	Male	OBC-Kunabi		Diploma [Computer Engineering]	63.66 %	GOBC	4000/-	28/08/2012	28/08/2012 17:59:27
20	CAP I	33129	DSE12138765	PATIL SAPANA SHANTARAM	Female	OBC-Kunbi		Diploma [Information Technology]	63.63 %	GNTD	34668/-	28/08/2012	28/08/2012 15:36:09
21	CAP I	34659	DSE12149121	CHAUDHARI KOMAL PRAMOD	Female	OBC-Reve Gujar		Diploma [Computer Engineering]	62.77 %	LNTC	34668/-	28/08/2012	28/08/2012 14:38:28
22	CAP I	35565	DSE12146091	BORSE NEHA PURUSHOTTAM	Female	OBC-Kathar		Diploma [Information Technology]	62.19 %	GOPEN	28668/-	27/08/2012	27/08/2012 17:48:41
23	CAP I	36963	DSE12149138	CHAUDHARI SAYALI DINESH	Female	OBC-Teli		Diploma [Computer Engineering]	61.23 %	GOBC	34668/-	28/08/2012	28/08/2012 15:19:25
				PATIL PALLAVI		OBC-		Diploma					

24	CAP I	37418	DSE12149346	ARAVIND	Female	Kunabi		[Information Technology]	60.88 %	GOBC	34668/-	28/08/2012	28/08/2012 15:25:30

DIRECTORATE OF TECHNICAL EDUCATION, MAHARASHTRA STATE, MUMBAI

3, Mahapalika Marg, Elphinstone Technical Highschool Campus, Mumbai - 400001.

Admission To Direct Second Year of Four Year Degree Courses in Engineering / Technology for the year 2012-13

List of admitted candidates in Information Technology(510424610)

CAP Seats : 39

Admitted Candidates List In CAP Rounds

Sr.No.	Round	SLGMN	Application ID	Name	Gender	Category	PH Type/Def Type	Mode of Admission	Diploma/B.Sc. Percentage	Seat Type	Fees Paid (Rs.)	Admission Date	Uploaded Date
25	CAP I	37954	DSE12139015	PATIL NITIN BAPURAO	Male	OBC-Kunbi		Diploma [Computer Engineering]	60.41 %	GSC	31838/-	29/08/2012	29/08/2012 14:07:14
26	CAP I	39205	DSE12146370	CHAUDHARI GAURAV RAVINDRA	Male	OBC-Leva Patidar		Diploma [Computer Engineering]	59.24 %	GSC	34668/-	28/08/2012	28/08/2012 14:11:01
27	CAP I	39532	DSE12149359	PATIL MANISH SANJAY	Male	OBC-Kunbi		Diploma [Computer Engineering]	58.84 %	LSC	34668/-	28/08/2012	28/08/2012 15:08:34
28	CAP I	40461	DSE12141020	BARHATE NILIMA RUPKUMAR	Female	OBC-Leva Patidar		Diploma [Computer Engineering]	57.29 %	LSC	34668/-	28/08/2012	28/08/2012 13:02:17
29	CAP II	11284	DSE12149625	DESHMUKH RUCHIKA SHRIKANT	Female	OPEN		Diploma [Computer Engineering]	75.10 %	GOPEN	20000/-	10/09/2012	10/09/2012 13:49:54

Printed on: 09/01/2013 14:19:05 **Seal of the Institute** **Signature of The Director/Principal**

DIRECTORATE OF TECHNICAL EDUCATION, MAHARASHTRA STATE, MUMBAI

3, Mahapalika Marg, Elphinstone Technical Highschool Campus, Mumbai - 400001.

Admission To Direct Second Year of Four Year Degree Courses in Engineering / Technology for the year 2012-13

List of admitted candidates in Information Technology(510424610)

CAP Seats : 39

Admitted Candidates List In Against CAP

Sr.No.	Round	Institute Merit No	Application ID	Name	Gender	Category	PH Type	Mode of Admission	Diploma/B.Sc. Percentage	Seat Type	Fees Paid (Rs.)	Admission Date	Reported Date	Admitted/Reported Late
1	ACAP	4	DSE12501792	MARATHE SURAJ MADHUKAR	Male	OPEN		Diploma [Computer Engineering]	67.68 %	ACAP	40000/-	20/09/2012	25/09/2012 13:46:53	**No**

Printed on: 09/01/2013 14:19:05 **Seal of the Institute** **Signature of The Director/Principal**

DIRECTORATE OF TECHNICAL EDUCATION, MAHARASHTRA STATE, MUMBAI

3, Mahapalika Marg, Elphinstone Technical Highschool Campus, Mumbai - 400001.

Admission To Direct Second Year of Four Year Degree Courses in Engineering / Technology for the year 2012-13

List of admitted candidates in Information Technology(510424610)

Summary

Sr. No.	Admission Details	Admitted Till 25th September 2012	Admitted After 25th September 2012	Total Admitted
1.	CAP Seats	29	0	29
2.	Against CAP Seats	1	0	1
3.	Minority Seats	0	0	0
4.	Against Minority Seats $	0	0	0
5.	Over And Above Seats	0	0	0
Total		30	0	30

Legends -
*-Admitted After Cut-off Date (For eg.25/09/2012 *)
#-Uploaded After Uploading Date (For eg.30/09/2012 #)
SLGMN-State Level General Merit No.
Non-Minority Candidates admitted against minority seat.Permission letters from authority to be attached.
Institute Merit No - institute level admission merit no given to candidate while uploading the candidate.

Printed on: 09/01/2013 14:19:05 **Seal of the Institute** **Signature of The Director/Principal**

For Regional Office Use Only

Seal of the Regional Office **Signature of the Regional Officer**

For DTE Use Only

Seal of the DTE **Signature of The Director**

Printed On: 09/01/2013 14:19:05 **Printed By:**: **Page 5/5**

DIRECTORATE OF TECHNICAL EDUCATION, MAHARASHTRA STATE, MUMBAI

3, Mahapalika Marg, Elphinstone Technical Highschool Campus, Mumbai - 400001.

Admission To Direct Second Year of Four Year Degree Courses in Engineering / Technology for the year 2012-13

List of admitted candidates in Mechanical Engineering(510461210)

CAP Seats : 26

Admitted Candidates List In CAP Rounds

Sr.No.	Round	SLGMN	Application ID	Name	Gender	Category	PH Type/Def Type	Mode of Admission	Diploma/B.Sc. Percentage	Seat Type	Fees Paid (Rs.)	Admission Date	Uploaded Date
1	CAP I	1827	DSE12146390	PAWAR GOKUL SUDHAKAR	Male	OBC-Kunbi		Diploma [Mechanical Engineering]	84.30 %	GOPEN	34668/-	29/08/2012	29/08/2012 14:42:48
2	CAP I	3208	DSE12146096	PATIL NITIN BHIKAN	Male	OBC-Kunabi		Diploma [Mechanical Engineering]	82.03 %	GOPEN	34668/-	28/08/2012	28/08/2012 13:45:46
3	CAP I	3550	DSE12149216	AMODKAR HEMANT DATTATRAY	Male	OBC-Hajjam, Naavisen		Diploma [Mechanical Engineering]	81.61 %	GOPEN	34668/-	28/08/2012	28/08/2012 14:08:35
4	CAP I	3903	DSE12146388	RANE LOKESH SATISH	Male	OBC-Leva Patidar		Diploma [Mechanical Engineering]	81.19 %	GOPEN	34668/-	29/08/2012	29/08/2012 14:33:09
5	CAP I	4735	DSE12149519	PATIL SARANG ASHOK	Male	OBC-Leva Gujar		Diploma [Mechanical Engineering]	80.24 %	GOPEN	34668/-	29/08/2012	29/08/2012 13:34:55
6	CAP I	4778	DSE12146160	AHIRRAO CHETAN SANJAY	Male	OBC-Shimpi		Diploma [Mechanical Engineering]	80.18 %	GOPEN	34668/-	27/08/2012	27/08/2012 17:11:09
7	CAP I	5188	DSE12146348	PATIL CHHAJENDRA VALMIK	Male	OBC-Kunabi		Diploma [Mechanical Engineering]	79.76 %	GOBC	34668/-	28/08/2012	28/08/2012 13:59:30
8	CAP I	5639	DSE12149049	PATIL VIVEK SANJAY	Male	OBC-Leva Patidar		Diploma [Mechanical Engineering]	79.34 %	GOBC	34668/-	28/08/2012	28/08/2012 12:55:50
9	CAP I	6318	DSE12141129	MAHALE HARISH LAHU	Male	OBC-Navi or Nhavi		Diploma [Mechanical Engineering]	78.73 %	GOBC	34668/-	27/08/2012	27/08/2012 16:05:14
10	CAP I	7906	DSE12146240	KATE VINOD ARJUN	Male	NT-C-Dhangar		Diploma [Mechanical Engineering]	77.49 %	LNTC	8136/-	28/08/2012	28/08/2012 15:10:23
				BONDE		OBC-Leva		Diploma					

11	CAP I	8703	DSE12141145	BHAVANA ANANDA	Female	Patidar		[Mechanical Engineering]	76.84 %	LOPEN	34668/-	27/08/2012	27/08/2012 15:21:09
12	CAP I	8701	DSE12149596	TAYDE SAGAR SIDDHARTH	Male	SC-Buddhist		Diploma [Mechanical Engineering]	76.84 %	GSC	8136/-	28/08/2012	28/08/2012 16:03:53

Printed on: 09/01/2013 14:21:58 **Seal of the Institute** **Signature of The Director/Principal**

DIRECTORATE OF TECHNICAL EDUCATION, MAHARASHTRA STATE, MUMBAI

3, Mahapalika Marg, Elphinstone Technical Highschool Campus, Mumbai - 400001.

Admission To Direct Second Year of Four Year Degree Courses in Engineering / Technology for the year 2012-13

List of admitted candidates in Mechanical Engineering(510461210)

CAP Seats : 26

Admitted Candidates List In CAP Rounds

Sr.No.	Round	SLGMN	Application ID	Name	Gender	Category	PH Type/Def Type	Mode of Admission	Diploma/B.Sc. Percentage	Seat Type	Fees Paid (Rs.)	Admission Date	Uploaded Date
13	CAP I	10696	DSE12146358	BARSE SANTOSH DHONDU	Male	NT-B-Gavali		Diploma [Automobile Engineering]	75.48 %	GNTB	8136/-	29/08/2012	29/08/2012 12:42:13
14	CAP I	11004	DSE12146033	JOSHI YUGA PRADIP	Female	OPEN		Diploma [Mechanical Engineering]	75.28 %	LOPEN	36100/-	27/08/2012	27/08/2012 18:12:03
15	CAP I	12503	DSE12139281	PAWAR YAMINI YASHWANTRAO	Female	OBC-Kunbi		Diploma [Mechanical Engineering]	74.33 %	LOPEN	34668/-	28/08/2012	28/08/2012 16:42:19
16	CAP I	14077	DSE12149227	SURALKAR NITIN NINA	Male	SC-Chambhar		Diploma [Mechanical Engineering]	73.37 %	LST	8136/-	28/08/2012	28/08/2012 15:38:09
17	CAP I	19328	DSE12120221	NARKHADE KANCHAN NINU	Female	OBC-Kunabi		Diploma [Mechanical Engineering]	70.51 %	LOBC	34668/-	29/08/2012	29/08/2012 13:32:35
18	CAP I	20667	DSE12146402	MALI MAYUR PRAKASH	Male	OBC-Mali	Deaf and Dumb	Diploma [Electronics and Telecommunication]	69.83 %	PHC	34668/-	27/08/2012	27/08/2012 15:52:03
19	CAP I	24785	DSE12146382	VASAVE NITIN BHIKAN	Male	ST-Bhil		Diploma [Mechanical Engineering]	67.82 %	GST	8136/-	29/08/2012	29/08/2012 14:35:55
20	CAP I	24901	DSE12146149	PATIL AASHISH YUVRAJ	Male	VJDT-Rajput Bhamta		Diploma [Mechanical Engineering]	67.76 %	GVJDT	8136/-	27/08/2012	27/08/2012 17:44:41
21	CAP I	26149	DSE12149077	TAYADE MINAL VIJAY	Female	SC-Mahar		Diploma [Mechanical Engineering]	67.16 %	LSC	8136/-	28/08/2012	28/08/2012 16:36:25
22	CAP I	26144	DSE12149595	RATHOD SACHIN RAVINDRA	Male	ST-Pardhi	Ex servicemen	Diploma [Mechanical Engineering]	67.16 %	DEF	8136/-	28/08/2012	28/08/2012 16:22:17
23	CAP II	8698	DSE12147041	CHAVAN TUSHAR RAJENDRA	Male	OBC-Shimpi		Diploma [Mechanical Engineering]	76.84 %	GOPEN	34668/-	09/09/2012	07/09/2012 17:41:52
				PATIL		OBC-		Diploma					

24	CAP II	9005	DSE12146076	PUSHPAK ASHOK	Male	Kunabi		[Mechanical Engineering]	76.62 %	GOPEN	34668/-	09/09/2012	07/09/2012 13:11:00

Printed on: 09/01/2013 14:21:58 **Seal of the Institute** **Signature of The Director/Principal** **Page 2/4**

DIRECTORATE OF TECHNICAL EDUCATION, MAHARASHTRA STATE, MUMBAI

3, Mahapalika Marg, Elphinstone Technical Highschool Campus, Mumbai - 400001.

Admission To Direct Second Year of Four Year Degree Courses in Engineering / Technology for the year 2012-13

List of admitted candidates in Mechanical Engineering(510461210)

CAP Seats : 26

Admitted Candidates List In CAP Rounds

Sr.No.	Round	SLGMN	Application ID	Name	Gender	Category	PH Type/Def Type	Mode of Admission	Diploma/B.Sc. Percentage	Seat Type	Fees Paid (Rs.)	Admission Date	Uploaded Date
25	CAP II	20545	DSE12149078	SHIMPI TEJASWINI PRAKASH	Female	OBC-Shimpi		Diploma [Mechanical Engineering]	69.91 %	LOPEN	34668/-	07/09/2012	07/09/2012 15:20:29
26	CAP II	27358	DSE12149282	SAPKALE PRADIP MURALIDHAR	Male	SC-Mahar		Diploma [Mechanical Engineering]	66.60 %	GSC	8136/-	07/09/2012	07/09/2012 15:14:11

Printed on: 09/01/2013 14:21:58 **Seal of the Institute** **Signature of The Director/Principal** **Page 3/4**

DIRECTORATE OF TECHNICAL EDUCATION, MAHARASHTRA STATE, MUMBAI

3, Mahapalika Marg, Elphinstone Technical Highschool Campus, Mumbai - 400001.

Admission To Direct Second Year of Four Year Degree Courses in Engineering / Technology for the year 2012-13

List of admitted candidates in Mechanical Engineering(510461210)

Summary

Sr. No.	Admission Details	Admitted Till 25th September 2012	Admitted After 25th September 2012	Total Admitted
1.	CAP Seats	26	0	26
2.	Against CAP Seats	0	0	0
3.	Minority Seats	0	0	0
4.	Against Minority Seats $	0	0	0
5.	Over And Above Seats	0	0	0
Total		26	0	26

Legends -
*-Admitted After Cut-off Date (For eg.25/09/2012 *)
#-Uploaded After Uploading Date (For eg.30/09/2012 #)
SLGMN-State Level General Merit No.
Non-Minority Candidates admitted against minority seat.Permission letters from authority to be attached.
Institute Merit No - institute level admission merit no given to candidate while uploading the candidate.

Printed on: 09/01/2013 14:21:58 **Seal of the Institute** **Signature of The Director/Principal**

For Regional Office Use Only

Seal of the Regional Office **Signature of the Regional Officer**

For DTE Use Only

Seal of the DTE **Signature of The Director**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[Environmental Engineering]

Admitted Candidate List to the First Year of Two-Year Full-Time Post Graduate Courses in Engineering/Technology for the academic Year 2012-2013

Quota : 18

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Graduation Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time
1.	1	64.00	ME12506250	1	RAJPUT AMITKUMAR ABHIJIT	Male	Open	North Maharashtra	NA	65.13	Non-GATE Non Sponsored - Entrance	30000	7/6/2012	3/9/2012 3:01PM
2.	2	78.00	ME12506403	2	KAPADNIS PARESH JIBHAU	Male	Open	North Maharashtra	NA	73.21	Non-GATE Non Sponsored - Entrance	30000	16/7/2012	3/9/2012 3:27PM
3.	3	52.00	ME12506484	03	BHORAS KUMAL DATTATRAY	Male	Open	North Maharashtra	NA	61.47	Non-GATE Non Sponsored - Entrance	25000	22/5/2012	3/9/2012 3:45PM
4.	4	58.00	ME12506220	4	SHIRSATH MOHAN NIVRUTTI	Male	Open	North Maharashtra	NA	69.24	Non-GATE Non Sponsored - Entrance	40000	1/6/2012	3/9/2012 2:56PM
5.	5	67.00	ME12506319	5	PATIL PRAVIN KRISHNA	Male	Open	North Maharashtra	NA	58.42	Non-GATE Non Sponsored - Entrance	15000	16/7/2012	3/9/2012 3:13PM
6.	6	65.00	ME12506427	6	JAIN RAHUL NAVANITLAL	Male	Open	North Maharashtra	NA	66.71	Non-GATE Non Sponsored - Entrance	35000	16/7/2012	3/9/2012 3:33PM
7.	7	55.00	ME12506469	7	NIKAM PRASAD GORAKSHANATH	Male	Open	North Maharashtra	NA	73.13	Non-GATE Non Sponsored - Entrance	35000	16/7/2012	3/9/2012 3:41PM
8.	8	53.00	ME12506136	8	WAGH DIAMBER SUDAM	Male	Open	North Maharashtra	NA	63.93	Non-GATE Non Sponsored - Entrance	10000	6/6/2012	3/9/2012 2:42PM
9.	9	57.00	ME12506193	9	SURYAWANSHI MAYUR MOHAN	Male	Open	North Maharashtra	NA	60.12	Non-GATE Non Sponsored - Entrance	10000	6/7/2012	3/9/2012 2:51PM
											Non-GATE			

10.	10	70	ME12506345	10	MORE MINAL DILIP	Male	Open	North Maharashtra	NA	67.21	Non Sponsored - Entrance	35000	7/6/2012	3/9/2012 3:18PM

Printed On : 9/1/2013 4:52:18 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 1/2**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[Environmental Engineering]

Admitted Candidate List to the First Year of Two-Year Full-Time Post Graduate Courses in Engineering/Technology for the academic Year 2012-2013

Quota : 18

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Graduation Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time
11.	11	56.00	ME12506161	11	AMITKUMAR ANANDRAO GHANMODE	Male	Open	North Maharashtra	NA	58.85	Non-GATE Non Sponsored - Entrance	25000	25/7/2012	3/9/2012 2:46PM
12.	12	56.00	ME12506286	12	PAWAR RAHUL KANTILAL	Male	Open	North Maharashtra	NA	58.60	Non-GATE Non Sponsored - Entrance	30000	7/6/2012	3/9/2012 3:07PM
13.	13	59	ME12506536	13	BOBDE NIKHIL RAMKRISHNA	Male	Open	North Maharashtra	NA	52.54	Non-GATE Non Sponsored - Entrance	10000	16/7/2012	3/9/2012 3:57PM
14.	14	54	ME12506413	14	WAGH KISHOR SURESH	Male	Open	North Maharashtra	NA	64.47	Non-GATE Non Sponsored - Entrance	25000	16/7/2012	3/9/2012 3:31PM
15.	15	71.00	ME12506081	15	SHAH CHIRAG RAMESHCHANDRA	Male	Open	North Maharashtra	NA	62.35	Non-GATE Non Sponsored - Entrance	30000	18/7/2012	3/9/2012 2:31PM
16.	16	57.00	ME12506006	16	PRAMOD VITHALRAO KHARMALE	Male	Open	North Maharashtra	NA	62.50	Non-GATE Non Sponsored - Entrance	30000	14/6/2012	3/9/2012 2:17PM
17.	18	63.00	ME12506117	18	HAJERI ABHIJITSINGH KESARSINGH	Male	Open	North Maharashtra	NA	60.30	Non-GATE Non Sponsored - Entrance	62150	18/6/2012	3/9/2012 2:38PM
18.	24	79.00	ME12506513	24	AGIWAL DILIP RAMGOPAL	Male	Open	North Maharashtra	NA	60.08	Non-GATE Non Sponsored - Entrance	30000	24/7/2012	3/9/2012 3:51PM

Print

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[Computer Science and Engineering]

Admitted Candidate List to the First Year of Two-Year Full-Time Post Graduate Courses in Engineering/Technology for the academic Year 2012-2013

Quota : 18

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Graduation Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time
1.	1	43	ME12503647	1	INGALE MINAL GANESH	Female	Open	North Maharashtra	NA	67.53	Non-GATE Non Sponsored - Entrance	30000	20/7/2012	1/9/2012 2:12PM
2.	2	50.00	ME12511898	2	MULEY TUSHAR CHANDRAKANT	Male	Open	North Maharashtra	NA	61.47	Non-GATE Non Sponsored - Entrance	10000	16/8/2012	5/9/2012 4:47PM
3.	3	48.00	ME12503667	3	PATIL KAVITA TUKARAM	Female	Open	North Maharashtra	NA	64.73	Non-GATE Non Sponsored - Entrance	20000	19/7/2012	1/9/2012 2:23PM
4.	4	44.00	ME12503701	4	PATIL SONIYA SUNIL	Female	Open	North Maharashtra	NA	67.33	Non-GATE Non Sponsored - Entrance	30000	18/7/2012	1/9/2012 2:37PM
5.	5	47.00	ME12503635	5	WAGHULDE NILAKSHI PRADIP	Male	Open	North Maharashtra	NA	75.47	Non-GATE Non Sponsored - Entrance	30000	19/7/2012	1/9/2012 2:07PM
6.	6	53.00	ME12503438	6	NARKHEDE UTKARSHA PRAMOD	Female	Open	North Maharashtra	NA	70.87	Non-GATE Non Sponsored - Entrance	30000	19/7/2012	1/9/2012 12:27PM
7.	7	52.00	ME12503659	7	NAVAL POOJA VIJAY	Female	Open	North Maharashtra	NA	67.73	Non-GATE Non Sponsored - Entrance	20000	1/9/2012	1/9/2012 2:18PM
8.	8	43.00	ME12503414	8	KANADE DHANASHRI PATNAKAR	Female	Open	North Maharashtra	NA	66.86	Non-GATE Non Sponsored - Entrance	5000	26/7/2012	1/9/2012 12:18PM
9.	9	44.00	ME12503392	9	CHAUDHARI SWATI RAMESHCHAND	Male	Open	North Maharashtra	NA	76.47	Non-GATE Non Sponsored - Entrance	30000	17/7/2012	1/9/2012 12:09PM
											Non-GATE			

10.	10	46	ME12503630	10	DHANDE LINA LAXMAN	Female	Open	North Maharashtra	NA	71.13	Non Sponsored - Entrance	30000	30/7/2012	1/9/2012 2:04PM

Printed On : 9/1/2013 4:53:45 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 1/2**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[Computer Science and Engineering]

Admitted Candidate List to the First Year of Two-Year Full-Time Post Graduate Courses in Engineering/Technology for the academic Year 2012-2013

Quota : 18

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Graduation Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time
11.	11	43.00	ME12503459	11	YOGESH LANDGE	Male	Open	North Maharashtra	NA	65.78	Non-GATE Non Sponsored - Entrance	8000	27/7/2012	1/9/2012 12:35PM
12.	12	58.00	ME12503428	12	MAHAJAN ARCHANA NILKANTH	Female	Open	North Maharashtra	NA	72.14	Non-GATE Non Sponsored - Entrance	1000	16/7/2012	1/9/2012 12:23PM
13.	13	42.00	ME12503678	13	TAYADE DHANASHRI SHASHIKANT	Female	Open	North Maharashtra	NA	61.33	Non-GATE Non Sponsored - Entrance	30000	16/7/2012	1/9/2012 2:29PM
14.	14	47.00	ME12503352	14	DHANDE VAIBHAV SHASHIKANT	Male	Open	North Maharashtra	NA	62.87	Non-GATE Non Sponsored - Entrance	20000	24/7/2012	1/9/2012 11:52AM
15.	15	43.00	ME12511921	15	DHIWAR AMOL ANNA	Male	Open	North Maharashtra	NA	40.88	Non-GATE Non Sponsored - Entrance	2000	24/7/2012	5/9/2012 4:53PM
16.	16	53.00	ME12503329	16	TALEKAR DINESH LAXMAN	Male	Open	North Maharashtra	NA	142.97	Non-GATE Non Sponsored - Entrance	20000	24/7/2012	1/9/2012 11:42AM
17.	17	48.00	ME12503690	17	PATIL BHAGYASHRI SUDHAKAR	Female	Open	North Maharashtra	NA	64.00	Non-GATE Non Sponsored - Entrance	35000	21/7/2012	1/9/2012 2:33PM
18.	18	45.00	ME12503470	18	RAHIL AMIN BHURANI	Male	Open	North Maharashtra	NA	66.81	Non-GATE Non Sponsored - Entrance	30000	28/7/2012	1/9/2012 12:40PM

Printed On : 9/1/2013 4:53:45 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 2/2**

Print

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[Digital Electronics]

Admitted Candidate List to the First Year of Two-Year Full-Time Post Graduate Courses in Engineering/Technology for the academic Year 2012-2013

Quota : 18

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Graduation Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time
1.	1	65	ME12504180	12	KHAIRNAR DNYANESHWAR DILIP	Male	Open	North Maharashtra	NA	69.53	Non-GATE Non Sponsored - Entrance	1000	21/7/2012	1/9/2012 4:48PM
2.	2	64.00	ME12503743	2	PANDE KAUSHALKUMAR KRUPASHANKAR	Male	Open	North Maharashtra	NA	64.93	Non-GATE Non Sponsored - Entrance	62150	28/7/2012	1/9/2012 2:51PM
3.	3	62.00	ME12504190	22	SANTAWANI YOGESH SHANKARLAL	Male	Open	North Maharashtra	NA	72.93	Non-GATE Non Sponsored - Entrance	10000	25/7/2012	1/9/2012 4:52PM
4.	4	60.00	ME12503910	11	KAMALASKAR HARSHAL NANDKISHOR	Male	Open	North Maharashtra	NA	66.33	Non-GATE Non Sponsored - Entrance	1000	30/8/2012	1/9/2012 3:34PM
5.	7	55	ME12503882	19	HARWAR BHAGESHREE DURYODHAN	Female	Open	North Maharashtra	NA	69.53	Non-GATE Non Sponsored - Entrance	20000	17/7/2012	1/9/2012 3:28PM
6.	8	53	ME12504203	14	VERULKAR NILESH MOHAN	Male	Open	North Maharashtra	NA	68.92	Non-GATE Non Sponsored - Entrance	30000	27/7/2012	1/9/2012 4:57PM
7.	9	51.00	ME12503813	23	DESHMUKH RAHUL NANDKISHOR	Male	Open	North Maharashtra	NA	71.87	Non-GATE Non Sponsored - Entrance	20000	25/7/2012	1/9/2012 3:08PM
8.	10	51.00	ME12504160	13	KOR ASHWINI NARAYANRAO	Female	Open	North Maharashtra	NA	57.20	Non-GATE Non Sponsored - Entrance	15000	3/8/2012	1/9/2012 4:41PM
9.	11	50.00	ME12503958	15	IRFAN KHAN YOUSUF KHAN	Male	Open	North Maharashtra	NA	75.67	Non-GATE Non Sponsored - Entrance	30000	4/8/2012	1/9/2012 3:46PM
											Non-GATE			

10.	12	50.00	ME12504111	10	WAGH POONAM MADHAV	Female	Open	North Maharashtra	NA	71.00	Non Sponsored - Entrance	30000	17/7/2012	1/9/2012 4:29PM

Printed On : 9/1/2013 4:55:10 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 1/2**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[Digital Electronics]

Admitted Candidate List to the First Year of Two-Year Full-Time Post Graduate Courses in Engineering/Technology for the academic Year 2012-2013

Quota : 18

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Graduation Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time
11.	13	50	ME12503851	1	PANGALLU DHEERAJ RAJENDRA	Male	Open	North Maharashtra	NA	67.73	Non-GATE Non Sponsored - Entrance	20000	28/7/2012	1/9/2012 3:18PM
12.	14	47.00	ME12503788	17	DESAI SHAMAL ANIL	Female	Open	North Maharashtra	NA	68.57	Non-GATE Non Sponsored - Entrance	30000	20/7/2012	1/9/2012 3:02PM
13.	16	44	ME12504213	9	PATIL SANDIP KHUSHAL	Male	Open	North Maharashtra	NA	65.40	Non-GATE Non Sponsored - Entrance	10000	31/7/2012	1/9/2012 5:02PM
14.	17	41.00	ME12503929	16	SHARMA PRACHITI PANKAJ	Female	Open	North Maharashtra	NA	66.87	Non-GATE Non Sponsored - Entrance	30000	28/7/2012	1/9/2012 3:39PM
15.	18	41.00	ME12503725	18	KU PRITI SURESH ASOLKAR	Female	Open	North Maharashtra	NA	72.31	Non-GATE Non Sponsored - Entrance	20000	27/7/2012	1/9/2012 2:46PM
16.	19	40.00	ME12503840	5	PATIL PALLAVI RAMRAO	Female	Open	North Maharashtra	NA	67.00	Non-GATE Non Sponsored - Entrance	30000	28/7/2012	1/9/2012 3:14PM
17.	19	40.00	ME12504095	8	PATIL PANKAJ AVINASH	Male	Open	North Maharashtra	NA	62.67	Non-GATE Non Sponsored - Entrance	35000	11/8/2012	1/9/2012 4:24PM
18.	20	40.00	ME12503757	20	PATIL KUNAL JAGANNATH	Male	Open	North Maharashtra	NA	60.00	Non-GATE Non Sponsored - Entrance	30000	30/7/2012	1/9/2012 2:56PM

Print

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[Machine Design]

Admitted Candidate List to the First Year of Two-Year Full-Time Post Graduate Courses in Engineering/Technology for the academic Year 2012-2013

Quota : 18

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Graduation Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time
1.	1	61	ME12505715	1	RANA PRAVIN PRATAPSING	Male	Open	North Maharashtra	NA	69.47	Non-GATE Non Sponsored - Entrance	30000	21/7/2012	3/9/2012 12:48PM
2.	02	58.00	ME12505628	2	SURYAWANSHI BHUSHAN KHUSHAL	Male	Open	North Maharashtra	NA	66.40	Non-GATE Non Sponsored - Entrance	30000	28/7/2012	3/9/2012 12:29PM
3.	03	51	ME12505470	03	BHARAMBE DEEPAK VASANT	Male	Open	North Maharashtra	NA	63.00	Non-GATE Non Sponsored - Entrance	30000	20/7/2012	3/9/2012 11:43AM
4.	04	51	ME12505397	04	NIKUMBH TUSHAR SANTOSH	Male	Open	North Maharashtra	NA	65.86	Non-GATE Non Sponsored - Entrance	5000	17/8/2012	3/9/2012 11:20AM
5.	5	55.00	ME12505554	5	JHA SHANKAR MADANMOHAN	Male	Open	North Maharashtra	NA	70.73	Non-GATE Non Sponsored - Entrance	30000	30/7/2012	3/9/2012 12:11PM
6.	6	51.00	ME12505512	6	HADPE MUKESH DNYANDEO	Male	Open	North Maharashtra	NA	68.54	Non-GATE Non Sponsored - Entrance	4000	26/7/2012	3/9/2012 11:57AM
7.	8	55.00	ME12505620	8	SHINDE NILAMBARI VILASRAO	Female	Open	North Maharashtra	NA	66.71	Non-GATE Non Sponsored - Entrance	30000	29/7/2012	3/9/2012 12:26PM
8.	9	72.00	ME12505451	09	DHANKE MILIND DAYARAM	Male	Open	North Maharashtra	NA	64.93	Non-GATE Non Sponsored - Entrance	15000	7/8/2012	3/9/2012 11:37AM
9.	10	53.00	ME12505477	10	WADADKAR JITENDRA NARAYAN	Male	Open	North Maharashtra	NA	65.07	Non-GATE Non Sponsored - Entrance	30000	31/7/2012	3/9/2012 11:46AM
											Non-GATE			

10.	11	53.00	ME12505644	11	SONWANE PRAVIN BHIKULAL	Male	Open	North Maharashtra	NA	66.07	Non Sponsored - Entrance	35000	26/7/2012	3/9/2012 12:32PM

Printed On : 9/1/2013 4:55:37 PM **Seal of the Institute** **Signature of the Director/Principal** **Page No.: 1/2**

Directorate of Technical Education, Maharashtra State

3, Mahapalika Marg, Post Box No.1967, Mumbai-400001

Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon

[Machine Design]

Admitted Candidate List to the First Year of Two-Year Full-Time Post Graduate Courses in Engineering/Technology for the academic Year 2012-2013

Quota : 18

Sr. No.	Merit No	Merit Marks	Application ID	Roll No	Name	Gender	Category	Home University	PH Type	Graduation Percentage	Seat Type	Fees Paid	Admission Date	Reported Date Time
11.	12	53	ME12505518	12	JADHAV PANKAJ SAMBHAJI	Male	Open	North Maharashtra	NA	67.67	Non-GATE Non Sponsored - Entrance	20000	31/7/2012	3/9/2012 12:00PM
12.	13	54	ME12505701	13	SURANGE JAGRUTI RAMESH	Female	Open	North Maharashtra	NA	68.64	Non-GATE Non Sponsored - Entrance	3000	12/7/2012	3/9/2012 12:45PM
13.	14	58.00	ME12505601	14	FARDE KISHOR DATTATRAY	Male	Open	North Maharashtra	NA	71.93	Non-GATE Non Sponsored - Entrance	30000	31/7/2012	3/9/2012 12:23PM
14.	15	56.00	ME12505679	15	KETAN VIJAY DHANDE	Male	Open	North Maharashtra	NA	63.20	Non-GATE Non Sponsored - Entrance	30000	26/7/2012	3/9/2012 12:40PM
15.	16	53.00	ME12505657	16	SARODE VIJAY SALIRAM	Male	Open	North Maharashtra	NA	61.21	Non-GATE Non Sponsored - Entrance	30000	26/7/2012	3/9/2012 12:35PM
16.	17	57	ME12505501	17	RAJPUT SUNILSING CHANDRAMOHAN	Male	Open	North Maharashtra	NA	63.93	Non-GATE Non Sponsored - Entrance	30000	20/7/2012	3/9/2012 11:53AM
17.	18	57.00	ME12505489	18	BAVISKAR DNYANDEEP HIRAMAN	Male	Open	North Maharashtra	NA	64.60	Non-GATE Non Sponsored - Entrance	20000	30/7/2012	3/9/2012 11:49AM
18.	19	53	ME12505529	19	BHANDARKAR DHIRAJ KESHAVRAO	Male	Open	North Maharashtra	NA	67.60	Non-GATE Non Sponsored - Entrance	20000	30/7/2012	3/9/2012 12:03PM

Print

Application Form
for
(FE / Direct SE / First Year ME/ MBA)
Shram Sadhana Bombay Trust's
College of Engineering & Technology,
P.B.No.94, BAMBHORI, JALGAON 425 001
(Maharashtra State)

ISO 9001:2008

Affix Recent Passport size Photograph here

Website- www.sscoetjalgaon.ac.in
Email: sscoetjal@gmail.com
Phone No. (0257) 2258393
Fax No. (0257) 2258392

Note:- (a) To be filled in and signed by the candidate.
(b) Application submitted without required certificates shall not be considered.
(c) Score out which is not applicable

1) Details of student

Particular	Surname	First Name	Middle Name
Name of Student			
Father Name			
Mother Name			

2) Date of birth:- _____

3) Address for correspondence :- _____

_____

Address for permanent:- _____

Pin Code _____ State _____

Telephone No. _____ Mobile No.:- _____

Email Address:- _____ Admitted in College Hostel :- Yes/No

4) (a) State & District from which you have passed SSC (Std. X) :-_____
(b) State & District from which you have passed HSC (Std. XII) :-_____

5) SEX :- (Male/Female) _____

6) Occupation of the Earning member(s) of the family :- _____

7) Annual income of the family:- _____

8) Indicate the category to which you belong (Tick appropriate box)

a) Category :- ( ) Open ( ) SC ( ) ST ( ) VJNT ( ) NT1 ( ) NT2
( ) NT3 ( ) OBC ( ) SBC

b) Minority :- ( ) Yes ( ) No Religion:- _____ Caste:- _____

c) Physically Handicapped :- ( ) Yes ( ) No

I) <u>U.G. Programme</u>: I hereby apply for admission to First / Second year of degree course in the branches given below in order of preference

1)_____ 2) _____ 3) _____

4)_____ 5) _____ 6) _____

7)_____ 8) _____

A) For F.E. & Direct S.E. students

PCM Total out of 300		**EXAM.**	**MERIT NO.**	**SCORE**
Category		MH-CET		
Branch Allotted		University Merit No.		
Final Year Diploma Marks Obtained /Out of		AIEEE		
Percentage HSC		State Merit No.		
Percentage Diploma		Main Group Merit		

B) Details of qualification (For F.E. & Direct S.E.):-

Examination	Month & Year of passing	Name & Address of Institution	Name & Address of Board/ University	Passed from M.S. or O.M.S.
S.S.C.				
H.S.C.				
Diploma final year				

C) S.S.C. Marks

Sr. No.	Subjects	Marks out of	Marks Obtained	Total percentage	Remark result
1	Mathematics				

D) H.S.C. Marks

Sr. No.	Subjects	Marks out of	Marks Obtained	Total PCM & percentage	Remark result
1	Physics				
2	Chemistry				
3	Mathematics				
4	Biology				
5	English				

II) <u>P.G. Programme</u>:- I hereby apply for admission to First year P.G. Programme in Engineering & Technology/ Management for M.E. Civil (Environmental Engg.)/ Mechanical (Machine Design) / E.& TC. (Digital Electronics) / Computer Science & Engineering/ M.B.A.

A) Academic Programme

1) First Year M.E. Course

i) Detail Qualification

Course & Examination	College Attended	Month & Year of Passing	No. of attempts	University/Boards	Total Marks Obtained	Max. Marks (Out of)	Percen-tage
1	2	3	4	5	6	7	8
1st Year Engineering							
2nd Year Engineering							
3rd Year Engineering							
4th Year Engineering							

ii) GATE Score: Valid up to

iii) Sponsored: ( ) Yes ( ) No

2) First Year M.B.A.

i) Details of qualification:-

Examination Passed	Name of Board/ University	Year	Subject Specialization	Marks	Percentage/ Score	Remark
S.S.C.						
H.S.C.						
Graduation						
Post graduation						
Any other exam.						

For M.B.A. Course		
EXAM.	**MERIT NO.**	**SCORE**
MH-CET		
University Merit No.		
Any other Entrance Test		

09) Work experience (attach extra sheet, if space is not enough)

Name of the Organization/Industry	Period	Nature of Work

10). Presently Employed or Unemployed? : Yes/No

If employed, give details

Name of Organization: _____

Date of appointment: _____

Regular/ Temporary :_____

11) Sponsorship certificate attached? Yes/No

(Note : Employed candidates will have to produce a certificate from the employer in the prescribed format attached with the form, without which the application may not be considered)

12) List of Certificates attached with application form:- Tick only available documents

1) CET Score Card (2) CAP Allotment letter (3) SSC (10^{th}) Marksheet
4) HSC (12^{th}) / Diploma Marksheet (5) Latest L.C./T.C. (6) Migration Certificate
7) Indian Nationality Certificate (8) Character/ Bonafide Certificate
9) First Attempt Certificate (10) Gap Affidavit (If applicable)
11) Caste Certificate (If applicable) (12) Validity Certificate (If applicable)
13) Non-Creamy Layer (If applicable) except SC/ST students only
14) Degree Marksheet (15) Degree Certificate
16) Experience Certificate (17) Sponsor Certificate
18) No Objection Certificate (19) Domicile Certificate

Please do not attach any original or photo copy of certificate not asked for.

However you shall have to submit all original certificates at the time of admission.

Declaration by the Candidates
(Undertaking)

I _____ declare that:

1) I have read all the Rules of Admission for the current year, after understanding these rules I have filled up this application form for the current year.
2) The information given by me in my application is true to the best of my knowledge and belief.
3) I have not been debarred from appearing at any examination held by any Govt. body constituted or statutory examination authority in India.
4) I fully understand that the offer of a course or branch of Engineering/ Technology/ Management will be made to me depending on my merit inter-se and availability of seat at the time of scrutiny of my application when I will report to the Admission Authority according to the schedule of the admission.
5) I understand that no other document other than those attached to the application form will be entertained for the purpose of claims/ concession etc. in connection with my admission.
6) I hereby agree to confirm to all rules and laws enforced by the Govt. including ragging Act 1999 of Maharashtra, the College Management and North Maharashtra University, Jalgaon. I hereby undertake that as long as I am a student of the college, I will do nothing either inside or outside the College which may result in disciplinary action against me under the act and laws refer to under rules Nos. 13-0. I will abide by all the rules of the Hostel, if I am given admission in to the Hostel.
7) I fully understand that the Principal of the college will have the right to expel/ rusticate me from the college for any infringement of the rules of conduct and discipline refer to under Rules No.13-0 and the rules of conduct and discipline prescribed by the College/University and the undertaking given above.
8) The total numbers of certificates attached with the application form are:_____

Place:
Date: Signature of the Candidate

Declaration by the Parents/Guardians
(Undertaking)

I _____ declare that the particulars furnished by my son/daughter/ward in this application form are correct to the best of my knowledge and belief.

I undertake & bind myself to pay on behalf my son/daughter/ward, such fees charges etc. which the College/Government of Maharashtra/University may levy from time to time by due date & in the event of failure on my part and/or on the part of my son/daughter/ward the Principal of the College may take such action against my son/daughter/ward as he may deem fit.

I will sign the requisite agreement bond as prescribed by the Government (In case or Minor only).

Place:
Date: Signature of the Parent/Guardian

A G R E E M E N T

I Shri/Shrimati/Kumari_____
(Name of the Candidate)
do hereby affirm that I have taken admission in _____ at College of Engineering & Technology, Jalgaon on my own and I solemnly declare that I will abide by all Rules & Regulation laid down by the Management of the aforesaid College, University and Government of Maharashtra, from time to time and if I fail to do so I will be liable for any punishment including expulsion from the College.

I shall not ask for transfer from the aforesaid College, to any other College, under any circumstances, I shall be responsible for full payment of fees and all dues for the entire course and shall not be entitled for refund of any fees at any stage.

Signature of the Father/Guardian Signature of the Student

Place:
Date

M E D I C A L C E R T I F I C A T E

I certify that I have carefully examined Shri/Kum._____
_____
on_____and hereby certify that him/her eye sight is good and that any minor defects in the same can be corrected by means of suitable glasses that he/she is fairly robust, his/her constitution is sound/is not likely to make him/her unfit for manual work in the workshop or active out-door service as an Engineer, (Score out whichever is not applicable)

Date: Signature_____

Address:_____ Name:_____

_____ Qualification_____

Registration No.:_____

UNDERTAKING-1

I, _____ taking admission in First Year/ Second Year_____ in the year 20 - 20 give an undertaking that as per the letter No.NMU/7/A/4718/2008, dated 27/09/2008, North Maharashtra University, Jalgaon I am not engaged in any job full time/part time. Similarly I have not taken admission in any other college within this University or any other University.

Date:- Signature of candidate

PRINCIPAL

UNDERTAKING-2

I, _____ interested to take admission in First Year/ Second Year_____ in the year 20 - 20 . As per North Maharashtra University, Jalgaon vide letter No.NMU/2/106/2002, dated 26/06/2002, I undertake that if I fail to maintain my attendance in the classes as per the rule means 80% out of total 180 working days then I will not be eligible to appear in College/University examinations. It is in my knowledge and I will not do any type of complaint against the same.

Date:- Signature of Candidate

Signature of Parents

PRINCIPAL

Shram Sadhana Bombay Trust's
COLLEGE OF ENGINEERING AND TECHNOLOGY,
BAMBHORI POST BOX NO. 94, JALGAON – 425001. (M.S.)
Included under section 2 (f) of the UGC Act, 1956
Included under section 12 (B) of the UGC Act, 1956
ISO 9001:2008 with NBA Accredited courses & ISO 9001 : 2008 certified

Website- www.sscoetjalgaon.ac.in Phone No. (0257) 2258393.
Email: sscoetjal@gmail.com Fax No. (0257) 2258392.

Chairman	Trustee	Principal
Dr. D.R. Shekhawat	Raosaheb Shri R.D. Shekhawat	Dr. Rakesh Mowar

GUIDELINES TO CURB THE MENACE OF RAGGING IN UNIVERSITIES/EDUCATIONAL INSTITUTIONS

What is ragging?

The word 'ragging' means the act of teasing, playing a practical joke upon some one or holding comic parades and other activities during certain period of a college term to raise money for charity.

Causes of ragging:

Eagerness of seniors to show off their power, authority, superiority.
An attitude of backlash – a 'do unto others did to you'.
(similar to mother-in-law Vs daughter-in-law syndrome)

Recommendations:

Before ragging to any individual please read the following and remember the cost of this heinous crime.

MAHARASHTRA ACT NO. XXXIII OF 1999:

1) This Act may be called the Maharashtra Prohibition of Ragging Act, 1999

HIGHER AND TECHNICAL EDUCATION DEPARTMENT

Mantralaya Annexe, Mumbai 400 032, dated the 19th May 1999.

NOTIFICATION

Maharashtra Prohibition of Ragging Act, 1999.

No Sankirana 1098 (133/98)/UNI-3-In exercise of the powers conferred by sub- section (2) of section 1 of the Maharashtra Prohibition of Ragging Act, 1999 (Mah. XXXIII of 1999) the Government of Maharashtra hereby appoints the First day of June 1999 to be the date on which the said Act shall come in to force. By order and in the name of the Governor of Maharashtra.

V.P. Raja
Secretary of Government

PROHIBITION OF RAGGING: Ragging within or outside of any educational institution is prohibited.

PENALTY OF RAGGING: Whoever directly or indirectly commits, participates in a beta or propagates ragging within or outside any education institution shall, on conviction, be punished with imprisonment for a term which may extend to two years and shall also be a liable to fine which may extend to ten thousand rupees.

DISMISSAL OF STUDENT: Any student convicted of an offence under section 4 shall be dismissed from the educational institution and such student shall not be admitted in any other educational institution for a period of the five years from the date of order such of dismissal.

SUSPENSION OF STUDENT:

1. Whenever any student or, as the case may be, the parent or guardian, or a teacher of an educational institution complaints, in writing, of ragging to the head of the educational institution who shall, without prejudice to the foregoing provisions, within seven days of the receipt of the complaint, enquire into the matter mentioned in the complaint and if, prima facie, it is found true, suspend the student who is accused of the offence, and shall immediately forward the complaint to the police station having jurisdiction over the area in which the educational institution is situated, for further action.
2. Where, one enquiry by the head of the educational institution, it is proved that there is substance, prima facie, in the complaint received under sub-section (i) he shall intimate the fact, in writing to the complainant.
3. The decision of the head of the educational institution that the students has indulged in ragging under sub-section (l), shall be final.

UNDERTAKING BY STUDENTS AND THEIR PARENTS:

Following two undertakings should be taken through the Head of the concerning Departments at the beginning of First Session from the students of II year onwards.

1) UNDERTAKING FROM THE STUDENTS

Name of the student _____

_____

Branch & Class _____

Address _____

_____

Affix Passport size Photo

I am aware of the law that ragging in educational institutions or its hostels is a cognizable offence. If it is committed while under institution by anyone is liable to rigorous punishments, expelled from classes and / or rustication from the college and / hostel.

Date:-_____

Signature of student

2) UNDERTAKING FROM THE PARENTS/GUARDIANS

My son/daughter/ward Name_____
has secured admission in the college in the session_____

I am aware of the law of ragging in educational institutions and agree to abide by the punishment to my son/daughter/ward in case he/she is found guilty of the offence of ragging.

Date:-_____

Signature of Parents/Guardian
Full Name:_____
_____
Address:_____
_____
_____
Ph. No. _____

3) I am not in service or in part time service nor I will do so during tenure of my study in the college.

Signature of student
Address:_____
_____
Ph. No. _____

GOVT. OF MAHARASHTRA
SHIKSHAN SHULKA SAMITI

305, Government Polytechnic Building, 49, Kherwadi,
Ali Yawar Jung Marg, Bandra (E), Mumbai - 400 051. (M.S.)

Tel No. 022 - 2647 6034/37
Fax No. 022 - 2647 6034

Website : www.sspnsamiti.gov.in
E-mail : sssamiti@yahoo.com

Date : 24th December 2012

The Samiti in its **meeting held on 13th December, 2012** considered the proposals of the following Colleges/Institutes for finalization of fee structure for the students who joined the course started during Academic Year 2012-13. After deliberations, the Samiti decides to approve the final fee structure of the following Institutes/Colleges for the students who joined the course started during Academic Year 2012-13. Figures are arrived at after considering the calculations drawn in the worksheet – calculation sheets of the respective colleges/institutes prepared by a Chartered Accountant. The students admitted in the Academic Year 2012-13 and there after continuing their studies will pay an enhanced fee of 8% each successive year as per the norms for 2012-13 till completion of the course, For example if the fee approved is Rs. 1,00,000/- then 2nd year, 3rd year and 4th year's student will be Rs. 1,08,000/-. (Assuming course is of 4 years). Worksheet – Calculation sheets are available in the office.

M. ENGINEERING

Sr. no.	Code No.	Name of the Institute	Tuition Fee	Devp. Fee	Total Fee
1	ME 4147	Backward Class Youth Relife Commitee's, Karmavir Dadasaheb Kannamwar College of Engineering, Nagpur	67290	4710	**72000**
2	ME 5171	Godavari Foundation's Godavari College Of Engineering, Jalgaon	70093	4907	**75000**
3	ME2136	Aditya Enginnering College, Beed	60748	4252	**65000**

B. ENGINEERING

Sr. no.	Code No.	Name of the Institute	Tuition Fee	Devp. Fee	Total Fee
1	EN1109	Chaitanya Bahu Uddeshiya Sanstha's Insttitute of Management Studies, Amravati	74766	5234	**80000**

Sr. no.	Code No.	Name of the Institute		Tuition Fee	Devp. Fee	Total Fee
2	EN 1130	Vision Buldhana Educational & Welfare Society's Pankaj Laddhad Institute of Technology & Management Studies,Yelgaon		50841	3559	**54400**
3	EN 1267	Pratap Institute of Management & Technology, Washim.		36215	2535	**38750**
4	EN 2144	Maharashtra Education Society's Maharashtra Udayagiri Institute of Management & Technology, Somnathpur		25981	1819	**27800**
5	EN 2146	Adarsh Shikshan Prasarak Mandal's K. T. Patil College of Engineering and Technology, Osmanabad		37981	2659	**40640**
6	EN 2250	Aurangabad College of Engineering, Naygaon Savangi, Aurangabad		28037	1963	**30000**
7	EN 2255	Balaghat Engineering College,Ruddha, Ahmedpur		42056	2944	**45000**
8	EN 3205	Vidyalankar Institute of Technology,Wadala, Mumbai	EN/ME/ MMS	98131	6869	**105000**
9	EN 3211	S.I.E.S. Graduate School of Technology, Nerul, Navi Mumbai		89720	6280	**96000**
10	EN 4133	Sanmarg Shikshan Sanstha's Smt. Radhikatai Pandav College of Engineering, Nagpur	IInd Shift	54159	3791	**57950**
11	EN 4134	Guru Nanak Institute of Engineering & Technology,Kalmeshwar, Nagpur		70093	4907	**75000**
12	EN 4146	Backword Class Youth Relife Commitee's Umrer College of Engineering, Umrer		51925	3635	**55560**
13	EN 4147	Backward Class Youth Relife Commitee's, Karmavir Dadasaheb Kannamwar College of Engineering, Nagpur		59196	4144	**63340**
14	EN 4180	Backward Class Youth Relief Committee, Shrimati Rajashri Mulak College of Engineering for Womens, Nagpur		42916	3004	**45920**
15	EN 4181	Sarvasiddhanta Education Soc's Nuva College of Engineering and Technology, Nagpur		45206	3164	**48370**

Sr. no.	Code No.	Name of the Institute		Tuition Fee	Devp. Fee	Total Fee
16	EN 4190	M.D. Yergude Memorial Shikshan Prasarak Mandal's Shri Sai College of Engineering & Technology, Badravati		53271	3729	**57000**
17	EN 5104	Shramsadhana Bombay Trust, College of Engineering & Technology, Jalgaon	EN/ME/ MBA	56607	3963	**60570**
18	EN 5106	K. C. E. Societys College of Engineering and Information Technology, Jalgaon	MBA	51037	3573	**54610**
19	EN 5171	Godavari Foundation's Godavari College Of Engineering, Jalgaon		50561	3539	**54100**
20	EN 5180	Nashik Gramin Shikshan Prasarak Mandal's Brahma Valley College of Engineering and Research Institute,Nashik	MBA	67290	4710	**72000**
21	EN 5184	Amruta Vaishnavi Education & Welfare Trust's, Shatabdi Institute of Engineering & Research.		44860	3140	**48000**
22	EN 5396	College of Engineering and Technology ,North Maharashtra Knowledge City ,Jalgaon		52243	3657	**55900**
23	EN 6183	Al-Ameen Educational and Medical Foundation, College of Engineering, Koregaon, Bhima	MBA	46710	3270	**49980**
24	EN 6219	KSGBS's Bharat- Ratna Indira Gandhi College of Engineering, Kegaon, Solapur		61178	4282	**65460**
25	EN 6270	Karmaveer Bhaurao Patil College of Engineering and Polytechnic, Satara		60589 *650	4241	**64830**
26	EN 6313	Shetkari Shikshan Prasarak Mandal, Jaywant College of Engineering & Management, Walva		61682	4318	**66000**
27	EN 6628	Dattakala Group Of Institutions, Swami - Chincholi Tal. Daund Dist. Pune		37383	2617	**40000**
28	EN 6756	Fabtech Technical Campus College of Engineering and Research, Sangola		63551	4449	**68000**
29	EN 6758	Sahyadri Valley College of Engineering & Technology, Rajuri, Pune.		47682	3338	**51020**

XV. INFORMATION ON INFRASTRUCTURE AND OTHER RESOURCES AVAILABLE LIBRARY.

A) Number of Library books/Titles/Journals available (Programme-wise)

S.No.	Department	No. of Titles of the Books	No. of Volumes	No.of Journals	
				National	International
1	Civil	1528	6698	6	2
2	Chemical	832	3668	6	2
3	Computer	1954	9873	12	2
4	I.T	633	3254	6	2
5	Electrical	719	3537	6	2
6	Electonics& Tele.	1246	6658	12	2
7	Mechanical	1488	8383	12	2
8	App.Sci.	1246	5477	6	2
9	Bio-Tech.	393	1230	6	2
10	M.B.A	787	2204	12	2
11	General	495	649	--	--
Total		11321	51622	84	20

B) E-Library facilities Our College Library is Subscribed E-Journals i.e. 1) IEEE 2) Springer (Mechanical & Electrical) 3) ASCE 4) Mc Graw Hill Access Engineering 5) ASTM 6) J-gate & JSMS 7) Elsevier (Chemical Engineering) 8) Nature Biotechnology for the year 2013.

Annexure No.

18. Details of Laboratories and Workshop

NAME OF THE DEPARTMENT :- APPLIED SCIENCE .

S.No.	**Name of the Laboratory /Workshop Details**	**Total area of Lab./w.s. in m^2**	**Major Equipment above 50,000/-**
01	Physics Laboratory	153	Nil
02	Chemistry Laboratory	135	Nil
03	Language Laboratory	135	Nil
04	Environmental Laboratory	108	Nil

Annexure No.

18. Details of Laboratories and Workshops

Name of the Department: - BIOTECHNOLOGY

Laboratories Name	Area Sq.M	Major Equipment* Above 50000/-
1. LAB-1 Microbiology	69	Lyophilizer, Rotary flask shaker,
2. LAB-2 Biochemistry	69	Double distilled water plant, Vacuum Oven, Orbital Shaking Incubator,
3. LAB-3 Fermentation Technology	66	Fermenter,
4. LAB-4 Bioprocess Engineering	66	Autoclave, Rotary flask shaker.
5. LAB-5 Bioinformatics/ Computer Lab	66	5KVA UPS
6. LAB- 6.Plant Tissue Culture	66	Laminar Air Flow
7. LAB-7	68	----
8. LAB- 8 Immunology Lab/ Molecular Biology and Genetic Engineering	68	Microcentrifuge
9. LAB-9 Fluid Mechanics	108	----
10. LAB-10 Heat Transfer	66	----
11. Research Lab.	72	---

(Costing ≥Rs. 50,000/-)

18. Details of Laboratories and Workshop

NAME OF THE DEPARTMENT :- CIVIL ENGINEERING

Sr No	**Name of the laboratory/Workshop Detail**	**Total Area of lab/work shop in m^2**	**Major Equipment** above 50,000/-
1	Testing of Materials lab	225	1. Computerized Universal Testing Machine I 2. Computerized Universal Testing Machine II 3. Computerized Compression Testing Machine 4. Digitalized Tensile Testing Machine
2	Surveying lab	68	1. Total station 2. 1" Theodolite 3. Electronic distance measuring device 4. Digital Plannimeter
3	Fluid Mechanics Lab I	96	1. Pelton wheel turbine 2. Francis turbine
4	Fluid Mechanics II	90	3. Wind tunnel digitalized
5	Geo-technical Engineering Lab	108	1.Digitalized Triaxial shear testing machine 2. Standard penetration test apparatus 3. Plate load test apparatus
6	Transportation Engineering lab	81	-
7	Engineering Geology Lab	96	1. Aqua meter
8	Environmental Engg. Lab	96	Spectro phometer
9	Engineering Mechanics Lab I	96	-
10	Engineering Mechanics Lab I	96	-
11	Computer Lab	108	-
12	Structural Model lab	81	-

Details of Laboratories and Workshop

NAME OF THE DEPARTMENT :- CHEMICAL ENGINEERING

S.No.	Name of the Laboratory /Workshop Details	Total area of lab./w.s. in m^2	Major equipment* Above 50000/-
1	Mass Transfer- I	68	Absorption in Packed Column, Cooling Tower
	Mass Transfer- II	68	Bubble Cap Distillation, Ion Exchange, Single Effect Evaporator
	Unit Operation-I	66	-
	Unit Operation-II	66	Rotary Vaccum Filter
	Instrumentation	66	-
	Process Control	66	Dynamic Response of Control Valve Rotameter, Flow Control Trainer, Pressure Control Trainer
	Project	81	-
	Computer	81	Software Packages: ASPEN HYSIS,SIM 2K. Computer Controlled Heat Exchanger System
	Chemical Reaction Engineering	90	Rotating Basket Reactor, Continuous Stirred Tank Reactor, Plug Flow Reactor (Coil Type), Cascaded Continuous Stirred Tank Reactor
	Chemical Technology	90	Viscometric Bath
	Research	72	-

*(Costing ≥ Rs. 50,000/-)

APP-06A-CH-MD-13

Details of Laboratories

Name of the Department:- **COMPUTER ENGINEERING**

Sr. No.	Name of the Laboratory	Total Area of Lab in m^2	Major Equipment above 50,000/-
1	Lab 1 /Data Structure Lab	90	▪ UPS Online 5 KVA ▪ Software-Novell Netware Version 5.12
2	Lab 2/Embedded System Lab	68	-----
3	Lab 3 / ME (CSE) Computer Lab	96	▪ UPS Online 10KVA
4	Lab 4/Digital & Microprocessor Lab	81	- - - -
5	Lab 5/Software Engineering Lab	68	▪ Software -Rational Suite Enterprise Version 2002.5.20
6	Lab 6/Programming Lab-I	67	- - - -
7	Lab 7/Database Lab	67	▪ UPS Online 05KVA
8	Lab 8/System Programming Lab	67	- - - -
9	Lab 9/Project Lab	81	- - - -
10	Lab-10/Linux Lab	144	▪ UPS Online 10KVA Kirloskar
11	Lab-11/Programming Lab-II	81	- - - -
12	Lab-12/ME (CSE) Research Lab	81	▪ UPS Online 10KVA Kirloskar
13	Server Room	44.12	▪ Compaq Xeon Server@2.8Ghz ▪ IBM P-III Server@ 1.26GHz ▪ UPS Online 5KVA with Batteries

18. Details of Laboratories and Workshop

NAME OF THE DEPARTMENT: - ELECTRICAL ENGINEERING

Sr. No.	Name of the Lab	Area in Sq.m.	Total Major Equipment Above 50000/-
01	Measurement Lab	82 (E003A)	
02	Control System Lab	84(E004A)	
03	Seminar Hall	56	
04	Computer Lab	66(E007A)	
05	HOD cum department office cum staff	72	
06	Electrical Machine Lab-I	75(E005A)	
07	Electrical Machine Lab-II	79(E005B)	
08	Power System Lab	67(E005C)	
09	Microprocessor and Microcontroller & ADE, PE	69(E115B)	
10	Switchgear Lab	68(E008A)	
11	High Voltage Lab	70(EG1)	50 KV AC/70 KVDC Set
12	Industrial Drives & Control Lab and Network Analysis lab	68(E115A)	

Annexure No. 18. Details of Laboratories and Workshop

NAME OF THE DEPARTMENT :- ELECTRONICS & TELECOMMUNICATION ENGG.

Sr No	Name of the laboratory/Workshop Detail	Total Area of lab/work shop in m^2	Major Equipment above 50,000/-
1	Semiconductor Devices & Circuit Lab	90	---
2	UG Computer Lab	68	1. IBM Server 2. UPS
3	Communication Lab	71	----
4	RMT Lab	71	1. Microwave kit(MT9000) 2. Microwave kit(MT9001) 3. Microwave kit(MT9002) 4. Klystron Based Microwave Bench 5. Gunn diode Based Microwave Bench 6. Klystron Based Microwave Bench for radiation pattern of antennas
5	Television Engg / Consumer Elex Lab	71	----
6	Electronics Design Lab / Telematics	68	----
7	Project Lab/ Basic Electronics Lab / FOC Lab	135	---
8	Basic Elect Lab/ Power Elex Lab	75	---
9	E M / E.I Lab	72	1. GHZ Spectrum Analyzer
10	Network Analysis Lab	81	---
11	PG Computrer Lab	71	---
12	PG Research Lab	71	---
13	Seminar Hall	162	1. LCD Projector 2. LAPTOP
14	Departmental Library	22	---

***** Major Equipment mean cost above 50,000/-

67. Details of Laboratories and Workshop

NAME OF THE DEPARTMENT: - INFORMATION TECHOLOGY

Sr. No	Name of the laboratory/Workshop Detail	Total Area of lab/work shop in m^2	Major Equipment above 50,000/-
01	Lab1-Digital and Microprocessor Lab	73	Computers, 8085 microprocessor kit, power supply, Stabilizer.
02	Lab2 - Data Structure Lab	87	Computers, Stabilizer.
03	Lab3 - Programming Lab	73	Computers, Stabilizer, printer
04	Lab4 - Multimedia/Web Design Lab	69	Computers, printer, Stabilizer
05	Lab5 - Operating system Lab	58	Computers, Stabilizer
06	Lab6 - Computer Network Lab	83	Computers, Stabilizer
07	Lab7 - Database management Lab.	116	Computers
08	Lab8 - Software Engg. Lab	97	Computers
09	Lab9 - Computer Graphics Lab	87	Under development
10	Lab10 - Project Lab	87	Under development

Annexure No.

18. Details of Laboratories and Workshop

NAME OF THE DEPARTMENT: - MECHANICAL ENGINEERING .

Sr. No.	Name of the Laboratory /Workshop Details	Total area of Lab in m^2	Major Equipment above 50,000/-
01	Heat Power Lab	141	1. Four Cylinder Four Stroke Diesel Engine Test Rig. & Accessories 2. Hydraulic Trainer & Accessories 3. Computerized Twin cylinder Diesel Engine.
02	Refrigeration & Air Conditioning	85	1. Vapour Absorption System 2. ICE Plant Tutor 3. Computerized A/c cycle Test Rig.
03	Heat Transfer lab.1	75	---
04	Turbo machinery lab	73	1. Kaplan Turbine Test Rig.
05	Tribology Lab.	107	1. Friction In Journal Bearing 2. Michell Tilting Pad Thrust Bearing Apparatus. 3. Friction & Wear Test Rig
06	Cad /Cam lab	107	1. SDRC Master Series ➢ SDRC Artisan 07 seats (Upgraded) ➢ Compaq Desktop 2. Auto Desk Mechanical Desktop Ver. 1.2 Software 3. KEC Make kuanana UPS system with 28 ad 12 v. 12 nos Panasonic suf Battery Along With Rack Interconnecting Cables Basict Pageant 4. Computers 5. Neilsoft,406,Embassy center,11,crescent road, Kumara park Esat, Banglore 560001 India (Auto CAD 2005) 6. A001 -Core master modeler A002-Core drafting A003- Surfacing A004-Assembly A007-Manufacturing A009-Sim.Modelling A010-Simulation A145-Response } 7 Seats
07	Theory of Machine	107	1. Slip and Creep Measurement Apparatus
08	Mechanical Measurement & Metrology Lab	107	1. Gear Test Bench 2. Auto Collimator Model A-1 3. Angle Dekkor 4. Tool Maker Microscope Model No. TM 25 5. Gear Test Bench

			6. Profile Projector 7. Surface Test
09	Material Science & Engineering Metallurgy	114	1. Trinocular Metallurgical microscope with C.C.T.V. attachment 2. Metallurgical Microscope 3. Ultrasonic Flow Detector 4. Metzer Monocular Metallurgical Research Microscope Metz-783(08 Nos) Metallurgical 5. Metzer binocular universal research microscope
10	M.E. Computer Lab	109	1. Ansys introdactory multiphysics software ver.10.0 (5 licence) 2. MATLAB 2007 Software (2 licence) 3. ACER – LCD Projector 4. HP Design jet Printer. 5. UPS 7.5 Kva, Exide Make 6EL 144 V 6. AutoCAD Invertor Professional Suite 2010 Software (15 User)
11	Model Lab	114	---
12	Mechatronics Lab	107	1. Trainers 2. Pneumatic Actuator

H.O.D
Dept. Mechanical Engg.

DEPARTMENT OF BUSINESS ADMINISTRATION

Details of Laboratory

NAME OF THE DEPARTMENT: - M.B.A.

A)

Sr.No	Name of the laboratory/Workshop Detail	Total Area of lab/work shop in m^2	Major Equipment above 50,000/-
01	Computer Lab-01	87.98	-**NIL**- .

H.O.D (MBA)

Annexure No.

18. Details of Laboratories and Workshop

NAME OF THE DEPARTMENT :- WORKSHOP

Sr. no	**Name of the Workshop Section Details**	**Total area of Lab./w.s. in m^2**	**Major Equipment above 50,000/-**
01	Machine shop with CNC lab	621.66	Lathe machine (28 NO) Milling machine (02NO) Planner machine (01 NO) Shaper machine (01 NO) Surface grinding machine(01 NO) Slotting machine (01 NO) CNC Lathe machine (01NO) CNC Milling machine (01NO)
02	Welding shop	60.84	----
03	Foundry shop	100.50	----
04	Black smithy shop	41.85	-----
05	Fitting shop	95.00	-----
06	Plumbing shop	76.00	-----
07	Tin smithy shop	68.00	-----
08	Carpentry Shop	95.00	-----

Item No.26

A) Facilities for conducting Practical in the Laboratories

Name of Course: - **Engineering** Class: - **FE Common** Subject: - **Engg. Chemistry**

Name of the Department / Section: -Applied Science Dept./ Chemistry Section.

Subject wise & laboratory wise Lists of material, machinery, equipment & Instrument required to perform prescribed Practical (**Note: Minimum FIVE Experiments from the following**)

Subject: **EC -I**

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether expt. can be conducted
			Required	Available	
1	To measure total hardness of given water sample.	a. Burette (25ml) b. Pipette c. Measuring cylinder d. Titration Flask (250ml) e. Burette stand f. Beakers (500 ml)	10 10 10 10 10 10	24 24 12 30 15 12	Yes
2	Estimation of phenol volumetrically in given solution	a. Burette (25 ml) b. Pipette c. Measuring cylinder d. Titration Flask (250 ml e. Burette stand f. Beakers (250 ml)	10 10 10 10 10 10	24 24 12 30 15 12	Yes
3	Determination of chloride content in the given sample of water by Mohr's method	a. Burette (25 ml) b. Pipette d. Titration Flask. (250 ml) d. Beakers(250 ml) e. Burette stand	10 10 10 10 10	24 24 30 12 15	Yes
4	Determination of alkalinity of water sample.	a. Burette (25 ml) b. Pipette c. Measuring cylinder d. Titration Flask (250 ml) e. Burette stand f. Beakers (250 ml)	10 10 10 10 10 10	24 24 12 30 15 12	Yes
5	To Estimate Copper in brass idometrically.	a. Burette (25 ml) b. Pipette c. Measuring cylinder d. Titration Flask (250 ml) e. Burette stand f. Beakers (250 & 500 ml)	10 10 10 10 10 20	24 24 12 30 15 24	Yes

6	To Estimate zinc in brass idometrically.	a. Burette (25 ml) b. Pipette c. Measuring cylinder d. Titration Flask (250 ml) e. Burette stand f. Beakers	10 10 10 10 10 10	24 24 12 30 15 12	Yes
7	Preparation of phenol formaldehyde resin	Glass rod, Beaker(500 ml) glass funnel	10 10 10	20 12 12	Yes
8	To Determine percentage of calcium in cement.	water bath	05	00	NO
9	Preparation of polystyrene by Bulk polymerization	Round bottom flask, Condenser, Over head motor Thermostat	10 10 10 01	00 00 00 00	NO
10	Determination of DO in given water sample(Winklers method)	Burette (25ml) Pipette(25 ml) Titration Flask (250 ml glass bottles, Measuring Cylinder	10 10 10 10 10	24 24 30 20 12	Yes

Subject **: EC - II**(**Note: Minimum FIVE Experiments from the following**)

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether expt. can be conducted
			Required	Available	
1	Determination of acid value of vegetable oils.	a. Burette (10ml) b. Pipette c. Measuring cylinder d. Titration Flask e. Burette stand f .Digital balance	10 10 10 10 10 02	12 24 12 36 24 02	Yes
2	Determination of amount of NaOH & Na_2CO_3 in given Alkali mixture	a. Burette (25 ml) b. Pipette c. Measuring cylinder d. Titration Flask (250ml) e. Burette stand f. Beakers	10 10 10 10 10 10	24 24 12 30 24 24	Yes
3	Determination of PH value of water by PH meter.	a pH-meter b. Beaker c. Glass electrode d. Stirrer e. Burette stand	02 06 02 06 02	02 24 02 10 24	Yes
4	Determination of percentage of moisture ash content coal sample.	a. Oven b. Muffle Furnace c. Desiccators d. Digital balance	01 01 01 01	01 01 01 01	Yes
5	Determine of partition coefficient of iodine bet^{n}.water and carbon tetra-chloride.	a. Burette (25 ml) b. Pipette c. Measuring cylinder d. Titration Flask e. Burette stand f. Beakers g. Stoppered Bottles h. Separating flasks	10 10 10 10 10 10 10 03	24 24 12 36 24 24 24	Yes
6	To determine the coefficient of viscosity of a given liquid using Ostwald viscometer.	a. Ostwald viscometer. b. Burette (25ml) c. Beakers d. Burette stand	10 10 10 10	15 24 24 24	Yes
7	Determination of Calorific value of Fuel sample by using Bomb calorimeter.	Bomb calorimeter**,**	01	00	No

8	Determination of Aniline Point of an Oil	Aniline Point thermometer, Aniline Point apparatus	10 10	00 00	No
9	Determination of Iodine value of given lubricating Oil by Wij`s method.	water bath	05	00	No
10	Determination of Saponification Value of an Oil.	Water Condenser, Water bath.	10 05	00 00	No

Item No.26

A) Facilities for conducting Practical in the Laboratories

Name of Course: **- Engineering** Class: - **FE Common** Subject: - **Engg. Physics**

Name of the Department / Section: -Applied Science Dept./ **Physics Section**.

Subject wise & laboratory wise Lists of material, machinery, equipment & Instrument required to perform prescribed Practical (**Note: Minimum FIVE Experiments from the following**)

Subject: **EP -I**

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether expt. can be conducted
			Required	Available	
1	Semiconductor Diode characteristics	Diode characteristics kit	05	07	Yes
2	Forbidden gap in semiconductor	Forbidden gap kit	05	03	Yes
3	Four Probe Method	Four Probe Kit	05	05	Yes
4	Wavelength of He-Ne laser	He-Ne laser Diffraction grating	05	03	Yes
5	Fibre Optics Communication	Fibre Optics trainer kit	05	03	Yes
6	Hall Effect	Gauss meter, Electromagnets	05	05	Yes
7	Characteristics Of Solar Cell & Calculation Of Fill Factor	Solar Cell kit	5	7	Yes
8	Wavelength by Diffraction grating	Diffraction grating Spectrometer	5	4	Yes
9	Determination Of Wavelength Of Sodium Light By Michelson Interferometer	Michelson Interferometer Sodium Lamp	5 1	2 1	Yes
10	Brewster Law	Sodium source, Spectrometer	05	02	Yes
11	Law of Malus	Polarizer, Light source	05	02	Yes
12	Crystal Structure	Crystal Structure	05	05	Yes

Subject: **EP –II** (**Note: Minimum FIVE Experiments from the following**)

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether expt. can be conducted
			Required	Available	
1	Use Of Sound Level Meter	Sound Level Meter	5	3	Yes
2	Ultrasonic Interferrometer	Frequency Generator Measuring cell	5 5	2 2	No
3	Use Of Ultrasonic Detector	Frequency Generator	5	3	Yes
4	Determination Of Specific Charge Of An Electron By Thomson Method	C.R.T. Power supply Magnetometer Stop Watch	5 5 5 5	5 5 5 5	Yes
5	B-H Curve	B-H Curve kit	05	05	Yes
6	Magnetic susceptibility measurement	Magnetic power supply Strong magnets	05	03	Yes
7	Uses of CRO	CRO Function generator	05	02	Yes
8	Synthesis and Characterization of Nano Composites.	TEM, XRD	01	Nil	No

Item No.26

A) Facilities for conducting Practical in the Laboratories

Name of Course: - **Engineering** Class: - **FE Common** Subject: - **Soft Skills**

Name of the Department / Section: -Applied Science Dept./ **English Section**.

Subject wise & laboratory wise Lists of material, machinery, equipment & Instrument required to perform prescribed Practical

Subject: **SS -I**

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether expt. can be conducted
			Required	Available	
1	Communication Skills and Barriers to Communication	Computers Software Headphones	48 1 48	48 2 48	Yes
2	A Matter of Pronunciation	Computers Software Headphones	48 1 48	48 2 48	Yes
3	Speaking in Public	Computers Software Headphones	48 1 48	48 2 48	Yes
4	E-Presentations	Computers Software Headphones	48 1 48	48 2 48	Yes
5	Comprehension of Passages	Computers Software Headphones	48 1 48	48 2 48	Yes

Subject: **SS –II**

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether expt. can be conducted
			Required	Available	
1	Understanding of English Language	Computers Software Headphones	48 1 48	48 2 48	Yes
2	Resume and Curriculum Vitae Writing	Computers Software Headphones	48 1 48	48 2 48	No
3	Basics of Group Discussion	Computers Software Headphones	48 1 48	48 2 48	Yes
4	Strategies During the Interview	Computers Software Headphones	48 1 48	48 2 48	Yes
5	Principles of Team-Workmanship	Computers Software Headphones	48 1 48	48 2 48	Yes

ITEM:26 **APPENDIX:-15**

NAME OF COURSE: - BIOTECHNOLOGY ENGINEERING.
NAME OF THE DEPT: - BIOTECHNOLOGY.
NAME OF SUBJECT: - MICROBIOLOGY [S.E]
Subject wise and laboratory wise list of material, machinery, equipments and instruments required to perform prescribed practical and term work.
Facilities for conducting practical in the laboratory.

Sr.No.		Title of the Experiment	Name of eqpt M/c, inst, etc.Required to conduct the expt.	Quantity		Whether Expt, Can be conducted.
				Requ.	Avail.	
1		Use and care of Microscope	Compound microscope	10	10	Yes
2		Examination of Microorganisms	Compound microscope	10	10	Yes
3		Micrometry	Compound microscope, Stage Micrometer & Occular Micrometer	10 10 10	10 10 10	Yes
4	A	Simple staining of Bacteria	Compound microscope, Staining stands Vortex Shaker	10 02 01	10 03 01	Yes
	B	Gram staining of Bacteria				
	C	Bacterial spore staining				
	D	Capsule staining of bacteria				
5		Microscopic count by Haemocytometer	Compound microscope, Haemocytometer	10 10	10 10	Yes
6		Viable cell count	Colony counter Petri plates Incubator	01 36 01	01 40 02	Yes
7		Turbidity measurement	Spectrophotometer Micropipettes Conical Flask Beaker Orbital incubator shaker	01 02 04 02 01	01 06 10 10 01	Yes
8		Culture media preparation	Oven Double distilled plant Autoclave pH Meter Electronic Balance Conical Flask Beaker Measuring Cylinder Petri plates	01 01 01 01 01 08 04 01 36	01 01 01 01 01 10 10 02 40	Yes
9		Cultivation of microorganism	Refrigerator Petri plates Rotary flask shaker	01 36 01	01 40 01	Yes
10		Streak plate method	Petri plate Incubator	18 01	20 01	Yes
11		Serial dilution agar plate method	Petri plate Test tubes Incubator	36 30 01	40 50 01	Yes

12	A	Effect of UV radiation	Laminar air flow Culture tube	01 18	01 20	Yes
	B	Effect of temperature (Heat)	Incubator Refrigerator Water bath Thermometer	01 01 01 02	01 01 01 02	Yes
	C	Effect of antimicrobial agent	Glass spreader Petri plates Conical flask	05 18 04	05 20 10	Yes
13		Water microbiology	Pipettes Test tubes	30 120	30 150	Yes

NAME OF COURSE: - BIOTECHNOLOGY ENGINEERING.
NAME OF THE DEPT: - BIOTECHNOLOGY.
NAME OF SUBJECT: - FLUID FLOW & SOLID HANDLING [S.E.]
Subject wise and laboratory wise list of material, machinery, equipments and instruments required to perform prescribed practical and term work.
Facilities for conducting practical in the laboratory.

Sr. no.	Expt. Title	Name of eqptM/c, inst, etc.Required to conduct the expt.	Quantity		Whether Expt,Can be conducted.
			Requ.	Avail.	
01	To study separation of solids by sedimentation	Batch sedimentation assembly.	1	1	Yes
02	To ascertain fineness number & differential & cumulative analysis of sand.	Sieve shaker	1	1	Yes
03	To verify laws of crushing & grinding.	Ball mill.	1	1	Yes
4	To verify laws of crushing & grinding.	Jaw crusher	1	1	Yes
05	To determine rate of filtration using plate & frame filter press.	Plate & frame filter press.	1	1	Yes
06	To determine filtration rate of rotary vacuum filter.	Rotary vacuum filter	1	1	Yes
07	To find out the minimum fluid sing velocity.	Fluidisation equipment	1	1	Yes
08	To determine the coefficient of venturimeter.	Venturimeter	1	1	Yes
09	To determine the coefficient of orificemeter.	Orificemeter	1	1	Yes
10	To determine the coefficient of nozzle meter.	Nozzle meter	1	1	Yes
11	Verification of Bernoulli's theorem.	Bernoulli's apparatus	1	1	Yes
12	Reynold's expt.	Reynold's app.	1	1	Yes

NAME OF COURSE: - BIOTECHNOLOGY ENGINEERING.
NAME OF THE DEPT: - BIOTECHNOLOGY.
NAME OF SUBJECT: - COMPUTER APPLICATION [S.E.]
Subject wise and laboratory wise list of material, machinery, equipments and instruments required to perform prescribed practical and term work.
Facilities for conducting practical in the laboratory.

Sr. no.	Expt. Title	Name of eqptM/c, inst, etc.Required to conduct the expt.	Quantity		Whether Expt,Can be conducted.
			Requ.	Avail.	
1	Introduction to computer, O.S, M.S Office, Programming languages	Pentium-iv, digital computer.	10	10	Yes
2	History, C editor – C language	Pentium-iv, digital computer.	10	10	Yes
3	a +b, a-b, a*b, a/b, a % b using key board.	Pentium-iv, digital computer.	10	10	Yes
4	Using conditional operator find out largest number.	Pentium-iv, digital computer.	10	10	Yes
5	If – else – program using if – else.	Pentium-iv, digital computer.	10	10	Yes
6	For or while or Do while / nesting of for to print table of 1 to 10.	Pentium-iv, digital computer.	10	10	Yes
7	Addition using function.	Pentium-iv, digital computer.	10	10	Yes
8	Array - program using array.	Pentium-iv, digital computer.	10	10	Yes

NAME OF COURSE: - BIOTECHNOLOGY ENGINEERING.
NAME OF THE DEPT: - BIOTECHNOLOGY.
NAME OF SUBJECT: - BIOCHEMISTRY [S.E.]
Subject wise and laboratory wise list of material, machinery, equipments and instruments required to perform prescribed practical and term work.
Facilities for conducting practical in the laboratory.

Sr.No.	Title of the Experiment	Name of eqpt M/c, inst, etc.Required to conduct the expt.	Quantity		Whether Expt, Can be conducted.
			Requ.	Avail.	
1	Estimation of carbohydrates.	Electronic balance Spectrophotometer Beaker Conical flask Pipettes Burettes Test tubes	01 01 06 05 05 02 25	01 01 15 15 25 02 50	Yes
2	Estimation of proteins.	Electronic balance Spectrophotometer Water bath Beaker Conical flask Pipettes Test tubes	01 01 01 06 05 05 25	01 01 01 15 15 25 50	Yes
3	Estimation of nucleic acids.	Electronic balance Spectrophotometer Water bath Beaker Conical flask Pipettes Test tubes	01 01 01 06 05 05 25	01 01 01 15 15 25 50	Yes
4	Separation of amino acids by paper chromatography.	Whatmann filter paper Chromatographic Chamber Sprayer Incubator	01 01 02 01	10 01 02 02	Yes
5	Separation of sugars by paper chromatography.	Whatmann filter paper Chromatographic Chamber Sprayer Incubator	01 01 02 01	10 01 02 02	Yes
6	Extraction of Lipids.	Electronic Balance Beaker Conical flask Pipettes Test tubes Centrifuge	01 05 05 05 20 01	01 15 15 25 50 01	Yes
7	Thin layer Chromatography.	Electronic Balance Glass plates	01 18	01 20	Yes

		TLC Kit Incubator UV Chamber Sprayer	01 01 01 02	01 02 01 02	
8	Gel Electrophoresis.	Electronic Balance Vertical electrophoresis Kit Horizontal electrophoresis Kit Power supply unit Beaker Conical flask Micro-pipette Microcentrifuge	01 01 01 01 05 05 02 01	01 01 01 01 20 15 02 01	Yes
9	Assay of enzyme activity	Spectrophotometer Electronic Balance Water bath Incubator Beaker Conical flask Pipettes Test tubes	01 01 01 01 05 05 08 25	01 01 01 02 15 15 25 50	Yes
10	Assay of enzyme kinetics.	Spectrophotometer Electronic Balance Water bath Incubator Beaker Conical flask Pipettes Test tubes	01 01 01 01 05 05 08 25	01 01 01 02 15 15 25 50	Yes
11	Cell fractionation.	Centrifuge Beaker Conical flask Electronic Balance	01 05 05 01	01 15 15 01	Yes

NAME OF COURSE: - BIOTECHNOLOGY ENGINEERING.
NAME OF THE DEPT: - BIOTECHNOLOGY.
NAME OF SUBJECT: - CHEMISTRY [S.E.]
Subject wise and laboratory wise list of material, machinery, equipments and instruments required to perform prescribed practical and term work.
Facilities for conducting practical in the laboratory

Sr. no.	Expt. Title	Name of eqpt,M/c, inst, etc.Required to conduct the expt	Quantity		Whether ExptCan be conducted.
			Requ.	Avail.	
1	Preparation of p-nitro acetanilide from acetanilide.	Beakers, Suction pump.	8 1	8 1	Yes
2	Preparation of Quinone from hydroquinone.	Beakers, Suction pump.	8 1	8 1	Yes
3	Hydrolysis of Methyl acetate & show that the reaction is of first order.	Stopper bottle Water bath 5 ml pipette. Electric oven	8 2 8 1	8 2 8 1	Yes
4	Saponification of Ethyl acetate & show that the reaction is of second order.	Stopper bottle Water bath 25 ml pipette.	8 1 8	8 1 8	Yes
5	Surface Tension by using Stalagmometer.	Stalagmometer Beaker	8 8	8 8	**Yes**
6	Preparation of Colloidal solution of Starch	Conical flask Funnel Tripod stand	8 8 8	8 8 8	Yes
7	To Verify Freundlich adsorption isotherm	Stopper bottle Burette Pipette. Funnel	8 8 8 8	8 8 8 8	Yes
8	Estimation of Acetone	Burette, Pipette, Conical flask, stopper bottles.	8	8	Yes
9	Estimation of Aniline	Burette, Pipette, Conical flask, stopper bottles, volumetric flask.	8	8	Yes

NAME OF COURSE: - BIOTECHNOLOGY ENGINEERING.
NAME OF THE DEPT: - BIOTECHNOLOGY.
NAME OF SUBJECT: - IMMUNOLOGY [S.E.]
Subject wise and laboratory wise list of material, machinery, equipments and instruments required to perform prescribed practical and term work.
Facilities for conducting practical in the laboratory.

Sr.No.	Title of the Experiment	Name of eqpt M/c, inst, etc.Required to conduct the expt.	Quantity		Whether Expt, Can be conducted.
			Requ.	Avail.	
1	Immunoelectrophoresis	Immunoelectrophoresis kit Power supply Microcentrifuge Micropipettes Refrigerator	01 01 01 02 01	01 01 01 06 01	Yes
2	Radial immunodiffusion	Immunoelectrophoresis kit Power supply Microcentrifuge Micropipettes Refrigerator	01 01 01 02 01	01 01 01 06 01	Yes
3	Antigen –Antibody interaction: The Ouchterlony procedure	Immunoelectrophoresis kit Power supply Microcentrifuge Micropipettes Refrigerator	01 01 01 02 01	01 01 01 06 01	Yes
4	Introduction to ELISA reactions	Microcentrifuge Micropipettes Refrigerator	01 02 01	01 06 01	Yes
5	AIDS KIT-1: Simulation of HIV-1 detection	Micropipettes Refrigerator	02 01	06 01	Yes
6	Western Blot Analysis – demo	Vertical Electrophoresis Power supply Microcentrifuge Micropipettes Refrigerator	01 01 01 02 01	01 01 01 06 01	Yes
7	Immunology of pregnancy test – demo	Micropipettes Refrigerator	02 01	06 01	Yes
8	Viral antigen detection by rapid immuno-chromatographic cassette assay	Micropipettes	02	06	Yes
9	Latex agglutination test	Immunoelectrophoresis kit Power supply Microcentrifuge Micropipettes Refrigerator	01 01 01 02 01	01 01 01 06 01	Yes

10	Precipitin reaction	Immunoelectrophoresis kit Power supply Micropipettes Refrigerator	01 01 02 01	01 01 06 01	Yes
11	Antibody titer test	Immunoelectrophoresis kit Power supply Micropipettes Refrigerator	01 01 02 01	01 01 06 01	Yes
12	Agglutination reaction	Immunoelectrophoresis kit Power supply Microcentrifuge Micropipettes Refrigerator	01 01 01 02 01	01 01 01 06 01	Yes

NAME OF COURSE: - BIOTECHNOLOGY ENGINEERING.
NAME OF THE DEPT: - BIOTECHNOLOGY.
NAME OF SUBJECT: - PROCESS HEAT TRANSFER [S.E.]
Subject wise and laboratory wise list of material, machinery, equipments and instruments required to perform prescribed practical and term work.
Facilities for conducting practical in the laboratory

Sr. no.	Expt. Title	Name of eqpt, M/c, inst, etc. Required to conduct the expt.	Quantity		Whether Expt, Can be conducted.
			Requ.	Avail.	
1	Conductivity of metal rod and / or insulator.	Metal rod ,heater coil, Digital temp indicator, Dimmerstat Voltmeter, Ammeter, Measuring flask, stop watch, supporting structure,	1 set	1 set	Yes
2	Heat Transfer From Pin-Fin	Duct, fins, Temp indicator, Dimmerstat, Heater, Voltmeter, Ammeter	1 set	1 set	Yes
3	Experiments on forced convection	Pipe, temperature indicator, Ammeter, Voltmeter, dimmerstat, blower.	1 set	1 set	Yes
4	Experiment on natural convection apparatus.	Brass tube, Pipe, temperature indicator, Ammeter, Voltmeter, dimmerstat	1 set	1 set	Yes
5	Determination of Emmisivity of test plates	Emmisivity of test plates, temperature indicator, Ammeter, Voltmeter, dimmerstat.	1set	1set	Yes
6	Determination of Stefan Boltzman constant	Stefan Boltzman apparatus	1 set	1 set	Yes
7	Determination of heat transfer coefficient in Parallel/Counter flow heat exchanger	Parallel/Counter flow heat exchanger , Temperature indicator, rotameter.	1 set	1 set	Yes
8	Study of heat transfer in evaporator	Single effect evaporator	1 set	1 set	Yes
9	Temperature profile in a rod	Metal rod	1 set	1 set	Yes
10	Study of evaporators	Study experiment			Yes
11	Drop wise and film wise condensation	Drop wise and film wise condensation apparatus	1 set	1 set	Yes

NAME OF COURSE: - BIOTECHNOLOGY ENGINEERING.
NAME OF THE DEPT: - BIOTECHNOLOGY.
NAME OF SUBJECT: - CHEMICAL REACTION ENGINEERING [T.E.]
Subject wise and laboratory wise list of material, machinery, equipments and instruments required to perform prescribed practical and term work.
Facilities for conducting practical in the laboratory.

Sr.No.	Title of the Experiment	Name of eqpt M/c, inst, etc.Required to conduct the expt.	Quantity		Whether Expt, Can be conducted.
			Requ.	Avail.	
1	To determine the reaction rate constant {k} for given reaction.	Batch Reactor/CSTR.	1	1	Yes
2	To determine the effect of temperature on reaction rate constant.	Batch Reactor/CSTR.	1	1	Yes
3	To determine the activation energy {e} for the given reaction.	Batch Reactor/CSTR.	1	1	Yes
4	To draw C [t], E [t] & f [t] curve & to calculate the mean residence time {tm} variance {r^2} & skew ness {s^3} for plug flow reactor.	Plug flow Reactor [Straight tube.]	1	1	Yes
5	To draw C [t], E [t] & f [t] curve & to calculate the mean residence time {tm} variance {r^2} & skew ness {s^3} for packed Bed reactor.	Packed Bed Reactor.	1	1	Yes
6	To study the cascaded CSTR	Cascaded CSTR	1	1	Yes
7	To study the reaction of solid liquid system for an instantaneous reaction for benzoic acid NaOH & calculate the enhancement factor.	Solid liquid reactor.	1	1	Yes
8	To study the isothermal decomposition of ethyl alcohol in tubular reactor packed with activated alumina catalyst.	Catalytic packed bed reactor.	1	1	Yes
9	Adsorption- to study the adsorption of Acetic acid on charcoal	Adsorption column.	1	1	Yes

NAME OF COURSE: - BIOTECHNOLOGY ENGINEERING.
NAME OF THE DEPT: - BIOTECHNOLOGY.
NAME OF SUBJECT: - MASS TRANSFER - I [T.E.]
Subject wise and laboratory wise list of material, machinery, equipments and instruments required to perform prescribed practical and term work.
Facilities for conducting practical in the laboratory.

Sr. no.	Expt. Title	Name of eqpt, M/c, inst, etc. Required to conduct the expt.	Quantity		Whether Expt, Can be conducted.
			Requ.	Avail.	
1	Diffusion in still air.	Compressor, linear scale, glass tube with fluid, stand.	3 sets	3 sets	Yes
2	Liquid - Liquid diffusion.	Standard porous pot with covering glass vessels, weighing balance, vernier caliper, measuring. scale, chemicals.	3 unit	9 unit	Yes
3	Solid liquid diffusion.	Glasswares, stirrer with speed control, stand, vernier caliper.	1 unit	1 unit	Yes
4	Wetted wall column: To calculate mass transfer coefficient for air water system.	Wetted wall column with rotometer, temperature measuring. System, Compressor.	1 unit	1 unit	Yes
5	Cooling tower: Air water system.	Cooling tower with air blower, centrifugal pump, water storage tank, Rota meter, heater, temp. sensors, tower with packing material, 3 starter, physical chart.	1 unit	1 unit	Yes
6	Absorption in packed column.	Absorber with packed column with CO_2 & air supply with flow rate measuring system, supply tank & 3-phase compressor & composition measuring System, weighting system.	1 unit	1 unit	Yes
7	Natural {pan} dryer.	Pan dryer, wt. Box, etc.	1 unit	1 unit	Yes
8	Fluidized bed dryer.	Fluidized bed dryer with heat controller.	1 unit	1 unit	Yes

NAME OF COURSE: - BIOTECHNOLOGY ENGINEERING.
NAME OF THE DEPT: - BIOTECHNOLOGY.
NAME OF SUBJECT: - MOLECULAR BIOLOGY & GENETIC ENGINERRING [T.E.]
Subject wise and laboratory wise list of material, machinery, equipments and instruments required to perform prescribed practical and term work.
Facilities for conducting practical in the laboratory.

Sr.No.	Title of the Experiment	Name of eqpt M/c, inst, etc.Required to conduct the expt.	Quantity		Whether Expt, Can be conducted.
			Requ.	Avail.	
1	Isolation of genomic DNA from bacteria.	Submarine electrophoresis kit Power supply Microcentrifuge Micropipettes Refrigerator Deep Freezer	01 01 01 04 01 01	04 03 01 13 01 01	Yes
2	Isolation of RNA from yeast	Submarine electrophoresis kit Power supply Microcentrifuge Micropipettes Refrigerator Deep Freezer	01 01 01 04 01 01	04 03 01 13 01 01	Yes
3	Isolation of total plasmid DNA from bacteria	Submarine electrophoresis kit Power supply Microcentrifuge Micropipettes Refrigerator Deep Freezer	01 01 01 04 01 01	04 03 01 13 01 01	Yes
4	Restriction digestion of genomic DNA of bacteria	Submarine electrophoresis kit Power supply Microcentrifuge Micropipettes Refrigerator Deep Freezer	01 01 01 04 01 01	04 03 01 13 01 01	Yes
5	Ligation of bacterial DNA	Submarine electrophoresis kit Power supply Microcentrifuge Micropipettes Refrigerator Deep Freezer	01 01 01 04 01 01	04 03 01 13 01 01	Yes
6	Calculation of molecular weight by using DNA marker with agrose gel electrophoresis.	Submarine electrophoresis kit Power supply Microcentrifuge Micropipettes Refrigerator	01 01 01 04 01	04 03 01 13 01	Yes

		Deep Freezer	01	01	
7	DNA extraction from Blood.	Submarine electrophoresis kit Power supply Microcentrifuge Micropipettes Refrigerator Deep Freezer	01 01 01 04 01 01	04 03 01 13 01 01	Yes
8	Plasmid preparation.	Submarine electrophoresis kit Power supply Microcentrifuge Micropipettes Refrigerator Deep Freezer	01 01 01 04 01 01	04 03 01 13 01 01	Yes
9	DNA fingerprinting (by RFLP)	Submarine electrophoresis kit Power supply Microcentrifuge Micropipettes Refrigerator Deep Freezer	01 01 01 04 01 01	04 03 01 13 01 01	Yes
10	To study Bacterial transduction	Submarine electrophoresis kit Power supply Microcentrifuge Micropipettes Refrigerator Deep Freezer	01 01 01 04 01 01	04 03 01 13 01 01	Yes

NAME OF COURSE: - BIOTECHNOLOGY ENGINEERING.
NAME OF THE DEPT: - BIOTECHNOLOGY.
NAME OF SUBJECT: - INSTRUMENTATION & PROCESS CONTROL [T.E.]
Subject wise and laboratory wise list of material, machinery, equipments and instruments required to perform prescribed practical and term work.
Facilities for conducting practical in the laboratory.

Sr.No.	Title of the Experiment	Name of eqpt M/c, inst, etc.Required to conduct the expt.	Quantity		Whether Expt, Can be conducted.
			Requ.	Avail.	
1	To study the response of bimetallic thermometer.	Bimetallic thermometer, mercury thermometer, beaker.	1	1	Yes
2	Calibration of thermocouple.	Thermocouple, mercury thermometer, beaker.	1	1	Yes
3	To measure the pH of given solution.	pH meter	1	2	Yes
4	To measure the conductance of given solution.	Conductivity meter	1	2	Yes
5	To study dynamic response of first order system {mercury thermometer.}	Thermometer, heater, stopwatch.	1	1	Yes
6	To study dynamic behaviour of single tank system.	Single tank, pump, level indicator.	1	1	Yes
7	Dynamic behaviour of two tank non-interacting system.	Non-interacting system, stopwatch, pump.	1	1	Yes
8	Dynamic behaviour of two tank interacting system.	Interacting system, stopwatch, pump.	1	1	Yes

NAME OF COURSE: - BIOTECHNOLOGY ENGINEERING.
NAME OF THE DEPT: - BIOTECHNOLOGY.
NAME OF SUBJECT: - MASS TRANSFER-II [T.E.]
Subject wise and laboratory wise list of material, machinery, equipments and instruments required to perform prescribed practical and term work.
Facilities for conducting practical in the laboratory.

Sr. no.	Expt. Title	Name of eqpt, M/c, inst, etc. Required to conduct the expt.	Quantity		Whether Expt, Can be conducted.
			Requ.	Avail.	
1	To prepare ternary diagram for acetic acid benzene, water system.	Extraction app., burette, pipette, conical flask	3	3	Yes
2	To plot the tie line for the system used in expt.	Extraction assembly, separating funnel, burette, pipette, conical flask.	3	3	Yes
3	To determine the % efficiency of two stage cross current extraction process.	Extraction assembly, separating funnel, burette, pipette, conical flask.	3	3	Yes
4	To determine % recovery of NaOH in leaching apparatus	Leaching process app., beaker, burette, and pipette.	3	3	Yes
5	To determine the % yield of crystals with & without seeding operation.	Crystallization app.	1	1	Yes
6	To verify the Rayleigh's equation for simple batch distillation.	Batch distillation.	2	2	Yes
7	To study adsorption of acetic acid in charcoal.	Conical flask, burette, pipette Adsorption column.	6	6	Yes
8	To study mass transfer equipment.		1	1	Yes

NAME OF COURSE: - BIOTECHNOLOGY ENGINEERING.
NAME OF THE DEPT: - BIOTECHNOLOGY.
NAME OF SUBJECT: - BIOTECHNOLOGY OF WASTE TREATMENT [T.E.]
Subject wise and laboratory wise list of material, machinery, equipments and instruments required to perform prescribed practical and term work.
Facilities for conducting practical in the laboratory.

Sr.No.	Title of the Experiment	Name of eqpt M/c, inst, etc.Required to conduct the expt.	Quantity		Whether Expt, Can be conducted.
			Requ.	Avail.	
1	To determine alkalinity and pH of given sample.	pH meter	1	1	Yes
2	To determine total solids and suspended solids of given sample	Oven	1	1	Yes
3	To determine dissolved oxygen of given sample	Balance	1	1	Yes
4	To determine initial oxygen demand.	Balance	1	1	Yes
5	To determine B.O.D. of the given sample	BOD incubator	1	1	Yes
6	To determine C.O.D. of the given sample.	Reflux system	1	1	Yes
7	To determine sludge volume index of the sample.	Imhoff cone	1	1	Yes
8	To determine M.P.N test of the given water sample	Incubator and Autoclave	1	1	Yes
9	To study Microorganisms of the given water sample.	Microscope	1	1	Yes
10	Estimation of inorganic ion in water.	Spectrophotometer Balance	1 1	1 1	Yes

NAME OF COURSE: - BIOTECHNOLOGY ENGINEERING.
NAME OF THE DEPT: - BIOTECHNOLOGY.
NAME OF SUBJECT: - BIOPROCESS MODELING & SIMULATION [B.E.]
Subject wise and laboratory wise list of material, machinery, equipments and instruments required to perform prescribed practical and term work.
Facilities for conducting practical in the laboratory.

Sr.No.	Title of the Experiment	Name of eqpt M/c, inst, etc.Required to conduct the expt.	Quantity		Whether Expt, Can be conducted.
			Requ.	Avail.	
1	CAD of shell and tube exchanger.	Pentium-iv,digital Computer, Aspen Hysys Software	10	10	yes
2	CAD of adsorption column	Pentium-iv,digital Computer, Aspen Hysys Software	10	10	yes
3	CAD of single effect evaporator.	Pentium-iv,digital Computer, Aspen Hysys Software	10	10	yes
4	Computer controlled heat exchanger.	Pentium-iv,digital Computer, Aspen Hysys Software	10	10	yes
5	CAD for rotary dryer.	Pentium-iv,digital Computer, Aspen Hysys Software	10	10	yes
6	Simulation of temperature on surface catalyst	Pentium-iv,digital Computer, Aspen Hysys Software	10	10	yes
7	Simulation of reactor design.	Pentium-iv,digital Computer, Aspen Hysys Software	10	10	yes
8	Simulation of ammonia production system	Pentium-iv,digital Computer, Aspen Hysys Software	10	10	yes
9	Modeling and simulation of protein.	Pentium-iv,digital Computer.	10	10	yes
10	Drug designing	Pentium-iv,digital Computer.	10	10	yes

NAME OF COURSE: - BIOTECHNOLOGY ENGINEERING.
NAME OF THE DEPT: - BIOTECHNOLOGY.
NAME OF SUBJECT: - FERMENTATION BIOTECHNOLOGY-II [B.E.]
Subject wise and laboratory wise list of material, machinery, equipments and instruments required to perform prescribed practical and term work.
Facilities for conducting practical in the laboratory.

Sr. No.	Title of the Experiment	Name of eqpt M/c, inst, etc.Required to conduct the expt.	Quantity		Whether Expt, Can be conducted.
			Requ.	Avail.	
1	Study of growth curve of microorganisms.	Fermenter, Rotary flask shaker, Incubator, Balance, pH meter, Autoclave Conical Flask, Beakers, Test tubes	01 each 09 each 20	01 each 09 each 20	YES
2	Production of ethyl alcohol using yeast.	Fermenter, Rotary flask shaker, Incubator, Balance, pH meter, Autoclave Conical Flask, Beakers, Test tubes	01 each 09 each 20	01 each 09 each 20	YES
3	Citric acid production using Aspergillus niger	Fermenter, Rotary flask shaker, Incubator, Balance, pH meter, Autoclave Conical Flask, Beakers, Test tubes	01 each 09 each 20	01 each 09 each 20	YES
4	Penicillin production using Penicillium chrysogenum	Fermenter, Rotary flask shaker, Incubator, Balance, pH meter, Autoclave Conical Flask, Beakers, Test tubes	01 each 09 each 20	01 each 09 each 20	YES
5	Production of enzyme by solid state fermentation	Fermenter, Rotary flask shaker, Incubator, Balance, pH meter, Autoclave Conical Flask, Beakers, Test tubes	01 each 09 each 20	01 each 09 each 20	YES
6	Isolation of bacterial pigments.	Fermenter, Rotary flask shaker, Incubator, Balance, pH meter, Autoclave Conical Flask, Beakers, Test tubes	01 each 09 each 20	01 each 09 each 20	YES
7	Production of enzyme by submerged fermenter	Fermenter, Rotary flask shaker, Incubator, Balance, pH meter, Autoclave Conical Flask, Beakers, Test tubes	01 each 09 each 20	01 each 09 each 20	YES
8	Production of bakers yeast	Fermenter, Rotary flask	01 each	01 each	YES

	(biomass production).	shaker, Incubator, Balance, pH meter, Autoclave Conical Flask, Beakers, Test tubes	 09 each 20	 09 each 20	
9	Vinegar production by fermentation	Fermenter, Rotary flask shaker, Incubator, Balance, pH meter, Autoclave Conical Flask, Beakers, Test tubes	01 each 09 each 20	01 each 09 each 20	YES
10	Analysis of molasses.	Rotary flask shaker, Incubator, Balance, pH meter, Autoclave Conical Flask, Beakers, Test tubes	01 each 09 each 20	01 each 09 each 20	YES
11	Analysis of finished product (rectified spirit, beer, etc.).	Rotary flask shaker, Incubator, Balance, pH meter, Autoclave Conical Flask, Beakers, Test tubes	01 each 09 each 20	01 each 09 each 20	YES

NAME OF COURSE: - BIOTECHNOLOGY ENGINEERING.
NAME OF THE DEPT: - BIOTECHNOLOGY.
NAME OF SUBJECT: - BIOPROCESS ENGINEERING -II [B.E.]
Subject wise and laboratory wise list of material, machinery, equipments and instruments required to perform prescribed practical and term work.
Facilities for conducting practical in the laboratory

Sr.No.	Title of the Experiment	Name of eqpt M/c, inst, etc.Required to conduct the expt.	Quantity		Whether Expt, Can be conducted.
			Requ.	Avail.	
1	Growth kinetics of microorganisms using shake flask method.	Rotary flask shaker, Incubator, Balance, pH meter, Autoclave Conical Flask, Beakers, Test tubes	01 each 09 each 20	01 each 09 each 20	YES
2	Determination of specific thermal death rate constant (Ka).	Rotary flask shaker, Incubator, Balance, pH meter, Autoclave Conical Flask, Beakers, Test tubes	01 each 09 each 20	01 each 09 each 20	YES
3	Determination of Volumetric oxygen transfer coefficient (K_La), effect of aeration and agitation speed.	Fermenter, Rotary flask shaker, Incubator, Balance, pH meter, Autoclave Conical Flask, Beakers, Test tubes	01 each 09 each 20	01 each 09 each 20	YES
4	Preparation of Immobilized enzymes and cells and evaluation of kinetic parameters.	Rotary flask shaker, Incubator, Balance, pH meter, Autoclave Conical Flask, Beakers, Test tubes	01 each 09 each 40	01 each 09 each 40	YES
5	Kinetics study of Product formation.	Fermenter, Rotary flask shaker, Incubator, Balance, pH meter, Autoclave Conical Flask, Beakers, Test tubes	01 each 09 each 20	01 each 09 each 20	YES
6	Effect of substrate and product concentration on biomass yield for bakers yeast production	Fermenter, Rotary flask shaker, Incubator, Balance, pH meter, Autoclave Conical Flask, Beakers, Test tubes	01 each 09 each 20	01 each 09 each 20	YES
7	Studies on settling characteristics of various microbial cultures	Fermenter, Rotary flask shaker, Incubator, Balance, pH meter, Autoclave Conical Flask, Beakers, Test tubes	01 each 09 each 20	01 each 09 each 20	YES
8	Explant preparation and their	Laminar Air Flow,	01 each	01 each	YES

	inoculation on suitable plant growth media	Autoclave, Conical Flask, Beakers, Test tubes	10 each 40	10 each 40	
9	Callus induction technique and regeneration of plant from callus culture	Laminar Air Flow, Autoclave, Conical Flask, Beakers, Test tubes	01 each 10 each 40	01 each 10 each 40	YES
10	Artificial seed production.	Laminar Air Flow, Autoclave, Conical Flask, Beakers, Test tubes	01 each 10 each 10	01 each 10 each 10	YES
11	Shake flask studies of plant cell culture	Laminar Air Flow, Autoclave, Conical Flask, Beakers, Test tubes	01 each 10 each 20	01 each 10 each 20	YES

NAME OF COURSE: - BIOTECHNOLOGY ENGINEERING.
NAME OF THE DEPT: - BIOTECHNOLOGY.
NAME OF SUBJECT: - BIOINFORMATICS [B.E.]
Subject wise and laboratory wise list of material, machinery, equipments and instruments required to perform prescribed practical and term work.
Facilities for conducting practical in the laboratory

Sr.No.	Title of the Experiment	Name of eqpt M/c, inst, etc.Required to conduct the expt.	Quantity		Whether Expt, Can be conducted.
			Requ.	Avail.	
1	Databases search: protein and nucleic acid database.	Pentium-iv,digital Computer, Bioinformatics software, Internet	10	10	yes
2	Restriction mapping	Pentium-iv,digital Computer, Bioinformatics software, Internet	10	10	yes
3	Sequence (FASTA and BLAST) searches	Pentium-iv,digital Computer, Bioinformatics software, Internet	10	10	yes
4	Pair wise comparison of sequences	Pentium-iv,digital Computer, Bioinformatics software, Internet	10	10	yes
5	Multiple alignments of sequences	Pentium-iv,digital Computer, Bioinformatics software, Internet	10	10	yes
6	Phylogenetic analysis	Pentium-iv,digital Computer, Bioinformatics software, Internet	10	10	yes
7	Gene structure prediction	Pentium-iv,digital Computer, Bioinformatics software, Internet	10	10	yes
8	Protein database retrieval and visualization.	Pentium-iv,digital Computer, Bioinformatics software, Internet	10	10	yes
9	RNA structure prediction.	Pentium-iv,digital Computer, Bioinformatics software, Internet	10	10	yes
10	Protein structure prediction	Pentium-iv,digital Computer, Bioinformatics software, Internet	10	10	yes

B) List of Practicals which cannot be performed or conducted in the existing facilities actually available in the college.

Sr.No.	Name of the Department	Class	Title of Experiment	Name of Institute where the experiments are processed to conducted	When the deficiency in equipment will be fulfilled
--	--	--	--	--	--

Item no. 26

A) Facilities for conducting practical in the laboratories

Subject wise and laboratory wise list of material, machinery, equipment and instrument required to perform prescribed practical:

Name of course: **Civil Engineering** Class: FE

Subject: :Elements of civil Engineering and engineering mechanics

SN	Experiment title	Name of equipment, machinery, instrument, Etc required to conduct experiment	Quantity		Whether experiment can be performed
			Required	Available	
01	Observation of bearing and calculation and adjustment of included angle	Prismatic compass, ranging rods, tap and nails	06 each	30 each	Yes
02	To find law of machine, efficiency of machine	a) Differential axle and Wheel b) Worm & Worm Wheel c) Single &Double Purchase Crab d) Sets of Weights e) Scales	02 02 02 each 04 02	02 02 02 each 04 02	Yes Yes Yes Yes Yes
03	Reaction of Beam	a) Sets of Weights b) Scales	04 02	04 02	Yes Yes
04	To find the forces in the members of Jib Crane	a) Jib crane b) Sets of Weights c) Scale	02 02 02	02 02 02	Yes Yes Yes
05	Verification of Lami's theorem	Lami's apparatus	01	01	Yes

Name of department: Civil Engineering

Name of subject: Surveying I Class: SE (Civil)

Facilities for conducting practicals in laboratory:

SN	Experiment title	Name of equipment, machine, instrument etc	Quantity		Whether experiment can be performed
			Required	available	
1	Measurements of horizontal and vertical angles by transit Theodolite,	Theodolite	6	9	YES
2	Measurements of horizontal angles of a triangle by repetition method.	Theodolite	6	9	YES
3	Theodolite Traverse survey project of a closed traverse with at least four sides.	Theodolite	6	9	YES
4	Computation of horizontal distances and elevations by Tacheometry for horizontal and inclined sights.	Theodolite	6	9	YES
5	Tacheometric contouring project with at least two instrument stations at 60 m apart.	Theodolite	6	9	YES
6	Radiation and intersection method in plane Table survey.	Plane Table Tripod Allidade U-Fork Plumb-bob Bubble Tube Ranging Rods Pegs	6	12	YES

7	Plane table survey project of a closed traverse of minimum four sides.	Plane Table Tripod Allidade U-Fork Plumb-bob Bubble Tube Ranging Rods Pegs	6	12	YES
8	Solution of three - Point problem in plane tabling.	Plane Table Tripod Allidade U-Fork Plumb-bob Bubble Tube Ranging Rods Pegs	6	12	YES
9	Use of box sextant and Abney level.	Box Sextant Abney level	2	2	YES
10	Study and use of Indian pattern clinometer and pantagraph.	Clinometer Pantagraph	3	3	YES
11	Road project for minimum length of 500m, including fixing of alignment, profile leveling, and cross sectioning.	Auto level	2	2	YES

Name of subject: Concrete Technology Class: SE (Civil)

Facilities for conducting practicals in laboratory:

SN	Experiment title	Name of equipment, machine, instrument etc	Quantity		Whether experiment can be performed
			Required	Available	
1	To determine Fineness of cement	I.S. sieves Cement Balance	1	2	Yes
2	To determine Setting time of Cement	V-Cat's Apparatus Mould Balance	1	2	YES
3	To determine Compressive strength of Cement	Crushing Testing Machine Mould Balance	1	1	
4	To determine Soundness of Cement	Le-Chatelier Balance	6	12	Yes
5	To determine Fineness modulus and sieve analysis of aggregate.	I.S.Sieves Balance	1 set	1 set	Yes
6	To determine Crushing value of aggregate	Crushing Testing Machine Balance	1	1	Yes
7	To determine Impact value of aggregate	Impact Testing Machine Balance	1	1	YES
8	To determine moisture content of aggregate	Oven Containers Balance	1	1	YES
9	To determine Abrasion value of aggregate	Loss-Angles Balance	1	2	YES
10	To determine shape factor of aggregate	Elongation index Flakiness index Balance	1	1	YES

11	To determine specific gravity of aggregate	Jar Balance	1	1	YES
12	To determine Workability of concrete (Slump cone and compaction factor)	Slump cone Balance	3	3	YES
13	To determine Compressive strength of concrete (Cubes and cylinders)	Crushing Testing Machine Mould Balance	1	1	YES
14	To determine Split test or tensile test of concrete (cylinders)	Crushing Testing Machine Mould Balance	1	1	YES
15	To determine Modulus of rupture (flexural strength) of concrete	Universal Testing Machine Mould Balance	1	1	YES
16	Concrete mix design by I.S. method	-	-	-	YES

Name of subject: Surveying II Class: SE (Civil)

Facilities for conducting practicals in laboratory:

SN	Experiment title	Name of equipment, machine, instrument etc	Quantity		Whether experiment can be performed
			Required	Available	
1	Measurement of horizontal and vertical angles by 1" theodolite..	1" Theodolite	2	2	Yes
2	Measurement of horizontal angles by reiteration method by 1" theodolite.	1" Theodolite	2	2	Yes
3	Study and use of nautical sextant for measurement of angles for hydrographic survey.	Nautical sextant	2	3	Yes
4	Plotting the cross-section of the river by sounding method.	Boat, sounding equipment	1	Nil	No
5	Solution of three point problem for hydrographic survey.	Three arm protactor	1	1	Yes
6	To find out the scale of the photograph	Areil photographs	4 pairs	4 pairs	Yes
7	Study and use of mirror stereoscope and finding out the air base distance.	Mirror stereoscope	3	4	Yes
8	Radial line method of plotting (photo triangulation).	Photo theodolite	1	Nil	No
9	Use of parallax bar for measuring parallax of two points and finding out the difference of elevation between them.	Parallex bar	2	2	Yes

10	Adjustment of Geodetic quadrilateral by any one method .	1” theodolite	2	2	Yes
11	Study and use of E.D.M. and its principle	EDM	1	1	yes

Name of subject: Fluid Mechanics I Class: SE (Civil)

Facilities for conducting practicals in laboratory:

SN	Experiment title	Name of equipment, machine, instrument etc	Quantity		Whether experiment can be performed
			Required	Available	
1	Measurement of viscosity.	Viscosity meter	01	01	YES
	Study of simple and differential manometers.	Manometer set up	01	01	YES
	Buoyancy: metacentric height of ship model.	Metacentric height apparatus with water tank Weights	01	01	YES
	Study of Bernoulli's theorem	Bernoulli's theorem apparatus with collecting water tank	01	01	YES
	Calibration of Venturimeter / Orificementre	Venturimeter Orifice meter	01	01	YES
	Electrical analogy method.	Elecrical analogy apparatus set up	01	01	YES
	Study of laminar flow/ Heleshaw's apparatus.	Haleshaw apparatus set up	01	01	YES
	Coefficients of Orifice / Mouthpiece / notches.	Orifice meter & mouthpiece apparatus setup	01	01	YES
	Study of Impact of jet.	Impactof jet apparatus.	01	01	YES

	Study of uniform flow formulae in open channel (Chezy's & Manning's formulae) / velocity distribution in open channel.	Open channel Apparatus Venturi flume Spill way	01	01	YES
	Specific energy and specific force.		01	01	YES

Name of subject: Engineering Geology Class: SE (Civil)

Facilities for conducting practicals in laboratory:

SN	Experiment title	Name of equipment, machine, instrument etc	Quantity		Whether experiment can be performed
			Required	Available	
1	Study of the minerals in hand specimen:	Mineral Specimens	35	182	YES
2	Study of the rock types in hand specimens	Rock specimens	40	170	YES
3	Construction of geological sections from contoured geological maps	Geological maps	-	-	YES

Item no. 26

APPENDIX 15

A) Facilities for conducting practical in the laboratories

Name of course**: Civil Engineering** Class: **T.E.** Subject: **Fluid Mechanics II**

Sr. No.	Experiment Title	Name of Equipment, machinery Instrument etc. required to conduct experiment	Quantity		Whether Expt. can be conducted
			Required	Available	
01	Study of boundary layer on flat plate	Wind Tunnel	01	01	Yes
02	Flow through pipes Laminar and Turbulent Flow and determination of friction factor	Laminar and turbulent flow apparatus	01	01	Yes
03	Drag and lift on an airfoil	Wind Tunnel Aerofoil Model	01	01	Yes
04	Drag and lift on cylinder	Wind Tunnel Cylinder	01	01	Yes
05	Hydraulic Jump	Adjustable channel with gates	01	01	Yes
06	Standing wave flume (Venturi Flume)	Adjustable channel with Model	01	01	Yes
07	Velocity distribution in open channel	Adjustable channel apparatus	01	01	Yes
08	Characteristics of Pelton Wheel	Pelton Wheel Turbine	01	01	Yes
09	Characteristic of Turbines	Franci's Turbine Kaplon Turbine	01 01	01 01	Yes
10	Characteristic of centrifugal pump	Centrifugal Pump	01	01	Yes

Name of course: **Civil Engineering** Class: **T. E.** subject: **Environmental Engineering I**

SN	Experiment title	Name of equipment, machinery, instrument, Etc required to conduct experiment	Quantity		Whether experiment can be performed
			Required	Available	
1	Alum Jar Test	Jar equipments,Chemicals,Nephelometer,	1,2	1,2	Yes
2	M.P.N.Test	Autoclave ,Oven	1	1	Yes
3	Solid test	Oven,Imhoff cone	1,3	1,3	Yes
4	Available Chlorine	Chlorine Testing Kit	1	2	Yes
5	Chloride test	Chemicals	-	-	Yes
6	Alkalinity Determination	Chemicals	-	-	Yes
7	Fluoride Test	Spectrophotometer	1	1	Yes
8	Dissolve Oxygen Test	Chemicals	1	1	Yes

Name of course**: Civil Engineering** Class: **T. E.** Subject: **Geotechnical Engineering I**

SN	Experiment title	Name of equipment, machinery, instrument, Etc required to conduct experiment	Quantity	Whether experiment can be performed
1	Field Density by core cutter method ,sand replacement method	Core cutter, sand replacement equipment	1	Yes
2	Sieve Analysis & particle size determination	Sieve set	1	Yes
3	Specific gravity determination by Pycnometer	Pycnometer	1	Yes
4	Determination of liquid limit & plastic limit	Casagrade's Apparatus	1	Yes
5	Determination of shrinkage limit	shrinkage dish, measuring cylinder	1	Yes
6	Determination of coefficient of permeability by constant head or variable head permeamerter	constant head permeamerter variable head permeamerter	1	Yes
7	Direct shear test	Direct shear test Machine	1	Yes
8	Unconfined compression test	Unconfined compression test Machine	1	Yes
9	Vane shear test	Vane shear test Apparatus	1	Yes
10	Proctor's test	Proctor's test Apparatus	1	Yes
11	Triaxial test	Triaxial Test Machine	1	Yes
12	C.B.R. Test or consolidation test	C.B.R. Test Machine	1	Yes
13	Swelling Test	Glass ware	-	Yes

Name of course: **Civil Engineering** Class: **T.E.** Subject: **Testing of materials**

SN	Experiment title	Name of equipment, machinery, instrument, Etc required to conduct experiment	Quantity	Whether experiment can be performed
1	Tension test on metals	UTM	1	Yes`
2	Hardness test on metals	Los angles test apparatus	1	Yes
3	Impact test on metals	Impact machine	1	Yes
4	Water absorption on bricks	Oven	1	Yes
5	Compression Test	CTM	1	Yes
6	Abrasion transverse test on Tiles	Abrasion Testing Machine	1	Yes
7	Moisture content of timber	Oven	1	Yes
8	Bending on Timber	UTM	1	Yes
9	Aggregate Abrasion Test	Abrasion Machine	1	Yes
10	Impact Test of aggregate	Impact Machine	1	Yes
11	Penetration Test	Penetration Machine	1	Yes
12	Ductility Test	Ductility Testing Machine	1	Yes
13	Softening Point	Softening Point Apparatus	1	Yes
14	Specific Gravity	Weigts,Glassware	1	Yes
15	Flash And Fire Point	Flash / Fire Apparatus	1	Yes
16	Viscosity Test	Viscometer	1	Yes
17	Marshal Stability Test	Marshal Stability Machine	1	Yes

Name of course: **Civil Engineering** Class: **T.E.** subject: Geotechnical Engineering II

SN	Experiment title	Name of equipment, machinery, instrument, Etc required to conduct experiment	Quantity		Whether experiment can be performed
			Required	available	
1	Plate load test	Plate load test apparatus	1	1	Yes
2	Standard penetration test –	Standard penetration test apparatus	1	1	Yes
3	Pile Load Test	Hammer	1	1	Yes

Name of course: **Civil Engineering** Class: **T.E.**

Subject: Numerical methods, application in Civil Engg.

SN	Experiment title	Name of equipment, machinery, instrument, Etc required to conduct experiment	Quantity		Whether experiment can be performed
			Required	available	
1	Computer programming	Computers	15	13	Yes

Item no. 26

A) Facilities for conducting practicals in the laboratories

Name of course: **Civil Engineering** Class: **B.E.** subject: Environmental Engineering II

SN	Experiment title	Name of equipment, machinery, instrument, Etc required to conduct experiment	Quantity		Whether experiment can be performed
			Required	available	
1	Determination of Total solids	Oven, Muffle Furnace	1 1	1 1	Yes
2	Determination of Oil Grease	Glass ware	5	6	Yes
3	Determination of BOD	BOD Incubator	1	1	Yes
4	Determination of COD	COD Assembly with heating coil	1	1	Yes
5	Determination of Sulfate/Chloride	Burette with Stand	1	1	Yes
6	Determination of salt content by electrical conductivity meter	conductivity meter	1	1	Yes
7	Determination of Total Nitrogen / different form of Nitrogen	Kjeldahl distillation assembly	1	1	yes
8	Determination of sulfate / phosphate content	Spectrophotometer	1	1	yes
9	General technique of Microbiology	Microbiological colony counter	1	1	Yes

Item no. 26

A) Facilities for conducting practicals in the laboratories

Name of course: **Civil Engineering** Class: **B.E.** subject: Industrial Water Pollution Control

SN	Experiment title	Name of equipment, machinery, instrument, Etc required to conduct experiment	Quantity		Whether experiment can be performed
			Required	available	
1	Hardness by EDTA method	Burrete with stand	5	6	Yes
2	Ammonia/Nitrogen	Kjeldahl distillation assembly	5	6	Yes
3	Nitratrate/nitrogen	Kjeldahl distillation assembly	5	6	Yes
4	Estimation of Phosphate	Spectrophotometer	1	1	Yes
5	Sulphate by spectrophotometric & turbidity meter	Spectrophotometer & tubiditymeter	1	1	Yes
6	Biological oxygen demand	BOD incubator	1	1	Yes
7	Chemical oxygen demand	COD assembly with heating coil	1	1	yes
8	Fluorides by SPANDS reagent	Spectrophotometer	1	1	yes
9	Heavy metals by AAS	Spectrophotometer	1	1	Yes
10	Estimation of NO_x	High volume sampler	1	00	NO
11	Estimation of SO_x	High volume sampler	1	00	NO
12	Estimation of particulate matter	High volume sampler	1	00	NO

NAME OF COURSE: - CHEMICAL ENGINEERING.
NAME OF THE DEPT: - CHEMICAL ENGG.
NAME OF SUBJECT: - CHEMISTRY - I [S.E.]

Subject wise and laboratory wise list of material, machinery, equipments and instruments required to perform prescribed practical and term work.
Facilities for conducting practical in the laboratory.

Sr. no.	Expt. Title	Name of eqpt,M/c, inst, etc.Required to conduct the expt	Requ.	Avail.	Whether ExptCan be conducted.
1	Surface Tension by using Stalagmometer.	1] Stalagmometer 2] Beaker	8 8	8 8	Yes
2	Heat of Neutralisation	1] Cu-calorimeter 2] Measu. cylinder 3] Wooden box with insulation. 4] Cu stirrer.	8 2 8 8	8 2 8 8	Yes
3	Water Equivalent of Cu-calorimeter.	1] Cu-calorimeter 2] Measu.cylinder 3] Wooden box with insulation. 4] Cu stirrer.	8 2 8 8	8 2 8 8	Yes
4	Hydrolysis of Methyl acetate & show that the reaction is of first order.	1] Stopper bottle 2] Water bath 3] 5 ml pipette. 4] Laboratory Oven	8 2 8 1	8 2 8 1	Yes
5	Determination of Equivalent weight eudiometrically.	1] Eudiometer 2] Evaporating dish 3] Measu.cylinder	8 8 2	8 8 2	Yes
6	Conductometeric titration.	1] Conductivity meter 2] Burette	1 2	1 2	Yes
7	Heat of Solution. of Potassium nitrate.	1] Hard glass tube 2] Beaker. 3] Thermometer	8 8 8	8 8 8	Yes
8	Depression in Freezing point.	1] Hard glass tube 2] Beaker. 3] Thermometer	8 8 8	8 8 8	Yes
9	Saponification of Ethyl acetate & show that the reaction is of second order.	1] Stopper bottle 2] Water bath 3] 25 ml pipette.	8 2 8	8 2 8	Yes
10	Preparation of Colloidal solution of Starch	1] Conical flask 2] Funnel 3] Tripod stand	8 8 8	8 8 8	Yes

NAME OF COURSE: - CHEMICAL ENGINEERING.
NAME OF THE DEPT: - CHEMICAL ENGG.
NAME OF SUBJECT: - CHEMISTRY - II [S.E.]
Subject wise and laboratory wise list of material, machinery, equipments and instruments required to perform prescribed practical and term work.
Facilities for conducting practical in the laboratory.

Sr. no.	Expt. Title	Name of eqpt,M/c, inst, etc.Required to conduct the expt	Requ.	Avail.	Whether ExptCan be conducted.
1	Organic Spotting [4]	Thiele's tube & test tubes.	8	8	Yes
2	Estimation of Acetone	Burette, Pipette, Conical flask,stopper bottles.	8	8	Yes
3	Preparation of p-nitro acetanilide from acetanilide.	Beakers, Suction pump. Buchner funnel	8 1 2	8 1 2	Yes
4	Estimation of Glucose	Burette, pipette, Conical flask, stopper bottles.	8	8	Yes
5	Preparation of Quinone from hydroquinone.	Beakers, Suction pump. Buchner funnel	8 1 2	8 1 2	Yes
6	Preparation of Urea Formaldehyde resin.	Beakers Glass rod	8 8	8 8	Yes
7	Preparation of Nylon	Beakers Glass rod	8 8	8 8	Yes

NAME OF COURSE: - CHEMICAL ENGINEERING.
NAME OF THE DEPT: - CHEMICAL ENGG.
NAME OF SUBJECT: - UNIT OPERATION-I {Fluid Mechanics.} [S.E.]

Subject wise and laboratory wise list of material, machinery, equipments and instruments required to perform prescribed practical and term work.
Facilities for conducting practical in the laboratory.

Sr. no.	Expt. Title	Name of eqptM/c, inst, etc.Required to conduct the expt.	Requ.	Avail.	Whether Expt,Can be conducted.
1	Study of manometer.	1] Different types of manometer.	1 set	1 set	Yes
2	To determine the coefficient of venturimeter.	1] Venturimeter	1	1	Yes
3	To determine the coefficient of orificemeter.	1] Orificemeter	1	1	Yes

4	To determine the coefficient of nozzle meter.	Nozzle meter	1	1	Yes
5	Determination of Viscosity	Ostwald Viscometer	1	1	Yes
6	Study of fans, blower, compressor.	Fans, blowers, compressors.	1	1	Yes
7	Verification of Bernoullis Theorm	Bernoullis Theorm Setup	1	1	Yes
8	Reynold's expt.	Reynold's app.	1	1	Yes

NAME OF COURSE: - CHEMICAL ENGINEERING.
NAME OF THE DEPT: - CHEMICAL ENGG.
NAME OF SUBJECT: - STRENGTH OF MATERIALS. [S.E.]
Subject wise and laboratory wise list of material, machinery, equipments and instruments required to perform prescribed practical and term work.
Facilities for conducting practical in the laboratory.

Sr. no.	Expt. Title	Name of eqptM/c, inst, etc.Required to conduct the expt.	Requ.	Avail.	Whether Expt,Can be conducted.
1	Tension test on mild steel.	1]Universal testing m/c 2] Extensometer	1 1	1 1	Yes
2	Izod and charpy impact test for comparing the toughness of different material like mild steel, copper,brass, aluminiumj.	1] Standard izod and charpy.	1	1	Yes
3	Bending test on timber	1]Universal testing m/c with defletiemeter scale.	1	1	Yes
4	Single shear & double shear test on mild steel.	1]Universal testing m/c. 2] Shear box.	1 1	1 1	Yes
5	Torsion test on M.S.	1] Torsion testing m/c 2] Vernier caliper.	1 1	1 1	Yes

NAME OF COURSE: - CHEMICAL ENGINEERING.
NAME OF THE DEPT: - CHEMICAL ENGG.
NAME OF SUBJECT: - COMPUTER APPLICATION [S.E.]
Subject wise and laboratory wise list of material, machinery, equipments and instruments required to perform prescribed practical and term work.
Facilities for conducting practical in the laboratory.

Sr. no.	Expt. Title	Name of eqptM/c, inst, etc.Required to conduct the expt.	Requ.	Avail.	Whether Expt,Can be conducted.
1	Introduction to Computer and Introduction to C,C++ language	Pentium-iv, digital computer.	15	15	Yes
2	Program for Addition and Subtraction of	Pentium-iv, digital computer.	15	15	Yes

	variables				
3	Program for Multiplication, Division of variables	Pentium-iv, digital computer.	15	15	Yes
4	Program to find the greatest/largest number	Pentium-iv, digital computer.	15	15	Yes
5	Program to find Odd and Even number	Pentium-iv, digital computer.	15	15	Yes
6	Program to print 1 to 10 numbers in table format using nested for loop	Pentium-iv, digital computer.	15	15	Yes
7	Program using if else statement.	Pentium-iv, digital computer.	15	15	Yes
8	Program to compute and print a multiplication table for 1 to 8 using array.	Pentium-iv, digital computer.	15	15	Yes
9	Program for Area of triangle	Pentium-iv, digital computer.	15	15	Yes

NAME OF COURSE: - CHEMICAL ENGINEERING.
NAME OF THE DEPT: - CHEMICAL ENGG.
NAME OF SUBJECT: - CHEMICAL PROCESSES - I [S.E.]
Subject wise and laboratory wise list of material, machinery, equipments and instruments required to perform prescribed practical and term work.
Facilities for conducting practical in the laboratory.

Sr. no.	Expt. Title	Name of eqptM/c, inst, etc.Required to conduct the expt.	Requ.	Avail.	Whether Expt,Can be conducted.
1	Purification of Nacl from impure Nacl by crystalization.	Beaker, funnels, glass rod, evaporating dish, tripod stand, wire gauze, burette.	8	8	Yes
2	Estimation of available chlorine in bleaching powder.	Burette, pipette, stand, conical flask.	8	8	Yes
3	Analysis of cement. Fe content in cement.	Crucible, pair of tongs, conical flask, burette, pipette,	8 8	8 8	Yes
4	Preparation of sodium thiosulphate.	Evaporating dish, Bucknerfunnel water bath.	8 1	8 1	Yes
5	Preparation of ferrous ammonium sulphate	Beaker, buchner funnel Suction pump	8 2 1	8 2 1	Yes
6	Analysis of fertilizers.	Burette, pipette, conical flask.	8	8	Yes
7	Flue gas analysis	Orsat apparatus	1	1	Yes.
8	Determination of Sodium hydroxide & Sodium carbonate in given alkali mixture.	Burette Pipette Conical flask.	8 8 8	8 8 8	Yes

NAME OF COURSE: - CHEMICAL ENGINEERING.
NAME OF THE DEPT: - CHEMICAL ENGG.
NAME OF SUBJECT: - CHEMISTRY - III [S.E.]

Subject wise and laboratory wise list of material, machinery, equipments and instruments required to perform prescribed practical and term work.
Facilities for conducting practical in the laboratory.

Sr. no.	Expt. Title	Name of eqptM/c, inst, etc.Required to conduct the expt.	Requ.	Avail.	Whether Expt,Can be conducted.
1	Determination of Sodium bicarbonate & Sodium carbonate in given alkali mixture.	Burette Pipette Conical flask.	8 8 8	8 8 8	Yes
2	Gravimetric determination of Fe as Fe_2O_3	Volum. Flask Funnel Crucible. Muffle furnace	8 8 8 1	8 8 8 1	Yes
3	Determination of Chloride content of given sample by Mohr's method.	Burette Pipette Conical flask.	8 8 8	8 8 8	Yes
4	Gravimetric estimation of Nickel as Ni- DMG.	Volum. Flask. Beakers Gooch- crucible Suction pump. Laboratory Oven.	8 8 8 1 1	8 8 8 1 1	Yes
5	Manganese by Volhard's method.	Volum. Flask. Burette. Pipette. Conical flask.	8 8 8 8	8 8 8 8	Yes
6	Determination of amount of Magnesium volumetrically by using disodium EDTA.	Burette. Pipette. Conical flask.	8 8 8	8 8 8	Yes
7	Estimation of copper volumetrically from given solution of $Cu\ SO_4$	Burette. Pipette. Conical flask. Funnel.	8 8 8 8	8 8 8 8	Yes
8	Determination of strength in normal terms & in gram. /lit of FeSO4 solution.	Burette. Pipette. Conical flask	8 8 8	8 8 8	Yes

NAME OF COURSE: - CHEMICAL ENGINEERING.
NAME OF THE DEPT: - CHEMICAL ENGG.
NAME OF SUBJECT: - UNIT OPERATION – II
(MECHANICAL OPERATIONS). [S.E.]

Subject wise and laboratory wise list of material, machinery, equipments and instruments required to perform prescribed practical and term work.
Facilities for conducting practical in the laboratory

Sr. no.	Expt. Title	Name of eqptM/c, inst, etc.Required to conduct the expt.	Requ.	Avail.	Whether Expt,Can be conducted.
1	To determine rate of filtration using plate & frame filter press.	Plate & frame filter press.	1	1	Yes
2	To verify laws of crushing & grinding by Jaw Crusher	Jaw Crusher	1	1	Yes
3	To determine mixing index of ribbon blender	Ribbon blender	1	1	Yes
4	To verify laws of crushing & grinding Ball mill	Ball mill.	1	1	Yes
5	To study separation of solids by sedimentation	Batch sedimentation assembly.	1	1	Yes
6	To ascertain fineness number & differential & cumulative analysis of sand.	Sieve shaker	1	1	Yes
7	To study the operation behavior of the cyclone by using different materials.	Cyclone separators	1	1	Yes
8	To find out the minimum fluidsing velocity.	Fluidisation equipment.	1	1	Yes

A) Facilities for conducting Practicals in the Laboratories

1.Name of Course: Chemical Engg, Class:- T.E. Subject:- Chemical Processes-II

Sr. no.	Expt. Title	Name of eqpt, M/c, inst, etc. Required to conduct the expt.	Quantity		Whether Expt, Can be conducted.
			Requ.	Avail.	
1	Estimation of glucose	Volumetric flask, Burette, pipette, conical flask. Stoppered bottle	8 each	8 each	Yes
2	Determination of saponification value of an oil	Burette, pipette, conical flask., condenser	8 each	8 each	Yes
3	Determination of acid value of an oil	Burette, pipette, conical flask. Water bath	8 each 2	8 each 2	Yes
4	Determination of iodine value of an oil	Burette, pipette, iodine flask.	8 each	8 each	Yes
5	Preparation of azo dye	Beaker, glass rod, Buchner funnel, Suction Pump	1 set	1 set	Yes
6	Preparation of soap	Beaker, glass rod	8 each	8 each	Yes
7	Preparation of green pigment	Beaker, glass rod, funnel, oven	1 set	1 set	Yes
8	Preparation of yellow pigment	Beaker, glass rod, funnel, oven, air compressor	1 set	1 set	Yes
9	Preparation of blue pigment	Beaker, glass rod, funnel, oven	1 set	1 set	Yes
10	Preparation of drug aspirin	Conical flask, Burette, glass rod, Water Bath, Buchner funnel, Suction Pump	1 set	1 set	Yes

Name of Course: Chemical Engg, Class:- T.E. Subject:-Process Heat Transfer

Sr. no.	Expt. Title	Name of eqpt, M/c, inst, etc. Required to conduct the expt.	Quantity		Whether Expt, Can be conducted .
			Requ.	Avail.	
1	Determination of thermal Conductivity of metal rod.	Metal rod ,heater coil, Digital temp indicator, Dimmerstat Voltmeter, Ammeter, Measuring flask, stop watch, supporting structure,	1 set	1 set	Yes
2	Heat Transfer From Pin-Fin apparatus	Duct, fins, Temp indicator, Dimmerstat, Heater, Voltmeter, Ammeter	1 set	1 set	Yes
3	Determination of heat transfer coefficient in forced convection	Pipe, temperature indicator, Ammeter, Voltmeter, dimmerstat,	1 set	1 set	Yes

		blower.			
4	Determination of heat transfer coefficient in natural convection	Brass tube, Pipe, temperature indicator, Ammeter, Voltmeter, dimmerstat	1 set	1 set	Yes
5	Determination of emissivity of test surfaces	Emmisivity of test plates, temperature indicator, Ammeter, Voltmeter, dimmerstat.	1set	1set	Yes
6	Determination of Stefan Boltzman constant	Stefan Boltzman apparatus	1 set	1 set	Yes
7	Determination of heat transfer coefficient in Parallel/Counter flow heat exchanger	Parallel/Counter flow heat exchanger , Temperature indicator, rotameter.	1 set	1 set	Yes
8	Study of heat transfer in evaporator	Single effect evaporator	1 set	1 set	Yes
9	To determine heat flux through composite slabs	Heater,voltmeter,temperature indicator and supporting structure	1 set	1 set	Yes
10	Study of Dropwise and filmwise condensation	Dropwise and filmwise condensation apparatus	1 set	1 set	Yes

Name of Course: Chemical Engg, Class:- T.E. Subject:-Mass Transfer-I

Sr. no.	Expt. Title	Name of eqpt, M/c, inst, etc. Required to conduct the expt.	Quantity		Whether Expt, Can be conducted.
			Requ.	Avail.	
1	Diffusion in still air.	Compressor, linear scale, glass tube with fluid, stand.	3 sets	3 sets	Yes
2	Liquid - Liquid diffusion.	Standard porous pot with covering glass vessels, weighing balance, vernier caliper, mesu. scale, chemicals.	3 unit	9 unit	Yes
3	Solid liquid diffusion.	Glasswares, stirrer with speed control, stand, vernier caliper, comp. mesu.system.	1 unit	1 unit	Yes
4	Wetted wall column: To calculate mass transfer coefficient for air water system.	Wetted wall column with rotameter, temp.mesu. System, Compressor.	1 unit	1 unit	Yes
5	Cooling tower: Air water system.	Cooling tower with air blower, centrifugal pump, water storage tank, Rota meter, heater, temp. sensors, tower with packing material, physical chart.	1 unit	1 unit	Yes
6	Absorption in packed column.	Absorber with packed column with CO_2 & air supply with flow rate mesu. system, supply tank & 3-phase compressor & composition mesu. System, weighting system.	1 unit	1 unit	Yes

7	Natural {pan} dryer.	Pan dryer, wt. Box, etc.	1 unit	1 unit	Yes
8	Fluidized bed dryer.	Fluidized bed dryer with heat controller.	1 unit	1 unit	Yes

Name of Course: Chemical Engg, Class:- T.E. Subject:-Instrumentation & Instrumental Analysis

Sr. no.	Expt. Title	Name of eqpt, M/c, inst, etc. Required to conduct the expt.	Quantity		Whether Expt, Can be conducted.
			Requ.	Avail.	
1	To study the response of bimetallic thermometer.	Bimetallic thermometer, mercury thermometer, beaker.	1	1	Yes
2	Calibration of thermocouple.	Thermocouple, mercury thermometer, beaker.	1	1	Yes
3	To measure the pH of given solution.	pH meter	1	2	Yes
4	To measure the conductance of given solution.	Conductivity meter	1	2	Yes
5	To determine concentration of given solution by colorimeter	Colorimeter	1	1	Yes
6	Flame photometry (Study expt.)	Flame photometer	1	1	Yes
7	Thin layer chromatography	TLC apparatus.	6	6	Yes
8	Paper chromatography	Paper chromatography apparatus.	6	6	Yes
9	Abbey's Refractometer. To find out refractive index.	Abbey's Refractometer.	1	1	Yes

Name of Course: Chemical Engg, Class:- T.E. Subject:-Chemical Reaction Engg.-I

Sr. no.	Expt. Title	Name of eqpt, M/c, inst, etc. Required to conduct the expt.	Quantity		Whether Expt, Can be conducted.
			Requ.	Avail.	
1	To determine the reaction rate constant {k} for given reaction.	Batch Reactor/CSTR.	1	1	Yes
2	To determine the effect of temperature on reaction rate constant.	Batch Reactor/CSTR.	1	1	Yes
3	To determine the activation energy {e} for the given reaction.	Batch Reactor/CSTR.	1	1	Yes
4	To draw C [t], E [t] & f [t] curve & to calculate the mean residence time {tm} variance {r^2} & skew ness {s^3} for plug flow reactor.	Plug flow Reactor [Straight tube.]	1	1	Yes

5	To draw C [t], E [t] & f [t] curve & to calculate the mean residence time {tm} variance {r^2} & skew ness {s^3} for packed Bed reactor.	Packed Bed Reactor.	1	1	Yes
6	To study the cascaded CSTR	Cascaded CSTR	1	1	Yes
7	To draw C [t], E [t] & f [t] curve & to calculate the mean residence time {tm} variance {r^2} & skew ness {s^3} for Annular reactor.	Annular reactor	1	1	Yes
8	To study the kinetic in tubular flow reactor [coiled tube] for the given reaction.	Coiled tube Tubular flow Reactor.	1	1	Yes

Name of Course: Chemical Engg, Class:- T.E. Subject:-Mass Transfer-II

Sr. no.	Expt. Title	Name of eqpt, M/c, inst, etc. Required to conduct the expt.	Quantity		Whether Expt, Can be conducted.
			Requ.	Avail.	
1	To prepare ternary diagram for acetic acid benzene, water system.	Extraction app., burette, pipette, conical flask	3	3	Yes
2	To plot the tie line for the system used in expt.	Extraction assembly, separating funnel, burette, pipette, conical flask.	3	3	Yes
3	To determine the % efficiency of two stage cross current extraction process.	Extraction assembly, separating funnel, burette, pipette, conical flask.	3	3	Yes
4	To determine % recovery of NaOH in leaching apparatus	Leaching process app., beaker, burette, and pipette.	3	3	Yes
5	To determine the % yield of crystals with & without seeding operation.	Crystallization app.	1	1	Yes
6	To verify the Rayleigh's equation for simple batch distillation.	Batch distillation.	2	2	Yes
7	To study adsorption of acetic acid in charcoal.	Conical flask, burette, pipette Adsorption column.	6	6	Yes
8	To study mass transfer equipment.		1	1	Yes

A) Facilities for conducting Practicals in the Laboratories

Name of Course: Chemical Engg, Class:- B.E. Subject:-Process Dynamics & Control

Sr. no.	Expt. Title	Name of eqpt, M/c, inst, etc. Required to conduct the expt.	Quantity		Whether Expt, Can be conducted.
			Requ.	Avail.	
1	To study dynamic response of first order system {mercury thermometer.}	Thermometer, heater, stopwatch.	1	1	Yes
2	To study dynamic behaviour of single tank system.	Single tank, pump, level indicator.	1	1	Yes
3	Dynamic behaviour of two tank non-interacting system.	Non-interacting system, stopwatch, pump.	1	1	Yes
4	Dynamic behaviour of two tank interacting system.	Interacting system, stopwatch, pump.	1	1	Yes
5	Study of pneumatic controllers.	PI controller, compressor.	1	1	Yes
6	Dynamic behaviour of second order system	Mercury Manometer, stopwatch.	1	1	Yes
7	Study of characteristics & calibration of diaphragm actuated pneumatic control valve.	Pneumatically operated valve, compressor, Rota meter, and stopwatch.	1	1	Yes
8	Study of closed loop control system.	Closed loop control system, consisting of valve, tank, recorder, and controller.	1	1	Yes

Name of Course: Chemical Engg, Class:- B.E. Subject:-Chemical Reaction Engg.-II

Sr. no.	Expt. Title	Name of eqpt, M/c, inst, etc. Required to conduct the expt.	Quantity		Whether Expt, Can be conducted.
			Requ.	Avail.	
1	To study the reaction of solid liquid system for an instantaneous reaction for benzoic acid NaOH & calculate the enhancement factor.	Solid liquid reactor.	1	1	Yes
2	To study the isothermal decomposition of ethyl alcohol in tubular reactor packed with activated alumina catalyst.	Catalytic packed bed reactor.	1	1	Yes
3	To improve the % purity of commercially used ethanol using reactive distillation.	Distillation assembly.	1	1	Yes

4	To improve the % purity of commercially used ethanol using extractive distillation.	Distillation assembly.	1	1	Yes
5	To carry out the catalytic reaction to convert the nitrobenzene to aniline in presence of iron filling/HCl catalyst in the reactor.	Rotating basket reactor.	1	1	Yes
6	To study the reaction of liquid liquid system for butyl acetate NaOH & to calculate the enhancement factor.	Conical flask, beaker, pipette, burette.	1 Each	1 Each	Yes
7	Absorption – to study the reaction of liquid gas system for NaOH – CO_2 % to determine rate of absorption.	Absorption column.	1	1	Yes
8	Adsorption- to study the adsorption of Acetic acid on charcoal	Adsorption column.	1	1	Yes

Name of Course: Chemical Engg, Class:- B.E. Subject:-Computer Aided Process Equipment Design Modeling & Simulation.

Sr. no.	Expt. Title	Name of eqpt, M/c, inst, etc. Required to conduct the expt.	Quantity		Whether Expt, Can be conducted.
			Requ.	Avail.	
1	Computer aided design of shell & tube heat exchanger.	Pentium-iv, digital computer.	15	15	Yes
2	Computer aided design of single effect evaporator.	Pentium-iv, digital computer.	15	15	Yes
3	Computer aided design of rotary dryer.	Pentium-iv, digital computer.	15	15	Yes
4	Simulation of ammonia production system.	Pentium-iv, digital computer.	15	15	Yes
5	Simulation of temperature on surface catalyst.	Pentium-iv, digital computer.	15	15	Yes
6	Simulation of Reactor Design	Pentium-iv, digital computer.	15	15	Yes
7	Study of Computer control heat exchanger.	Computer control heat exchanger.	1	1	Yes
8	Computer Aided Design of absorption column	Pentium-iv, digital computer.	15	15	Yes

B) List of Practicals which cannot be performed or conducted in the existing facilities actually available in the college.

Sr.No.	Name of the Department	Class	Title of Experiment	Name of Institute where the experiments are processed to conducted	When the deficiency in equipment will be fulfilled
--	--	--	--	--	--

Department of Computer Engineering

Facilities for conducting practical in the laboratories

Name of course**: Computer Engineering** Class: **F.E**. Semester**: I**
Subject: **Computer Programming**

Sr. No.	**Experiment Title**	**Name of Equipment, machinery Instrument etc. required to conduct experiment**	**Quantity**		**Whether Expt. can be conducted**
			Required	Available	
01	Study of motherboard	-	-	-	Yes
02	Program for basic arithmetic operations	PC,T urbo c	20	20	Yes
03	Program for find the area Circle & Volume of Cylinder	PC,T urbo c	20	20	Yes
04	Program for finding Smallest & Greatest number between two numbers	PC,T urbo c	20	20	Yes
05	Program for finding number is Even or Odd	PC,T urbo c	20	20	Yes
06	Program for finding the factorial of number	PC,T urbo c	20	20	Yes
07	Program for checking given number is Palindrome or not	PC,T urbo c	20	20	Yes
08	Program for array element operation	PC,T urbo c	20	20	Yes
09	Program for Matrix Operation	PC,T urbo c	20	20	Yes
10	Program for sorting of numbers using bubble sort	PC,T urbo c	20	20	Yes
11	Program for String operations	PC,T urbo c	20	20	Yes

Facilities for conducting practical in the laboratories

Name of course**: Computer Engineering** Class: S.E. Semester: **I** Subject: **AE**

Experiment Title	**Name of Equipment, machinery Instrument etc. required to conduct experiment**	**Quantity**		**Whether Expt. can be conducted?**
		Required	Available	
Verify Superposition and Thevinins Theorem	Bread board, connecting wires, crocodile pins, Power supply, resistors.	20	20	Yes
Plot the Frequency response of single stage CE amplifier.	CRO, Function generator, Circuit, Crocodile pins, Power supply etc.	20	20	Yes
Square wave Testing of amplifier	CRO, Function generator, Circuit, Crocodile pins, Power supply etc.	20	20	Yes
Plot the Frequency response of CE-CC amplifier.	CRO, Function generator, Circuit, Crocodile pins, Power supply etc.	20	20	Yes
Differential Amplifier.	CRO, Function generator, Circuit, Crocodile pins, Power supply ,Multimeter etc.	20	20	Yes
Control transistor series regulator	Circuit, Crocodile pins, Power supply ,DRB , Multimeter etc.	20	20	Yes
Ic regulator	Circuit, Crocodile pins, Power supply ,DRB , Multimeter etc.	20	20	Yes
Plot the Frequency response of CS FET amplifier.	CRO, Function generator, Circuit, Crocodile pins, Power supply etc.	20	20	Yes

Facilities for conducting practical in the laboratories

Name of course**: Computer Engineering** Class: S.E. Semester: **I** Subject: **DSMP**

Sr. No.	**Experiment Title**	**Name of Equipment, machinery Instrument etc. required to conduct experiment**	**Quantity**		**Whether Expt. can be conducted?**
			Required	Available	
01	Verify the truth table of logic gates and verification of DeMorgan's theorem	Bread board, connecting wires, crocodile pins, Power supply, IC's 7408, 7404 and 7432,LEDs	20	20	Yes
02	Construction of Basic gates using universal gate (NAND/NOR)	Bread board, connecting wires, crocodile pins, Power supply, IC's 7400, 7402 ,LEDs	20	20	Yes
03	Construction of half adder & full adder circuit. Also implement full adder with the help of two adder circuits & one OR gate.	Bread board, connecting wires, crocodile pins, Power supply, IC's 7408, 7404 and 7432,LEDs	20	20	Yes
04	Construction of half Subtractor & full Subtractor circuit	Bread board, connecting wires, crocodile pins, Power supply, IC's 7408, 7404 and 7432,LEDs	20	20	Yes
05	Gray to binary and binary to gray code converter.	Bread board, connecting wires, crocodile pins, Power supply, IC's 7408, 7404 and 7432,LEDs	20	20	Yes
06	Addition and subtraction of 8 and 16 bit numbers	Anshuman 8085 kit,power supply.	20	20	Yes
07	Determining maximum and minimum elements in array	Anshuman 8085 kit,power supply.	20	20	Yes
08	Arranging the numbers in ascending and descending order	Anshuman 8085 kit,power supply.	20	20	Yes
09	Shift and mask off operation of 8 bit numbers.	Anshuman 8085 kit,power supply.	20	20	Yes
10	Program for look up table (square number).	Anshuman 8085 kit,power supply.	20	20	Yes

Facilities for conducting practical in the laboratories

Name of course**: Computer Engineering Class**: S.E Semester: **I** Subject: **Programming Laboratory-I**

Sr. No.	Experiment Title	Name of Equipment, machinery Instrument etc.	Quantity		Whether Expt. can be conducted
			Required	Available	
1.	Program for matrix operation	Single computer and Turbo C	20	20	Yes
2.	Swapping of 2 numbers using single pointer	Single computer and Turbo C	20	20	Yes
3.	Processing Students Record Using Structure.	Single computer and Turbo C	20	20	Yes
4.	String Operations.	Single computer and Turbo C	20	20	Yes
5.	Inter conversion of number system.	Single computer and Turbo C	20	20	Yes
6.	Sorting using Bubble Sort	Single computer and Turbo C	20	20	Yes
7.	Searching of given element using Linear search.	Single computer and Turbo C	20	20	Yes
8.	Searching of given element using Binary search	Single computer and Turbo C	20	20	Yes
9.	Program for macros and Program for nested macros	Single computer and Turbo C	20	20	Yes
10.	To find root of equation using Newton Raphson Method	Single computer and Turbo C	20	20	Yes
11.	To find root of equation using Regula– Falsi Method.	Single computer and Turbo C	20	20	Yes
12.	Find integral values using Simpson's 1/3 rule.	Single computer and Turbo C	20	20	Yes
13.	Find integral values using Simpson's 3/8 rule.	Single computer and Turbo C	20	20	Yes
14.	Find interpolating values using Interpolation methods	Single computer and Turbo C	20	20	Yes
15.	File manipulation, closing, input and operation on files.	Single computer and Turbo C	20	20	Yes

Facilities for conducting practical in the laboratories

Name of course**: Computer Engineering** Class: **S.E.** Semester: **II** Subject: **Data Structure and Files**

Sr. No.	Experiment Title	Name of Equipment, machinery Instrument etc. required to conduct experiment	Quantity		Whether Expt. can be conducted
			Required	Available	
01	Implementation of stack using array.	PC, Turbo C	20	20	Yes
02	Implementation of queue using array	PC, Turbo C	20	20	Yes
03	Implementation of circular queue using array	PC, Turbo C	20	20	Yes
04	Conversion of infix to postfix expression.	PC, Turbo C	20	20	Yes
05	Conversion of postfix expression to infix expression	PC, Turbo C	20	20	Yes
06	Addition of two single variable polynomial using linked list.	PC, Turbo C	20	20	Yes
07	Implementation of stack using Linked List	PC, Turbo C	20	20	Yes
08	Implementation of Queue using Linked List	PC, Turbo C	20	20	Yes
09	Implementation of doubly linked list insertion, deletion & searching.	PC, Turbo C	20	20	Yes
10	Implementation of pattern matching in string using linked list.	PC, Turbo C	20	20	Yes

11	Program for creation of binary tree and nonrecursive tree traversal on binary tree.	PC, Turbo C	20	20	Yes
12	Implementation of various operations on binary search tree.	PC, Turbo C	20	20	Yes
13	Implementation of various operations on binary search tree.	PC, Turbo C	20	20	Yes
14	Program to implement various operations on sequential file.	PC, Turbo C	20	20	Yes

Facilities for conducting practical in the laboratories

Name of course**: Computer Engineering** Class: S.E. Semester: **II** Subject: **MP-I**

Sr. No.	Experiment Title	Name of Equipment, machinery Instrument etc. required to conduct experiment	Quantity		Whether Expt. can be conducted?
			Required	Available	
01	Study of DOS and BIOS interrupts.	-	-	-	Yes
02	To study MASM assembler directives.	-	-	-	Yes
03	Write an Assembly Language Program for printing string in reverse order.	PC, MASM software	20	20	Yes
04	Write an Assembly Language Program to convert uppercase string into lowercase using macro.	PC, MASM software	20	20	Yes
05	Write an Assembly Language Program for password checking using macro.	PC, MASM software	20	20	Yes
06	Write an Assembly Language Program for addition of two packed BCD numbers.	PC, MASM software	20	20	Yes
07	Write an Assembly Language Program to convert 4-digit HEX number to its equivalent BCD number.	PC, MASM software	20	20	Yes
08	Write an Assembly Language Program to convert 4-digit BCD number to its equivalent HEX number.	PC, MASM software	20	20	Yes
09	Write an Assembly Language Program to calculate length of string using NEAR procedure.	PC, MASM software	20	20	Yes

10	Write an Assembly Language Program for addition of two 8-bit hex numbers using FAR procedure.	PC, MASM software	20	20	Yes
11	Write an Assembly Language Program to find the Area of circle using 8087.	PC, MASM software	20	20	Yes
12	Write an Assembly Language Program to calculate the hypotenuse of right angle triangle.	PC , MASM software	20	20	Yes
13	Write an Assembly Language Program to print the First Name, Middle Name, and Last Name of student using structure.	PC,MASM software	20	20	Yes

Facilities for conducting practical in the laboratories

Name of course**:** **Computer Engineering** Class: **S.E.** Semester: **II** Subject: **Programming Laboratory-II**

Sr. No.	Experiment Title	Name of Equipment, machinery Instrument etc. required to conduct experiment	Quantity		Whether Expt. can be conducted
			Required	Available	
01	C++ Program for library management using class.	PC, Turbo C	20	20	Yes
02	C++ Program for updating of item for shop.	PC, Turbo C	20	20	Yes
03	Managing the market sheet preparation.	PC, Turbo C	20	20	Yes
04	Program for string manipulation.	PC, Turbo C	20	20	Yes
05	Program for function overloading for stack and queue.	PC, Turbo C	20	20	Yes
06	Program for CAP round using unary operator overloading	PC, Turbo C	20	20	Yes
07	Program for addition, subtraction, multiplication, division of arithmetic operators on complex no's by complex no.	PC, Turbo C	20	20	Yes
08	Program for bank system using inheritance	PC, Turbo C	20	20	Yes
09	Program to implement stack.	PC, Turbo C	20	20	Yes
10	Program to implement queue.	PC, Turbo C	20	20	Yes
11	Program for various operations on file.	PC, Turbo C	20	20	Yes
12	Program for Payroll System using inheritance.	PC, Turbo C	20	20	Yes
13	Program for bubble sort using template.	PC, Turbo C	20	20	Yes
14	Program for friend function	PC, Turbo C	20	20	Yes

Facilities for conducting practical in the laboratories

Name of course**: Computer Engineering** Class: T.E. Semester: **I** Subject: **ADTL**

Sr. No.	Experiment Title	Name of Equipment, machinery Instrument etc. required to conduct experiment	Quantity		Whether Expt. can be conducted?
			Required	Available	
01	Study experiment on windows Programming	-	-	-	Yes
02	Program for creation of Dialog box	PC, OS Windows 98 onwards, VC++	15	15	Yes
03	Program for Demonstration of menu operation	PC, OS Windows 98 onwards, VC++	15	15	Yes
04	Program on HML Page creation	PC, Internet Explorer	15	15	Yes
05	Program for HTML Table creation	PC, Internet Explorer	15	15	Yes
06	Program for Javascript	PC, Internet Explorer	15	15	Yes
07	Program for java Application	PC, Windows OS ,jdk1.3 onwards	15	15	Yes
08	Program for Button event handling	PC, Windows OS ,jdk1.3 onwards	15	15	Yes
09	Program for Mouse event handling	PC, Windows OS ,jdk1.3 onwards	15	15	Yes
10	Program for Database access using java	PC, Windows OS ,jdk1.3 onwards, Microsoft Access	15	15	Yes
11	Program for creating GUI using java	PC, Windows OS ,jdk1.3 onwards	15	15	Yes
12	Introduction to AWT and Swing	PC, Windows OS ,jdk1.3 onwards	15	15	Yes
13	Study experiment on C#	--	--	--	Yes
14	Mini Project	PC, Windows OS ,jdk1.3 onwards, Microsoft Access/SQL	15	15	Yes

Facilities for conducting practical in the laboratories

Name of course**: Computer Engineering** Class: T.E. Semester: **I** Subject: **CG**

Sr. No.	Experiment Title	Name of Equipment, machinery Instrument etc. required to conduct experiment	Quantity		Whether Expt. can be conducted?
			Required	Available	
01	Study of Various Graphics Commands.	-	-	-	Yes
02	Differential Line Style using DDA and Bresenham's Algorithm.	PC,TURBO C	15	15	Yes
03	Differential Line Style using DDA and Bresenham's Algorithm.	PC,TURBO C	15	15	Yes
04	Circle generation using DDA and Bresenham's algorithms.	PC,TURBO C	15	15	Yes
05	Circle generation using DDA and Bresenham's algorithms.	PC,TURBO C	15	15	Yes
06	Program for Polygon Filling.	PC,TURBO C	15	15	Yes
07	Program for 2D Transformatation.	PC,TURBO C	15	15	Yes
08	Program for Segmentation.	PC,TURBO C	15	15	Yes
09	Program for Polygon Clipping.	PC,TURBO C	15	15	Yes
10	Program for 3D Rotation.	PC,TURBO C	15	15	Yes
11	Program for Parallel and Perspective projections.	PC,TURBO C	15	15	Yes
12	Program for Animation.	PC,TURBO C	15	15	Yes
13	To study Latest GUI Application Study.	PC,TURBO C	15	15	Yes

Facilities for conducting practical in the laboratories

Name of course**: Computer Engineering** Class: **T.E.** Semester: **I** Subject: **Computer Network**

Sr. No.	**Experiment Title**	**Name of Equipment, machinery Instrument etc. required to conduct experiment**	**Quantity**		**Whether Expt. can be conducted?**
			Required	Available	
01	Study of network resources and various components	-	-	-	Yes
02	TCP/IP Socket Programming	PC with LAN card or on-board networking support, UTP CAT-5 cable, TC/ JDK 1.2/ JCreator	15	15	Yes
03	Implementation of Data link layer protocol	PC with LAN card or on-board networking support, UTP CAT-5 cable, TC/ JDK 1.2/ JCreator	15	15	Yes
04	Implementation of Network routing algorithm	PC with LAN card or on-board networking support, UTP CAT-5 cable, TC/ JDK 1.2/ JCreator	15	15	Yes
05	Implementation of data compression and decompression algorithm (Huffman Algorithm)	PC with LAN card or on-board networking support, UTP CAT-5 cable, TC/ JDK 1.2/ JCreator	15	15	Yes
06	Implementation of Network security algorithm (Encryption and Decryption Algorithm)	PC with LAN card or on-board networking support, UTP CAT-5 cable, TC/ JDK 1.2/ JCreator	15	15	Yes
07	Study of proxy server	--	--	--	Yes
08	Study of Cisco router series	--	--	--	Yes

Facilities for conducting practical in the laboratories

Name of course**: Computer Engineering** Class: T.E. Semester: **I** Subject: **MP-II**

Sr. No.	Experiment Title	Name of Equipment, machinery Instrument etc. required to conduct experiment	Quantity		Whether Expt. can be conducted?
			Required	Available	
01	Study of DOS and BIOS interrupts.	-	-	-	Yes
02	ALP for graphics line editor.	PC, MASM software	15	15	Yes
03	ALP for mouse interfacing.	PC, MASM software	15	15	Yes
04	ALP for Terminate Stay Resident (TSR) routine.	PC, MASM software	15	15	Yes
05	ALP for reading and writing data on floppy disk.	PC, MASM software, Floppy Disk Drive	15	15	Yes
06	ALP for generating speaker tone by using PC.	PC, MASM software	15	15	Yes
07	ALP for centronics printer interface.	PC, MASM software, printer	15	15	Yes
08	ALP for PC to PC communication using serial port.	PC, MASM software, RS232 serial cable	15	15	Yes
09	ALP for interfacing stepper motor with 8086.	PC, 8086 kit, Stepper motor kit, RS232 serial cable	15	15	Yes
10	Study of Analog to Digital converter using 8086.	-	-	-	Yes
11	ALP for Digital to Analog converter.	PC, 8086 kit, DAC kit, RS232 serial cable, CRO	15	15	Yes
12	ALP for character device driver for printer.	PC with Windows 98 OS, Dot matrix Printer	15	15	Yes

Facilities for conducting practical in the laboratories

Name of course**:** **Computer Engineering** Class: TE. Semester: **I** Subject: **System Programming**

Sr. No.	Experiment Title	Name of Equipment, machinery Instrument etc. required to conduct experiment	Quantity		Whether Expt. can be conducted
			Required	Available	
01	Develop an application to simulate first pass of 2-pass.	PC ,TURBO C.	20	20	Yes
02	Develop an application to simulate second pass of 2-pass assembler.	PC ,TURBO C.	20	20	Yes
03	Design the simple loader.	PC ,TURBO C.	20	20	Yes
04	Develop an application to create a simple text editor.	PC ,TURBO C.	20	20	Yes
05	Write a program in C to implement Lexical analyzer.	PC ,TURBO C.	20	20	Yes
06	Develop an application for simulating Syntax Analysis phase of Compiler.	PC ,TURBO C.	20	20	Yes

Facilities for conducting practical in the laboratories

Name of course**: Computer Engineering** Class: T.E. Semester: **II** Subject: **ADA**

Sr. No.	Experiment Title	Name of Equipment, machinery Instrument etc. required to conduct experiment	Quantity		Whether Expt. can be conducted
			Required	Available	
01	Study of algorithm design and analysis	-	-	-	Yes
02	Design and analysis on algorithm for insertion sort and implement it	PC,T urbo c	20	20	Yes
03	Design and implement an algorithm for merge sort	PC,T urbo c	20	20	Yes
04	Design , implement and analysis of algorithm for quick sort	PC,T urbo c	20	20	Yes
05	Design and implement algorithm for graph coloring	PC,T urbo c	20	20	Yes
06	Study of traveling sells man problem	PC,T urbo c	20	20	Yes
07	Design an algorithm for the optimal binary search tree	PC,T urbo c	20	20	Yes

Facilities for conducting practical in the laboratories

Name of course**: Computer Engineering** Class: T.E. Semester: **II** Subject: **DBMS**

Sr. No.	Experiment Title	Name of Equipment, machinery Instrument etc. required to conduct experiment	Quantity		Whether Expt. can be conducted?
			Required	Available	
01	Creating a sample database application using conventional file processing mechanism.	PC, TURBO C/C++	15	15	Yes
02	Preparation of an E-R diagram & verification of a relational database design.	PC, EDRAWMAX	15	15	Yes
03	Creating sample database file and indexes using SQL DDL queries.	PC, Oracle 9i or higher version	15	15	Yes
04	Creating sample database file and perform various operations using SQL DML queries.	PC, Oracle 9i or higher version	15	15	Yes
05	To perform PL/SQL operations	PC, Oracle 9i or higher version	15	15	Yes
06	Designing of a screen and Report generation using Visual Basic 6.0.	PC, Oracle 9i, Visual Basic 6.0, MS Access.	15	15	Yes

Facilities for conducting practical in the laboratories

Name of course**: Computer Engineering** Class: T.E. Semester: **II** Subject: **MP-III**

Sr. No.	Experiment Title	Name of Equipment, machinery Instrument etc. required to conduct experiment	Quantity		Whether Expt. can be conducted
			Required	Available	
01	Study of CMOS setup	-	-	-	Yes
02	Write an assembly language program for addition of two 32-bit numbers	PC, MASM 6.11	20	20	Yes
03	Write an assembly language program for addition of two 64-bit numbers	PC, MASM 6.11	20	20	Yes
04	Study of Layout of motherboard & minimum peripheral	PC, motherboard	20	20	Yes
05	Write an assembly language program for switching from Real mode to Protected mode and comeback in Real mode	PC, MASM 6.11	20	20	Yes
06	To study installation of peripheral devices	PC	20	20	Yes
07	To study PC Diagnostics tools	PC	20	20	Yes
08	Case study on Latest GUI Applications	PC, Internet	20	20	Yes

Facilities for conducting practical in the laboratories

Name of course**: Computer Engineering** Class: T.E. Semester: **II** Subject: **Operating System**

Sr. No.	Experiment Title	Name of Equipment, machinery Instrument etc. required to conduct experiment	Quantity		Whether Expt. can be conducted?
			Required	Available	
01	Implementation of command interpreter using system calls.	PC, TURBO C	15	15	Yes
02	Study of command interpreter.	-	-	-	Yes
03	Implementation of CPU scheduling algorithms.	PC, TURBO C	15	15	Yes
04	Simulation of page replacement algorithms.	PC, TURBO C	15	15	Yes
05	Implementation of Memory management.	PC,TURBO C	15	15	Yes
06	Implementation of Banker algorithm.	PC, TURBO C	15	15	Yes
07	Installation of UNIX / LINUX operating system.	PC, Redhat 5.0	15	15	Yes
08	Study of Unix / Linux command.	PC, Redhat 5.0	15	15	Yes

Facilities for conducting practical in the laboratories

Name of course**:** **Computer Engineering Class**: T.E Semester: **II** Subject: **Software Engineering**

Sr. No.	Experiment Title	Name of Equipment, machinery Instrument etc. required to conduct experiment	Quantity		Whether Expt. can be conducted
			Required	Available	
01	To study the Rational Rose Software.	Single computer preferably Pentium IV and Rational Rose software.	15	15	Yes
02	Designing an ATM System.	Single computer preferably Pentium IV and Rational Rose software.	15	15	Yes
03	Designing the Railway Reservation System.	Single computer preferably Pentium IV and Rational Rose software.	15	15	Yes
04	Designing a Library Management System.	Single computer preferably Pentium IV and Rational Rose software.	15	15	Yes
05	Designing an E-SITE Management System.	Single computer preferably Pentium IV and Rational Rose software.	15	15	Yes

Facilities for conducting practical in the laboratories

Name of course**: Computer Engineering** **Class**: B.E Semester: **I** Subject: ACA

Sr. No.	Experiment Title	Name of Equipment, machinery Instrument etc. required to conduct experiment	Quantity		Whether Expt. can be conducted
			Required	Available	
1.	Program for simulation of SIMD matrix	C or C++ Compiler, PC	15	15	Yes
2.	To implement the program for Quick sort as Parallel	C or C++ Compiler, PC	15	15	Yes
3.	Design and implementation of even-odd sorting	C or C++ Compiler, PC	15	15	Yes
4.	Assignment on Parallel programming model	-	15	15	Yes
5.	Design and implementation of associative search algorithm (extreme search).system.	C or C++ Compiler, PC	15	15	Yes
6.	Assignment on SIMD array processor.	-	15	15	Yes
7.	Study of Vector Processingsearch.	-	15	15	Yes
8.	Assignment on multiprocessor	-	15	15	Yes

Facilities for conducting practical in the laboratories

Name of course**: Computer Engineering** **Class**: B.E Semester: **I** Subject: AI

Sr. No.	Experiment Title	Name of Equipment, machinery Instrument etc. required to conduct experiment	Quantity		Whether Expt. can be conducted
			Required	Available	
1.	To develop Mini-Expert System (Medical Expert System) in PROLOG /TC	C or C++ Compiler, PROLOG ,PC	15	15	Yes
2.	To develop Parsing Method in PROLOG	C or C++ Compiler, PROLOG ,PC	15	15	Yes
3.	To Implement Single Perception Training Algorithm (AND Gate)	C or C++ Compiler, PROLOG ,PC	15	15	Yes
4.	Application development using Neural Network: implementation of intelligent perceptron system (X-OR Gate)	C or C++ Compiler, PROLOG ,PC	15	15	Yes
5.	To Implement Unification Algorithm	C or C++ Compiler, PROLOG ,PC	15	15	Yes
6.	Program for Dynamic Database Management	C or C++ Compiler, PROLOG ,PC	15	15	Yes

Facilities for conducting practical in the laboratories

Name of course**: Computer Engineering** Class: **B.E.** Semester: **I**
Subject: **Advanced UNIX Programming**

Sr. No.	Experiment Title	Name of Equipment, machinery Instrument etc. required to conduct experiment	Quantity		Whether Expt. can be conducted
			Required	Available	
01	Study and Execution of Unix/Linux Commands	Linux (e.g. RedHat5.0), PC	15	15	Yes
02	Program for listing the contents of directory e.g. Files/ subdirectories	Linux (e.g. RedHat5.0)	15	15	Yes
03	File Management :-Perform various file operationsin Linux like create, delete, rename, copy etc.	Linux (e.g. RedHat5.0)	15	15	Yes
04	Simulation Of Commands :- Program for simulation of various commands in Linux like date, mkdir, rmdir, pwd uname.	Linux (e.g. RedHat5.0)	15	15	Yes
05	Demonstration of various functions on Signal Set and Sigprocmask function.	Linux (e.g. RedHat5.0)	15	15	Yes
06	To perform programs on Thread for:a) Thread_Mutex b) Thread _Cleanup Handler. c) Real Time Clock	Linux (e.g. RedHat5.0)	15	15	Yes
07	Program for creating daemon process in Linux\Unix	Linux (e.g. RedHat5.0)	15	15	Yes
08	Program for unnamed pipe - Sending data from parent to child over a pipe**.**	Linux (e.g. RedHat5.0)	15	15	Yes

09	Client/Server implementation of named pipe.	Linux (e.g. RedHat5.0)	15	15	Yes
10	Program for inter process communication using Message Queue.	Linux (e.g. RedHat5.0)	15	15	Yes
11	Program for client/server implementation using Socket Programming.	Linux (e.g. RedHat5.0)	15	15	Yes
12	Shell scripts: a)Type Of a File b) User, process and environment related information. c) Factorial of a given number.	Linux (e.g. RedHat5.0)	15	15	Yes

Facilities for conducting practical in the laboratories

Name of course**: Computer Engineering** Class: **B.E.** Semester: **I**
Subject: **Embedded Systems**

Sr. No.	Experiment Title	Name of Equipment, machinery Instrument etc. required to conduct experiment	Quantity		Whether Expt. can be conducted
			Required	Available	
01	Study of Embedded System and JTAG Debugger	---	---	---	Yes
02	Case study on any latest Embedded Technology	PC, Internet	15	15	Yes
03	Write a C program for I/O operations for LED blinking	ARM 7 board with complete set, PC, Triton IDE	06 Set	06 Set	Yes
04	Write a C Program for External Interrupts for 7-segment Display	ARM 7 board with complete set, PC, Triton IDE	06 Set	06 Set	Yes
05	Write C program for implementation of I2C protocol	ARM 7 board with complete set, PC, Triton IDE	06 Set	06 Set	Yes
06	Write a C Program to demonstrate interface between Keypad and LCD	ARM 7 board with complete set, PC, Triton IDE	06 Set	06 Set	Yes
07	Write a C Program to demonstrate wireless communication between two boards using RF transmission	Two ARM 7 boards with complete set, Transmitter and Receiver kit, Two PC, Triton IDE	03	03 Set	Yes
08	Write a C Program for interfacing on-board Keypad & LCD, using Real Time Operating System	ARM 7 board with complete set, PC, Triton IDE	06 Set	06 Set	Yes
09	Write a C Program for Task Switching using RTOS	ARM 7 board with complete set, PC, Triton IDE	06 Set	06 Set	Yes
10	Write a C Program for process creation by using Linux for ARM-9 Board	ARM 9 board with complete set, PC, Triton IDE	06 Set	06 Set	Yes

11	Write a C Program for interfacing of Stepper Motor with ARM Board	ARM 7 board with complete set, stepper motor, PC, Triton IDE	06 Set	06 Set	Yes
12	Write a C Program for implementing AT commands and interface of GSM modem	ARM 7 board with complete set, GSM modem set, SIM card, PC, Triton IDE	06 Set	06 Set	Yes

Facilities for conducting practical in the laboratories

Name of course**: Computer Engineering** Class: **B.E.** Semester: **I**
Subject: **Object Oriented Modeling and Design**

Sr. No.	Experiment Title	Name of Equipment, machinery Instrument etc. required to conduct experiment	Quantity		Whether Expt. can be conducted
			Required	Available	
01	Study of Object Oriented Modeling and Object Oriented Concepts.	Textbooks	15	15	Yes
02	Study of Unified Modeling Language (UML) and UML 2.0.	Textbooks	15	15	Yes
03	Design of any Real Time System using Static UML Diagrams. (Course Registration System)	PC, Rational Rose Software	15	15	Yes
04	Design of any Real Time System using dynamic UML Diagrams. (Library Management system)	PC, Rational Rose Software	15	15	Yes
05	Design of any Real Time System using various UML Diagrams. (ATM System)	PC, Rational Rose Software	15	15	Yes
06	Design of any Real Time system using UML Diagrams. (Use Case Diagram, Class Diagram, Deployment Diagram) (Company or Organization).	PC, Rational Rose Software	15	15	Yes

07	Design of static UML model and class diagram Using OCL for some loyalty program for a company.	PC, Rational Rose Software	15	15	Yes
08	Design of UML diagrams based on your BE Project.	PC, Rational Rose Software	15	15	Yes

Facilities for conducting practical in the laboratories

Name of course**: Computer Engineering** Class: **B.E.** Semester: **II**
Subject: **Compiler Construction.**

Sr. No.	Experiment Title	Name of Equipment, machinery Instrument etc. required to conduct experiment	Quantity		Whether Expt. can be conducted
			Required	Available	
01	Study of LEX and YACC	PC,LINUX O.S	15	15	No
02	LEX program for Number Identification	PC, LINUX O.S	15	15	No
03	LEX program for Generation of token	PC,TURBO C	15	15	No
04	Simple Desk Calculator.	PC,TURBO C	15	15	No
05	Design of Predictive parser.	PC ,TURBO C	15	15	No
06	Implementation of Code generator	PC ,TURBO C	15	15	No
07	Implementation of Code Optimization	PC ,TURBO C	15	15	No
08	Lexical Analyzer for subset of C using LEX.	PC ,TURBO C	15	15	No

Facilities for conducting practical in the laboratories

Name of course**: Computer Engineering** Class: **B.E.** Semester: **II**
Subject: **DWM.**

Sr. No.	Experiment Title	Name of Equipment, machinery Instrument etc. required to conduct experiment	Quantity		Whether Expt. can be conducted
			Required	Available	
01	Develop an application to construct a multidimensional model using Star Schema	PC,Oracle	15	15	Yes
02	Develop an application to Performa OLAP Operations	PC,Oracle	15	15	Yes
03	Develop an application to implement Data Preprocessing Techniques (Data Cleaning and Data Reduction)	PC,Oracle	15	15	Yes
04	Develop an application to Implement Data Generalization and Summarization	PC,Oracle	15	15	Yes
05	Develop an application to Implement Extract Association Rule Mining.	PC,Oracle	15	15	Yes
06	Develop an Application to Implementing Classification Technique of Data	PC,Oracle	15	15	Yes
07	Develop an application to Implementing one of clustering Technique (K-Means Clustering)	PC,Oracle	15	15	Yes

08	Study of Weka Commercial Data Mining Tool	-	-	-	Yes
09	Study of Various Applications of Data Mining in Real Life	-	-	-	Yes

Facilities for conducting practical in the laboratories

Name of course**: Computer Engineering** Class: **B.E.** Semester: **II**
Subject: **Mobile Network**

Sr. No.	Experiment Title	Name of Equipment, machinery Instrument etc. required to conduct experiment	Quantity		Whether Expt. can be conducted
			Required	Available	
01	Setting up wireless network with and without infrastructure support	Access Point, P-IV Machines	15	15	Yes
02	Configuring Access point with bridging mode(point to point and point to multipoint)	Access Point, P-IV Machines	15	15	Yes
03	Configuring routing between wired and wireless networks	Router , P-IV machines	15	15	Yes
04	Configuring Security in wireless network with and without infrastructure support	Router , P-IV machines	15	15	Yes
05	Installation of Network simulator2(NS2)	NS2 software, P-IV machines	15	15	Yes
06	Simulation of Wired Network	NS2 software, P-IV machines	15	15	Yes
07	Simulation of Wireless network	NS2 software, P-IV machines	15	15	Yes
08	Simulation of any routing protocol using NS2	NS2 software, P-IV machines	15	15	Yes

Facilities for conducting practical in the laboratories

Name of course**: Computer Engineering** Class: **B.E.** Semester: **I**
Subject: **Software Metrics & Quality Assurance**

Sr. No.	Experiment Title	Name of Equipment, machinery Instrument etc. required to conduct experiment	Quantity		Whether Expt. can be conducted
			Required	Available	
01	Program for Calculating the Size of Program. (Line of Code Measure)	Computer, Turbo C	15	15	Yes
02	Measure Cyclomatic Complexity of given program	Computer, Turbo C	15	15	Yes
03	Implementation of COCOMO Model	Computer, Turbo C	15	15	Yes
04	Study of Software Documentation	Computer, Turbo C	15	15	Yes
05	Study Software Reengineering Process	Computer, Turbo C	15	15	Yes
06	Study of Clean Room software Engineering.	Computer, Turbo C	15	15	Yes
07	Study of Software Testing	Computer, Turbo C	15	15	Yes

APPENDIX-15

ELECTRICAL ENGINEERING DEPARTMENT

A) Facilities for conducting Practicals in the Laboratories

Name of the Department / Section :-

Subject wise & laboratory wise Lists of material, machinery, equipment & Instrument required to perform prescribed Practical

Name of the Course : Electrical Class:-Second Year

Subject- Electrical Engineering Material

S.N.	Experiment Title	Name of Equipment, Machinery, Instrument required to Conduct Experiment	Quantity		Whether Experiment can be conducted
			Required	Available	
1	Testing of Insulating Oil as per IS	Oil testing Set	01	01	Yes
2	Testing of Solid Insulating Material	Solid Insulating Kit	01	01	Yes
3	Testing of Power Capacitor as per IS	3 Phase Induction Motor Power Capacitor Wattmeter AC Ammeter AC Voltmeter Belt and Balance set	01 01 02 01 01 01	01 01 02 01 01 01	Yes
4	Measurement of resistivity of conducting Material	Conducting wire AC Ammeter Multimeter Load Bank	01 01 01 01	01 01 01 01	Yes
5	Measurement of resistivity of resistance Material	Resistive wire AC Ammeter Multimeter Load Bank	01 01 01 01	01 01 01 01	Yes
6	Study and Use of Gauss Meter	Gauss Meter	01	00	No
7	Use of Spark Gap for measurement of High Voltage	Sphere Gap arrangement High Voltage Generator	01 01	01 01	Yes
8	Study of Seeback and Peltier effects	Seeback & Peltier Kit	01	00	No
9	Study of Hysterias Loop of Ferromagnetic material	DC Shunt motor Generator set DC Ammeter DC Voltmeter Speedometer	01 01 01 01	01 01 01 01	Yes
10	Study of various insulating material	Various Insulating Material	03	03	Yes

Name of Course- Electrical Engineering Class- SE
Subject- AC **Circuit and Transformer**

S.N.	Experiment Title	Name of Equipment, Machinery, Instrument required to Conduct Experiment	Quantity		Whether Experiment can be conducted
			Required	Available	
1	Open Circuit and Short Circuit on Single Phase Transformer	Single Phase Transformer AC Ammeter AC Voltmeter Wattmeter Autotransformer	01 02 02 02 02 01	01 02 02 02 02 01	Yes
2	Polarity Test on Single Phase and 3PhaseTransformer	Single Phase and Transformer AC Voltmeter Autotransformer	01 02 01	01 02 01	Yes
3	Sumpners Test on Two Identical Single Phase Transformer	Single Phase and Transformer AC Voltmeter AC Ammeter Autotransformer	02 02 02 02	02 02 02 02	Yes
4	Parallel Operation of Two Single Phase Transformer	Single Phase and Transformer AC Voltmeter AC Ammeter Autotransformer Lamp Bank	02 02 02 02 01	02 02 02 02 01	Yes
5	Study of connection for three phase transformer	three phase transformer	01	01	Yes
6	V- Connection of Two Single Phase Transformer at no load and balanced load.	Two Single Phase Transformer AC Ammeter AC Voltmeter Autotransformer Lamp Bank	01 02 02 01 01	01 02 02 01 01	Yes
7	T- Connection of Two Single Phase Transformer at no load and balanced load.	Two Single Phase Transformer AC Ammeter AC Voltmeter Autotransformer Lamp Bank	01 02 02 01 01	01 02 02 01 01	Yes
8	Scott Connection of Two Single Phase Transformer at no load and balanced load.	Two Single Phase Transformer AC Ammeter AC Voltmeter Autotransformer Lamp Bank	01 02 02 01 01	01 02 02 01 01	Yes
9	Study of Two Wattmeter Method	3 Phase Induction motor	01	01	Yes

	for Balance & Unbalance three phase load, Effect of load PF on Wattmeter reading in case of balance load	AC Ammeter AC Voltmeter Wattmeter Autotransformer Electrical Load	02 01 02 01 01	02 01 02 01 01	
10	Measurement of Reactive Volt - Ampere in three phase balance load	3 Phase Induction motor AC Ammeter AC Voltmeter Wattmeter Autotransformer	01 02 01 01 01	01 02 01 01 01	Yes
11	Verification of Milliman's Theorems	Millimans Theorems Kit AC Voltmeter AC Ammeter	01 01 01	01 01 01	Yes
12	Study the no load current wave farm of Single phase Transformer on CRO	Single Phase Transformer CRO	01 01	01 00	No

Name of Course Electrical Engineering Class- SE
Subject- Electrical Measurement- I

S.N.	Experiment Title	Name of Equipment, Machinery, Instrument required to Conduct Experiment	Quantity		Whether Experiment can be conducted
			Required	Available	
1	Barlow method of measurement of power using Two Current Transformer	Current Transformer, ammeter, voltmeter, Wattmeter	02 01 01 01	02 01 01 01	Yes
2	Barlow method of measurement of power using Two Potential Transformer	Potential Transformer, ammeter, voltmeter, Wattmeter	02 01 01 01	02 01 01 01	Yes
3	Measurement of power in 3 ph. 4 wire circuit	ammeter, voltmeter, Wattmeter	01 01 02	01 01 02	Yes
4	Calibration of 1phase. Energy meter at different. Power factor	1 Phase Energy meter, ammeter, voltmeter, Wattmeter	01 01 01 01	01 01 01 01	Yes
5	Calibration of 3phase. 2 element at different. Power factors.	3 Phase Energy meter, ammeter, voltmeter, Wattmeter	01 01 01 01	01 01 01 01	Yes
6	Use of DC Potentiometer for calibration of Ammeter and Voltmeter	DC Potentiometer Voltage Ratio Box Voltmeter	01 01 01	01 01 01	Yes
7	Study of Kelvin bridge.	Kelvin Bridge Kit	01	01	Yes
8	Study of Anderson bridge.	Anderson Bridge kit	01	01	Yes
9	Epstein Squire	Epstein Squire	01	00	No
10	Measurement of phase angle error and ratio error in Current Transformer,	Phase angle error and ratio error measurement kit	01	01	Yes
11	Measurement of phase angle error and ratio error in Potential Transformer	Phase angle error and ratio error measurement kit	01	01	Yes
12	Measurement of Earth Resistance	Earth Testing Kit	01	01	Yes

Name of Course Electrical Engineering Class- SE
Subject- Analog and Digital Electronics

S.N.	Experiment Title	Name of Equipment, Machinery, Instrument required to Conduct Experiment	Quantity		Whether Experiment can be conducted
			Required	Available	
1	Op-amp as square & sine wave generator	1. Analog Oscilloscope 2.Analog Power Scope 3.Function Generator 4.Power Supply 5.Multimeter	01 01 01 01 01	01 01 01 01 01	Yes
2	Op-amp as comparator & Schmitt trigger	1. Analog Oscilloscope 2.Analog Power Scope 3.Function Generator 4.Power Supply 5.Multimeter	01 01 01 01 01	01 01 01 01 01	Yes
3	Instrumentation amplifier using 3 Op-amps	1. Analog Oscilloscope 2.Analog Power Scope 3.Function Generator 4.Power Supply 5.Multimeter	01 01 01 01 01	01 01 01 01 01	Yes
4	IC 555 application – astable, monostable,square wave generator, square counter IC 565/4046 application ,calculation of lock range and capture range	1. Analog Oscilloscope 2.Analog Power Scope 3.Function Generator 4.Power Supply 5.Multimeter	01 01 01 01 01	01 01 01 01 01	Yes
5	Study of JK flip flop	1. Analog Oscilloscope 2.Analog Power Scope	01 01	01 01	Yes

		3.Function Generator 4.Power Supply 5.Multimeter	01 01 01	01 01 01	
6	A to D & D to A converter using ADC 0808 and DAC 0808	1. Analog Oscilloscope 2.Analog Power Scope 3.Function Generator 4.Power Supply 5.Multimeter	01 01 01 01 01	01 01 01 01 01	Yes
7	Study of up down counter & N-modulo counter	1. Analog Oscilloscope 2.Analog Power Scope 3.Function Generator 4.Power Supply 5.Multimeter	01 01 01 01 01	01 01 01 01 01	Yes
8	Study of IC 723 as low / high voltage regulator	1. Analog Oscilloscope 2.Analog Power Scope 3.Function Generator 4.Power Supply 5.Multimeter	01 01 01 01 01	01 01 01 01 01	Yes
9	IC 7805 used as fixed voltage regulator, elevated voltage and current, constant current source	1. Analog Oscilloscope 2.Analog Power Scope 3.Function Generator 4.Power Supply 5.Multimeter	01 01 01 01 01	01 01 01 01 01	No

Name of Course Electrical Engineering Class- SE
Subject- Digital Computational Technique & Programming.

S.N.	Experiment Title	Name of Equipment, Machinery, Instrument required to Conduct Experiment	Quantity		Whether Experiment can be conducted
			Required	Available	
1	Program to evaluate truncation error in a series	Computer C –Compiler Printer	01 01 01	01 01 01	Yes
2	To find roots of polynomial using any iterative method	Computer C –Compiler Printer	01 01 01	01 01 01	Yes
3	Solution of simultaneous equation leaner algebraic equation	Computer C –Compiler Printer	01 01 01	01 01 01	Yes
4	Evaluation of interpolating polynomial	Computer C –Compiler Printer	01 01 01	01 01 01	Yes
5	Differentiation using numerical differentiation	Computer C –Compiler Printer	01 01 01	01 01 01	Yes
6	Integration using numerical integration	Computer C –Compiler Printer	01 01 01	01 01 01	Yes
7	Solution of differential Equation	Computer C –Compiler Printer	01 01 01	01 01 01	Yes

Name of the Course : Electrical Engineering Class:- SE
Subject:- Network Analysis

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether expt. can be conducted
			Required	Available	
1	Verification of Thevenins Theorem for two port reactive network	A 470 ohm resistor B 680 ohm resistor C multimeter D connecting probes	2 1 2	2 1 2	Yes
2	Verification of Nortons Theorem for reactive network	A 470 ohm resistor B 680 ohm resistor C multimeter D connecting probes E dual power supply	2 1 2	2 1 2	Yes
3	Pole and Zero plot of a one port network	A 470 ohm resistor B 680 ohm resistor C multimeter D connecting probes E dual power supply	2 1 2	2 1 2	Yes
4	Measurement of Z-parameter	A 470 ohm resistor B 680 ohm resistor C multimeter D connecting probes E dual power supply	2 1 2	2 1 2	Yes
5	Measurement of Y-parameter	A 470 ohm resistor B 680 ohm resistor C multimeter D connecting probes E dual power supply	2 1 2	2 1 2	Yes
6	Measurement of ABCD-parameter	A 470 ohm resistor B 680 ohm resistor C multimeter D connecting probes E dual power supply	2 1 2	2 1 2	Yes

7	Plot the frequency Response of RLC series network	A 470 ohm resistor B 680 ohm resistor C multimeter D connecting probes E dual power supply	2 1 2	2 1 2	Yes
8	Plot the frequency Response of RLC parallel network	A 470 ohm resistor B 680 ohm resistor C multimeter D connecting probes E dual power supply	2 1 2	2 1 2	Yes
9	Study of Power transfer and insertion loss	Study			Yes
10	Verification of Superposition Theorem for two port network	A 470 ohm resistor B 680 ohm resistor C multimeter D connecting probes	2 1 2	2 1 2	Yes

Name of Course Electrical Engineering Class- SE
Subject- Electrical Machines-I

S.N.	Experiment Title	Name of Equipment, Machinery, Instrument required to Conduct Experiment	Quantity		Whether Experiment can be conducted
			Required	Available	
1	Determination of magnetization ,external and internal characteristics of D.C Shunt Generator	DC Shunt Generator DC Shunt Motor Set DC Ammeter DC Voltmeter Rheostats Speedometer Load Bank	01 02 01 02 01 01	01 02 01 02 01 01	Yes
2	Determination of magnetization , external and internal characteristics of D.C Series Generator	DC Series Generator DC Shunt Motor Set DC Ammeter DC Voltmeter Rheostats Speedometer Load Bank	01 02 01 02 01 01	01 02 01 02 01 01	Yes
3	Determination of external characteristics of D.C Compound Generator Differential and Cumulative	DC Compound Generator DC Shunt Motor Set DC Ammeter DC Voltmeter Rheostats Speedometer Load Bank	01 02 01 02 01 01	01 02 01 02 01 01	Yes
4	Speed control of D.C Shunt Motor by armature and field control	DC Shunt Motor DC Ammeter DC Voltmeter Rheostats Speedometer	01 02 01 02 01	01 02 01 02 01	Yes
5	Study of 3point and 4 point starters b)Reversal of Motor rotation	3 and 4 point Starters Rheostats Speedometer	02 02 01	02 02 01	Yes
6	Load test on D.C shunt motor	DC Shunt Motor DC Ammeter DC Voltmeter Rheostats Speedometer	01 02 01 02 01	01 02 01 02 01	Yes

		Spring Balance and Belt	01	01	
7	Load test on Induction Motor	3 Phase Induction motor AC Ammeter AC Voltmeter Speedometer Spring Balance and Belt	01 01 01 01 01	01 01 01 01 01	Yes
8	Determination of performance of Induction Motor from circle diagram	3 Phase Induction motor AC Ammeter AC Voltmeter Wattmeter	01 01 01 02	01 01 01 02	Yes
9	Study of Induction Motor starter	Different starters for 3Phase Induction motor	04	04	Yes
10	Speed control of slip ring Induction Motor using rotor resistance method	3 Phase slip ring Induction motor Rheostat Speedometer	01 03 01	01 03 01	Yes
11	Determination of Equivalent Circuit From no load and Block rotor test on Induction Motor	3 Phase Induction motor AC Ammeter AC Voltmeter Wattmeter	01 01 01 02	01 01 01 02	Yes

Name of Course Electrical Engineering Class- SE

Subject- Electrical Workshop

S.N.	Experiment Title	Name of Equipment, Machinery, Instrument required to Conduct Experiment	Quantity		Whether Experiment can be conducted
			Required	Available	
1	Study of different wires	TRC Wires CTS Wires Weather proof wires Flexible wire	01 01 01 01	00 00 01 01	Yes
2	Study of wiring accessories	Switch Lamp holder Ceiling rose Socket outlet plugs Wooden boards ICDP/ICTP Distribution boxes Fuse	01 01 01 01 01 01 01 01	01 01 01 01 01 01 01 01	Yes
3	Lamp circuits	Wires Switch Lamps Lamp holder Fuse	01 01 01 01 01	00 00 01 01 01	Yes
4	Underground cables	Fiber optic cable	01	00	No
5	Study of DC and AC voltmeter	Dc voltmeter Ac voltmeter	01 01	01 01	Yes
6	Study and use of analog multimeter and digital multimeter	analog multimeter digital multimeter	01 01	01 01	Yes
7	Study and use of megger	Megger	01	01	Yes
8	Study electrical shocks and safety precautions	Safety precautions charts	01	00	No
9	Industrial visit	Visit Substation Electrical workshops Industries	Visit	Visit	Yes

A)Facilities for conducting Practicals in the Laboratories

Name of the Department / Section :- Electrical
Subject wise & laboratory wise Lists of material, machinery, equipment & Instrument required to perform prescribed Practical

Name of the Course : Electrical Engineering Class:- TE
Subject:-Power System II

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether expt. can be conducted
			Required	Available	
1	Measurement of ABCD constant of Long transmission line and plotting of its circle diagram to estimate its performance parameters				No
2	The effect of VAR compensation on receiving and voltage profile of transmission line using capacitor bank.	DC shunt motor or synchronous. Motor as PM Voltmeter(0-600V) Ammeter(0-10A) Capacitor bank	1 2 2 1	1 2 2 1	Yes
3	Determination of steady state limit of a transmission line				No
4	Measurement of sub-transient reactance of a salient pole synchronous machine by static or Dalton-cameron method	Ammeter(O-10A) 1ph Auto transformer	1 1	1 1	Yes
5	study of load flow on a 3 bus power system using A.C network analyzer or by actual simulation				No
6	Measurement of sequence reactance of a synchronous machine	3 ph synchronous motor 3 ph synchronous generator wattmeter voltmeter ammeter 1 ph transformer	1 1 2 1 1 1	1 1 2 1 1 1	Yes

7	Fault analysis for symmetrical 3ph. Fault by simulation or by AC/DC analyzer	3 ph synchronous motor 3 ph synchronous generator Voltmeter(0-600V) Ammeter(0-10A)	1 1 1 1	1 1 1 1	Yes
8	Unsymmetrical fault analysis for LL ,LLG ,LG fault on AC/DC network analyzer	With the help of panel and probes Model Kit	1	1	Yes
9	Computer aided solution of a 3 bus load flow problem using Guass Seidal method	Computer			Yes
10	steady state stability study on a synchronous motor and plotting P-Delta curve	Study			Yes
11	Formulation of “Y BUS” matrix using computer program	Computer	1	1	Yes

Name of the Course: Electrical Class:- TE
Subject:- Electrical Machine -II

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether expt. can be conducted
			Required	Available	
1	Direct loading test on 3 ph Alternator	D.C. Shunt Motor as P.M. Ammeter (0-10A) Voltmeter (0-600V) Lamp bank as Resistive Load Tachometer D.C. Ammeter (0-1A) Rheostats (800,1.2A)	1 1 1 1 1 1 2	2 1 1 1 1 1 2	Yes
2	OC & SC test on 3 Phase Alternator: Determination of regulation by e.m.f method and mmf method	D.C. Shunt Motor as P.M./3Ph. Synchronous. Motor as P.M. Ammeter (0-10A) Voltmeter (0-600V) Lamp bank as Resistive Load Tachometer D.C. Ammeter (0-1A) Rheostats (800,1.2A)	1 1 1 1 1 1 1 2	1 1 1 1 1 1 1 2	Yes
3	Zero p. f. test on 3 Phase Alternator: Regulation of alternator by Poitiar Method and A.S.A Metho	D.C. Shunt Motor as P.M. Ammeter (0-10A) Voltmeter (0-600V) 3Ph inductive load Tachometer D.C. Ammeter (0-1A) Rheostat (800,1.2A)	1 1 1 1 1 1 2	1 1 1 1 1 1 2	Yes

4	Slip test on 3 Phase salient pole synchronous machine : determination of d-axis and q-axis reactance and hence regulation	Dc shunt motor as PM 3Ph Auto Transformer (10A,600V) Voltmeter (0-600V) Ammeter (0-5A) Tachometer	1 1 1 1 1	1 1 1 1 1	Yes
5	Synchronizing Alternator : Lamp method and use of sunchroscope.	3Ph alternator as load on synchronous motor ammeter(0-10A) Voltmeter(0-600V) DC ammeter (0-2A) Rheostats (400,1.2A) 2 Wattmeter (600V/10A) Synchronoscope	1 1 1 1 2 1	1 1 1 1 2	No
6	V curves of Synchronous Motor at const load	3Ph alternator as load on synchronous motor ammeter(0-10A) Voltmeter(0-600V) DC ammeter (0-2A) Rheostats (400,1.2A) 2 Wattmeter (600V/10A)	1 1 1 1 2	2 1 1 1 1 2	Yes
7	Load test on Synchronous induction motor or synchronous motor at a const excitation	Voltmeter (0-300V) Ammeter (0-10A) 1ph Auto transformer (10A/270V) Alt as a load	1 1 1 1	1 1 1 1	Yes
8	Study of various types of 1 ph induction motors	Demonstration			Yes

9	No load & block rotor test on capacitor starts 1 ph Induction Motor: Determination of parameter of equivalent circuit.	Voltmeter(0-300V) Ammeter(0-10A) 1 ph Auto transformer Wattmeter(300V/ 10A	1 1 1 1	1 1 1 1	Yes
10	Load test on 1 Phase Induction Motor	Voltmeter(0-300V) Ammeter(0-10A) Auto transformer Wattmeter(300V/ 10A	1 1 1 1	1 1 1 1	Yes

Name of the Course : Electrical Engineering Class:- TE
Subject:-Microprocessor and Microcontroller

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether expt. can be conducted
			Required	Available	
1	Study of Architecture of 8085. Microproccer & write program of 8 bit addition & subtraction.	8085 Microprocessor Kit with 7 segment LED display	05	06	YES
2	Instruction set of 8085. & write program of 16 bit addition & subtraction.	8085 Microprocessor Kit with 7 segment LED display	05	06	YES
3	write program for asending/ desending/comparision of given number.	8085 Microprocessor Kit with 7 segment LED display	05	06	YES
4	study of different memories & write program of block transfer.	8085 Microprocessor Kit with 7 segment LED display	05	06	YES
5	Study of 8255 PPI	8255Kit	02	02	YES
6	Study of 8253 PIT	8155Kit	02	02	YES
7	Study of D/A & A/D converter.	IC and Breadboard	02	04	YES
8	Study of 8259 interrupter controller.	IC and Breadboard	02	04	YES
9	Study of Architecture of 8086.	8086 Microprocessor Kit with 7 segment LED display	02	02	YES
10	Applications in Electrical drives speed control	Stepper Motor Kit	02	02	YES
11	Study of micro controller based system.	Stepper Motor Kit	02	02	YES

Name of the Course : Electrical Class:- TE
Subject:-Software Application-I

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether expt. can be conducted
			Required	Available	
1	Program to solve the numerical method:Bisection, Newton Raption method using defined function	Computer C –Compiler Printer	1 1 1	1 1 1	Yes
2	Program to solve differential equation by Elur's modified metrhod	Computer C –Compiler Printer	1 1 1	1 1 1	Yes
3	Program using function to find integration by Simpson's 1/3 and 3/8 method	Computer C –Compiler Printer	1 1 1	1 1 1	Yes
4	ETAP Power station	Computer ETAP Power Station Printer	1 1 1	1 1 1	Yes

Name of the Course : Electrical **Class:- TE**
Subject:-Power Electronics

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether expt. can be conducted
			Required	Available	
1	Triggering Circuit of SCR	Triggering circuit of SCR	01	01	YES
2	Characteristics of SCR,MOSFET,		01	01	YES
3	Commutation circuit class C, class D	Commutation circuit class C & class D	01	01	YES
4	Single phase full wave controlled rectifiers R, R-L characters tics	Single phase full wave controlled rectifiers R, R-L, LOAD CHAR	01	01	YES
5	Single phase semi-converter	Single phase semi converter	01	01	YES
6	Three phase full wave controlled rectifiers	Three phase full wave controlled rectifiers	01	01	YES
7	Step up chopper	Step up chopper	01	01	YES
8	Step down chopper	Step down chopper	01	01	YES
9	Series and parallel inverter	Series inverter & Parallel inverter	01	01	YES
10	Three phase inverter	Three phase inverter. MOSFET	01	01	YES

Name of the Course : Electrical **Class:- TE**
Subject:-Electrical Measurement -II

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether expt. can be conducted
			Required	Available	
1	Measurement of inductance by Anderson bridge	a. KIT Anderson b. Headphone	1 1	1 1	No
2	Measurement of capacitance and loss angle of capacitor by Shering bridge	a. Shering Kit	1	1	No
3	Measurement of freq / multi inductance by Cambell Bridge	Cambell Bridge Function generator Power supply Multimeter	1 1 1 1	1 1 1 1	Yes
4	Strain measurement using strain Gauge	strain Gauge measurement kit	1	1	Yes
5	Study of LVDT	LVDT Transducer unit with controller	1	1	Yes
6	Temp measurement by RTD / Thermostat and Thermocouple	Heater RTD Thermometer Multimeter	1 1 1 1	1 1 1 1	Yes
7	Study of pressure transducer	pressure transducer kit compressor	1 1	1 1	Yes
8	Study of recorder	Strip chart recorder	1	1	Yes
9	Speed measurement by peak up and photo electric method	peak up and photo electric method kit	1	1	Yes
10	Step response of meter				No
11	Study of CRO different types and their application	CRO	1	1	Yes
12	Measurement of systematic error of wattmeter				No

Name of the Course : Electrical Class:-TE Subject:-Control System I

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether expt. can be conducted
			Required	Available	
1	Study of potentiometer as on A)error detector B) Determination of sensitivity C) Determination of input and out put of Characteristic	Potentiometer Multimeter	1 1	1 1	Yes
2	Study of a. Synchro characteristic b. Electrical zeroing of Synchro d.Synchronous as error detector d.Synchros on position control system	Kit of Synchros Multimeter	1 1	1 1	Yes
3	To determine the transfer function of armature and field Control dc generator				No
4	To determine transfer function of dc servo motor	dc servo motor kit tachometer multimeter	1 1 1	1 1 1	Yes
5	To study , performance Characteristic Of dc motor angular position control system	dc motor angular position system multimeter	1 1 1	1 1 1	Yes
6	To plot the torque speed characteristic. Of two phase AC servo motor	AC servo motor Tachometer Multimeter	1 1 1	1 1 1	Yes
7	Frequency response of second order system	second order system kit	1	1	Yes
8	To determine transfer function of AC servo motor	AC servo motor Tachometer Multimeter	1 1 1	1 1 1	Yes
9	Operation of stepper motor in single step and multi step	stepper motor Tachometer Multimeter	1 1 1	1 1 1	Yes
10	Study of P,PI, PID controller	PID controller CRO	1 1	1 1	Yes

A) Facilities for conducting Practicals in the Laboratories

Name of the Course : Electrical **Class:-BE**

Subject:-Industrial Electrical Engineering.

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether expt. can be conducted
			Required	Available	
1	To perform load test on single phase induction motor & plot its performance characteristic.	Voltmeter (0-300V) Ammeter (0-10A) 1ph auto Transformer(270 V,10A) Tachometer Load Balance	1 1 1 1 1	1 1 1 1 1	Yes
2	To perform load test on DC Series Motor & plot its performance characteristic.	DC shunt generator as load on DC motor Voltmeter (0-300V) Ammeter (0-10A) tachometer	1 1 1 1 1	1 1 1 1 1	Yes
3	Speed control of DC Series Motor	Voltmeter (0-300V) Ammeter (0-10A) Tachometer Rheostats (100,5A)	1 1 1 2	1 1 1 2	Yes
4	Rheostatic breaking of three phase Induction Motor	Voltmeter (0-300V) Ammeter (0-5A) Rheostats (200,5A) Change over switch Stop watch	1 1 1 1 1	1 1 1 1 1	No

5	To perform load test on Three phase Induction Motor and Plot its performance characteristic.	Voltmeter (0-600V) Ammeter (0-10A) Wattmeter(600v/10A) Tachometer Loading arrangement 3ph auto transformer.	1 1 2 1 1	1 1 2 1 1	Yes
6	Rheostatic breaking of DC Shunt Motor	Voltmeter (0-300V) Ammeter (0-5A) Rheostat (200,5A) Change over switch Stop watch	1 1 1 1 1	1 1 1 1 1	Yes
7	Speed control of three phase slip ring Induction Motor by rotor resistance method	Voltmeter (0-600V) Ammeter (0-10A) Tachometer	1 1 1	1 1 1	Yes
8	To perform load test on DC Series Motor & plot its performance characteristic	Ammeter ((0-10A) Voltmeter (0-300V) Tachometer, Loading arrangement	1 1 1 1	1 1 1 1	Yes
9	Study Illumination system	By case study			Yes
10	Study of Different type of Enclosures	Machine lab Enclosures			Yes

Name of the Course :Electrical Class:- BE
Subject:- High Voltage Engineering.

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether expt. can be conducted
			Required	Available	
1	Measurement of insulation resistance of 600/250 V.P.T by Meger	Meger	1	1	Yes
2	Power frequency high voltage withstand test on CT,11KV,10/5 A	--	--	--	No
3	Study of Corona Discharge	50 KVA C/70 KV DC HV testing kit corona cage 2-0-50 KV HV Transformer 3-0-70 KV Rectifier 4-0-70 KV Filter 5-Bedding Resistor (0-90 KV)	1 1 1 1 1	1 1 1 1 1	Yes
4	Determination of insulation break-down strength of solid, Liquid and gaseous dielectric media	Insulation Tester Set	1	1	Yes
4	Dry & wet power freq. With stand test on insulator	HV testing kit 0-50 KV AC Transformer Insulator Artificial raining sys.	1 1 1 1	1 1 1 1	Yes
5	Power frequency high voltage withstand test on cable	--	--	--	No
6	Study of Impulse Generator	As Study Experiment			Yes

7	Dry & Wet power frequency withstand test on insulator	Insulator & artificial rainfall set	1	1	Yes
8	Flashover test on insulator	As a study experiment	1	1	Yes
9	Double voltage Double freq. With stand test on transformer.	1. Double voltage, double freq. Kit 2. Transformer	1 1	1	Yes
10	Study of calibration of sphere gap	HV testing kit 0-50 KVAC HV transformer Sphere gap assembly	1 1 1	1 1 1	Yes
11	Study of 100KV high voltage testing Kit	high voltage testing Kit	1	1	Yes

Name of the Course : Electrical Class:-BE
Subject:-Switch Gear Protection

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether expt. can be conducted
			Required	Available	
1	Study of relaying component and control circuit development	Switch gear testing kit MCB ,fuse wire	1	1	Yes
2	To plot operating characteristic Of inverse time over current relay	Microprocessor based over current relay	1	1	Yes
3	To study the through fault stability of differential relay	As a study excrement.& Kit	1	1	Yes
4	Study of MHO distance relay to plot a)RX diagram b)relay voltage Vs admittance char.	As a study experiment & Kit	1	1	Yes
5	Study of combine over current and earth fault protection scheme of alternator.	Protection of three phase alternator kit	1	1	Yes
6	Protection of three phase transformer using differential relay(Merz-price protection scheme)	three phase transformer protection kit	1	1	Yes
7	To plot the char. Of rewire able fuse and MCB	Relay testing kit	1	1	Yes
8	Study of Arc extinction phenomenon	As a study experiment	1	1	Yes
9	Demonstration of Microprocessor based protection three phase using MM-30L&Tmake study of different types of fuses	As a study experiment	1	1	Yes

Name of the Course : Electrical **Class:-BE**
Subject:-Power system stability

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether expt. can be conducted
			Required	Available	
1	Parameter and time constants of synchronous machine	DC shunt motor coupled with synchronous alternator Voltmeter Ammeter Wattmeter	1 1 1 1	1 1 1 1	Yes
2	synchronous machine on infinite bus	DC shunt motor coupled with synchronous alternator Voltmeter Ammeter Wattmeter	1 1 1 1	1 1 1 1	Yes
3	Effect of saturation and determination of equivalent reactance of synchronous machines	DC shunt motor coupled with synchronous alternator Voltmeter Ammeter Wattmeter	1 1 1 1	1 1 1 1	Yes
4	Retardation test on synchronous machine to find moment of inertia of rotating part and angular momentum	As a study experiment.			Yes
5	To obtain power angle characteristic . Of lossy and lossless lines	As a study experiment.			Yes
5	To study Transient state stability by Point by Point Method	By taking problem			Yes
7	To determine Steady state stability of short transmission line	As a study experiment			Yes

8	To determine Steady state stability of Long transmission line	As a study experiment.			Yes
9	Study of Clerk diagram	As study experiment.	----	----	Yes
10	Study of different types of automatic voltage regulator	As study experiment.	-----	----	Yes

Name of the Course : Electrical **Class:- BE**
Subject: Industrial Drives and Control

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether expt. can be conducted
			Required	Available	
1	A)Control of DC Motor using Single phase half controlled rectifier B)Control of DC Motor using Single phase Full controlled rectifier	½ HP D.C Shunt Motor With Loading arrangement	1	1	Yes
2	One quadrant chopper control of DC Motor	½ HP D.C Shunt Motor With Loading arrangement	1	1	Yes
3	Two quadrant chopper control of DC Motor	½ HP D.C Shunt Motor With Loading arrangement	1	1	Yes
4	Speed control single phase motor by ac voltage regulator	1 HP Single Phase Induction motor.	1	1	Yes
5	Study of steeper motor drive circuit	Stepper Motor 2 phase , 3.5 Kg-cm, 12 volt	1	1	Yes
6	Speed control Universal motor	FHP AC/DC Universal Motor	1	1	Yes
7	Study of micro-controlled base DC drive	½ HP D.C Shunt Motor	1	1	Yes
8	Study of Vector control method for induction motor	3 HP/2.2 KW, 415 volt , 4 Pole , 50 Hz, 1440 RPM Induction Motor	1	1	Yes

Annexure No. 18. Details of Laboratories and Workshop

NAME OF THE DEPARTMENT :- ELECTRONICS & TELECOMMUNICATION ENGG.

Sr No	Name of the laboratory/Workshop Detail	Total Area of lab/work shop in m^2	Major Equipment above 50,000/-
1	Semiconductor Devices & Circuit Lab	90	---
2	UG Computer Lab	68	1. IBM Server 2. UPS
3	Communication Lab	71	----
4	RMT Lab	71	1. Microwave kit(MT9000) 2. Microwave kit(MT9001) 3. Microwave kit(MT9002) 4. Klystron Based Microwave Bench 5. Gunn diode Based Microwave Bench 6. Klystron Based Microwave Bench for radiation pattern of antennas
5	Television Engg / Consumer Elex Lab	71	----
6	Electronics Design Lab / Telematics	68	----
7	Project Lab/ Basic Electronics Lab / FOC Lab	135	---
8	Basic Elect Lab/ Power Elex Lab	75	---
9	E M / E.I Lab	72	1. GHZ Spectrum Analyzer
10	Network Analysis Lab	81	---
11	PG Computrer Lab	71	---
12	PG Research Lab	71	---
13	Seminar Hall	162	1. LCD Projector 2. LAPTOP
14	Departmental Library	22	---

***** Major Equipment mean cost above 50,000/-

List of Experimental Setup – Term-I

Name of Lab: - Lab no.1/ DSMP Lab

Name of Course: Information Technology **Class: SE IT**

Subject: DSMP

Sr. No.	Experiment Title	Name of Equipment/ Software available to Conduct the Experiment	Quantity		Whether experiment can be performed
			Required	Available	
1	Digital System and microprocessor	Verify the Truth table of logic gates and of Demorgance Theorem	18	20	Yes
2	Digital System and microprocessor	Construction of basic gates using Universal gates	18	20	Yes
3	Digital System and microprocessor	Construction of Half Adder and Full Adder	18	20	Yes
4	Digital System and microprocessor	Construction of Half and Full Substractor	18	20	Yes
5	Digital System and microprocessor	File manipulation opening, closing input and output operation on file	18	20	Yes
6	Digital System and microprocessor	Program for macro	18	20	Yes
7	Digital System and microprocessor	Interco version of number system	18	20	Yes
8	Digital System and microprocessor	To find the values of unknown by Gauss elimination	18	20	Yes
9	Digital System and microprocessor	To find root of equation by Newton Rapson	18	20	Yes
10	Digital System and microprocessor	To find root of equation of Regula Falsi	18	20	Yes

Name of Course: Information Technology **Class: BE IT**
Subject: ES

Sr. No.	Experiment Title	Name of Equipment/ Software available to Conduct the Experiment	Quantity		Whether experiment can be performed
			Required	Available	
1	Embedded Systems	Study of ES and its application with overview and Study of JTAG Debugger/on-board debugger-emulator.	18	20	Yes
2	Embedded Systems	Program to interface Keyboard and display key pressed on LCD	18	20	Yes
3	Embedded Systems	Writing basic C-programs for I/O operations	18	20	Yes
4	Embedded Systems	Program to interface kbd and display a key pressed on LCD	18	20	Yes
5	Embedded Systems	Program to demonstrate I2C Protocol.	18	20	Yes
6	Embedded Systems	Create two tasks, which will print some characters on the serial port, Start the scheduler and Observe the behavior.	18	20	Yes
7	Embedded Systems	Program to demonstrate RF communication	18	20	Yes
8	Embedded Systems	Ethernet Based Socket Programming using Embedded Real Time Linux.	18	20	Yes
9	Embedded Systems	Interfacing 4 x 4 matrix keyboards and 16 x 2 character LCD display to microcontroller / Microprocessor and writing a program using RTOS for displaying a pressed key.	18	20	Yes
10	Embedded Systems	Program for exploration of (Process creation, Thread creation) using Embedded Real Time Linux.	18	20	Yes

List of Experimental Setup – Term-I

Name of Lab: - Lab no. 2/ Data Structure Lab
Name of Course: Information Technology **Class: TE IT**
Subject: System Programming

Sr. No.	Experiment Title	Name of Equipment/ Software available to Conduct the Experiment	Quantity		Whether experiment can be performed
			Required	Available	
1	Understand the Different Classes of System Programs	PC,Ms Office 2007	18	22	Yes
2	Develop an application to simulate Pass I of Two Pass Assembler	PC, Ms Office 2007 ,TC 3	18	22	Yes
3	Develop an application to simulate Pass II of Two Pass Assembler	PC, Ms Office 2007,TC 3	18	22	Yes
4	Design a Absolute Loader	PC, Ms Office 2007 ,TC 3	18	22	Yes
5	Develop an application to create a simple Text Editor	PC, Ms Office 2007 ,TC 3	18	22	Yes
6	Develop an application to simulate Syntax Analysis phase of Compiler	PC, Ms Office 2007, TC 3	18	22	Yes

Name of Course: Information Technology **Class: TE**
Subject: Computer Graphics

Sr. No.	Experiment Title	Name of Equipment/ Software available to Conduct the Experiment	Quantity		Whether experiment can be performed
			Required	Available	
1	Study of Graphics commands	PC, TC Compiler	**18**	**20**	**Yes**
2	Program for line drawing using DDA	PC, TC Compiler	**18**	**20**	**Yes**
3	Program for line drawing using Bresenham's line drawing algorithm	PC, TC Compiler	**18**	**20**	**Yes**
4	Program for Circle drawing using Bresenham's Algorithm	PC, TC Compiler	**18**	**20**	**Yes**
5	Program for Polygon filling	PC, TC Compiler	**18**	**20**	**Yes**
6	Program for Polygon Clipping	PC, TC Compiler	**18**	**20**	**Yes**
7	Program for 3D Rotation	PC, TC Compiler	**18**	**20**	**Yes**
8	Program for Parallel projection	PC, TC Compiler	**18**	**20**	**Yes**
9	Program for Perspective projection	PC, TC Compiler	**18**	**20**	**Yes**
10	Program for Animation	PC, TC Compiler	**18**	**20**	**Yes**
11	Study of Latest GUI application	PC, TC Compiler	**18**	**20**	**Yes**

Name of Course: Information Technology **Class: BE**
Subject: Advanced UNIX Programming

Sr. No.	Experiment Title	Name of Equipment/ Software available to Conduct the Experiment	Quantity		Whether experiment can be performed
			Required	Available	
1	Study and Execution of various Unix or Linux Commands	Fedora Core	18	20	Yes
2	Listing of Files &Directories	Fedora Core	18	20	Yes
3	Implementation of Files	Fedora Core	18	20	Yes
4	Program on signals in Linux	Fedora Core	18	20	Yes
5	Program on threads in Linux	Fedora Core	18	20	Yes
6	Program to demonstrate Daemon Process	Fedora Core	18	20	Yes
7	Program for pipe sending data from parent to child over pipe	Fedora Core	18	20	Yes
8	Client –Server Implementation using name pipe	Fedora Core	18	20	Yes
9	Program on shell script	Fedora Core	18	20	Yes

List of Experimental Setup – Term-II

Name of Course: Information Technology **Class: TE IT**
Subject: Operating System

Sr. No.	Experiment Title	Name of Equipment/ Software available to Conduct the Experiment	Quantity		Whether experiment can be performed
			Required	Available	
1	Installation of Fedora.	PC, Fedora Bootable CD	16	20	Yes
2	Study of Unix / Linux commands.	PC, Fedora	16	20	Yes
3	Study of command interpreter.	PC, Internet Explorer	16	20	Yes
4	Implementation of command interpreter using system calls	PC, TC	16	20	Yes
5	Implementation of CPU scheduling algorithms.	PC, TC	16	20	Yes
6	Implementation of Memory Management algorithms.	PC, TC	16	20	Yes
7	Simulation of page replacement algorithms.	PC, TC	16	20	Yes
8	Implementation of Bankers algorithm.	PC, TC	16	20	Yes

Name of Course: Information Technology **Class: SE IT**
Subject: Microprocessor - I

Sr. No.	Experiment Title	Name of Equipment/ Software available to Conduct the Experiment	Quantity		Whether experiment can be performed
			Required	Available	
1	Program to generate reverse string of a given string	PC, MASM	16	20	Yes
2	Program for password using MACRO	PC, MASM	16	20	Yes
3	Addition of two 8 bit numbers	PC, MASM	16	20	Yes
4	Addition of two 16 bit numbers	PC, MASM	16	20	Yes
5	Addition of two 8 bit numbers using NEAR procedure	PC, MASM	16	20	Yes
6	2-digit BCD to HEX conversion	PC, MASM	16	20	Yes
7	4-digit BCD to HEX conversion using FAR procedure	PC, MASM	16	20	Yes
8	HEX to BCD conversion	PC, MASM	16	20	Yes
9	Program for BCD addition	PC, MASM	16	20	Yes

List of Experimental Setup – Term-I

Name of Lab: - Lab no. 3/ Programming Lab

Name of Course: Information Technology **Class: TE**
Subject: Computer Network

Sr. No.	Experiment Title	Name of Equipment/ Software available to Conduct the Experiment	Quantity		Whether experiment can be performed
			Required	Available	
1	Study of Network resources and various components	PC	18	20	Yes
2	TCP/IP Socket Programming	PC, JDK 1.3	18	20	Yes
3	Implementation of Data link layer protocol	PC, TC/JDK 1.3	18	20	Yes
4	Implementation of network routing algorithm	PC, TC	18	20	Yes
5	Implementation of data compression and decompression algorithm (Huffman Algorithm)	PC, TC/JDK 1.3	18	20	Yes
6	Implementation of Network security algorithm(Encryption and Decryption algorithm)	PC, TC/JDK 1.3	18	20	Yes
7	Study of Wireshark Tool	PC, Wireshark 1.8.4	18	20	Yes

Name of Course: Information Technology **Class: BE**
Subject: Enterprise Resource Planning

Sr. No.	Experiment Title	Name of Equipment/ Software available to Conduct the Experiment	Quantity		Whether experiment can be performed
			Required	Available	
1	Searching of Information on Internet for Oracle corporation	PC,IE	14	20	Yes
2	Searching of Information on Internet for SAP R/3 & Sap AG	PC, IE	14	20	Yes
3	Searching of Information on Internet for BAAN Company	PC, IE	14	20	Yes
4	Searching of Information on Internet for Peoplesoft & JD EDWARDS	PC, IE	14	20	Yes
5	Searching of Information on Internet for System Software Association(SSA)	PC, IE	14	20	Yes
6	QAD & ERP Implementation Life Cycle	PC, IE	14	20	Yes

Name of Course: Information Technology **Class: TE IT**
Subject: System Programming

Sr. No.	Experiment Title	Name of Equipment/ Software available to Conduct the Experiment	Quantity		Whether experiment can be performed
			Required	Available	
1	Understand the Different Classes of System Programs	PC,Ms Office 2007	18	22	Yes
2	Develop an application to simulate Pass I of Two Pass Assembler	PC, Ms Office 2007 ,TC 3	18	22	Yes
3	Develop an application to simulate Pass II of Two Pass Assembler	PC, Ms Office 2007,TC 3	18	22	Yes
4	Design a Absolute Loader	PC, Ms Office 2007 ,TC 3	18	22	Yes
5	Develop an application to create a simple Text Editor	PC, Ms Office 2007 ,TC 3	18	22	Yes
6	Develop an application to simulate Syntax Analysis phase of Compiler	PC, Ms Office 2007, TC 3	18	22	Yes

Name of Course: Information Technology **Class: SE IT**
Subject: Programming Lab-I

Sr. No.	Experiment Title	Name of Equipment/ Software available to Conduct the Experiment	Quantity		Whether experiment can be performed
			Required	Available	
1	Program for Matrix operation(addition ,multiplication, inverse)	PC , TC Compiler	14	20	Yes
2	Program for swapping of number using single pointer	PC , TC Compiler	14	20	Yes
3	Processing student record using structure	PC , TC Compiler	14	20	Yes
4	Program for string operation	PC , TC Compiler	14	20	Yes
5	File manipulation opening, closing input and output operation on file	PC , TC Compiler	14	20	Yes
6	Program for macro	PC , TC Compiler	14	20	Yes
7	Interco version of number system	PC , TC Compiler	14	20	Yes
8	Program for nesting of macro	PC , TC Compiler	14	20	Yes
9	To find root of equation by Newton Rapson	PC , TC Compiler	14	20	Yes
10	To find root of equation of Regula Falsi	PC , TC Compiler	14	20	Yes
11	Find Integral values using Simpson's 1/3 ,3/8 rule	PC , TC Compiler	14	20	Yes
12	Sorting using Bubble sort	PC , TC Compiler	14	20	Yes
13	Sorting using Quick sort	PC , TC Compiler	14	20	Yes
14	Searching of given element by Linear search	PC , TC Compiler	14	20	Yes
15	Searching of given element by Binary search	PC , TC Compiler	14	20	Yes
16	To find root of equation by Interpolation Method	PC , TC Compiler	14	20	Yes

List of Experimental Setup – Term-II

Name of Course: Information Technology **Class: BE IT**
Subject: Internet Security

Sr. No.	Experiment Title	Name of Equipment/ Software available to Conduct the Experiment	Quantity		Whether experiment can be performed
			Required	Available	
1	Study of IP Spoofing	--	15	22	Yes
2	Simulate encryption & decryption technique using RSA public key crypto system.	PC, TC/ JDK 1.5	15	22	Yes
3	Study of digital certificate and understand role of certificate authority	PC, Windows XP	15	22	Yes
4	Study and implement Digital Signature	PC, JDK 1.5	15	22	Yes
5	Study and configure Active Directory Service on Windows 2003 Server	PC, Windows Server 2003	15	22	Yes
6	User management in Linux	Fedora 5	15	22	Yes

Name of Course: Information Technology **Class: SE IT**
Subject: Programming Lab L- II

Sr. No.	Experiment Title	Name of Equipment/ Software available to Conduct the Experiment	Quantity		Whether experiment can be performed
			Required	Available	
1	Implementation of class with member function.	PC , TC++ Compiler	15	22	Yes
2	Function study in C++.	PC , TC++ Compiler	15	22	Yes
3	Implementation of Constructor & destructor.	PC , TC++ Compiler	15	22	Yes
4	Implementation of friend function.	PC , TC++ Compiler	15	22	Yes
5	Polymorphism: Function overloading	PC , TC++ Compiler	15	22	Yes
6	Implementation of Inheritance:- -Single Inheritance. -Multiple Inheritances. -Hybrid Inheritance. -Hierarchical Inheritance.	PC , TC++ Compiler	15	22	Yes
7	Program in Java: To find volume of box.	PC, JDK Kit	15	22	Yes
8	Program in Java: Various operation on stack	PC, JDK Kit	15	22	Yes
9	Java Applet program.	PC, JDK Kit	15	22	Yes
10	Program in C# : Sorting the numbers	PC, Visual Studio.NET	15	22	Yes
11	Program in C# : Summation of numbers.	PC, Visual Studio.NET	15	22	Yes
12	Program in C#: Illustrating class & objects.	PC, Visual Studio.NET	15	22	Yes

Name of Course: Information Technology **Class: BE**
Subject: Software Engineering

Sr. No.	Experiment Title	Name of Equipment/ Software available to Conduct the Experiment	Quantity		Whether experiment can be performed
			Required	Available	
1	Study of Rational Rose.	PC, Rational Rose Software	18	20	Yes
2	Study of Unified Modeling Language (UML).	PC, Rational Rose Software	18	20	Yes
3	Study of Waterfall Model and Spiral Model.	PC, Rational Rose Software	18	20	Yes
4	Study of V Model from Internet.	PC, Rational Rose Software	18	20	Yes
5	Design Class Diagram and Use Case Diagram of Library Management System.	PC, Rational Rose Software	18	20	Yes
6	Design Class Diagram and Use Case Diagram of Railway Reservation System.	PC, Rational Rose Software	18	20	Yes
7	Prepare SRS of your Mini Project.	PC, Rational Rose Software	18	20	Yes
8	Draw Data Flow Diagram for your Mini Project.	PC, Rational Rose Software	18	20	Yes

List of Experimental Setup – Term-I

Name of Lab: - Lab no. 4/ Multimedia Lab

Name of Course: Information Technology **Class: BE IT**

Subject: Object Oriented Modeling and Design

Sr. No.	Experiment Title	Name of Equipment/ Software available to Conduct the Experiment	Quantity		Whether experiment can be performed
			Required	Available	
1	Study of Rational Rose and OOPS concepts	Textbooks	15	22	Yes
2	Study of UML and UML 2.0	Textbooks	15	22	Yes
3	Design of any Real Time System using Static UML Diagram. (Railway Reservation System)	PC, Rational Rose Software	15	22	Yes
4	Design of any Real Time system using Dynamic Diagram. (Library Management System)	PC, Rational Rose Software	15	22	Yes
5	Design of any Real Time system using Dynamic Diagram. (ATM System)	PC, Rational Rose Software	15	22	Yes
6	Design of any Real Time system using Dynamic Diagram for a company	PC, Rational Rose Software	15	22	Yes

Name of Course: Information Technology **Class: TE**
Subject: Multimedia Technique

Sr. No.	Experiment Title	Name of Equipment/ Software available to Conduct the Experiment	Quantity		Whether experiment can be performed
			Required	Available	
1	Study of multimedia devices, standards & various programming languages.	PC, Internet Explorer	18	20	Yes
2	Audio, video representation tools & prepare presentation of any project	PC with speaker, MS Powerpoint	18	20	Yes
3	Creating Animation using Ms Power point	PC, MS PowerPoint	18	20	Yes
4	Create animation using C language	PC TC	18	20	Yes
5	Create animation using macromedia flash 8 software	PC, Macromedia Flash	18	20	Yes
6	To editing audio files using sound forge 5.0	PC with speaker, ,Sound Forge	18	20	Yes
7	Development of HTML pages using macromedia Dreamweaver	PC, Dreamweaver	18	20	Yes
8	To create simple database file using SQL	PC, Oracle	18	20	Yes
9	Implementation of Run Length Encoding Algorithm using C	PC, TC	18	20	Yes

List of Experimental Setup – Term-II

Name of Course: Information Technology **Class: BE**
Subject: Software Engineering

Sr. No.	Experiment Title	Name of Equipment/ Software available to Conduct the Experiment	Quantity		Whether experiment can be performed
			Required	Available	
1	Study of Rational Rose.	PC, Rational Rose Software	18	20	Yes
2	Study of Unified Modeling Language (UML).	PC, Rational Rose Software	18	20	Yes
3	Study of Waterfall Model and Spiral Model.	PC, Rational Rose Software	18	20	Yes
4	Study of V Model from Internet.	PC, Rational Rose Software	18	20	Yes
5	Design Class Diagram and Use Case Diagram of Library Management System.	PC, Rational Rose Software	18	20	Yes
6	Design Class Diagram and Use Case Diagram of Railway Reservation System.	PC, Rational Rose Software	18	20	Yes
7	Prepare SRS of your Mini Project.	PC, Rational Rose Software	18	20	Yes
8	Draw Data Flow Diagram for your Mini Project.	PC, Rational Rose Software	18	20	Yes

Name of Course: Information Technology **Class: SE IT**
Subject: Programming Lab L- II

Sr. No.	Experiment Title	Name of Equipment/ Software available to Conduct the Experiment	Quantity		Whether experiment can be performed
			Required	Available	
1	Implementation of class with member function.	PC , TC++ Compiler	15	22	Yes
2	Function study in C++.	PC , TC++ Compiler	15	22	Yes
3	Implementation of Constructor & destructor.	PC , TC++ Compiler	15	22	Yes
4	Implementation of friend function.	PC , TC++ Compiler	15	22	Yes
5	Polymorphism: Function overloading	PC , TC++ Compiler	15	22	Yes
6	Implementation of Inheritance:- -Single Inheritance. -Multiple Inheritances. -Hybrid Inheritance. -Hierarchical Inheritance.	PC , TC++ Compiler	15	22	Yes
7	Program in Java: To find volume of box.	PC, JDK Kit	15	22	Yes
8	Program in Java: Various operation on stack	PC, JDK Kit	15	22	Yes
9	Java Applet program.	PC, JDK Kit	15	22	Yes
10	Program in C# : Sorting the numbers	PC, Visual Studio.NET	15	22	Yes
11	Program in C# : Summation of numbers.	PC, Visual Studio.NET	15	22	Yes
12	Program in C#: Illustrating class & objects.	PC, Visual Studio.NET	15	22	Yes

List of Experimental Setup – Term-I

Name of Lab: - Lab no. 5/ Operating System Lab

Name of Course: Information Technology **Class: TE IT**

Subject: System Programming

Sr. No.	Experiment Title	Name of Equipment/ Software available to Conduct the Experiment	Quantity		Whether experiment can be performed
			Required	Available	
1	Understand the Different Classes of System Programs	PC,Ms Office 2007	18	22	Yes
2	Develop an application to simulate Pass I of Two Pass Assembler	PC, Ms Office 2007 ,TC 3	18	22	Yes
3	Develop an application to simulate Pass II of Two Pass Assembler	PC, Ms Office 2007,TC 3	18	22	Yes
4	Design a Absolute Loader	PC, Ms Office 2007 ,TC 3	18	22	Yes
5	Develop an application to create a simple Text Editor	PC, Ms Office 2007 ,TC 3	18	22	Yes
6	Develop an application to simulate Syntax Analysis phase of Compiler	PC, Ms Office 2007, TC 3	18	22	Yes

Name of Course: Information Technology **Class: TE**
Subject: Advanced Development Tools Laboratory

Sr. No.	Experiment Title	Name of Equipment/ Software available to Conduct the Experiment	Quantity		Whether experiment can be performed
			Required	Available	
1	Study Experiment On Windows Programming.	PC, Internet Explorer	22	22	Yes
2	To develop a web page regarding academic information of Students using - Tables, links, images.	PC, Internet Explorer	22	22	Yes
3	Program for table creation (nested table) using HTML	PC, Internet Explorer	22	22	Yes
4	Develop a EMI calculator	PC,VB 6.0	22	22	Yes
5	Develop application for tic-tac-toe game	PC,VB 6.0,Ecess	22	22	Yes
6	Create a Phone Book Application with Database Connectivity	PC,VB 6.0	22	22	Yes
7	Windows Application in vb.net	PC,VB.net	22	22	Yes
8	To Create an Application using DLL in VB.NET	PC,VB.net	22	22	Yes
9	Program for use of String and Math functions in VB.NET.	PC,VB.net	22	22	Yes
10	Program for Drawing Various Shapes in VB.Net	PC,VB.net	22	22	Yes
11	Develop a web page using ASP.net.	PC,VB.net	22	22	Yes
12	Elaboration of “Search engines”	PC,VB.net	22	22	Yes

Name of Course: Information Technology **Class: SE IT**
Subject: Programming Lab-I

Sr. No.	Experiment Title	Name of Equipment/ Software available to Conduct the Experiment	Quantity		Whether experiment can be performed
			Required	Available	
1	Program for Matrix operation(addition ,multiplication, inverse)	PC , TC Compiler	14	20	Yes
2	Program for swapping of number using single pointer	PC , TC Compiler	14	20	Yes
3	Processing student record using structure	PC , TC Compiler	14	20	Yes
4	Program for string operation	PC , TC Compiler	14	20	Yes
5	File manipulation opening, closing input and output operation on file	PC , TC Compiler	14	20	Yes
6	Program for macro	PC , TC Compiler	14	20	Yes
7	Interco version of number system	PC , TC Compiler	14	20	Yes
8	Program for nesting of macro	PC , TC Compiler	14	20	Yes
9	To find root of equation by Newton Rapson	PC , TC Compiler	14	20	Yes
10	To find root of equation of Regula Falsi	PC , TC Compiler	14	20	Yes
11	Find Integral values using Simpson's 1/3 ,3/8 rule	PC , TC Compiler	14	20	Yes
12	Sorting using Bubble sort	PC , TC Compiler	14	20	Yes
13	Sorting using Quick sort	PC , TC Compiler	14	20	Yes
14	Searching of given element by Linear search	PC , TC Compiler	14	20	Yes
15	Searching of given element by Binary search	PC , TC Compiler	14	20	Yes
16	To find root of equation by Interpolation Method	PC , TC Compiler	14	20	Yes

List of Experimental Setup – Term-II

Name of Course: Information Technology **Class: BE IT**
Subject: Artificial Intelligence and Neural Network

Sr. No.	Experiment Title	Name of Equipment/ Software available to Conduct the Experiment	Quantity		Whether experiment can be performed
			Required	Available	
1	Implementation of Water Jug Problem.	PC, TC Compiler	18	20	Yes
2	Implementation of Unification Algorithm.	PC, TC Compiler	18	20	Yes
3	Implementation of Dynamic database.	PC, Prolog	18	20	Yes
4	Study of NN Tool Box in Mat Lab.	PC, MATLAB	18	20	Yes
5	Implementation of Hebb Rule in MATLAB.	PC, MAT LAB	18	20	Yes
6	Implementation of Delta Rule in MATLAB.	PC, MATLAB	18	20	Yes

Name of Course: Information Technology **Class: TE**
Subject: Web Design

Sr. No.	Experiment Title	Name of Equipment/ Software available to Conduct the Experiment	Quantity		Whether experiment can be performed
			Required	Available	
1	Detail study of Web Server: IIS	PC, IE 8, IIS	18	22	Yes
2	Detail study of HTML Authoring Tool: Dream Weaver 2004	PC,IE8, Dreamweaver 2004	18	22	Yes
3	Detail study ofImaging Tool:Adobe Photoshop 7.0	PC, Adobe Photo Shop7.0	18	22	Yes

Name of Course: Information Technology **Class: SE IT**
Subject: Microprocessor - I

Sr. No.	Experiment Title	Name of Equipment/ Software available to Conduct the Experiment	Quantity		Whether experiment can be performed
			Required	Available	
1	Program to generate reverse string of a given string	PC, MASM	16	20	Yes
2	Program for password using MACRO	PC, MASM	16	20	Yes
3	Addition of two 8 bit numbers	PC, MASM	16	20	Yes
4	Addition of two 16 bit numbers	PC, MASM	16	20	Yes
5	Addition of two 8 bit numbers using NEAR procedure	PC, MASM	16	20	Yes
6	2-digit BCD to HEX conversion	PC, MASM	16	20	Yes
7	4-digit BCD to HEX conversion using FAR procedure	PC, MASM	16	20	Yes
8	HEX to BCD conversion	PC, MASM			
9	Program for BCD addition	PC, MASM	16	20	Yes

Name of Course: Information Technology **Class: SE IT**
Subject: Data Structure & Files.

Sr. No	Experiment Title	Name of Equipment, Software available to Conduct the Experiment	Quantity		Whether experiment can be performed
1	Program For Implementation Of Stack.	PC, TC Compiler	22	22	Yes
2	Program For Implementation Of Queue.	PC, TC Compiler	22	22	Yes
3	Program For Implementation of Circular Queue	PC, TC Compiler	22	22	Yes
4	Program For Infix To Postfix Conversion.	PC, TC Compiler	22	22	Yes
5	Program For Postfix To Infix Conversion.	PC, TC Compiler	22	22	Yes
6	Program For Polynomial Addition.	PC, TC Compiler	22	22	Yes
7	Program For Doubly Linked List.	PC, TC Compiler	22	22	Yes
8	Program For Construction of Binary Tree Traversal.	PC, TC Compiler	22	22	Yes
9	Program For Binary Search Tree.	PC, TC Compiler	22	22	Yes
10	Program For Pattern Matching.	PC, TC Compiler	22	22	Yes
11	Program For Hash Table.	PC, TC Compiler	22	22	Yes
12	Program For Sequential File Handling.	PC, TC Compiler	22	22	Yes

List of Experimental Setup – Term-I

Name of Lab: - Lab no. 6/ Computer Network Lab

Name of Course: Information Technology **Class: TE IT**

Subject: System Programming

Sr. No.	Experiment Title	Name of Equipment/ Software available to Conduct the Experiment	Quantity		Whether experiment can be performed
			Required	Available	
1	Understand the Different Classes of System Programs	PC,Ms Office 2007	18	22	Yes
2	Develop an application to simulate Pass I of Two Pass Assembler	PC, Ms Office 2007 ,TC 3	18	22	Yes
3	Develop an application to simulate Pass II of Two Pass Assembler	PC, Ms Office 2007,TC 3	18	22	Yes
4	Design a Absolute Loader	PC, Ms Office 2007 ,TC 3	18	22	Yes
5	Develop an application to create a simple Text Editor	PC, Ms Office 2007 ,TC 3	18	22	Yes
6	Develop an application to simulate Syntax Analysis phase of Compiler	PC, Ms Office 2007, TC 3	18	22	Yes

Name of Course: Information Technology **Class: TE**
Subject: Advanced Development Tools Laboratory

Sr. No.	Experiment Title	Name of Equipment/ Software available to Conduct the Experiment	Quantity		Whether experiment can be performed
			Required	Available	
1	Study Experiment On Windows Programming.	PC, Internet Explorer	22	22	Yes
2	To develop a web page regarding academic information of Students using - Tables, links, images.	PC, Internet Explorer	22	22	Yes
3	Program for table creation (nested table) using HTML	PC, Internet Explorer	22	22	Yes
4	Develop a EMI calculator	PC,VB 6.0	22	22	Yes
5	Develop application for tic-tac-toe game	PC,VB 6.0,Ecess	22	22	Yes
6	Create a Phone Book Application with Database Connectivity	PC,VB 6.0	22	22	Yes
7	Windows Application in vb.net	PC,VB.net	22	22	Yes
8	To Create an Application using DLL in VB.NET	PC,VB.net	22	22	Yes
9	Program for use of String and Math functions in VB.NET.	PC,VB.net	22	22	Yes
10	Program for Drawing Various Shapes in VB.Net	PC,VB.net	22	22	Yes
11	Develop a web page using ASP.net.	PC,VB.net	22	22	Yes
12	Elaboration of “Search engines”	PC,VB.net	22	22	Yes

List of Experimental Setup – Term-II

Name of Course: Information Technology **Class: BE IT**
Subject: Software Metrics and Quality Assurance

Sr. No.	Experiment Title	Name of Equipment/ Software available to Conduct the Experiment	Quantity		Whether experiment can be performed
			Required	Available	
1	Study of Clean Room software Engineering.	PC, Internet Explorer	22	22	Yes
2	Study of ISO 9000 standard	PC, Internet Explorer	22	22	Yes
3	Program for Calculating the Size of Program. (Line of Code Measure)	PC,TC	22	22	Yes
4	Study of Documentation of S/W	PC, Internet Explorer	22	22	Yes
5	Re-engineering Concepts.	PC, Internet Explorer	22	22	Yes
6	To study various software engineering tools.	PC, Internet Explorer	22	22	Yes

Name of Course: Information Technology **Class: TE**
Subject: Web Design

Sr. No.	Experiment Title	Name of Equipment/ Software available to Conduct the Experiment	Quantity		Whether experiment can be performed
			Required	Available	
1	Detail study of Web Server: IIS	PC, IE 8, IIS	18	22	Yes
2	Detail study of HTML Authoring Tool: Dream Weaver 2004	PC,IE8, Dreamweaver 2004	18	22	Yes
3	Detail study ofImaging Tool:Adobe Photoshop 7.0	PC, Adobe Photo Shop7.0	18	22	Yes

Name of Course: Information Technology **Class: SE IT**
Subject: Data Structure & Files.

Sr. No	Experiment Title	Name of Equipment, Software available to Conduct the Experiment	Quantity		Whether experiment can be performed
1	Program For Implementation Of Stack.	PC, TC Compiler	22	22	Yes
2	Program For Implementation Of Queue.	PC, TC Compiler	22	22	Yes
3	Program For Implementation of Circular Queue	PC, TC Compiler	22	22	Yes
4	Program For Infix To Postfix Conversion.	PC, TC Compiler	22	22	Yes
5	Program For Postfix To Infix Conversion.	PC, TC Compiler	22	22	Yes
6	Program For Polynomial Addition.	PC, TC Compiler	22	22	Yes
7	Program For Doubly Linked List.	PC, TC Compiler	22	22	Yes
8	Program For Construction of Binary Tree Traversal.	PC, TC Compiler	22	22	Yes
9	Program For Binary Search Tree.	PC, TC Compiler	22	22	Yes
10	Program For Pattern Matching.	PC, TC Compiler	22	22	Yes
11	Program For Hash Table.	PC, TC Compiler	22	22	Yes
12	Program For Sequential File Handling.	PC, TC Compiler	22	22	Yes

List of Experimental Setup – Term-II

Name of Lab: - Lab no. 7/ Database Management Lab

Name of Course: Information Technology **Class: BE IT**
Subject: Data Ware Housing and Mining

Sr. No.	Experiment Title	Name of Equipment/ Software available to Conduct the Experiment	Quantity		Whether experiment can be performed
			Required	Available	
1	Develop an application to construct a multidimensional model using Star Schema	PC, Oracle 8i/9i	22	22	Yes
2	Develop an application to Performa OLAP Operations	PC, Oracle 8i/9i	22	22	Yes
3	Develop an application to implement Data Preprocessing Techniques (Data Cleaning and Data Reduction)	PC, Oracle 8i/9i	22	22	Yes
4	Develop an application to Implement Data Generalization and Summarization	PC, Oracle 8i/9i	22	22	Yes
5	Develop an application to Implement Extract Association Rule Mining.	PC, Oracle 8i/9i	22	22	Yes
6	Develop an Application to Implementing Classification Technique of Data	PC, Oracle 8i/9i	22	22	Yes
7	Develop an application to Implementing one of clustering Technique (K-Means Clustering)	PC, Oracle 8i/9i	22	22	Yes
8	Study of Weka Commercial Data Mining Tool	PC, Oracle 8i/9i	22	22	Yes
9	Study of Various Applications of Data Mining in Real Life	PC, Oracle 8i/9i	22	22	Yes

List of Experimental Setup – Term-II

Name of Lab: - Lab no. 8/ Software Engineering Lab

Name of Course: Information Technology **Class: TE**

Subject: Database Management System

Sr. No.	Experiment Title	Name of Equipment/ Software available to Conduct the Experiment	Quantity		Whether experiment can be performed
			Required	Available	
1	Creating a sample database application using conventional file processing mechanism and "C" language. The program should provide facilities for retrieving adding. Deleting and modifying records	PC,Oracle 9i	16	20	Yes
2	Prepare an E-R diagram for the given problem definition. Prepare and verify a relational database design using concepts of normalization techniques in appropriate normal form.	PC,Oracle 9i	16	20	Yes
3	Creating a sample database file and indexes (for the design made in experiment No.2) using any client server RDBMS (oracle / Sybase) package using SQL DDL queries. This will include constraints (Key reference etc.) to be used while creating tables.	PC,Oracle 9i	16	20	Yes

4	SQL DML queries: Use of SQL DML queries to retrieve, Insert, delete and update the database created in experiment No. 3. The queries should involve all SQL features such as aggregate functions, group by. Having, order by. Sub queries and various SQL operators.	PC,Oracle 9i	16	20	Yes
5	PL SQL: Fundamentals of cursors, stored procedures, stored functions.	PC,Oracle 9i	16	20	Yes
6	Screen design and Report generation: Sample forms and reports should be generated using Developer 2000 (in case of Oracle) or through Power builder or Visual basic front-end tools or any prototyping software engineering tool.	PC,Oracle 9i	16	20	Yes

Facilities for conducting Practicals in the Laboratories

Name of Course : **MECHANICAL ENGINEERING** Class: - **F.E.**

Subject: - **Engineering Thermodynamics**

Name of the Department / Section:- **MECHANICAL ENGINEERING**

Subject wise & laboratory wise Lists of material, machinery, equipment & Instrument required performing prescribed Practicals

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether experiment can be conducted
			Required	Available	
1	Study of air compressor	Air compressor, charts	01	01	Yes
2	Study of various boiler mountings	Models, charts	01	02	Yes
3	Study of boiler accessories	Models, charts	01	02	Yes
4	Study of Cochran & Lancashire boiler	Models, charts	01	02	Yes
5	Study of petrol engine 2Stroke & Diesel engine.	Models, charts	01	02	Yes
6	Study of Babcock & Wilcox boiler	Models, charts	01	01	Yes
7	Study of petrol engine 4Stroke & Diesel engine.	Models, charts	01	02	Yes
8	Study of household refrigerator, & window air conditioner	Chart, actual machine	01	01	Yes
9	Study of air water cooler	Models, charts	01	02	Yes

Facilities for conducting Practicals in the Laboratories
Name of Course : **MECHANICAL ENGINEERING** Class: - **S.E.**
Subject: - **MANUFACTURING ENGINEERING -II**
Name of the Department / Section:- **MECHANICAL ENGINEERING**
Subject wise & laboratory wise Lists of material, machinery, equipment & Instrument required performing prescribed Practicals

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether experiment can be conducted
			Required	Available	
1	Any Assignment on Unit I	Lathe Machine, Tools	01	01	Yes
2	Design of jig / fixture for drilling / milling operation of a given component	Drilling Machine, & Milling Machine	01	02	Yes
3	Any Assignment on Unit. III	Press, Dies	01	02	Yes
4	Write a program for manufacturing a component on CNC Milling or CNC Lathe	CNC Milling or CNC Lathe	01	01	Yes
5	Any Assignment on Unit. V	Grinding machine	01	02	Yes

Facilities for conducting Practicals in the Laboratories
Name of Course : **MECHANICAL ENGINEERING** Class: - **S.E**. Subject: - - **Applied Thermodynamics.**
Name of the Department / Section:- **MECHANICAL ENGINEERING**
Subject wise & laboratory wise Lists of material, machinery, equipment & Instrument required performing prescribed Practicals

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether experiment can be conducted
			Required	Available	
1	Determination of calorific value of solid / liquid / gaseous fuel	Bomb Calorimeter test rig	01	01	Yes
2	Analysis of flue gases by Orsat / PUC apparatus.	Model of Orsat Apparatus	01	01	Yes
3	Study of high –pressure boilers	Models	01	01	Yes
4	Determination of Isothermal and volumetric efficiency of reciprocating air compressor	Reciprocating Air Compressor test rig	01	01	Yes
5	Study of steam nozzles.	Chart	01	01	Yes

6	Study of steam condensers and cooling towers	Models	01	01	Yes
7	Study of thermal power plant by actual visit	Chart ,Visit to thermal power station	01	01	Yes
8	Study of boiler draughts	Chart Models	01	01	Yes
9	Study of Rankine cycle (five numericals based on the syllabus)	Chart	01	01	Yes
10	Study of on boiler efficiency and heat balance sheet (Assignment on the same)	Chart Models	01	01	Yes

Name of Course : **MECHANICAL ENGINEERING** Class: - **S.E.** Subject: - **Machine Drawing & Computer Graphics**

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether experiment can be conducted
			Required	Available	
1	Drawing of following machine parts a)Arbor	Models of all given parts in column (2)	02	02	Yes
	b)Couplings 1)Oldham' 2)Universal	Chart	 02 02	 01 01	
	c)Bearings 1)Ball 2)Roller 3)Simple bush 4)Plummer block 5)Foot step Chart		 02 02 02 02 02	 02 02 --- --- ---	
	d)Brackets Chart				
	e)Pulleys 1)V 2)Fast & Loose 3)Cone	Chart Model	 02 02 02	 02 01 02	
	f)Pipe Joints	Chart Model	01	01	
	g)Lathe Parts	Chart	02	02	
	h)Screw Jack	Chart	01	---	
	I)Springs	Model	02	02	

	j)CNC m/c tool holder	Model	02	02	
	k)IC engine parts	Model	01	01	
	l)Vices	Model	02	02	
	m)Clutches 1)single plate 2)cone 3)Multi-plate 4)Centrifugal 5)Hydraulic	Chart Model	 02 02 02 02 02	 01 -- -- -- ----	
	n)Valves(types)	Model	Each01	---	
	o)Drill jigs	Model	02	----	
	p)Press Tool	Model	02	01	
2	Introduction to limits ,Fits & Tolerances	Charts	01	01	Yes
3	Drawing with help of Autocadr-14	computer Software,Autocad-14/2005	10	----	Yes

Name of Course : **MECHANICAL ENGINEERING** Class: -**S.E.** Subject: -
Theory Of Machine – I

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether experiment can be conducted
			Required	Available	
1	To determine the mass moment of inertia of compound pendulum.	Vibration Lab.Test Rig	01	01	Yes
2	To determine the mass moment of inertia of Bifiar / triflor suspension method	Working Model	01	01	Yes
3	To determine the slip of belt drive.	Test Rig of slip & creep of belt	01	01	Yes
4	Velocity analysis by ICR method (2 problems)	Transparency	01	01	Yes
5	Relative velocity & acceleration method (4 problems)	Transparency	01	01	Yes
6	Klein's construction (4 problems)	Transparency	--	--	Yes
7	Inertia force analysis of IC engine mechanism by graphical method .	Transparency	--	--	Yes

Name of Course : **MECHANICAL ENGINEERING** Class: -**S.E.** Subject: - **Material Science**

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether experiment can be conducted
			Required	Available	
1	Tensile Test on	Universal testing M/C	01	01	Yes
2	Rockwell's Hardness Test	Rockwell's Hardness testing machine	01	01	Yes
3	Brinell's Hardness Test	Brinell's Hardness testing machine	01	01	Yes
4	Erichesen Cupping Test	Erichesen Cupping Testing machine	01	01	Yes
5	Non-destructive tests: Dye penetrant test	Dye penetrant test kit	01	01	Yes
6	Magnetic particle testing or eddy current test	Magnetic Yoke, Magnetic induct. M/c Ultrasonic test m/c	01	01	Yes
7	Izod & Charpy Impact Test	Izod & Charpy Impact Testing M/C	01	01	Yes
8	Effect of Cold Working on hardness of minimum two materials.	Rockwell's Hardness testing machine	01	01	Yes
9	Testing of bulk properties such as flow rate, apparent density and top density of metal powder	----	---	---	---

Name of Course : **MECHANICAL ENGINEERING** Class: - **S.E.**
Subject: - **Fluid Mechanics.**

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether experiment can be conducted
			Required	Available	
1	Determination Viscosity of a given liquid	Redwood Viscometer	01	01	Yes
2	Study of manometers	Manometers	01	01	Yes
3	Study of stability of floating bady	Haleshaw apparatus.	01	01	Yes
4	Study of forced vortex motion				
5	Flow net by Electrical Analogy Method				
6	Clarification of Venturi meter / orifice meter	Venturimeter set	01	01	Yes

7	Verification of Bernoulli's Theorem.	Bernoulli's apparatus.	01	01	Yes
8	Study of sharp – edge circular orifice / mouth piece	Sharp – edge circular orifice	01	01	Yes
9	Study of momentum equation				
10	Study of Laminar and turbulent flow by use of Reynold's app.	Reynold's app.	01	01	Yes
11	Study of flow through pipe.	Flow through pipe set.	01	01	Yes

Name of Course : **MECHANICAL ENGINEERING** Class: - **S.E. Electrical**
Subject: **- Applied Thermodynamics.**

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether experiment can be conducted
			Required	Available	
1	Study of steam power plant	Chart	01	01	Yes
2	study of Boiler Mountings and Accessories	Chart Model	01	01	Yes
3	study of fuel feeding system of an I.C. engine.	Chart Model	01	01	Yes
4	study of ignition system of an I.C. engine	Chart	01	01	Yes
5	Study and trial on Petrol engine at one load.	Petrol Engine Test rig	01	01	Yes
6	Study and trial on reciprocating air compressor	Reciprocating Air Compressor Test rig	01	01	Yes
7	Study and trial on refrigeration system	Vapour Compression Refrigeration system	01	01	Yes
8	Study and visit of central air conditioning plant.	visit of central air conditioning plant.	--	--	Yes
9	Determination of thermal conductivity of metal rod.	Test rig to measure the thermal conductivity of metal rod	01	01	Yes
10	Determination of Stefan Boltzmann Constant.	Stefan Boltzmann app..	01	01	Yes
11	Calculation of fin efficiency in natural and forced convection	Pin Fin App.	01	01	Yes
12	Study and trial on diesel engine at one load.	Diesel Engine Test rig	01	01	Yes

Name of Course: **MECHANICAL ENGINEERING** Class: - **T.E. Chemical.**
Subject: - **Process Heat Transfer**

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether experiment can be conducted
			Required	Available	
1	Determination Of Thermal Conductivity Of Metal Rod.	Test Rig.	01	01	Yes
2	Determination Of Heat Transfer Coefficient In Natural Convection.	Test Rig.	01	01	Yes
3	Determination Of Stefan Boltzmann Constant.	Test Rig.	01	01	Yes
4	Determination Of Emissivity Of A Test Surface.	Test Rig.	01	01	Yes
5	Determination Of Thermal Conductivity Of Composite Wall.	Test Rig.	01	01	Yes
6	Determination Of Heat Transfer Through Lagged Pipe	Test Rig.	01	01	Yes

Facilities for conducting Practicals in the Laboratories

Name of Course : **MECHANICAL ENGINEERING** Class: - **T.E.**

Subject: - **Engineering Metallurgy**

Name of the Department / Section:- **MECHANICAL ENGINEERING**

Subject wise & laboratory wise Lists of material, machinery, equipment & Instrument required performing prescribed Practicals

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether experiment can be conducted
			Required	Available	
1	Micro Specimen Preparation and use of metallurgical microscope. (Additional CCTV is available)	Metallurgical microscope Polishing m/c, polish papers, cut- off m/c	01 Each	09	Yes
2	Furnace operations and spark testing	Bench grinder Muffle furnace, Temp. indicator	01 01 01	01 01 01	Yes Yes Yes
3	Study and drawing microstructure of low carbon, medium carbon, eutectoid steel, and hypereutectoid steel in annealed condition. (Additional CCTV is available)	Metallurgical microscope & Specimen of mild steel, medium carbon steel, eutectoid steel & hypereutectoid Steel	01 Each	09	Yes
4	Study and drawing microstructure of Gray, White, Malleable and Spheroidal Graphite Cast Iron. (Additional CCTV is available)	specimen - Grey nodular cast iron, white and malleable cast iron. & Metallurgical microscope	01Each 01	01 09	Yes
5	Sulphur print test on steel specimen or flow lines examination on forged components	Bromide paper, sodium thiosulphate, H_2SO_4 , Mild steel polished specimen.	01Each	01	Yes
6	Study of change in microstructure of annealed and normalized medium carbon steel.	Furnace Microscope Steel samples	01 01	01 09	Yes
7	Hardening of steels: - effect of temperature on the properties. (Additional CCTV is available)	Muffle furnace Hardness tester Microscope	01 01 01	01 01 09	Yes

8	Jominy Harden ability test	Muffle furnace, Jominy Hardenability test apparatus, steel sample, Hardness tester.	01 Each	01	Yes
9	To study & draw the microstructure of carburized steel fusion weld in mild steel	Specimen – carbureted steel , tempered steel & welded joints samples Metallurgical microscope	01Each 01	01 09	Yes
10	Study and drawing microstructure of alpha brass, alpha-beta brass, Aluminum Bronze and bearing metal	Microscope, Microstructure of non ferrous materials.	01	01	Yes
11	To study the effect of temperature on hardness of tempered steel	Furnace Hardness Tester	01 01	01 01	Yes

Name of Course : **MECHANICAL ENGINEERING** Class: - **T.E.**
Subject: - **I C ENGINE**

Sr. No.	**Experiment Title**	**Name of Equipment, Machinery Instrument etc. Required to conduct experiment**	**Quantity**		**Whether experiment can be conducted**
			Required	**available**	
1	Study of Cooling System of IC Engine	Not Required	----	-----	Yes
2	Study of Simple & Solex Carburetor	Not Required	----	----	Yes
3	Study of Lubrication System of IC Engine	Not Required	----	----	Yes
4	Study of Fuel Pump & Fuel Injector	Not Required	----	----	Yes
5	Trial on Petrol Engine & Calculation of Air/Fuel Ratio, Volumetric ,	4 stroke 4 cylinder engine test rig	01	01	Yes

	Thermal & Mechanical Efficiencies				
6	Trial on Diesel Engine& Calculation of Air/Fuel Ratio, Volumetric , Thermal & Mechanical Efficiencies	4 stroke single cylinder Diesel engine test rig	01	01	Yes
7	Morse Test & Determination of BSFC & ISFC	4 stroke 4 stroke Petrol engine test rig	01	01	Yes
8	Study Of Combustion Chambers Of SI Engines	Not Required	----	----	Yes

Name of Course : **MECHANICAL ENGINEERING** Class: - **T.E.**
Subject: - **HTMT**

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether experiment can be conducted
			Required	Available	
1	Determination Of Thermal Conductivity Of Metal Rod.	Test Rig.	01	01	Yes
2	Determination Of Thermal Conductivity Of Insulating Powder.	Test Rig.	01	01	Yes
3	Determination Of Thermal Conductivity Of Composite Wall.	Test Rig.	01	01	Yes
4	Determination Of Heat Transfer Coefficient In Natural Convection.	Test Rig.	01	01	Yes
5	Determination Of Temperature Distribution, Fin Efficiency In Natural And Forced Convection.	Test Rig.	01	01	Yes
6	Determination Of Emissivity Of A Test Surface.	Test Rig.	01	01	Yes
7	Determination Of Stefan Boltzmann Constant.	Test Rig.	01	01	Yes

8	Determination of log-mean temperature difference, overall heat transfer coefficient and effectiveness of heat exchanger in parallel and counter flow arrangement.	Test Rig.	01	01	Yes

Name of Course : **MECHANICAL ENGINEERING** Class: - **T.E.**
Subject: - **TM**

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether experiment can be conducted
			Required	Available	
1	Study of steam turbine power plant	Chart	01	01	Yes
2	Study of steam turbine system	Chart	01	01	Yes
3	Study of gas turbines	Chart	01	01	Yes
4	Study of hydraulic turbines	Chart	01	01	Yes
5	Trial on Pelton wheel	Pelton wheel Test rig	01	01	Yes
6	Trial on Francis turbine	Francis turbine Test rig	01	01	Yes
7	Trial on Kaplan turbine	Kaplan turbine Test rig	01	01	Yes
8	Study of centrifugal / rotary flow air compressor.	Charts, Transparency	--	--	Yes

Name of Course : **MECHANICAL ENGINEERING** Class: - **T.E.** Subject: - **TOM – II**

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether experiment can be conducted
			Required	Available	
1	Study of various of gear boxes such as industrial gear boxes, synchromesh & differtial gear box	Model & transparency	03	03	Yes
2	To draw conjugate profile for any general shape of gear tooth	Transparency	01	01	Yes
3	To generate gear tooth profile to study under cutting & rack shift	Working model	01	01	Yes
4	To determine torque capacity of dynamometer using transducers	Rope Braker dynamometer Test rig	01	01	No
5	To study epi-cyclic gear train and to measure torque transmitted and holding torque.	Epicyclic gear train & transparency.	01	No	No
6	To draw cam profile for various type of follower motions		--	--	Yes
7	To determine the characteristic curve of a centrifugal governer and to find its coefficient of insensitiveness and stability	Governers app.	01	01	Yes
8	Verification of principal of gyroscopic couple	Motorized gyroscope	01	02	Yes
9	Study of any two gyro controlled instrument	Transparency	01	01	Yes
10	To study the dynamic balancing m/c	Dynamic balancing m/c app.	01	01	yes
11	Study of different brakes	Transparency	02	02	yes
12	Study of gyroscopic effect on Naval ship and four wheel vehicles	Transparency	02	02	yes

Name of Course: Mechanical Engineering Class: T.E. Subject: **Mechanical Measurement and Metrology**

Sr. No.	Experiment Title	Name of Equipment, Machinery, Instrument, etc. required to conduct experiment	Quantity		Whether experiment can be conducted
			Required	Available	
1	Determination of linear and angular dimension.	1. Digital Micrometer 2. Digital Vernier Calliper 3. Micrometer 4. Vernier Calliper 5. Scale 6. Inside Micrometer 7. Vernier Height Gauge 8. Dial Gauge 9. Bevel Protractor 10. Combination Set 11. Sine Bar 12. Slip Gauge 13. Auto-Collimator 14. Angle Dekkor 15. Surface Plate 16. Magnetic Base 17. V Blocks	01 01 01 01 01 01 01 01 01 01 01 01 01 01 01 01 01	01 01 01 01 01 01 01 01 01 01 01 01 01 01 01 01 01	Yes
2	M/c tool alignment tests on any M/c tool like Lathe, Drilling m/c, Milling m/c	1. Spirit Level 2. Test Mandrels 3. Straight Edges 4. Gauge Blocks 5. Try Square 6. Dial Gauge 7. Fillet Gauge	01 01 01 01 01 01 01	01 01 01 01 01 01 01	Yes
3	Measurement of surface finish and testing of surface flatness by optical flat	1. Tomlinson Surface Recorder 2. Optical Flat 3. Monochromatic light unit with standard surfaces	01 01 01	--- 01 01	Yes
4	Study and measurement of parameter using tool makers microscope Use of comparator.	1. Tool Makers Microscope 2. Electronic Comparator	01 01	01 01	Yes
5	Measurement of screw parameter using floating carriage micrometer	1. Floating Carriage Micrometer	01	01	Yes
6	Measurement by gear parameter- Gear tooth thickness,	1. Vernier Caliper 2. Vernier gear tooth caliper 3. Gear Test Bench 4. Profile Projector	01 01 01 01	01 01 01 01	Yes

	constant chord, pitch circle diameter				
7	Measurement of temperature using thermocouple and pyrometer	1. Thermocouple 2. Pyrometer	01 01	-- --	Yes
8	LVDT for displacement measurement	1. LVDT set	01	--	Yes
9	Flow measurement-using rotameter.	1. Rotameter	01	--	Yes

Facilities for conducting Practical in the Laboratories

Name of Course : **MECHANICAL ENGINEERING** Class: - **B.E.** Subject: - **R.A.C**

Name of the Department / Section:- **MECHANICAL ENGINEERING**

Subject wise & laboratory wise Lists of material, machinery, equipment & Instrument required performing prescribed Practical

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether experiment can be conducted
			Required	Available	
1	Trial on Vapour Compression Refrigeration system	Vapour Compression Refrigeration System	01	01	Yes
2	Trial on ICE plant/ Domestic refrigeration system	ICE Plant	01	01	Yes
3	Study & Trial in Vapour Absorption refrigeration system.	Vapour Absorption Refrigeration System.	01	01	Yes
4	Study of Construction of hermitically sealed compressor and actually viewing of a cut model of the same.	Chart	01	01	Yes
5	Evacuation and charging of refrigeration plant.	Visit to workshop	---	---	Yes
6	Trial on Vapour compression air conditioning test rig.	Air Conditioning Test Rig.	01	01	Yes
7	Study of various types of air conditioning system & its specification	Chart and transparency	01	01	Yes
8	Study & trial on cooling towers.	Chart	01	01	Yes
9	Study of pressure control relays and oil separators.	Chart	01	01	Yes

Name of Course : **MECHANICAL ENGINEERING** Class: - **B.E.** Subject: - **CAD/CAM**

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether experiment can be conducted
			Required	Available	
1	Modeling of any three Machine component	No. of computers available 16 Software's available: - I-DEAS-11 NX series			Yes
2	Any Two assembly of Mechanical component				Yes
3	Problems for transformation- Translation, rotation, Scaling				Yes
4	Assignment on geometric Modeling				Yes
5	Assignment on FMS & Group Technology , Robot	---------	--------	--	Yes

Name of Course : **MECHANICAL ENGINEERING** Class: - **B.E.** Subject: - **Tribology**

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether experiment can be conducted
			Required	Available	
1	Journal bearing apparatus.	Journal bearing apparatus.	01	01	Yes
2	Tilting pad thrust bearing apparatus.	Tilting pad thrust bearing apparatus.	01	01	Yes
3	Friction in journal bearing.	Friction in journal bearing.	01	01	Yes
4	Coefficient of friction using pin on disk type friction monitor	friction using pin on disk type friction monitor	01	01	Yes

Name of Course : **MECHANICAL ENGINEERING** Class: - **B.E.** Subject: - **Mechanical Vibration.**

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether experiment can be conducted
			Required	Available	
1	Study of whirling of shaft	whirling of shaft apparatus	01	01	Yes
2	Study of undamped free Vibration of equivalent spring mass system	Vibration lab	01	01	Yes
3	Study of forced vibration of spring mass system	Vibration lab	01	01	Yes
4	Study of Torsional vibration of single rotor system	Vibration lab	01	01	Yes
5	To Verify Dunkerly's Rule	Vibration lab	01	01	Yes

DEPARTMENT OF BUSINESS ADMINISTRATION

Facilities for conducting Practical in the Laboratories

Subject wise and laboratory wise list of material, machinery, equipments and instrument required to perform the prescribed practical

Name of Course: MBA Class: First Year (SEM-I) Subject: IT for Managers

Sr. No.	Experiment Title	Name of Equipment, Machinery, Instrument Etc required to conduct experiment	Quantity		Whether Experiment can be performed
			Required	Available	
1	MS Word – Creation Of Document, Formatting, Editing	Computer, LCD Projector, OHP, Printer, Scanner	30 per Batch	30 per Batch	YES
2	Organizing Information With Tables And Outlines	Computer, LCD Projector, OHP, Printer, Scanner	30 per Batch	30 per Batch	YES
3	Mail Merge Application	Computer, LCD Projector, OHP, Printer, Scanner	30 per Batch	30 per Batch	YES
4	MS-Access – Creating Database, Defining Primary Keys, Designing Query	Computer, LCD Projector, OHP, Printer, Scanner	30 per Batch	30 per Batch	YES
5	MS-Access – Designing Reports, Labels And Forms	Computer, LCD Projector, OHP, Printer, Scanner	30 per Batch	30 per Batch	YES
6	Creating And Editing Worksheet	Computer, LCD Projector, OHP, Printer, Scanner	30 per Batch	30 per Batch	YES
7	Creating And Using Formulae And Functions	Computer, LCD Projector, OHP, Printer, Scanner	30 per Batch	30 per Batch	YES
8	Sorting And Querying Data, Working With Graphs And Charts	Computer, LCD Projector, OHP, Printer, Scanner	30 per Batch	30 per Batch	YES
9	MS Power Point Slides, Use Of Templates And Slide Designs	Computer, LCD Projector, OHP, Printer, Scanner	30 per Batch	30 per Batch	YES
10	Developing A Professional Presentation On Business Plan	Computer, LCD Projector, OHP, Printer, Scanner	30 per Batch	30 per Batch	YES

H.O.D (MBA)

A) Facilities for conducting Practicals in the Laboratories

Name of Course : **FE Common** Class: - **F.E. Subject: - Workshop Practice -I**

Name of the Department / Section:- **Workshop**

Subject wise & laboratory wise Lists of material, machinery, equipment & Instrument required performing prescribed Practicals

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether expt.can be conducted
			Required	Available	
1	Fitting- one job finishing of two sides of a square piece by filing b) Drilling of two holes of size 5 mm and 12 mm diameter on fitting job c) Tapping of 5 mm dia hole on above job	1) Files (Flat, triangular, safe-edge) 2) Hack saw frame 3) Tap set 4) Combination set 5) Drilling machine 6) 'V' Block 7) Bench vice 8) Vernier caliper 9) Try square 10) Number/Letter punch 11) Hammer 12) Vernier height gauge 13) Tap wrench 14) Surface plate	20 20 04 01 01 01 24 11 20 01 10 02 01 01	150 38 07 01 01 01 43 19 41 01 08 02 03 02	Yes
2	Moulding Practice Preparation of mould of any pattern (One Job) b) Casting of any simple pattern (One job each)	1) Moulding Boxes 300X300X100 m.m 2) Moulding Boxes 450X 450X100 m.m 3) Moulding Tool set 4) Moulding closing pin round 19 X 35 5) Moulding box bush round 6) Blow**er (Air fan) 01** h.p.**3** p.h. **2880** rpm and pi**t** furnace	10 10 2 20 40 1	10 10 2 20 40 1	Yes
3	Welding shop Gas welding practice by student on mild steel flat (One job) b) Lap joints by Gas welding and Arc welding (one Job c) Demonstration of brazing	1) Hack saw frame 2) Flat file 3) Hammer 4) Measuring tape 5) Try square 6) Bench vice 7) Welding transformer 8) Hand screen 9) Hand gloves 10) Chipping hammer 11) Gas welding equipment	20 20 05 03 20 16 03 18 12 06 01 set	20 20 05 02 20 16 03 12 12 06 01 set	Yes

4	CARPENTRY T-Lap joint & Bridle joint (one job each)	1) Carpentry vice 2) Try Square 3) Marking Gauge 4) Mortise Gauge 5) Metal Jack Plane 6) Tenon Saw 7) Firmer Chisel 8) Mortise Chisel 9) Chisel ½" 10) Chisel 2" 11) Wooden Mallet 12) Marfa File	20 20 20 20 20 20 20 20 20 20 20 20	16 53 21 24 36 48 63 63 25 24 30 30	Yes

Item No.26

A) Facilities for conducting Practicals in the Laboratories

Name of Course : **FE Common** Class: - **F.E. Subject: - Workshop Practice -II**

Name of the Department / Section:- **Workshop**

Subject wise & laboratory wise Lists of material, machinery, equipment & Instrument required performing prescribed Practicals

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether expt. can be conducted
			Required	Available	
1	TIN SMITHY One Job including Riveting, Soldering e.g. letter box, waste paper basket, funnel etc.	1) Smithy try square 2) Shearing Strips 3) Small shearing M/C 4) Bending M/C 5) Edge folding M/C 6) Hammer 7) Soldering Iron	04 20 2 1 1 8 1	04 17 2 1 1 8 1	Yes
2	Plumbing One Job involving operation like Bending, Threading	1) Pipe Vice 2) Die Set 3) Hand Hacksaw frame 4) Bending Machine	16 20 20 1	16 17 20 1	Yes

3	Black Smithy One job on black smithy including bending and flattening. E.g S-Hook, S or U or 8 shape, etc.	1) Round Nose Tongs 2) Sledge hammer 3) Ball peen hammer 4) Anvil 100 kg 5) Furnace	15 09 09 04 04	26 10 10 04 04	Yes
4	Machine Shop a) One job on lathe involving operations like plain turning, step turning, taper turning and chamfering b) One job on shaper for finishing two sides of a job and preparing the slot grinding, polishing corners of above job on bench grinder	1) Lathe machine 2) Vernier caliper 3) HSS cutting tool 4) Shaper machine 5) Milling machine 6) Try square 7) Cutter 8) Hammer 9) Spanner (set)	20 20 20 01 02 06 01 03 01 set	28 30 40 01 02 06 01 03 01 set	Yes

Item No.26

A) Facilities for conducting Practicals in the Laboratories

Name of Course : **Mechanical** Class: - **S.E. Subject: - Workshop Practice -III**

Name of the Department / Section:- **Workshop**

Subject wise & laboratory wise Lists of material, machinery, equipment & Instrument required performing prescribed Practicals

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether expt. can be conducted
			Required	Available	
1	Machine Shop- One composite Job involving different machine operation on lathe, shaper, slotter, drilling, milling & grinding operations.	1) Lathe Machine 2) Vernier caliper 3) H.S.S. cutting tool 4) Screw pitch gauge 5) Knurling tool 6) Drill (20 m.m.) 7) boring tool 8) V threading tool 9) Shaper machine 10) Drilling machine 11) Milling machine 12) Slotter machine 13) Grinder	20 20 20 05 05 02 10 05 01 01 02 01 01	28 30 40 05 05 02 10 05 01 04 02 01 02	Yes
2	Carpentry shop- Preparation & Manufacturing of solid pattern involving wood turning from component drawing. (one job)	1) Measuring Tape 2) Try Square 3) Marking Gauge 4) Metal Jack plane 5) Tenon saw 6) Mortise chisel 1” 7) Firmer chisel 25 mm 8) Chisel 1" & 2 1/2” 9) Chisel 2” 10) Wooden mallet 11) File 12) Carpentry Bench Vice 13) Screw driver 14) Hand drill M/C 15) Wood Turning Set 16) Wood Turning Lathe M/C. 17) Caliper (inside) 18) Caliper (outside) 19) Contraction slide rule	5 20 20 20 20 20 20 12 12 20 20 20 2 5 8 8 10 10 14	5 20 20 20 20 20 20 12 12 20 20 20 2 5 4 set 4 10 10 4	Yes

3	Foundry shop- Preparation of mould of above pattern, casting from this mould.Actual weight calculation, Yield & costing of item should be performed. (one job)	1)Moulding Boxes 300x300x100 mm 2) Moulding Boxes 450x450x100 mm 3) Moulding tool set 4) Moulding closing pin Round 5) Moulding Box bush round 6) Blower (Air fan) 01 h.p. 3 ph 2880 rpm & pit furnace	10 10 2 20. 40 1	10 10 2 20 40. 1.	Yes

Name of Course : **Mechanical** Class: - **S.E.** Subject: - **Workshop Practice -III**
Name of the Department / Section:- **Workshop**

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether expt.can be conducted
			Required	Available	
4.	Welding shop- One job on welding preparing a component comprising welding joints such as shoe rack, book rack, stands for flower pots, house hold applications etc.	1) Hack saw frame 2) Flat file 3) Hammer 4) Measuring tape 5) Try square 6) Bench vice 7) Welding transformer 8) Hand screen 9) Hand gloves 10) Chipping hammer	20 20 05 03 20 16 03 18 12 06	20 20 05 02 20 16 03 12 12 06	Yes

Item No.26

A) Facilities for conducting Practicals in the Laboratories

Name of Course : **Mech.** Class: - **S.E.** Subject: - **Workshop Practice -IV**

Name of the Department / Section:- **Workshop**

Subject wise & laboratory wise Lists of material, machinery, equipment & Instrument required performing prescribed Practicals

Sr. No	Experiment Title	Name of Equipment, Machinery Instrument etc. Required to Conduct Experiment	Quantity		Whether expt. can be conducted
			Required	Available	
1	One mini project on die making for sheet metal working. Rubber or plastic die/ vice assembly/ hammer assembly/ pulley assembly/ coupling assembly/ drilling jig.	1) All geared lathe M/C 2) Milling M/C 3) Machine Vice 4) Power hack saw M/C 5) Verniner caliper 6) Drilling M/C 7) Dial test indicator 8) Cutters 9) HSS tool 10) Spanner set	20. 02. 04. 01. 20. 03. 03. 02. 20. 01	28 02 04 01 30 03 03 16 40 01	Yes
2	One job of programming and manufacturing on CNC Lathe	1) CNC lathe M/C 2) Vernier caliper 3) Spanner set	01 05 01	01 10 01	Yes
3	One job of programming and manufacturing on CNC milling or trainer	1) CNC milling M/C 2) Vernier caliper 3) Spanner set	01 05 01	01 10 01.	Yes

4	Plumbing shop- O ne pipe assembly including Union, T-joint, Elbow, Cock fitting.	1) Pipe Vice 2) Die Set 3) Hand Hacksaw frame 4) Bending Machine	16 20 20 1	16 17 20 1	Yes
5	Disassembly and assembly of following mechanism for preventive maintenance. a) All geared head stock b) Apron mechanism c) Quick return mechanism d) Spindle assembly in a driiling machine.	1) All geared lathe M/C **2) Shaper machine** **3) Drilling machine**	20. 01 01	28 01 04	Yes

COLLEGE OF ENGINEERING AND TECHNOLOGY,
BAMBHORI POST BOX NO. 94, JALGAON – 425001. (M.S.)

NBA Accredited

Website : www.sscoetjalgaon.ac.in Email : sscoetjal@gmail.com

Mandatory Disclosure

Part-II

January 2013

Shram Sadhana Bombay Trust's
COLLEGE OF ENGINEERING AND TECHNOLOGY,
BAMBHORI POST BOX NO. 94, JALGAON – 425001. (M.S.)
Included under section 2 (f) & 12 (B) of the UGC Act, 1956
with NBA Accredited courses & ISO 9001 : 2008 certified
ISO 9001:2008

Website- www.sscoetjalgaon.ac.in
Email: sscoetjal@gmail.com
Phone No. (0257) 2258393.
Fax No. (0257) 2258392.
Principal: Dr. K.S.Wani
M. Tech, DBM, Ph.D.

Ref. No. COET/AICTE/MD/ / 13 **Date:**

C E R T I F I C A T E

Certified that all enclosures contained in PART-I , PART-II & PART-III bearing page no. **01** to page no. **1207** are pertaining to our institution which are being submitted in two separate above mentioned bound booklets/box file of Mandatory Disclosure. All xerox copies may be treated as original.

PRINCIPAL

Computing Facilities Existing for the existing programmes 2012-13

Sr. No.	Particulars	Requirements as per Norms	Availability
01.	No of Computer Terminals	732	989
02.	Hardware Specification	PIV Processor	P-IV, Dual core, Core 2 Duo
03.	No of Terminals on LAN/WAN	495	700
04.	Relevant Legal Software	• At least 02 System software packages • At least 08 Application software packages	• 54 system software packages • 69 Application software packages
05.	Peripherals / Printers	74 Printers	• Printers= 81 • Scanners = 9
06.	Internet Accessibility (in kbps & hrs)		• Leased Line = 25 Mbps • Reliance Data card = 2 x 256 = 512 KBPS • Broadband (NMEICT Connections) = 10 x 512 = 5 Mbps = 10 Mbps x 1 = 10 Mbps

College is having Wireless and OFC Connectivity throughout the Campus

Central Computing Facility

1	Number of Systems available	42
2	Configuration of the Systems	HCL EZEEBEE, INTEL CORE 2 Duo, @2.93GHz processor,3GB DDR RAM, 320GB SATA Hard disk, DVD writer,18.5" TFT Monitor, G41 Motherboard, Keyboard , Mouse
3	Total Number of Systems Connected in LAN	42
4	Total Number of Systems Connected in LAN	42
5	Internet band width	• Leased Line = 25 Mbps • Reliance Data card = 2 x 256 = 512 KBPS • Broadband (NMEICT Connections) = 10 x 512 = 5 Mbps = 10 Mbps x 1 = 10 Mbps
6	Major software Packages Available	• Windows 2000 • Novell Small Business suite 6 • Red Hat Linux 8.0 • Borland TC++ suite • Personal Oracle • Visual Studio Dot net • MS Office 2000
7	Special Purpose Facilities Available	• MATLAB 6.0 S/W. in E& TC Department • Ideas s/w. in Mechanical Engg. Department • Auto CAD 2005 in Mechanical Engg. Department. • OrCAD 15.5 in E&TC Department • Rational suit Enterprise Ver.2002.5.20 in Computer Department • ASPEN HYSYS SOFTWARE in Chemical Department • PLC ,SCADA in Electrical Department • ETAP Power Station (Educational Version) in Electrical Department • Language Lab Software in Applied Science Dept. • Attendance Tracking Software in Applied Science Department • Ansys Introductory Multi physics software version 10.0 in Mechanical Department

Department of Computer Engineering

Details of Licensed Softwares :- Year (2012-13)

Name of the software	No. of User License	Price
➢ **Multi user Operating Systems**		
SCO Unix 5.0.4 Enterprise.	16 Users	1,13,000
Win NT 4.0	25 Users	38,000
Windows 2000	25 Users	44,000
Novell Netware 5.12	25 Users	1,30,500
Win XP with IBM M/C	25 Users	Free
Red Hat Linux 7.2	Multi-user	15,000
Red Hat Linux 8.0	Multi-user	5,800
Windows 2000	40 Users	20,550
Novell Small Business suit 6	25 Upgrade + 25 Additional	78,473
Novell Linux Desktop 9	5 Users	13,000
MSDN Academic Alliance S/W Product (Ordered)	Multi User	39,900
Windows Starter 7 SNGL OLP NL Academic Legalization Get Genuine	111 Users	2,55,300
➢ **Single user Operating Systems**		
Win 95	01 User	3,000
Win 98	01 User	3,500
MS-DOS 6.2	01 User	1,500
Tick RTOS with Compiler, debugger etc.	01 User	90,875
SUSE Linux Enterprises Server 9	01 User	12,480
➢ **Compilers**		
TC++	01 User	8,500
VC++	01 User	4,000
VB 6.0 Pro.	01 User	20,000
VJ++ 1.0	01 User	2,500
Boroland TC++ Suite	Multi-user	2,850
Visual Studio .Net (Media kit)	20 Users	61,500
i) ASP		
ii) VC++		
iii) VB++ 1.0		
iv) VJ++ 1.0		
v) C#		
FORTRAN 77 on DOS	01 User	5,000
Ansi COBOL on DOS	01 User	15,000
PASCAL on DOS	01 User	15,000
FORTRAN 77 on Unix	16 Users	15,000
Ansi COBOL on Unix	16 Users	40,000
PASCAL on Unix	16 Users	15,000

Name of the software	No. Of User License	Price
➢ **Applications Packages**		
Rational suit Enterprise Ver.2002.5.20	10 Users	3,00,000
MS Office 2000	01 User	9,500
Antivirus		
Antivirus QH V 5.10	01 User	2,700
Antivirus QH Kit	01 User	3,000
Antivirus Dr. Soloman for Win NT	Multi-user	18,500
Antivirus Dr. Soloman Antivirus V 7.9	01 User	1,500
Antivirus Norton 2001 Symantics for Win 95/98	01 User	1,800
Antivirus Norton 5.0	01 User	1,500
Antivirus Macafee	01 User	3,000
Antivirus Norton 2000 7.5.1 (for NT)	Multi-user	8,500
QH Antivirus Plus 2007	30 Users	24,000
Net Protector 2007	30 Users	32,000
Mcafee Plus 2007	01 User	900
Net Protector Server 2007	05 Users	11,000
Net Protector Server 2012	111 Users	33,300
➢ **Database Support**		
Oracle Personal 8.0	01 User	14,000
Oracle on 8 Relese 8.0.3 for Win NT	05 Users	48,000
SQL Server 2000	30 Users	56,600
Oracle 9i (standard Edition) for server.	10 Users	1,15,000
Power Builder Enterprise 6.0	01 User	79,500
Oracle Developer suite 10g with WDP Programme	100 User	2,75,027
Total Cost		**20,18,730/-**

S.S.B.T's College of Engineering & Technology,Bambhori,Jalgaon.

Details of Licensed Softwares: - Year (1012-13)

Name of the software	No. of User License	Price
➢ **Multi user Operating Systems**		
SCO Unix 5.0.4 Enterprise.	16 Users	1,13,000
Win NT 4.0	25 Users	38,000
Windows 2000	25 Users	44,000
Novell Netware 5.12	25 Users	1,30,500
Win XP with IBM M/C	25 Users	Free
Red Hat Linux 7.2	Multi-user	15,000
Red Hat Linux 8.0	Multi-user	5,800
Windows 2000	40 Users	20,550
Novell Small Business suit 6	25 Upgrade + 25 Additional	78,473
Novell Linux Desktop 9	5 Users	13,000
MSDN Academic Alliance S/W Product (Ordered)	Multi User	39,900
Windows Starter 7 SNGL OLP NL Academic Legalization Get Genuine	300 Users	6,90,000
➢ **Single user Operating Systems**		
Win 95	01 User	3,000
Win 98	01 User	3,500
MS-DOS 6.2	01 User	1,500
Tick RTOS with Compiler, debugger etc.	01 User	90,875
SUSE Linux Enterprises Server 9	01 User	12,480
➢ **Compilers**		
TC++	01 User	8,500
VC++	01 User	4,000
VB 6.0 Pro.	01 User	20,000
VJ++ 1.0	01 User	2,500
Boroland TC++ Suite	Multi-user	2,850
Visual Studio .Net (Media kit)	20 Users	61,500
i) ASP		
ii) VC++		
iii) VB++ 1.0		
iv) VJ++ 1.0		
v) C#		
FORTRAN 77 on DOS	01 User	5,000
Ansi COBOL on DOS	01 User	15,000
PASCAL on DOS	01 User	15,000
FORTRAN 77 on Unix	16 Users	15,000
Ansi COBOL on Unix	16 Users	40,000
PASCAL on Unix	16 Users	15,000

Name of the software	No. of User License	Price
➢ **Applications Packages**		
Rational suit Enterprise Ver.2002.5.20	10 Users	3,00,000
Ideas	07 Users	18,80,000
Ideas 11 nx Series (Upgraded Version)	07 Users	2,80,000
Build Master	01 User	26,000
Adfast	01 User	12,500
MDT	01 User	50,000
Ansys Introductory Multi physics software version 10.0	05 Users	1,83,750
AutoCAD 2005	10 Users	3,20,000
Soul	Multi User	20,000
SEPL LS Drafter	01 User	7,500
STRUDD	03 Users	36,000
OrCAD Capture (Ordered)	02 Users	50,400
OrCAD PSPICES A/D (Ordered)	01 User	87,500
OrCAD Layout (Ordered)	01 User	88,350
TECS	03 Users	27,000
CM (Construction Manager)	03 Users	16,500
En soft Build Master	01 User	27,000
Super Civil	01 User	1,250
MATLAB 6	05 Users	5,50,000
MATLAB 2007	02 Users	3,16,201
VLSI Software of Xilinx	Multi Users	41,500
PCB Software (Ulti board)	01 User	41,800
Sim 2K	01 User	59,600
MS Office 2000	01 User	9,500
Antivirus		
Antivirus QH V 5.10	01 User	2,700
Antivirus QH Kit	01 User	3,000
Antivirus Dr. Soloman for Win NT	Multi-user	18,500
Antivirus Dr. Soloman Antivirus V 7.9	01 User	1,500
Antivirus Norton 2001 Symantics for Win 95/98	01 User	1,800
Antivirus Norton 5.0	01 User	1,500
Antivirus Macafee	01 User	3,000
Antivirus Norton 2000 7.5.1 (for NT)	Multi-user	8,500
QH Antivirus Plus 2007	30 Users	24,000
Net Protector 2007	30 Users	32,000
Mcafee Plus 2007	01 User	900
Net Protector Server 2007	05 Users	11,000
Net Protector Server 2012	300 Users	60,000

Name of the software	No. of User License	Price
➢ **Database Support**		
Oracle Personal 8.0	01 User	14,000
Oracle on 8 Relese 8.0.3 for Win NT	05 Users	48,000
SQL Server 2000	30 Users	56,600
Oracle 9i (standard Edition) for server.	10 Users	1,15,000
Power Builder Enterprise 6.0	01 User	79,500
Oracle Developer suite 10g with WDP Programme	100 User	2,75,027
Total		**76,88,200/-**

Note: The College has done Microsoft Campus Agreement to use Microsoft Products Legally which includes following software

Sr.No.	Name of Software under Microsoft Campus Agreement
01	MS Office 2010 PRO or MS Office 2007 Pro or MS Office 2003 Pro
02	MS Windows XP Pro/ Windows 7 Pro & VISTA UPG
03	MS Windows Server 2008
04	MS SQL Server 2008
05	MS Windows CAL 2008
06	MS Visual Studio Pro 2010
07	MS Visual C++ , MS Visual Basic , MS Visual c # & MS Visual NET Frame Works .
08	MSDN Academic Alliance License (On line Program)

List of facilities available

Sports facilities:

a) **List of indoor facilities**

01	Badminton Court	Separate for Boys & Girls
02	Gymnasium	Common for Boys & Girls
03	Table Tennis	Separate for Boys & Girls
04	Chess	Separate for Boys & Girls
05	Carom	Separate for Boys & Girls
06	Billied	For staff

b) **Outdoor**

01	Football	Playground
02	Cricket	Playground
03	Volleyball	Playground
04	Basketball	Basketball Court
05	Kho-Kho	Playground
06	Kabaddi	Playground
07	Handball	Playground
08	Atalatics 200m Track	Playground

Extra Curriculum Activities

1) Cultural activity committee :

1) Shri M.V.RAWLANI	(Mechanical)	: Chairman
2) Ms SAPNA MADAN	(Chemical)	: Member
3) Ms RICHA.MODIYANI	(MBA)	: Member
4) Shri C.K.MUKHARJEE	(Mechanical)	: Member
5) MsT.S.JOSHI	(I.T.)	: Member
6) Shri KALYAN DANI	(Computer)	: Member
7) ShriD.S.PATIL	(Electrical)	: Member
8) Shri J.N.KALE	(Civil)	: Member
9) Shri M.B.PATIL	(App. Sci.)	: Member
10) Shri J.P.PALPALLIWAR	(Biotech)	: Member
11) Shri R.S.KALSI	(E&TC)	: Member

2) Seminar Hall 02 Nos. Seating capacity 166 for each.

3) Audio Video facilities including mike system, LCD, OHP, Computer Camera recording system.

4) Funds available

5) List of activities carried out in each year

a) Sketching
b) Debate
c) Quiz
d) Group Discussion
e) Elocution
f) Traditional Day
g) Celebration Independence Day
h) Celebration Republic Day
i) Ganesh Utsav
j) Arranging Workshop like Personality development
k) Fashion Show
l) Dance Competition
m) Singing Competition
n) Rangoli Competition
o) Annual Gathering
p) Personality Contest
q) Ad Mad Show r) Dum Charad Competition

Soft Skill Development Facilities

The soft skill development facilities is provided at the college level through Training and Placement Cell which is headed by Training and Placement Officer. One faculty member of each department is the member of the cell. They are provided with computer tools such as scanner, Internet etc.

We had signed an MOU with Astrum solution (Pvt.) Ltd., New Delhi for skills & personality development for success in professional & personal life.

The college is the member of the federation of the engineering colleges under North Maharashtra University, Jalgaon and the soft skill facilities are also provided at the federation level. The Training and Placement Cell caters to soft skill development in the following areas :

a) Work ethic
b) Courtesy
c) Teamwork
d) Self-discipline and self-confidence
e) Conformity to prevailing norms pertaining to dress, body language, tone of voice and vocabulary according to the particular culture of the given workplace.
f) Language proficiency and environmental awareness

Revised & final on 12.12.12

APPENDIX - 1

LAND

Enclose with appendix 01, 7/12 extracts or other documents showing ownership of land on which the buildings are constructed.

Particulars of ownership of land of Engineering college only do not club with polytechnic or otherst

Sr.No	Date of Purchase or Acquisition	Gut No.or Survey No	Area in Hacters	Present ownership title
01	**The Collector, Jalgaon vide letter No.3-RR4431, dated 17/10/1984**	**280**	**9.56**	**Shram Sadhana Sadhana Bombay Trust**
02	**The Collector, Jalgaon vide letter No.3-RR4431, dated 17/10/1984**	**290**	**0.44**	**Shram Sadhana Sadhana Bombay Trust**
	Total Area		**10.00**	

SSBT'S COLLEGE OF ENGINEERING & TECH. BAMBHORI, JALGAON.

Department: - 1) **Civil Engineering**

Building wise/Department wise space allocation

Sr. No.	Particulars/Details	Room No.	Size Maximum m x m	Carpet Area in Sq m.	Remarks
1	Departmental Office	102	4.5 x 6	27	Administrative
2	HOD Cabin	102A	4.5 x 6	27	Administrative
3	Staff Cabin	G16A,13B 104A, 108B 105(A) 105(B) G20 (B) 102 A	2x3x4 2x3x4 4.5 x 4.5 6 x 3 3 x 3 7.5x3	24 24 20 18 09 22	Administrative 180
4	Class Room Class Room Class Room Class Room Tutorial P G Tutorial P G Tutorial UG	203 205 114 302 G13A 104B G10A	12 x 9 15 x9 12x9 12x9 4.5 x 7.5 6 x 5.5 6x5.65	108 135 108 108 34 PG 33 PG 34	Instructional 560
5	Drawing Hall/ Seminar Room	305	15x 9	135	Instructional
	Seminar Hall	G14	18x9	162	
6	Laboratories				**UG PG1484**
	1) Engg. Geology Lab	108	10.5 x 9	95	Instructional
	2) TOM Lab	G9 + G10	21 x 9-6x5.5	155	UG
	3) Engineering Mechanic I	109	9 x 9	81	PG
	4) Engg. Mechanics II	110	9 x 9	81	
	5) Geotechnical Lab	G13	18 x 9+9 x 3-3x3-4.5x7.5	147	
	6) Survey Store	108 (A)	7.5x9	68	
	7) Fluid Mechanics I	G19	12 x 9-3x4	96	
	8) Fluid Mechanics II	G20	9x9+3x3	90	
	9) Comp lab UG & PG	101	12 x 9	108	
	10) Environmental Lab	103+104	12 x 9-3x3-6x5.5	66	PG Shared UG
	11) Transportation Lab	105	9 x9	81	
	12) PG comp. Lab Research Lab	G16	12 x 9-3x4	96	PG Renovation in progress
	13) Dept. Library	102C	3x7.5	23	UG
7	Store	G 20 (A)	3 x 3	09	Administrative
8	Toilet	G11+G12 106+107 206+207	3 x 6 3 x 6 3 x 6	18 18 18	Amenities 54
9	Passage, Passage GF, FF, SF Stair	G8 205 212	1.5 x 5.5 6 x 1.5 6 x 1.5 3x51x3 3x 3x4.5	8.25 09 09 459 40.5	Circulation & Other 525
	Total			2803	

Total Instructional area =2044
Total Administrative area = 180
Total Amenities area= 54

SSBT'S COLLEGE OF ENGINEERING & TECH. BAMBHORI, JALGAON.

Department: - 2) **Computer Engineering**

Building wise/Department wise space allocation

Sr. No.	Particulars/Details	Room No.	Size Maxim m x m	Carpet Area in Sq m.	Remarks
1	Departmental Office	G22	6 x 6	36	Administrative
2	HOD Cabin (Computer)	G22 (B)	6 x 3	18	Administrative
3	Staff Cabin	G28 (B) B2 B2 (B) G22(C) G22 (D) G22 (E) G28 G25 G30A 129 115 A2 115 B2C2 115D1D2 314	3x3 6 x 3 3 x 3 3 x 3 6 x 3 3 x 6 3 x 4.5 3 x 4.5 3 x7.5 6x3 3x3 2x4x3 2X4X3 6x3	9 18 09 09 18 18 13 13 22 18 9 24 24 18	Administrative 303
4	Class Room Tutorial Room **P G** Tutorial Room **P G**	130 131 132 133 115 124 115A1	9 x 9 9 x 9 9 x 9 9 x 9 12 x 9 7.5 x 6 6 x 5.5	81 81 81 81 108 45 33	Instructional 510 PG PG
5	Seminar Hall	317	18 x 9	162	Instructional
6	Laboratories				Instructional
	1) Lab 1/ Data Structure Lab	B2 (A)	15 x 6	90	UG
	2) Lab 2/Embedded System Lab	B1 (A)	9 x 7.5	68	UG
	3) Lab 3/M.E.(CSE) Computer Lab	115 A	12x9-3x3-6X5.5	66	PG-Renovation
	4) Lab 4/ Digital & Microprocessor Lab	B1 ©	9 x 9	81	UG
	5) Lab 5/Software Engg. Lab	G25 ©	9 x 7.5	68	UG
	6) Lab 6/Programming Lab-I	G25(B)	9 x 9- 3 x 4.5	67	UG
	7)Lab 7/Database Lab	G28 ©	9 x 7.5	67	UG
	8)Lab 8/System Programming Lab	G28(A)	7.5 x 9	67	UG
	9)Lab 9/Project Lab	G29	9 x 9	81	UG
	10) Lab 10/ Linux Lab	115D	18x9-6x3	144	UG
	11) Lab 11/Programming Lab-II	115 C	9 x9-3X3.	71	UG
	12) Lab12 /M.E. (CSE) Research Lab	115 B	9 x9-3X3.	71	PG-Renovation
	13) Departmental Library	B5	9 x 3	27	
7	Toilet	G26,G27 318,19	3 x 6 3x6	18 18	Amenities

	Passage, Store Server Room UPS Room Passage GF Passage Basement Stair GF , Basement	B2(C) B1 G28 G25 B2 (D) G22 (A) B3 GF SF	3 x 3 12 x 3 3 x 3 9 x 1.5 9 x 1.5 3 x 3 3 x 3 3 x 3 50x3 21x3 12x3 2x3x4.5	09 36 09 13.5 13.5 09 09 09 150 66 36 27	Circulation & Other 387 Administration Administration Administration
	Total			2339	

Total Instructional area = 1640
Total Administrative area = 303
Total Amenities area=36

SSBT'S COLLEGE OF ENGINEERING & TECH. BAMBHORI, JALGAON.

Department: - 3) **Biotech**

Building wise / Department wise space allocation

Sr. No.	Particulars/Details	Room No.	Size Maximum m x m	Carpet Area in Sq m.	Remarks
1	Departmental Office	236	6 x 4.5	27	Administrative
2	HOD Cabin	236(A)	6 x 3	18	Administrative
3	Staff Cabin	237 238A 239 A	3 x 6 3x4 3x4	18 12 12	87
4	Class Room Tutorial room Tutorial room	223 224 225 226 111A	6x9 6x9 6x7.5 4x9 5.5x6	54 54 45 36 33	Instructional 222
5	Seminar Hall with chemical	308	18 x 9	162	Instructional
6	Laboratories				Instructional
	1) Microbiology Lab	238	9 x 9-3x4	69	UG 913
	2) Biochemistry Lab	239	9 x 9-3x4	69	
	3) Immunology lab	245	9 x 7.3	66	
	4) Computer Lab	244	4.8 x 9+ 3x7.5	66	
	5) Bio process Lab	242	4.8 x 9+ 3x7.5	66	
	6) Fermentation	241	9 x 7.3	66	
	7) Lab	234	3 x 7.5 +5 x 9	68	UD renovation
	8) Lab	235 B	7.5 x9	68	UD renovation
	9) Fluid Mech Lab	111	12 x 9- 5.5x6	108	Civil
	10) Heat power lab	M001A	8.8x 7.5	66	Mechanical
	11) **Research lab**	227	9x8	72	
7	Toilet	240	3 x 3	09	Amenities
	Passage SF Stair		66x3 1x3x4.5	198 13.5	Circulation 212
	Total			**1443**	

Total Instructional area = 1135
Total Administrative area = 87
Total Amenities area= 09

SSBT'S COLLEGE OF ENGINEERING & TECH. BAMBHORI, JALGAON.

Department: -4) **Mechanical Engineering**

Building wise/Department wise space allocation

Sr. No.	Particulars/Details	Room No.	Size Maximum m x m	Carpet Area in Sq m.	Remarks
1	**Departmental Office**	M108	7.5 x 7.6	57	Administrative
2	HOD Cabin	M107	7.5 x 3.6	27	Administrative
3	Staff Cabin	M 2,3,5,6 M109 M110,111 M201 M202 M207 M208 M209 M214	4x3.7x3.7 3.4x3.7 2x3x3.7 3.75x3.5 3X3.5 4.5x3.75 5.75x3.5 3.5x1 4.5x3.75 2.5x3.75	56 13 22 13 10.5 17 20 3.5 17 9	Administrative 295
4	MESA Office	M310	7.5x4	30	Administrative
5	Class Room **SE (A)** **TE (A)** **TE (B)** **BE (A)** **BE (B)** **SE (B)** Tutorial Room U G* Tutorial Room U G* Tutorial Room **P G*** Tutorial Room **P G***	M301 M302 M303 M304 M306 M309 M306 A M309 A M102 A M 103 A	7.5x11 7.5x11.3 7.5x11.3 7.5x11.3 9.5x7.5 9.5 x 7.5 9.5 x 3.8 9.5 x 3.8 7.5 x4.5 7.5 x 4.5	82 85 85 85 71 71 36 36 34 P G 34 P G	Instructional 619 NR NR PG PG
6	Drawing Hall	M305	9.7x7.5	73	Instructional
7	Seminar Hall	M104	7.5x18.75	141	214
8	Laboratories				Instructional
	1)Heat Transfer Lab	M001	7.5x10.00	75	UG PG 1298
	2) Heat Power Lab	M004	7.5 x18.75	141	UG
	3) RAC lab 4) Turbo Machine lab	M007 M007A	**7.5x11.25** **7.5x7.5 + 2.25x7.5**	85 73= **158**	PG Renovation
	5) Computer Lab	M102	7.5x14.5	109	
	6) CAD CAM Lab/ Research Lab	M103	7.5x14.25	107	PG shared by UG
	7) Tribology Lab	M204	9.5x11.3	107	PG
	8) Materials Science Lab	M203	9.5x11.2 7.5x1	114	
	9) Mechanical Measurement & Metrology Lab	M205	9.5x11.3	107	
	10) Mechatronics Lab	M213	9.5x11.3	107	
	11) Theory of Machine	M210	9.5xx11.3	107	
	12) Model & project Lab	M206	9.5x11.3 7.5x1	114	
	12) Dept library	M101	7.5x7.25	54	
9	Toilet	M105,106, 211,212 307,308	6x3.8x3.8	87	Amenities 87

10	Passage, Passage FF,SF& TF Passage FF & TF Passage SF Stair	GF	2.75x20 3x12.75 x3.75 3x42x2.75 3x4x10.5	55 143 346 126	Circulation & Other 670
	Total			3183	

Total Instructional area = 2131
Total Administrative area = 295
Total Amenities area=87

SSBT'S COLLEGE OF ENGINEERING & TECH. BAMBHORI, JALGAON.

Department: - 5) **Chemical Engineering**

Building wise/Department wise space allocation

Sr. No.	Particulars/Details	Room No.	Size Maximum m x m	Carpet Area in Sq m.	Remarks
1	Departmental Office	139	6 x 4.5	27	Administrative
2	HOD Cabin	139 (A)	6 x 3	18	Administrative
3	Staff Cabin	G42 (A) G42 (B) 134 138A 140 A	3 x 3 3 x 6 3 x 6 3 x 6 3x6	09 18 18 18 18	Administrative 126
4	Class Room Tutorial Room	122 123 124 125	6 x 9 6 x 9 6x7.5 4x9	54 54 45 36	Instructional 306
5	Seminar Hall with Biotech	308	18 x 9	162*	Instructional
6	Laboratories				820
	1) Mass transfer I	G42A	7.5 x 9	68	Instructional
	2) M T II	G42B	7.5 x 9	68	
	3) U. O. I	G44 A	4.8x9+3x7.5	66	
	4) U O II	G 44 B	9x7.3	66	
	5) Instrumentation lab	G 45 A	4.8x9+3x7.5	66	
	6) Process Control	G 45 B	9x7.3	66	
	7) C. R. E. Lab	138	12 x 9-3x6	90	
	8) C. T. Lab	140	12 x 9-3x6	90	
	9) Computer Lab	136	9 x 9	81	
	10) Project Lab	135	9 x 9	81	
	11) **Research Lab**	126	8x9	72	
	Compressor room		2x3	6	
8	Toilet	137 G43	3 x 3 3 x 3	09 09	Amenities 18
9	Passage GF,FF Passage GF,FF Stair GF'FF'		2x54x3 2 x 6x3 3x3x4.5	324 36 40.5	Circulation & Other 406
	Total			1676	

Total Instructional area = **1126**
Total Administrative area =**126**
Total Amenities area=**18**

SSBT'S COLLEGE OF ENGINEERING & TECH. BAMBHORI, JALGAON.

Department: - 6) **Electrical Engineering**

Building wise / Department wise space allocation

Sr. No.	Particulars/Details	Room No.	Size Maximum m x m	Carpet Area in Sq m.	Remarks
1	Central server Room	E01	7.5x7.5	56	Administrative
	HOD Cabin	E114	3.65x3.65	13	Administrative
	Departmental Office.	E104	3.8 x5.8	22	134
	Staff Cabins	E003A E005D E006C E115,16 E117	7.5 x 4 3x4 7.5x3 2x3x3.65 3.65x3.65	30 12 22 22 13	
2	Class Room Class Room* Class Room* **Tutorial PG** **Tutorial PG** **Tutorial UG** **Seminar Room Propose**	E110 E111 E112 E102 E103 E 106 A310	7.76x8.65 7.76x8.65 7.65x8.65 9.6x3.8 4.2 x7.85 7.6x7.6 9.10x17	66 66 66 37 33 58 155	Instructional 481
3	Laboratories				Instructional
	1) Measurement Lab	E003	15 x 7.5 - 7.5x4	82	UG+PG 927
	2) Control System	E004	7.5 X11.25	84	UG 728
	3) Electrical Machine Lab I	E005A	15 x 4.5 + 3.6 x 2.1	75	PG 184
	4) Machine lab II / PSS	E005 B	7.5 x 10.5	79	
	5) Power System lab	E005 C	7.5x10.5 - 4x3	67	
	6) Switch Gear Lab SGP	E008	7.5 x9	68	
	7) **P G Lab**	E009	7.5 x9	68	
	8) IDC / Network Analysis	E115 A	7.5 x 9	68	
	9) ADE / PMMC lab	E 115 B	7.5x7.5 + 3.5x3.5	69	
	10) High Voltage Lab	EG1	7.5x8.5 + 3x2	70	Renovation in progress
	11) Computer Lab	E007	8 x 8.25	66	
	12) Research lab **PG**	E113	7.65 x 11.5	87	Un developed
	13) Library	E 101	7.65X5.8	44	
5	Toilets	E114	3.65x3.65	13	Amenities 13
6	Circulation Paved passage	stair GF	2x12 3 x 46 3 x 23	24 138 69	231
	Total			**1786**	

Total Instructional area = 1408
Total Administrative area = 134
Total Amenities area=**13**

SSBT'S COLLEGE OF ENGINEERING & TECH. BAMBHORI, JALGAON.

Department: - 7) **Electronics & Telecommunication Engineering**

Building wise/Department wise space allocation

Sr. No.	Particulars/Details	Room No.	Size Max. m x m	Carpet Area in Sq m.	Remarks
1	Departmental Office	202	4.5 x 6	27	Administrative
2	HOD Cabin	202A	4.5 x 6	27	Administrative
3	Staff Cabin	202B,C 121(C) 121B,C 213ABC 214 215,16 A 217,18A 220C 201B 311	2x3 x 7.5 6 x 3 2x3 x 3 3 x 2.5x3 6 x 3 2x3 x 3 2x3 x 3 3x4 3x4 6x3	45 18 18 22 18 18 18 12 12 18	Administrative 253 UD UD
4	Class Room Tutorial Room **U G** Tutorial Room **U G** Tutorial Room **P G** Tutorial Room **P G**	229 230 232 233 301 119 A 119 C 220 A 221 A	9 x 9 9 x 9 9 x 9 9 x 9 12 x 9 9 x3.8 9 x 3.8 9X 3.8 9X 3.8	81 81 81 81 108 34 UG 34 UG 34 PG 34 PG	Instructional 568
5	Seminar Hall	209	18x9	162	Instructional
6	Laboratories 1) MMS DSP Lab	119(A)	7.5 x 9	68	Instructional
	2) Computer Lab	119 (B)	7.5 x 9	68	UG PG 967
	3) EDC Lab	121	12x9- 2x3x3	90	**UG**
	4) EM / EI Lab	201	9 x 9	72	**PG**
	5) NAS Lab	213 AB	12 x 9- 9x3	81	
	6) Communication Lab	215	9 x 9	71	
	7) RMT Lab	216	9 x 9	71	
	8)Televisión Lab	217(B)	9 x 9	71	
	9) E D / TM Lab	217(A)	9 x 7.5	68	
	10) P C B Lab	220 (B)	9 x 7.5	68	
	11) B EP Electronics	221	12 x 9 -9X3.8	75	
	12) Comp lab **PG**	209 A	9x9	71	PG Renovation
	13) Research lab **PG**	209 B	9 x 7.5	71	PG Renovation
	14) Library	201(A)	3 x 7.5	22	
7	Toilet	117+118 218+219	3 x 6 3 x 6	18 18	Amenities 36
	Passage Passage GF, FF, SF Passage FF, SF Passage SF Stair Stair	201	3 x 1.5 3x12x3 2x27x3 18x3 3x4.5x4.5 3x3x4.5	4.5 108 162 54 60.75 40.5	Circulation 430
	Total			2416	

Total Instructional area = **1697**

Total Administrative area =253

Total Amenities area=**36**

SSBT'S COLLEGE OF ENGINEERING & TECH. BAMBHORI, JALGAON.

Department: - 8) **Information Technology**

Building wise/Department wise space allocation

Sr. No.	Particulars/Details	Room No.	Size Maximum m x m	Carpet Area in Sq m.	Remarks
1	HOD Cabin	E210	3.65x5 3.80x1.80	25	Administrative
2	Departmental Office	E209	3.5x7.3	26	Administrative
3	Staff Cabins Staff Cabins **Proposed cabins**	E211-213 E 203 A E 204 A E 205 A E 301,2, E 308,9	3x3x3.65 4x3 7.6 x 3.8 9.1 x 3.5 4x 3.8x3.8	33 12 20 32 **58**	Administrative 206
4	Class Rooms	E 305 E 311 E 312	10.80x7.60 11.40x7.60 11.40x7.60	82 87 87	Instructional 256
5	Seminar Hall	310	18.30x7.60	139	139
6	Laboratories				Instructional
	1)Programming lab / lab3	E 201	9.50 x 7.60	72	723
	2) Digital & micro processor / lab 1	E202	9.50 x 7.60	72	
	3) Computer Network / lab 6	E203	11.4 x 7.60 – 3 x4	75	
	4) Data base & management / lab 7*	E204	7.60 x 9	68	
	5) Lab 8	E205	9.10 x 9.30	84	Furniture Not ready
	6) Operating System / lab 5	E 206	7.30 x9.50	69	
	7) Data Structure / lab2	E 207	7.30 x 9.20	67	
	8) Multimedia / lab 4	E 208	7.30 x 9.20	67	
	9)Lab 9 undeveloped	E303	7.60 x 10.80	82	UD Furniture Not ready
	10)Lab 10 undeveloped	E304	7.60 x 8.80	67	UD Furniture Not ready
7	Toilet		2x7.65x3.8	58	Amenities 58
8	Passage SF Stair	SF SF SF TF	11.5x1.80 30.5x1.8 46x2 7.5x2 2x7.5x3.75 41x1.8 3.65x9 2x9.5x3.8 2x6.2x1.9	21 55 92 15 56 74 33 +11 72 24	Circulation 453
				1835	

Total Instructional area = 1118

Total Administrative area = 206

Total Amenities area= 58

SSBT'S COLLEGE OF ENGINEERING & TECH. BAMBHORI, JALGAON.

Department: - 9) **MBA**

Building wise/Department wise space allocation

Sr. No.	Particulars/Details	Room No.	Size Maximum m x m	Area Sq m.	Remarks
1	HOD Cabin	A209	3.00x6.65	20	Administrative
	Department Office/ Lib.	A208	6.00x 6.65	20+20=40	Administrative
2	Staff Cabin	A203 A204A A212	3.0x4.00 3x3.0x3.0 3x4	12 27 12	Administrative 91
3	Class Room Class Room	A202 A213	9.1x7.4 9.1x7.4	67 67	Instructional 456
4	Seminar Hall*	A211	7.9x17.0	134	Instructional
5	Computer Lab	204	7.3x14.0	102	Instructional
	Tutorial room I	A206	4.5x7.4	33	
	Tutorial room II	A207	4.5x7.4	33	
6	Girl's Common Room	A306	7.4x9.1	67	Amenities
	Boy's Common / GD	A309	7.4x9.1	67	Amenities
	Toilets	A203,12A A205,10	2x1.2x1.8 2x2.9x3.3	4 19	157
7	Passage Stair	FF SF	19.5x2.4 19.5x2.4 3x3.2x6.7	47 47 64	Circulation 158
	Total			862	

Total Instructional area = 456
Total Administrative area = 91
Total Amenities area= 157

SSBT'S COLLEGE OF ENGINEERING & TECH. BAMBHORI, JALGAON.

Department: - 10) **Library**

Building wise/Department wise space allocation

Sr. No.	Particulars/Details	Room No.	Size Maximum m x m	Carpet Area in Sq m.	Remarks
1	Reading Room PG / staff Reading Girls Students Reading Boys	323 A 323 B 323 D	6 x 7.5 12 x 9 18x9	45 108 162	Instructional 927
2	Entrance Lobby	323 F	6 x9	54	
	Counter Clock room	323 E	6 x3	18	Administrative
	Issue Counter	323 H	9 x 3	27	Administrative
3	Liberian, room	323 G	3x9	27	Administrative
4	Stack Room	323 I	27x 9	243	
5	Reference Section	323 J	18 x 9	162	
	E lib	323 L	9 x 9	81	
6	Book Bank	323 M	3 x 9	27	
	Magazine	323 N	6 x 7.5	45	
7	Store	323 O	12 x3	36	Administrative
8	Pantry for library Staff	323 P	3x6	18	Amenities
9	Xerox	323 Q	3x3	9	Amenities
10	Toilets	323c,k	2x3x3	18	Amenities
11	Drinking water	323	3x3	9	Amenities
12	Passage		54x3	162	Circulation
	Total			1251	

Total Instructional area = 927
Total Administrative area = 108
Total Amenities area=54

SSBT'S COLLEGE OF ENGINEERING & TECH. BAMBHORI, JALGAON.

Department: - 11) **Applied Science**

Building wise/Department wise space allocation

Sr. No.	Particulars/Details	Room No.	Size Maximum m x m	Carpet Area in Sq m.	Remarks
1	HOD Cabin	G41	3 x 6	18	Administrative
	Dept office	G40A,B	3x9	27	
2	Staff Cabin	B14(A) B15 G 34A,B G35 A,B G37A,B G38 G39A,B 320A	3 x 6 3x3 3x7.5 3x7.5 3x9 3 x6 3x9 3x7.5	18 9 22 22 27 18 27 22	Administrative 210
3	Class Room Seminar / Class Room	303 309 312 313 316 320 321 322 325	12 x 9 12 x 9 12 x 9 12 x 9 15 x 9 12 x 9 12 x 9 12 x 9 12 x 9	108 108 108 108 135 108 108 108 108	Instructional 999
4	Drawing Hall	G37	15x9	135	135
5	Laboratories				Instructional
	1) Physics Lab	B14	15 x 9+3 x 3	144	522
	2) Chemistry Lab	G 40	15 x 9	135	
	3) Environment lab	G 34	12 x 9	108	NR
	4) Language & audio visual lab	G 39	15 x 9	135	NR Furniture
6	Toilet	228 306	2x3 x 3 2x3x6	18 18	Amenities
	Passage Stair		54x3 3x4.5	162 13.5	Circulation & other 175
	Total			2077	

Total Instructional area =1656
Total Administrative area = 210
Total Amenities area= 36

SSBT'S COLLEGE OF ENGINEERING & TECH. BAMBHORI, JALGAON.

Department: - 12) **Computer Centre**

Building wise/Department wise space allocation

Sr. No.	Particulars/Details	Room No.	Size Maximum m x m	Carpet Area in Sq m.	Remarks
1	I/C Cabin	128(A)	3 x 3	09	Administrative
2	Computer Centre	128	15 x 9 3 x 3	135 09	Instructional
3	UPS Room	128(B)	3 x 3	09	Administrative
	Total			162	

Total Instructional area = **144**
Total Administrative area =18

SSBT'S COLLEGE OF ENGINEERING & TECH. BAMBHORI, JALGAON.

13) Workshop

Building wise/Department wise space allocation

Sr. No.	Particulars/Details	Room No.	Size Maximum M x m	Carpet Area in Sq m.	Remarks
1	Main Work shop	W0	45.5 x 15-2x3.65x7.3	630	
2	Black Smithy	W1	15 x 6.7	101	
3	Foundry Shop	W2	4.65 x 9	42	
5	Fitting shop / Carpentry New Mech. bldg	M05	10.5x18.75-3x4	185	
	Staff Cabin	M05A	3x4	12	
	Staff Cabins	W0A	2x3.65x7.3	53	
	Total				

Total Instructional area = 958
Total Administrative area = 65
Total Amenities area= ---

SSBT'S COLLEGE OF ENGINEERING & TECH. BAMBHORI, JALGAON.

Department: - 14) **Tutorial Rooms U G**

Sr. No.	Particulars/Details	Room No.	Size Maximum m x m	Carpet Area in Sq m.	Remarks
1	Tutorial Rooms 12 Nos.	D1 to D12	12x8 x 4	384	Instructional
2	Main Bldg 3 Nos.	B16A, B	2 x 6 x 9	108	
		B13	6 x 7.5	45	
		310, 315	2 x 6 x 9	108	
	Electrical/ I T bldg.	E 310A	4.6x7.6	35	
		18		680	

Total Instructional area = **680**

15) Administrative

Building wise/Department wise space allocation

Sr. No.	Particulars/Details	Room No.	Size Maximum M x m	Carpet Area in Sq m.	Remarks
1	Conference Room	G02	9 x 4.5	40.5	co
2	Anti Chamber	G03(A)	4 x 4.5	18	co
3	Principal	G7	6 x 5.25	31.5	co
4	Dy. Registrar	G4 A	3 x 3	09	co
5	Director's Cabin	G6(A)	6 x 3	18	co
6	E.D.P. Office	G17	3 x 3	09	co
7	O.S	G31	3 x 6	18	co
8	Training & Place. Office	G08	9 x 6	54	
9	Maintenance Office	B11	9x6	54	
10	Main Office	G4 G5	6 x 9+ 6 x 6	90	co
11	A/C Office A.O	G32	3 x 6	18	co
12	Caretaker Room	G15	2 x 3	06	co
13	Waiting + Pantry Room	G3	4.5 x 4.5	20	co
14	Reception cum waiting	G01	3 x 9	27	co
15	Xerox Room	G18	1.2 x 3	3.6	
16	**Security Office**	B12	9 x 6	54	
17	General Store	B6	9 x 9-3x3	72	
18	Garden Maintenance Store	G23	2 x 3	06	co
19	Exam Record Room	211+210	3 x 3+3 x 3	18	co
20	**Exam office**	212 B	9 x 6	54	co
22	Office Store	D16, 17,18	27.88 x 3	84	co
23	Maint. Store Electrical	B09	3x3	9	
24	Maint. Store Plumbing	D15	7.62 x 3.66	28	
25	Rector office Hostel 1	OBHOO	3.66x4.57	17	
26	Warden Office		2.43x2.82	7	
27	U P S Room	G17 (A)	1.2 x 3	3	
28	Electrical Maint Room	B4	3 x 3	09	
29	House keeping	B10	3.2x3.2	10	
30	Reception/waiting	A101	2x3+1.2x6	13	
31	O S Main office	A102	9x6.3	57	
32	Office Record room	A103	6x5.4	32	
33	Account Office cash	A104A	3.65x17	62	
34	Exam Academic office	A104 B	3.65x17	62	
35	Directors Cabin Board Room	A107	9x5.4	49	
36	Principle/ Director meeting	A108	5.1x6.5	33	
37	Principle/ Director	A109	4.0x6.5	26	
38	Conference room	A111	7.3x17.0	124	
39	Pantry Office	A112	3x4.3	13	
40	AO office Other office	A113	6x5.4	32	
41	Dy. Registrar Other office	A115	3x5.4	16	
	Total			**1307**	

16) Amenities

Building wise/Department wise space allocation

Sr. No.	Particulars/Details	Room No.	Size Maximum M x m	Carpet Area in Sq m.	Remarks
	Girls common room	G35,	12 x 9	108	
	Boys common room	B17	12 x 9	108	
	Canteen Boys Hostel	CNTN	4.27x4.27	18	
	College **Canteen** **Near Gate**	CNTN2	11.30x5.80 7.50 x 15.50	65 116	
	Student activity center	G24	18x9	162	
	Dinning Hall No 1	DH1		184	
	Dinning Hall No 2	DH2		247	
	Dinning Hall for Girls	DHGH		143	
	T V Room (Girls)	TVGH	7.24 x 7.66	56	
	Medical Room Boys Hostel	MEDICL	3.73 x 4.57	17	
	Medical Room Girls Hostel	MEDI1	3.66 x 4.57	17	
	S T D Room Canteen	CNTN2	3.66x3.05	11	
	Generator Room	GENTOR	5.0x6.0	30	
	Transformer	TRANS	7x8	66	
	Meter room	MTR RM	3x3	9	
	Electric Room	ELE RM	2Nosx3x3	18	
	Generator	GENTOR2	3x6	18	
	Pump House	PUMPS	5 nosx2x2	20	
	Gymnasium TF	GYM	12.25x15.25	187	
	Yoga Gym	YOGA	12.25x15.25	187	
	Bus Stop	BUSSTP	7.5x10.	75	
	Cycle Stand	CYCLST	18.20x35	637	
	Parking 4 wheeler Class I	PARKN1		348	
	ATM	ATM	4.50 x 3.65	27	
	Bank	BANK	7.50 x 15.50	116	
	Stationary Store	B8-9	9 x 9-3x3	72	
	Toilets	A106	3x3.2	10	
	Toilet	A110	3x4.4	13	
	Toilet	AG1,2	2x3x3.2	19	
	Total			**3104**	

Sr. No.	Particulars/Details	Room No.	Size Maximum M x m	Carpet Area in Sq m.	Remarks
	Principal's Quarter	A8,9,10		169	
	Guest house	C1 to 8	8 x 32.2	258	
	VIP Guest house	VIP City	--	220	
				647	

17) Open-air theater

Open Air Theater **UC**		76 x 25		1900 Sq m
Central Canteen& Guest House **U C**				2400 sq m

SSBT'S COLLEGE OF ENGINEERING & TECH. BAMBHORI, JALGAON.

18) Residential

Building wise/Department wise space allocation

Sr. No.	Particulars/Details	Room No.	Size Maximum m x m	Carpet Area in Sq m.	Remarks
	Principal's quarter Staff quarter A Staff quarter B Renovated B Staff quarter (sweeper) Staff quarter IV New Staff quarter IV NMU		113+ 56 56.4 x 9 56.4x6 66.4 x 4 24.65x3 32.5x6 B/U	169 507 338 266 74 195 282	
	Guest house	A0, A4	56.4x2	113	
	Guest house Guest house VIP Guest House		32.2x4 32.2 x4	129 129 220	
	Hostel 1			1889 134	
	Hostel 2			2479	
	Girls Hostel 3rd floor	1087	660	1747	
	Girls Hostel / Class I staff Quarters		464x4	1856	
	Total			10528	

*Net residential area=10528 sq.m

SSBT'S COLLEGE OF ENGINEERING & TECH. BAMBHORI, JALGAON.

19) Sports

Building wise/Department wise space allocation

Sr. No.	Particulars/Details	Room No.	Size Maximum m x m	Carpet Area in Sq m.	Remarks
	Sport Office	113	3x3	09	
	Sport store		2.44x3.43	8	
	Badminton (Girls)		15.24x15.24	233	
	Badminton (Boys)		30.87x24.47	755	
	T T Hall Sport Bldg	YOGA	12.2x15.25	187	
	Gym office		2x1.2x 9.2	22	
	Total	**TT BDN**		**1004**	

20)Play field

	Basket ball	**BSKBAL**	**30x38**		**1140**
	Cricket, Football, Volleyball		160x66		10560
	Kabaddi ground		30x18		540
	Kho- Kho ground		29 x16		464
	Total				12704
	Total				13992

21**) Roads and Lawn in Campus**

A**) Roads**

(i) Black top road length: 2.10 km

B) Lawn:

(i) Central high land Lawn: 6000 Sqm.

(ii) Central low land Lawn: 1275 Sqm.

(iii) Main Building Lawn: 486 Sqm.

SSBT'S COLLEGE OF ENGINEERING & TECH. BAMBHORI, JALGAON

Department wise **carpet area (Excluding Administrative, Amenities)** Summary

Dept.	C.R	T.R	S.R	D.H	Lab.	Comp. lab.	Library	Other	Total Acad. Area
1)Civil	459 (4)	101 (3)	162	135	960 (10)	204 (2)	--	--	2044
2)Comp.	432 (5)	78 (2)	162	--	941 (12)	--	27	--	1640
3)Mech.	479 (6)	140 (4)	141	73	1030 (10)	216 (2)	54	--	2131
4)Chem.	108 (2)	36 (1)	162	--	739 (10)	81	--	--	1126
5)Biotech	153 (3)	69 (2)	--	--	685 (10)	66	--	--	973
6)Elec.	198 (3)	128 (3)	155	--	817 (11)	66	44	--	1408
7)E&TC	432 (5)	99 (2)	162	--	934 (12)	149 (2)	22.5	--	1798
8) IT	256 (3)	--	139	--	723 (10)	--	--	--	1118
9) MBA	134 (2)	66 (2)	134	--	--	102	20	--	456
10)App Sci.	999 (9)	--	--	135	387 (3)	135	--	--	1656
11) Library	--	--	--	--	--	--	927	--	927
12) Comp. Center	--	--	--	--	--	144	--	--	144
13)Work Shop	--	--	--	--	--	--	--	958	958
14) Tutorial	--	680 (18)	--	--	--	--	--	--	680
19)Sports									--
Total	**3650 (42)**	**1397 (37)**	**1217 (8)**	**343 (3)**	**7216 (88)**	**1163 (12)**	**1094 (6)**	**958**	**17059**

Figures below area show numbers of rooms

SSBT'S COLLEGE OF ENGINEERING & TECH. BAMBHORI, JALGAON

Department wise **carpet area** Summary for Instructional Administrative Amenities & other

	Requirement of area for total strength 0f 2664 Students	2664x6 = 15984	2664x1= 2664	2664x2= 5328	23976
Sr. No.	Department	Instructional	Administrative	Amenities	Total **Carpet Area**
01	Civil	2044	180	54	**2278**
02	Computer	1640	303	36	**1979**
03	Biotech	973	87	9	**1069**
04	Mechanical	2131	295	87	**2513**
05	Chemical	1126	126	18	**1270**
06	Electrical	1408	134	13	**1555**
07	E & TC	1798	253	36	**2131**
08	IT	1118	206	58	**1382**
09	MBA	456	91	157	**488**
10	Library	927	108	54	**1089**
11	App. Science	1656	210	36	**1875**
12	Comp Center	144	18	---	**162**
13	Workshop	958	65	---	**1023**
14	Tutorials	680	---	---	**680**
15	Administrative	---	1307	---	**869**
16	Principal qtr. Guest house	---	---	647	**647**
17	Amenities	---	---	3104	**3038**
18	Sport	---	---	1004	**1004**
19	Play field Basket Ball ground	---	---	1140	**1140**
	TOTAL	**17,059**	**3,383**	**6,453**	**26,895**

Under construction area (Carpet Area)

Sr. No.	Department	Instructional	Administrative	Amenities	Total
01	Open Air Theater	---	---	1900	**1900**
02	Canteen & Guest house	---	---	2400	**2400**

Proposed Construction Built up area

Sr. No.	Department				Total Sq m
01	Building for First year GF	GF 2800	FF 2800		**5,600**
02	Electrical/ E&TC Dept.	SF 3000	TF 3000		**6,000**

Teaching Learning Process

Methodology

For effective teaching learning process good and adequate infrastructure facilities are available. The class rooms and labs / workshop are well lighted with natural light during day time with circulation of fresh air. Conventional methods is adopted where in black board, chalk and faculty are involved in teaching the students in conjunction with modern methods like charts, cut models, OHPS, LCD's , electronics media like e-books , educational CD's, VCD. TV's are adopted by the faculty . Course files for all the subject are available in each department. Each department is having a departmental library and computer lab connected with internet. The central library is computerized with Del Net facilities and has AC reference room in addition to a reading room and staff rooms.

A computer center having 40 terminals is independently available for the use of faculty and students. The computer center is provided with internet facility and is available both during working hours and in additional time also.

Effectiveness

To asses the effectiveness of learning process by the students. Two class test at each month end and an assignment week is conducted where in the students are given an assignment sheets in a period sometime during 5^{th} and 6^{th} week of the term as per notified schedule and the students who gets the maximum marks is given a book on subject as reward with intention of motivating him for better performance in forthcoming university examination. The answer papers are checked in time and are shown to students and are collected back for record duly singed by student concerned.

Internal continuous evaluation system is followed for evaluation of term work as per guidelines issued by the University.

Motivations and rewards

Gold medals are awarded by the Management who are University first position rank holder in branch of Chemical Engg., Production Engg., Computer Engg. and Electronics Engg. in the University convocation. The University toppers are also felicitated at the college level in the afternoon of University convocation day.

Shrama Sadhana Bombay Trust's

COLLEGE OF ENGINEERING & TECHNOLOGY, BAMBHORI, JALGAON

TENTATIVE ACADEMIC CALENDAR (TERM-I) 2012-13

Sr.No.	Activity	Day	Date / From -To
1	Opening of College	Monday	09 July 2012
2	Registration of Students	Tuesday	10 July 2012
3	Commencement of Classes (S.E. To B.E.)	Wednesday	11 July 2012
4	Sketch Competition & Essay Competition (College level)	Saturday	21 July 2012
5	Opening of College &Commencement of Classes for F.E. Students.	Wednesday	01 August 2012 (Tentative)
6	Departmental Activity [All department] Guest Lecture/Group Discussion/Quiz Competition/ Expert Lecture	Saturday	04 August 2012
7	Independence Day Celebration	Wednesday	15 August 2012
8	Commencement of Classes (M.E.-I &II year)	Thursday	16 August 2012
9	Class Test – I (S.E. To B.E)	Tuesday to Saturday	21 Aug. to 25 August 2012
10	Lecture Series "FEAST"(College level)	Thursday to Saturday	30 Aug. to 01 Sept. 2012
11	Teacher's Day & Fresher's Welcome (All Depts.)	Wednesday	05 Sept. 2012
12	Feed back from students	Monday to Friday	03 Sept.to 07 Sept. 2012
13	Group Discussion(College level)	Saturday	08 Sept. 2012
14	Engineer's Day	Saturday	15 Sept. 2012
15	Class Test – I (F.E.) Class Test – II (S.E. to B.E.)	Thursday to Wednesday	20 Sept to 26 Sept. 2012
16	Quiz Competition / Traditional Day (College level)	Saturday	06 Oct. 2012
17	Term-Work Assessment (S.E To B.E.)	Thursday to Saturday	11 Oct. to 13 Oct. 2012
18	Class Test – II (F.E.)	Monday to Saturday	15 Oct. to 20 Oct. 2012
19	Makeup Week (S.E To B.E.)	Monday to Saturday	15 Oct. to 20 Oct. 2012
20	Alumina meet	Saturday	03 Nov. 2012
21	Term Work Assessment F.E.	Monday to Wednesday	05 Nov. to 07 Nov. 2012
22	Makeup Week (F.E.)	Monday to Saturday	19 Nov. to 24 Nov. 2012
23	PR/OR Exam. (S.E To B.E.) (Tentatively)	From Monday	29 Oct. to 10 Nov. 2012
24	University Theory Examination (Tentatively)	From Tuesday	26 Nov. to 24 Dec. 2012
25	Industrial Tour of All Dept. (Tentatively)	--	After 1st Term Exam. and before commencement of 2nd Term

Shrama Sadhana Bombay Trust's
COLLEGE OF ENGINEERING & TECHNOLOGY, BAMBHORI, JALGAON.
TENTATIVE ACADEMIC CALENDAR (TERM-II) 2012-13

Sr. No.	Activity	Day	Date / From -To
1.	Start of II Term (Registration of students)	Monday	14 Jan. 2013
2.	STTP on CAD, CAM, CAE (Mechanical Engg. Dept.)	Tuesday to Saturday	15 Jan. to 19 Jan.2013
3.	STTP on "Cloud Computing" (By Computer Engg. Dept.)	Monday to Friday	21 Jan. to 25 Jan.2013
4.	Republic Day Celebration	Saturday	26 Jan.2013
5.	Art of living (By Applied Science Dept.)	Tuesday to Sunday	29 Jan. to 03 Feb.2013
6.	Entrepreneurship Awareness Camp. (IEDC)	Wednesday to Friday	06 Feb. to 08 Feb. 2013
7.	Workshop on UTM Total Station (By Civil Dept.) for faculty, students)	Saturday	09 Feb.2013
8.	One day workshop on Disaster Management (By Applied Science Dept.)	Saturday	09 Feb. 2013
9.	Class Test-I (SE to BE)	Monday to Saturday	11 Feb. to 16 Feb.2013
10.	Alumni Meet	Sunday	17 Feb.2013
11.	Annual Sports	Monday to Wednesday	18 Feb. to 20 Feb.2013
12.	Annual Gathering (Vasantutsav)	Thursday to Saturday	21 Feb. to 23 Feb.2013
13.	Feedback from Students	Monday to Thursday	25 Feb. to 28 Feb.2013
14.	Science Exhibition (University Level) Applied Science Dept.	Thursday	28 Feb.2013
15.	MEC FEST (Mech., E&TC & Computer Dept.)	Friday	01 Mar.2013
16.	Student Activity- B-Storm (MBA Dept.)	Friday	01 Mar.2013
17.	National Level Student Paper Presentation "Milestone2K13"	Saturday	02 Mar.2013
18.	Use of Computer in day to day life : Women's Training Programme	Friday	08 Mar.2013
19.	Class Test- (ISE) for FE	Monday to Saturday	11 Mar. to 16 Mar.2013
20.	Workshop on Fermentation Technology (Biotech Dept.)	Friday to Saturday	15 Mar. to 16 Mar.2013
21.	Class Test-II (SE to BE)	Monday to Saturday	18 Mar. to 23 Mar.2013
22.	International Conference on "Advances in Energy Technology" (By Chemical & Civil Depts.)	Friday	29 Mar. 2013
23.	Class Test (ISE) for FE	Monday to Saturday	01 Apr. to 06 Apr.2013
24.	12th Students programme	Friday to Saturday	05 Apr. to 06 Apr.2013
25.	Project Exhibition	Saturday	06 Apr. 2013
26.	Farewell to B.E. Students (All department)	Saturday	13 Apr. 2013
27.	T.W. Assessment	Monday to Wednesday	15 Apr. to 17 Apr.2013
28.	Workshop on Sci-Lab for Faculty & BE Students (Electrical Dept.)	Tuesday to Saturday	16 Apr. to 20 Apr.2013
29.	End of Term	Saturday	20 Apr.2013
30.	Parents Meet	Sunday	21 Apr.2013
31.	Industrial Meet	Saturday	27 Apr. 2013
32.	PR/Oral Exam., FE to BE	Monday onwards	22 Apr. to 3 May. 2013
33.	Theory Exam., FE to BE & ME	Monday onwards	06 May. to 4 Jun. 2013
34.	Project Oral (BE)	Thursday to Sunday	06 Jun. to 09 Jun.2013
35.	PR/Oral Exam., ME	Thursday to Thursday	06 Jun. to 13 Jun.2013
36.	Commencement of Next Year	Monday	08 July. 2013

(**Dr. K.S.Wani)**
Principal

Copy to:
1) Chairman, G.B. & L.M.C. 2) Managing Trustee Sh. Raosaheb R.D.Shekhawat
3) All H.O.Ds 4) DOA 5) Director, T &P 6) DOR&D 7) D.R 8) A.R. 9) B.K.P. 10) Store
11) Library12) Chairman, Cultural Activities 13) Physical Director 14) Admission Office
15) Principal Office

NORTH MAHARASHTRA UNIVERSITY, JALGAON (M.S.)

Syllabus of First Year Engineering (Common to all branches) Faculty of Engineering and Technology

W.E.F 2012 - 2013

FE Semester – I

Course Code	Name of the Course	Group	Teaching Scheme				Theory		Practical		Total	Credits
			Theory Hrs / week	Tut. Hrs / week	PR. Hrs / week	Total	ISE	ESE	ICA	ESE		
FE 121	Engineering Physics – I	A	3	---	---	3	20	80	---	---	100	3
FE 122	Engineering Chemistry – I	A	3	---	---	3	20	80	---	---	100	3
FE 123	Engineering Mathematics - I	A	3	1	---	4	20	80	---	---	100	4
FE 124	Elements of Civil Engineering & Engineering Mechanics	B	3	1	---	4	20	80	---	---	100	4
FE 125	Computer Programming	B	3	---	---	3	20	80	---	---	100	3
FE 126	Engineering Science Lab - I	A	---	---	2*	2*	---	---	25	---	25	1
FE 127	Computer Programming Lab	B	---	---	2	2	---	---	25	25 **(PR)**	50	1
FE 128	Elements of Civil Engineering & Engineering Mechanics Lab	B	---	---	2	2	---	---	25	25 **(OR)**	50	1
FE 129	Workshop Practice – I	B	---	---	2	2	---	---	25	---	25	1
FE 130	Soft Skills – I	C	1	---	2	3	---	---	50	---	50	2
	Total		**16**	**2**	**10**	**28**	**100**	**400**	**150**	**50**	**700**	**23**

ISE: Internal Sessional Examination, **ESE:** End Semester Examination, **ICA :** Internal Continuous Assessment

Note: For Engineering Science Lab, practical of Engineering Physics and Engineering Chemistry shall be conducted in alternate week.

FE Semester-II

Course Code	Name of the Course	Group	Teaching Scheme				Theory		Practical		Total	Credits
			Theory Hrs / week	Tut. Hrs / week	PR. Hrs / week	Total	ISE	ESE	ICA	ESE		
FE 221	Engineering Physics – II	A	3	---	---	3	20	80	---	---	100	3
FE 222	Engineering Chemistry - II	A	3	---	---	3	20	80	---	---	100	3
FE 223	Engineering Mathematics - II	A	3	1	---	4	20	80	---	---	100	4
FE 224	Elements of Electrical & Electronics Engineering	B	3	---	---	3	20	80	---	---	100	3
FE 225	Engineering Drawing & Elements of Mechanical Engineering	B	3	---	---	3	20	80	---	---	100	3
FE 226	Engineering Science - II Lab	A	---	---	2*	2*	---	---	25	---	25	1
FE 227	Engineering Drawing & Elements of Mechanical Engineering Lab	B	---	---	4	4	---	---	25	25 **(OR)**	50	2
FE 228	Elements of Electrical & Electronics Engineering Lab	B	---	---	2	2	---	---	25	25 **(PR)**	50	1
FE 229	Workshop Practice - II	B	---	---	2	2	---	---	50	---	50	1
FE 230	Soft Skills-II	C	1	---	2	3	---	---	25	---	25	2
	Total		**16**	**1**	**12**	**29**	**100**	**400**	**150**	**50**	**700**	**23**

ISE: Internal Sessional Examination, **ESE:** End Semester Examination, **ICA:** Internal Continuous Assessment

Note: For Engineering Science Lab, practical of Engineering Physics and Engineering Chemistry shall be conducted in alternate week.

NORTH MAHARASHTRA UNIVERSITY, JALGAON (M.S.)

Syllabus of First Year Engineering (Common to all branches) Faculty of Engineering and Technology

SEMESTER-I

W.E.F 2012 - 2013

Engineering Physics - I

COURSE OUTLINE

Engineering Physics - I	**EP- I**	**FE 121**
Course Title	Short Title	Course Code

Course Description:
This course is aimed at introducing the fundamentals of basic sciences (Engineering Physics-I) to undergraduate students. The background expected includes a prior knowledge of physics from HSC (science) and familiarity with various laws, principles and theories. The goals of the course are to understand the basic principles of science (Engineering Physics -I) and their applications in different areas.

Lecture	**Hours / Week**	**No. of Weeks**	**Total Hours**	**Semester Credits**
	03	15	40	03

Prerequisite Course(s): 11th, 12th Physics.

General Objective:

The objective of this course is to provide learner with basic concepts and knowledge of sciences (various principles, theories, laws etc.) and to analyze it from experiments. The learner can apply the same in various branches of Engineering and Technology.

Learning Outcomes:

After successful completion of this course the student will be able to:

a) Understand the concept of different Energy Sources, their production, advantages, disadvantages, applications etc
b) Understand the basic properties, mechanism, terminology etc of Laser and their types, Principles, construction and re-construction of Holography. Principle, structure, and propagation mechanism of Fiber optics communication and their Industrial application.
c) Understand the basic of crystal structure, its parameter.
d) Understand the production of X-rays, properties and applications in various fields.
e) Describe the classification of solid, its properties , formation of semiconductor diode, its application and concept of Hall effect and Hall coefficient.
f) Understand to know about the basic concepts of Interference, Diffraction Polarization, their production and various applications

COURSE CONTENT

Engineering Physics - I **Semester-I**

Teaching Scheme	**Examination Scheme**	
Lectures -3 Hrs/week	**End Semester Exams (ESE)**	**: 80 Marks.**
	Duration of ESE	**: 3 Hours.**
	Internal Sessional Exam (ISE)	**: 20 Marks.**

Unit –I- Environmental Science **No of Lecture: 8 Hours, Marks: 16**

A) Energy Sources (non conventional): Introduction to non-conventional energy sources, Solar cell (Principle- Construction- Working & Characteristics), Wind energy- Wind Mill, Biogas & Bio Mass (Brief Explanation about way of harnessing or utilization, advantages), Advantages of non-conventional energy.

B) Energy Sources (conventional): Introduction to Nuclear Fission, Fusion, Chain reaction Multiplication Factor, Nuclear Reactor (with Diagram and Working), Numericals.

Unit –II- Laser & Fiber Optics **No of Lecture: 8 Hours, Marks: 16**

A) Laser: Introduction, Laser beam characteristics -Coherence, Directionality, Intensity, Mono chromaticity. Mechanism of Laser- Stimulated absorption, Spontaneous emission, Stimulated emission, Laser Terminology- Active Medium, Population, Population Inversion, Pumping, and Metastable State. Types of Laser-Gas Laser (He-Ne Laser), Nd-Yag Laser, Applications of Laser, Holography – Introduction, Principle of Holography, Recording of 3 D Image using Hologram, Reconstruction of 3 D images, Comparison with ordinary photography.

B) Fiber Optics: Structure of optical fiber. Principle of optical fiber. Propagation Mechanism in optical fiber- Angle of acceptance, Numerical aperture, Critical angle. Optical fiber communication system (Only Diagram), Advantages of optical fiber, Applications of optical fiber.

Unit-III- Crystallography & X-ray **No of Lecture: 8 Hours, Marks: 16**

A) Crystallography : – Introduction , Space Lattice – Translation Vectors, The Basis and crystal structure, Unit cell & Lattice parameters, Bravais Lattices, The cubic crystal- The Simple Cube (SC), Body Centered Cube (BCC), Important Parameters of cubic lattice – Number of atom per unit cell, Coordination Number, Atomic Radius , Packing density OR

Packing Factor, Calculation of Lattice Constant. Miller indices – Rules for finding Miller Indices, Important features of Miller Indices, Miller Indices for cube crystal, Numericals.

B) X-Rays: Production of X –rays (Coolidge tube), Continuous and characteristic x – rays, Bragg's law, Properties & Applications of X-ray, Numericals.

Unit- IV -Physics of Semiconductor **No of Lecture: 8 Hours, Marks: 16**

Classification of solid on the basis of band theory, Fermi-level and position of Fermi level in intrinsic [With derivation i.e E_f =(Ec + Ev) /2] and extrinsic semiconductors, Conductivity in semiconductors, Formation of P-N junction, Diode under forward and reverse bias, Hall Effect, Determination Hall Coefficient.

Unit-V- Optics **No of Lecture: 8 Hours, Marks: 16**

Interference- Interference, Michelson's Interferometer, Applications of Michelson's interferometer- wavelength determination, Refractive index of thin film, thickness of transparent material.

Diffraction- Diffraction, Theory of plane transmission diffraction grating, Determination of wavelength by grating, Rayleigh's criteria of resolution, resolving power of grating.

Polarization-Polarization, Polarization by reflection, Brewster's law, law of Malus, Dichroism, Polaroid's, Engineering application of polarization

Reference Books:

1. R K Gaur, S L Gupta, "Engineering Physics", Dhanpath Rai Publications.
2. P S Aithal, H J Ravindra, "Engineering Physics", Acme Learning.
3. G Vijaya kumari , "Engineering Physics" , Vikas Publications.
4. M R Srinivasan, "Physics for Engineers", New Age International Publishers.
5. C S Solanki, "Solar Photovoltaic", PHI Learning Private Limited.
6. S O Pillai, "Solid state Physics", New Age International Publishers.
7. Ajay Ghatak, "Optics", TMH.
8. Hugh D Young, Roger A Freedman, "University Physics (With Modern Physics)", Pearson.
9. Hintendra K Malik, A K Singh, "Engineering Physics", Mc Graw Hill.
10. K Rajgopal, "Engineering Physics", PHI Learning Private Limited.
11. M N Avadhanulu, P G Kshrisagar, "Text book of Engineering Physics", S. Chand.
12. Uma Mukharji, "Engineering Physics" , Narosa Publishing House
13. S Deswal, A Deswal, "Basic Course of Environmental Pollution", Dhanpath Rai Publications.
14. N Subrahmanyam, Brijal, M N Avadhanulu, "Optics", S. Chand.
15. Sanjay Jain, "Engineering Physics", Universities Press (India) Pvt Ltd.

Engineering Chemistry – I

COURSE OUTLINE

Engineering Chemistry-I	**EC-I**	**FE 122**
Course Title	Short Title	Course Code

Course Description:

This course is aimed at introducing the fundamentals of basic sciences (Engineering Chemistry –I) to undergraduate students. The background expected includes a prior knowledge of chemistry from HSC (science) and familiarity with basic fundamental theories. The goals of the course are to understand the basic principles of Engineering Chemistry –I and their applications in different branches of engineering.

Lecture	**Hours / Week**	**No. of Weeks**	**Total Hours**	**Semester Credits**
	03	15	40	03

Prerequisite Course(s): 11th, 12th Chemistry,

General Objectives:

To apply the knowledge of science in engineering and technology and also understand the basic concepts of chemistry and to analyze it from experiments.

Learning Outcomes:

After successful completion of this course the student will be able to:

a) Design and conduct experiments, analyze and interpret data.
b) Design a component, system or process to meet desired needs within realistic constraints.
c) An ability to function on multidisciplinary terms.
d) Identify, formulate and solve problems.
e) Understand the impact of engineering solutions in global, economic, environmental and societal context.
f) Ability to appreciate contemporary issues and engages in life-long learning.
g) Use the latest techniques, skills and modern tools necessary for engineering practices.

h) Understanding of the necessity to quantitatively balance the built environment with the natural world.
i) Understanding the basic parameters of water, different water softening processes and effect of hard water in industries.
j) Understanding the preparation, basic properties and applications of various polymers as an engineering material.
k) Understand the preparation, basic properties and applications of Portland cement.
l) Understand the synthesis, various properties and applications of ceramics as an engineering material.
m) Understand the classification, preparation, properties and applications of different alloys.

COURSE CONTENT

Engineering Chemistry-I **Semester-I**

Teaching Scheme **Examination Scheme**

Lectures -3 Hrs/week

End Semester Exams (ESE) : 80 Marks.
Duration of (ESE) : 3 Hours.
Internal Sessional Exam (ISE) : 20 Marks.

Unit – I Water **No. of Lect. – 08, Marks: 16**

a) Introduction: Definition of water, impurities of water
b) Types of hardness – Units of hardness, causes of hardness of water
c) Analysis of water - Chloride contents by Mohr's method, Alkalinity along with numerical.
d) Water Softening Process:(i) Lime soda process by Hot continuous process (Numerical based on it) (ii) Zeolite process, (iii) Ion exchange method, (iv) Reverse Osmosis method
e) Effect of hard water in steam generation, priming, foaming, caustic embrittlement.

Unit – II Polymer **No. of Lect. – 08, Marks: 16**

a) Introduction , Definition, functionality
b) Classification: on the basis of chemical composition, synthesis, intramolecular forces.
c) Types of polymerization – addition &condensation polymerization with mechanism and examples.
d) Plastic – Types of plastic – Thermoplastic & thermosetting plastic.
e) Compounding of plastic & their functions.

f) Explanation & different types with their properties & applications(i) PVC (ii) Teflon (iii) Polyurethane (iv) Polycarbonate (v) Polystyrene
g) Rubber - Types of rubber- natural & synthetic
h) Vulcanization of rubber: drawbacks of natural rubber
i) Synthetic Rubber - Synthesis, structure, properties & applications of- (i) Styrene butadiene rubber (SBR) (ii) Neoprene rubber (iii) Nitrile rubber (iv) Butyl rubber

Unit – III Cement **No. of Lect. – 08, Marks: 16**

a) Definition, Classification and properties - Natural, Puzzolona & Port land
b) Chemical constituent of Portland cement.
c) Manufacture of Portland cement by wet process.
d) Manufacture of Portland cement by dry process (using flow sheet diagram)
e) Setting & Hardening of Portland cement with chemical reaction.
f) Heat of hydration of cement.

Unit – IV Ceramics **No. of Lect. – 08, Marks: 16**

a) Introduction, Definition Classification of ceramics such as functional & structural classification.
b) Basic raw materials for ceramic preparation – clays, feldspars and flint or sand
c) Manufacture of ceramic by flow sheet diagram
d) Drying of ceramic wares – mechanism of drying, drying rate & shrinkage, methods of drying such as drying shades, cross – circulating drying, hot floor drying.
e) Firing of ceramic wares - Effect of heat on ceramic ware, Effect of heat on shrinkage & porosity.
f) Properties of ceramic material –
   1. Mechanical Properties such as Tensile strength, compressive strength, torsional Strength, plastic deformation.
   2. Thermal properties such as thermal conductivity, thermal shock resistance.
   3. Electrical properties such as insulator, ceramic conductor, ceramic Semiconductors.
g) Application of ceramics.

Unit – V Alloys **No. of Lect. – 08, Marks: 16**

a) Introduction,
b) Necessity (Purpose) of making alloys
c) Classification of alloys
d) Preparation of alloys – Fusion method, Electro deposition method

e) Composition , properties & application of following -(i)Brass (ii) Bronze (iii) Duralumine (iv) Nichrome (v) Steel – Mild, Medium & High.

Reference Books:

1. B K Sharma, Krishna, "Engineering Chemistry", Prakashan Media (P) Ltd.
2. Suba Ramesh, "Engineering Chemistry", Wiley India Pvt. Ltd..
3. Jain & Jain, "Engineering Chemistry", Dhanpat Rai Publishing Co.
4. S S Dara, "A Text Book of Engineering Chemistry", S Chand & Co. Ltd.
5. R Gopalan, "A Text book of Engineering Chemistry", Vikas Publishing House Pvt. Ltd. Third Edition
6. B S Chauhan, "Engineering Chemistry", University Science Press, Third Edition.
7. Shashi Chawla, "A Text book of Engineering Chemistry", DhanpatRai Publishing Co.
8. V R Gowariker, "Polymer Science". New Age International.
9. Abhijit Mallick, "Engineering chemistry", Viva books.
10. Sunita Ratan, "Engineering chemistry", S K Kataria & Sons.
11. Das R K, "Industrial Chemistry", Asia Pub. House, New York, 1966

Engineering Mathematics - I

COURSE OUTLINE

Engineering Mathematics -I	**EM-I**	**FE 123**
Course Title	Short Title	Course Code

Course Description:

This course is aimed at introducing the fundamentals of basic Mathematics to undergraduate students. The background expected includes a prior knowledge of Mathematics from 12th science and familiarity with various laws, principles and theories. The goals of the course are to understand the basic principle of Mathematics and its application in different area.

Lecture	**Hours / Week**	**No. of Weeks**	**Total Hours**	**Semester Credits**
	03	15	40	03
Tutorial	01	15	13	01

Prerequisite Course(s): 11^{th}, 12^{th} Physics.

General Objective:

The basic necessity for the foundation of Engineering and Technology being Mathematics, the main aim is to teach mathematical methodologies and models, develop mathematical skill and enhance thinking and decision making power of student.

Learning Outcomes:

After completion of this course learner will be able to:

a) Apply knowledge of mathematics in engineering and technology.
b) Identify, formulate and solve engineering problems.
c) Design Mathematical models for engineering problems and solve them.

COURSE CONTENT

Engineering Mathematics-I **Semester-I**

Teaching Scheme	**Examination Scheme**	
Lecture: 3 hours / week	**End Semester Examination (ESE)**	**: 80 Marks**
Tutorial: 1 hour / week	**Paper Duration (ESE)**	**: 03 Hours**
	Internal Sessional Exam (ISE)	**: 20 Marks**

Unit-I: Matrix Algebra **No. of Lect. - 08, Marks-16**

a) Definition of Elementary Transformations, Normal Form, Canonical Form & Rank of Matrix.
b) System of Linear Equations. (by using rank of matrix) for both Homogeneous & non-Homogeneous system.
c) Eigen values & Eigen vectors.
d) Orthogonal Matrix.
e) Introduction to Cayley-Hamilton's Theorem. (without proof)
f) Applications of Matrices (Translation, Scaling, Rotation).

Unit-II: Calculus of factions of single variable **No. of Lect. - 08, Marks-16**

a) Introduction to Successive Differentiation with standard formulae.
b) Leibnitz's theorem (without proof).
c) Taylor's & Maclaurin's theorems (without proof).
d) Expansion of Functions by using Taylor's theorem, Maclaurin's theorem & Leibnitz's theorem.
e) Applications of Taylor's theorem.

Unit-III: Integral Calculus (Some Special Functions) **No. of Lect. - 08, Marks-16**

a) Gamma Function.
b) Beta Function.
c) Differentiation under Integral Sign. (No Verification of Rule).
d) Error Function.

Unit-IV: Differential equation & its applications (1st order & 1st degree)
No. of Lect. - 08, Marks-16

a) Exact differential equation.

b) Non-exact differential equation. (reducible to exact differential equation by using integrating factor).
c) Linear differential equation.
d) Reducible to linear differential equation.
e) Applications of differential equation to simple electrical circuits & conduction of heat

Unit-V: Complex Number **No. Of Lect. - 08, marks-16**

a) Introduction to Circular functions, Hyperbolic functions & Inverse hyperbolic functions & their relations (without proof).
b) Hyperbolic functions.
c) Logarithm of a complex number.
d) Separation into real & imaginary parts.

Reference Books:

1. Erwin Kreyszig, "Advanced Engineering Mathematics", Wiley Eastern Ltd.
2. C R Wylie, "Advanced Engineering Mathematics", TMH New Edition.
3. B S Grewal, "Higher Engineering Mathematics", Khanna Publication.
4. H K Das, "Advanced Engineering Mathematics", S. Chand & Company.
5. B V Ramana , "Engineering mathematics", (New Edition) TMH.
6. N P Bali, "A Text Book of Engineering Mathematics", Laxmi Publication.
7. Babu Ram, "Engineering Mathematics", Pearson Education.

Elements of Civil Engineering & Engineering Mechanics

COURSE OUTLINE

Elements of Civil Engineering & Engineering Mechanics **ECE&EM** **FE 124**
Course Title Short Title Course Code

Course Description:
This course provides the elementary level knowledge of civil Engineering and Engineering mechanics which includes-

a) Study of Forces and force systems.
b) Resultant and equilibrium of coplanar force systems.
c) Kinematics and kinetics of bodies which are in motion.
d) Scope of civil engineering and basic areas of civil engineering.
e) Types of civil engineering structures and important parts of buildings.
f) Principles of Planning and Building Byelaws.

Lecture	**Hours / Week**	**No. of Weeks**	**Total Hours**	**Semester Credits**
	03	13	39	03
Tutorial	01	13	13	01

Prerequisite Course(s): Fundamental knowledge of Physics and mathematics of 11th and 12th std.

General Objective:

The general objective of course is to know the concepts of statics and dynamics. This includes application of math and physics principles to identify formulate and solve engineering problems. Also it aims to introduce the students the scope and basic areas of civil engineering.

Learning Outcomes:

Upon successful completion of this course the student will be able to:
(Engineering Mechanics):

a) Understand the basic physics concepts, such as force, weight, particle, and rigid body and SI system of units.
b) Compute the rectangular components of a force.
c) Identify and/or list the different types of force systems.
d) Define and calculate the resultant of coplanar force systems.
e) Define and calculate the moment of forces about any given point.

f) Draw free body diagrams of coplanar force systems.
g) Understand condition of equilibrium for coplanar forces
h) Solve for the forces and reactions in statically determinate coplanar force systems
i) Calculate the centroid of composite plane and curved figures.
j) Compute the tensile and compressive values of forces in truss members.
k) Define friction, friction force, static friction, kinetic friction,normal force, coefficient of static friction, angle of friction, and angle of repose.
l) Calculate the frictional force between two bodies in contact.
m) Find position, displacement, speed, velocity, acceleration, distance, and time of moving particle along the straight line and curved path.
n) Solve particle motion involving equation in 2D using rectangular and tangential/normal Coordinate systems.
o) Understand Newton's second law and D'Alembert's principle.
p) Understand principle of linear impulse and momentum.
q) Understand the principle of work and energy for particles.

(Element of Civil Engineering)

r) Understand of the role of the civil engineer
s) Know basic areas of civil engineering
t) Understand important civil engineering structures
u) Know principle of planning and building byelaws.
v) Understand use of the compass for angular measurement and calculation of included angles in a traverse

COURSE CONTENT

Elements of Civil Engineering & Engineering Mechanics **Semester-I**

Teaching Scheme	**Examination Scheme**
Lecture: 3 hours / week	**End Semester Examination (ESE) : 80 Marks**
Tutorial: 1 hour / week	**Paper Duration (ESE) : 03 Hours**
	Internal Sessional Exam (ISE) : 20 Marks

Unit I **No. of Lect. - 08, Marks-16**

A) Resultant of coplanar forces : Introduction, basic concepts, principle of mechanics, force systems, composition and resolution of forces, resultant of concurrent force system in plane, moment of forces, couples, Varignon's theorem, equivalent force couple systems, resultant of non-concurrent force system in plane.

B) Equilibrium of coplanar force system : Introduction, body constraints, types of supports and loads, free body diagram, conditions of equilibrium, equilibrium of forces in a plane , Lami's theorem, reactions of determinate beams, (simple and compound beams).

Unit II **No. of Lect. - 08, Marks-16**

A) Centre of Gravity: - Introduction, centre of gravity/centroid of composite plane figures and curves.

B) Analysis of Structure: - Plane trusses, method of joints and method of sections, cables subjected to point loads.

c) Friction: - Introduction, laws of friction, simple contact friction, ladder friction, application of friction on horizontal and inclined planes.

Unit III **No. of Lect. - 09, Marks-16**

A) Kinematics of rectilinear motion of particle: - Introduction, basic concepts, types of rectilinear motions, motion under gravity.

B) Kinematics of curvilinear motion of particle: - Introduction, basic concepts, motion along curved path, normal and tangential components of motion, rectangular and path coordinate systems, projectile motion.

Unit IV **No. of Lect. - 07, Marks-16**

A) Kinetics of rectilinear motion of particle: - D'Alembert's Principle, Newton's second law of motion, introduction to work and energy, impulse momentum principle. (No numerical on work and energy and impulse momentum principle).

B) Elements of Civil Engineering: Surveying: Compass: - Principles of surveying. Introduction to compass, bearing, Whole Circle Bearing and Reduced Bearing systems, local attraction, its detection and correction.

Note for unit 4: Out of three questions on unit 4; one question, consisting of 04 marks on Engineering Mechanics (EM), i.e. part A and 04 marks on Elements of Civil Engineering (ECE), i.e. part B is compulsory. Out of remaining two questions, one complete question should be on EM and one complete question should be on ECE.

Unit V **No. of Lect. - 07, Marks-16**

A) Basic Civil Engineering: - Introduction to various branches of civil engineering, introduction to various civil engineering structures such as buildings, highways, railways, bridges, dams, canals, elevated and ground storage reservoirs etc.

B) Building Construction: - Introduction to principles of planning, building rules and bye-laws, load bearing, framed and composite structures, introduction to various parts of buildings.

Reference Books:

1. Bhavikatti S S & K G Rajashekarappa, "Engineering Mechanics", New Age International (P) Ltd., Publishers.
2. Unadkat Sanju, "Engineering Mechanics", Tech-Max Publications, Pune.
3. Kanitkar T P and Kulkarni , "Surveying and Levelling, Part I", Pune Vidyarthi Graha Prakashan, 24th Edition
4. Bindra and Arora, "Building Construction", Dhanpatrai and Sons, Delhi.
5. N Kumara Swamy and A Ksmeswara Rao, "Building Planning and Drawing" ,Charotar Publishing House Pvt. Ltd.
6. Satish Gopi, "Basic Civil Engineering", Pearson Education, Delhi, 2008.
7. F P Beer and E R Johnson, "Mechanics for Engineers – Statics", McGraw-Hill Publication, 5th Edition
8. F P Beer and E R Johnson, "Mechanics for Engineers – Dynamics", McGraw-Hill Publication, 8th Edition.
9. S P Timoshenko and D H Young, "Engineering Mechanics", McGraw- Hill Publications, 4th Edition
10. R C Hibbeler "Engineering Mechanics statics and dynamics", Pearson Education, 11th Edition.
11. S R Bendale, "Engineering Mechanics", John Wiley & Sons, Delhi, 1st Edition
12. Jaget Babu, "Engineering Mechanics", Pearson Education, Delhi, 1st Edition.
13. Sushilkumar, "Building Construction", Standard Publishers, New Delhi, 2010.
14. M G Shah, Kale C.M. and Patki S.Y., "Building Drawing", Tata McGraw Hill Co. Ltd., New Delhi.

Computer Programming

Course Outline

Computer Programming	**CP**	**FE 125**
Course Title	Short Title	Course Code

Course Description:

The objective of this course is to introduce the students to the fundamentals of computers, the concepts of the C and C++ programming language and enable them to apply these concepts for solving real world problems.

Lecture	**Hours / Week**	**No. of Weeks**	**Total Hours**	**Semester Credits**
	03	15	45	03

Prerequisite Course(s): Fundamental knowledge of Computers.

General Objective:

This course covers introduction to Computers, Algorithms and flowcharts, C and C++ programming concepts including variables, control structures, arrays and structures.

Learning Outcomes:

Upon successful completion of this course the student will be able to:

a) Understand the principles of designing structured programs.
b) Write and debug programs using an IDE.
c) Know use of the appropriate statements available in the C and C++ language.
d) Implement small to medium programs of varying complexity, using the most commonly used features of the language.
e) Employ good programming style, standards and practices, during program development.
f) Adapt programming experience and language knowledge to other programming language Contexts.
g) Explain the principles of structured program design.
h) Describe what is meant by a well designed program.
i) Describe when and how to use the standard C and C++ statement.

COURSE CONTENT

Computer Programming **Semester-I**

Teaching Scheme	**Examination Scheme**	
Lecture: 3 hours / week	**End Semester Examination (ESE)**	**: 80 Marks**
	Paper Duration (ESE)	**: 03 Hours**
	Internal Sessional Exam (ISE)	**: 20 Marks**

Unit- I: Program Development Concepts and Introduction to C

No of Lect. – 8, Marks: 16

a. Algorithms, flowcharts.
b. Types of programming languages.
c. Programming language tools.
d. History of C programming.
e. Data types in C.
f. Writing simple programs.

Unit- II: Control Structures and Basic Input/output

No of Lect. – 8, Marks: 16

a. C operators and expressions.
b. Introduction to decision control statements.
c. Conditional branching statements.
d. Iterative statements.
e. Nested loops.
f. Break, continue and goto statements.
g. Basic Input/output statements.

Unit- III: Arrays and Strings **No of Lect. – 8, Marks: 16**

a Declaration and initialization of arrays
b Accessing and storing values in arrays
c Operations performed on arrays
d One and Two- dimensional arrays
e Introduction to strings.
f Declaration and initialization of string.
g String operations with and without C library functions.

Unit- IV: Functions and Structures **No of Lect. – 8, Marks: 16**

a Introduction to functions.

b Function declaration and definition.

c Function call and parameter passing.

d Introduction to structures.

e Initializing and accessing members of a structure.

Unit- V: Introduction to C++ **No of Lect. – 8, Marks: 16**

a Limitations of procedure oriented programming.

b Object-oriented programming paradigm.

c Basic concepts of object-oriented programming.

d Classes and objects

e Defining member functions and scope resolution operator.

f Simple C++ program with class and object.

Reference Books:

1. E Balagurusamy, "Programming in ANSIC C", Tata McGraw Hill, 4/E, 2007.
2. E Balagurusamy "Object Oriented Programming with C++", Tata McGraw Hill, 4/E, 2008.
3. Yashavant Kanetkar, "Let Us C", BPB Publications ,10/E, 2010.
4. Reema Thareja, "Computer Fundamentals and Programming in C", OXFORD University Press, 2012.
5. Stephen G Kochan "Programming in C", Pearson Education , 3/E, 2004.
6. Ashok N Kamthane, "Computer Programming", Pearson Education , 2/E,2008.
7. Vikas Gupta, "Computer Concepts and C Programming", Dreamtech Press, 2009.
8. K R Venugopal and S R Prasad, "Mastering C", Tata McGraw Hill, 1/E, 2011.
9. Behrouz A Forouzan, Richard F Gilberg, "COMPUTER SCIENCE – A Structured Programming approach using C", Thomson, 3/E Indian Edition, 2007.
10. Kernighan, Ritchie, "The C Programming Language", Prentice Hall of India , 2/E, 1988.
11. Pradeep K Sinha and Priti Sinha, "Computer Fundamentals", BPB Publications , 4/E, 2007.
12. Robert Lafore, "Object Oriented Programming in Turbo C++", Galgotia Publication, 2003.

(Engineering Science Lab-I)

LAB COURSE OUTLINE

(Engineering Science Lab-I)

Engineering Science Lab-I	**ES-I LAB**	**FE 126**
Course Title	Short Title	Course Code

Laboratory (Alternate week)	**Hours/ Week**	**No. of Weeks**	**Total Hours**	**Semester Credits**
	02	15	26	1

Engineering Physics – I

Course Description:

In this laboratory, course emphasis is on the understanding of basic principles, characteristic – properties for semiconductor diode, different instruments used in a field of optics, electronics, communication and metallurgy etc. The learner here can use this knowledge and apply in various branches of engineering as required.

Prerequisite Course(s): Course of Physics at HSC level.

General Objective:

The objective of the laboratory is to impart the fundamental knowledge of physics to the students and develop their ability to apply the specific procedures to analyze the experimental results.

In this lab, students will be familiar with the use of different equipments, basic principles, properties etc which they can apply in various disciplines of engineering during their studies and in future.

Learning Outcomes: After successful completion of this lab student will be able to:

a) Use the latest techniques, skills, and modern tools necessary for engineering practices.

b) Design a component, system or process to meet desired needs with in realistic constraints.

c) Understand classification of solid on the basis of band gap

d) Can analyze characteristic properties and determine the resistivity of semiconductor.

e) Analyze wavelength of Laser, working of Laser, various properties and applications.

f) Describe the use of fiber optics in communication.

g) Can study Hall effect & determine Hall coefficient.

h) Describe working of solar cell, its advantages, disadvantages and uses.

i) Describe the working of Michelson's Interferometer & find unknown wavelength of monochromatic light..

j) Can understand the phenomenon of diffraction & diffraction grating and determine wavelength of light using diffraction grating.

k) Can determine the polarizing angle & refractive index of glass by using Brewster's law.

l) Can study the law of Malus.

m) Can study the crystal structure.

LAB COURSE CONTENT

Practical -2 Hrs/Alternate weeks (Alternate with Engineering Chemistry- I)

(Note: Minimum FIVE Experiments from the following)

1. Semiconductor diode characteristics.

a) To determine forward and reversed characteristics of given semiconductor diode.

b) Analyze the knee voltage of given diode.

c) Compare analytical and the practical values.

2) Band gap in semiconductor material.

a) To determine forbidden energy gap of given semiconductor.

b) Compare analytical and the practical values.

3) To determine the resistivity of the given semiconductor by using four probe method.

a) To determine the resistivity of given semiconductor.

b) To study its variation with temperature.

4) To determine the wavelength of laser source

a) To determine wavelength of He-Ne Laser using diffraction grating.

b) Study the properties of Laser.

c) Compare analytical and the practical values.

5) Fiber Optics Communications.

a)Study of fiber optics communication

b) Describe the advantages of optical fiber over metallic cables.

6) Hall effect & determination of Hall coefficient.

a) A study of Hall Effect in semiconductors.

b) To determine Hall coefficient of semiconductor.

c) To determine the sign of majority charge carrier.

7) Solar cell Characteristics

a) To study the characteristics of solar cell

b) To find fill factor.

c) To determine its efficiency.

d) Measure intensity of source using Lux meter.

8) Spectrometer Grating

a) To understand diffraction phenomenon and diffraction grating.

b) To determine wavelength of light using diffraction grating

c) Compare analytical and the practical values.

9) Michelson's Interferometer

a) To determine unknown wavelength of monochromatic light.

b) Describe the operation of Michelson's Interferometer.

c) Compare analytical and the practical values.

10) Determination of polarizing angle for glass and to determine refractive index of glass using Brewster's law.

a) To determine polarizing angle and refractive index using Brewster's law.

11) Experimental verification of law of Malus

a) To study law of Malus (i.e.- Intensity of polarized light is proportional to $\cos^2\theta$)

12) Crystal structure

a) To Study the given crystal structure.

Reference Books:

1. M N Avadhanulu, A A Dani, P M Pokley, "Experimets in Engineering Physics", S.Chand.
2. S P Singh, "Advanced Practical Physics", Pragati Prakashan.

Engineering Chemistry-I

LAB COURSE OUTLINE

Course Description: In this laboratory course emphasis is on the understanding of basic principles, characteristic properties of water, polymers, and alloys as engineering materials. The learner here can use this knowledge and apply in various branches of engineering as required.

Prerequisite Lab Course(S): 12th Chemistry, Different laws, basic principles and theories.

General Objectives:

This course is intended to provide engineering students with a background in important concepts and principles of chemistry and emphasis on those areas considered most relevant in an engineering context, and practical applications in engineering and technology.

Learning Outcomes:

Upon successful completion of lab Course, student will be able to:

a) Analyze the total hardness of water sample by EDTA method.

b) Analyze the strength of dissolved oxygen from water sample by

Winkler's Method.

c) Analyze the alkalinity of water sample by volumetric method.

d) Analyze the chloride content of water sample by Mohr's method.

e) Estimate the percentage of phenol iodometrically.

f) Determine the yield percentage of Polystyrene by bulk polymerization.

g) Determine the yield percentage of Phenol Formaldehyde Resin (Bakelite).

h) Analyze the percentage of copper in given Brass Sample.

i) Analyze the percentage of Zinc in given Brass Sample.

j) Analyze the percentage of Calcium in given Cement sample.

LAB COURSE CONTENT

Practical : 2 hour/ week (Alternate with Engineering Physics-I)

(Note: Minimum FIVE Experiments from the following)

1. Estimation of total hardness of given sample of water by EDTA Method.

a. Standardization of EDTA by using standard hard water.

b. To find the exact normality of EDTA solution.

c. Estimation of total hardness of given water sample.

2. Determination of Dissolved oxygen present in given water sample (Winkler's Method).

a. Standardization of Sodium Thiosulphate solution against std. $K_2Cr_2O_7$ solution using starch indicator.

b. Calculate exact normality of Sodium Thiosulphate solution.

c. Estimation of dissolved oxygen from given water sample.

d. Calculate the strength of dissolved oxygen from given water sample.

3. Determination of alkalinity of water sample.

a. To find the presence of OH^-, CO_3^{2-} and HCO_3^- ions in given sample of water by titrating against N/10 HCL using phenolphthalein indicator.

b. Using Methyl orange indicator in the same solution, to find out the methyl orange end point.

c. Calculate the amount of OH^-, CO_3^{2-} and HCO_3^- ions in given sample by end point results.

4. Estimation of Chloride content in a given water sample by Mohr's Method.

a. Standardization of $AgNO_3$ solution by using Standard NaCl solution.

b. To find the exact normality of $AgNO_3$ solution.

c. Estimation of Chloride ions in given sample of water.

d. Calculate the strength of Chloride ions in sample water.

5. Estimation of phenol by Iodometrically.

a. Dilution of Phenol solution.

b. Back titration of the above solution against standard 0.1 N Sodium Thiosulphate solutions.

c. Blank titration from brominating stock solution against 0.1 N Sodium Thiosulphate solutions.

d. Calculate the percentage of phenol.

6. Preparation of Polystyrene by bulk polymerization.

a. Add nitrogen to styrene in oil bath.

b. Cool the mixture and break it to give Polystyrene.

c. Dissolve the polystyrene in benzene, filter the precipitate and dry it.

d. Calculate the yield percentage.

7. Preparation of Phenol Formaldehyde Resin (Bakelite).

a. Dissolution of Glacial acetic acid, formaldehyde and phenol.

b. Acidifying the above solution.

c. Washing the residue obtained with distilled water and dry it.

d. Calculate of the yield of Phenol formaldehyde resin.

8. Estimation Copper in Brass Iodometrically.

a. Prepare given brass sample by acidifying, neutralizing and dilution in volumetric flask.

b. Determine the amount of Copper in diluted brass sample solution by volumetric titration.

c. Calculate the percentage of copper in given Brass Sample.

9. Estimation of Zinc from Brass Volumetrically.

a. Standardization of K_4 [Fe (CN) $_6$] by using Uranyl nitrate indicator.

b. Dilution of the brass sample.

c. By removing Sn, Pb, Cu, Fe from the solution.

d. Titrating the remaining solution against K_4 [Fe (CN) $_6$] and calculate the percentage of Zinc in Brass sample.

10. Determination of % of Ca in Cement.

a. Dilution of the cement sample in NH_4Cl Solution.

b. Distilled off and filter the solution with Whatmann paper No. 1.

c. To the above filtrate add NH_4NO_3 solution, keep the filtrate and washing for the estimation of Lime.

d. Estimation of Lime- Rectify the solution then add methyl red indicator along with ammonium oxalate solution.

e. Calculate the amount of Calcium using oven and estimate the percentage of lime from the sample.

f. Also find the percentage of calcium by volumetric analysis using $KMNO_4$ solution.

Reference Books:

1. Shashi Chawla, "Essentials of Experimental Engineering Chemistry", DhanpatRai Publishing Co.Pvt. Ltd.
2. Dr Sudha Rani, "Laboratory Manual on Engineering Chemistry", Dhanpat Rai Publishing Co.Pvt. Ltd.

Guide lines for ICA :

ICA (Internal Continuous Assessment) marks of 25 are for practicals in Engineering Physics - I & Engineering Chemistry – I.

ICA shall be based on continuous evaluation of student performance throughout semester and practical assignment submitted by the student in the form of journal.

Computer Programming Lab

LAB COURSE OUTLINE

Computer Programming Lab	**CP LAB**	**FE 127**
Course Title	Short Title	Course Code

Course Description:

This laboratory provides students with a comprehensive study of the C and C++ programming language. Classroom lectures stress the strengths of C and C++, which provide students with the means of writing efficient, maintainable, and portable code.

	Hours per Week	**No. of Weeks**	**Total Hours**	**Semester Credits**
Laboratory	2	15	30	1

ESE Pattern: Practical (PR)

Prerequisite Course(s): Fundamental knowledge of Computers.

General Objective:

The objective of this laboratory is to introduce the students to the fundamentals of computers, the concepts of the C and C++ programming language and enable them to apply these concepts for solving real world problems.

Learning Outcomes:

Upon successful completion of the lab student will be able to

a) Program for basic arithmetic operations and expressions

b) Program for finding roots of a quadratic equation, square root of a number

c) Find area and volume of geometric objects

d) Find greatest and smallest of 2or 3 numbers

e) Generate odd / even numbers

f) Find factorial of a number

g) Check / generate prime numbers

h) Check for Armstrong numbers

i) Check a number for palindrome

j) Find GCD of two numbers

k) Generate sine /cosine series/value

l) Solve a linear equation

m) Print a number in words

n) Find Greatest / smallest/ sum /average of 'n' numbers

o) Convert Integer to binary / hex and octal

p) Find Greatest / smallest/ sum /average of 'n' numbers(Using arrays)

q) Apply Linear / binary search

r) Generate Permutation and Combination

s) Perform String processing / operations

t) Sort numbers and Strings

u) Perform Matrix operations

v) Record processing using structure

LAB COURSE CONTENT

(Note: Minimum SIX Experiments from group A and FOUR from group B.)

Group A

1. **Program for basic arithmetic operations and expressions.**
    a. Performing simple arithmetic operations like
    b. Addition,
    c. Subtraction,
    d. Multiplication,
    e. Division.
2. **Program for finding roots of a quadratic equation, square root of a number**

    Finding roots of any quadratic equation and square root of any given number.
3. **Find area and volume of geometric objects**

    Calculate area and volume of geometric objects (circle, square, triangle etc.)
4. **Finding greatest and smallest of 2 or 3 numbers**

    To find smallest and largest numbers from given 2 or 3 numbers.

5. **Generating odd / even numbers**

   To generate odd and even numbers.

6. **Finding factorial of a number**

   Calculate the factorial of any given number.

7. **Checking / generating prime numbers**

   Generate the prime numbers.

8. **Checking for Armstrong numbers**

   Generate the Armstrong numbers.

9. **Checking a number for palindrome**

   Check the given number for palindrome.

10. **Finding GCD of two numbers**

    Calculate GCD of any two numbers.

11. **Generating sine /cosine series/value**

    Generate the sine/cosine series.

12. **Solving a linear equation**

    To solve the linear equation.

13. **Printing a number in words**

    Print any given number in words.

14. **Greatest / smallest/ sum /average of 'n' numbers**

    Find the greatest/smallest/sum/average of any given n numbers.

15. **Integer to binary / hex and octal conversion**

    To integer to binary, hex and octal.

Group B

1. **Greatest / smallest/ sum /average of 'n' numbers**

   To find the greatest/smallest/sum/average of given n numbers using arrays.

2. **Linear / binary search**

   To search a number from given n numbers using linear and binary search.

3. **Permutation and Combination generation**

   Calculate the permutation and combination.

4. **String processing / operations**

Performing string operations using arrays.

5. **Sorting of numbers and Strings**

   Sorting any string and numbers ascending and descending order using arrays.

6. **Matrix operations**

   Performing matrix operation (addition, subtraction, multiplication etc.) using arrays.

7. **Record processing using structure**

   Processing student record using structures.

Reference Books:

1. E Balagurusamy, "Programming in ANSIC C", Tata McGraw Hill, 4/E, 2007.
2. E Balagurusamy "Object Oriented Programming with C++", Tata McGraw Hill, 4/E, 2008.
3. Yashavant Kanetkar, "Let Us C" , BPB Publications ,10/E, 2010.
4. Reema Thareja, "Computer Fundamentals and Programming in C", OXFORD University Press, 2012.
5. Stephen G Kochan "Programming in C",Pearson Education , 3/E, 2004.
6. Ashok N Kamthane, "Computer Programming", Pearson Education , 2/E,2008.
7. Vikas Gupta, "Computer Concepts and C Programming", Dreamtech Press, 2009.
8. K R Venugopal and S R Prasad ,"Mastering C", Tata McGraw Hill, 1/E, 2011.
9. Behrouz A Forouzan, Richard F Gilberg, "COMPUTER SCIENCE – A Structured Programming approach using C", Thomson, 3/E Indian Edition, 2007.
10. Kernighan, Ritchie, "The C Programming Language", Prentice Hall of India , 2/E, 1988.
11. Pradeep K Sinha and Priti Sinha, "Computer Fundamentals", BPB Publications , 4/E, 2007.
12. Robert Lafore, "Object Oriented Programming in Turbo C++", Galgotia Publication, 2003.

Guide lines for ICA :

ICA shall be based on continuous evaluation of student performance throughout semester and practical assignment submitted by the student in the form of journal.

Guide lines for ESE:

a. ESE will be based on the practical assignments submitted by the students in the form of journal.

b. In the ESE, the students may be asked to perform the practical assignment with minor modification.

c. Evaluation will be based on the paper work of flowchart and algorithm, understanding of the logic and the syntax, quality of program code, execution of the program code, type of input and output for the program code.

Elements of Civil Engineering & Engineering Mechanics Lab

LAB COURSE OUTLINE

Elements of Civil Engineering & Engineering Mechanics Lab	**ECE & EM LAB**	**FE 128**
Course Title	Short Title	Course Code

Course Description:

These laboratories cover experiments related to basic principles of Statics, Dynamics and Compass Surveying.

	Hours per Week	No. of Weeks	Total Hours	Semester Credits
Laboratory	2	13	26	1

ESE Pattern: Oral (OR)

General Objective:

In these laboratories students will be introduced to the applications of different theorems of mechanics to solve problems in statics and dynamics. Also students will get familiar with surveying with Compass. These include:

a) Concept of vectors.
b) Triangle law of forces.
c) Lami's theorem.
d) Conditions of equilibrium.
e) Laws of friction.
f) Laws of simple machines.
g) Angular measurement with Compass.

Objective to develop following Intellectual skills:

a) To understand basic laws of engineering mechanics & apply the same to solve problems.
b) To learn use of prismatic compass for angular measurements.
c) To identify principles and working of different apparatus in laboratories.

Objective to develop following Motor skills:

a) Ability to draw diagrams and graphs.
b) Ability to apply forces and measure the corresponding effects.
c) Ability to perform the experiments and record the observations.
d) Ability to apply the basic principles in various field conditions.

Learning Outcomes:

Upon successful completion of these experiments the student will be able to

a) Apply concept of vectors to solve problems in engineering.
b) Study and verify Lami's theorem and apply it to solve problems in engineering.
c) Understand and apply triangle law of forces for solving problems.
d) Understand the conditions of equilibrium of forces.
e) Describe efficiency, load, effort, velocity ratio, frictional effort and verify law of machines.
f) Describe frictional forces, limiting friction, coefficient of friction and verify law of friction.
g) Apply graphical method to solve problems.
h) Measure bearings of lines with prismatic compass and calculate included angles.

LAB COURSE CONTENT

Group A

1 Study of vectors.

a. To calculate resultant of coplanar and non coplanar (space) forces.
b. To calculate unknown force (reaction).

2 Verification of law of polygon of forces.

a. To verify law of polygon of forces.
b. To calculate analytically and experimentally resultant of concurrent force system.
c. To compare analytical values with measured ones.

3 Verification of Lami's theorem.

a. To Verify Lami's theorem.
b. To observe the ratios of $P/\sin\alpha$, $Q/\sin\beta$, $R/\sin\gamma$ and compare the same.

4 Forces in jib crane

a. To study law of triangle of forces analytically and graphically.
b. To apply conditions of equilibrium.
c. To calculate forces in members of jib crane.
d. To compare the theoretical results with experimental values.

5 Reactions of beam.

a. To verify conditions of equilibrium of a system of coplanar parallel forces using reaction of beam apparatus.
b. To understand active and reactive forces.

6 Simple friction on horizontal and inclined planes.

a. To describe frictional force, limiting friction, coefficient of friction, angle of repose.
b. To know the concept that the Force ? Reaction.

c. To find coefficient of friction for bodies in equilibrium on inclined planes.

7 Study of simple machines and verification of law of machines

a. To describe efficiency, load, effort, velocity ratio, frictional effort and verify law of machines.

b. To establish the law of machine from graph.

8 Graphical work (Statics) – (minimum three problems on graphical solution of Static's problems).

To understand graphical method to solve the problems in statics.

a. To solve the problem on coplanar concurrent forces, parallel forces and reactions of beam by graphical method.

b. To describe Bow's notation, space diagram, vector diagram, polar diagram, funicular diagram and to draw the same.

9 Graphical work (Dynamics) – (minimum two problems on graphical solution of Dynamic's problems).

a. To draw the motion curve and understand the significance of the same.

b. To calculate displacement and distance travelled from V-T diagram.

Note: The laboratory journal should consist of six experiments/assignments from group A. Assignment no. 8 and 9 are compulsory. Any four out of remaining seven experiments/assignments are to be conducted.

Group B

1 Observations of bearings by using Compass and calculations of included angles.

a. Describe whole circle and quadrantal bearing system.

b. Calculate included angles from observed bearings in a closed traverse.

2 Assignment based on fifth unit. Any one of the following.

a. Write notes on the following: Various branches of civil engineering such as Structural Engineering, Water Resources Engineering, Geotechnical Engineering, Transportation Engineering, Environmental Engineering, Building Science and Construction Management.

b. Write notes on the following Civil Engineering structures such as buildings, highways, railways, bridges, dams, canals, elevated & ground storage reservoirs.

c. i) Explain principles of planning.

ii) Differentiate between load bearing and framed structures with neat sketches.

Note: The laboratory journal should consist of above two experiments/assignments from group B.

Reference Books:

1. Bhavikatti S S & K G Rajashekarappa, "Engineering Mechanics", New Age International (P) Ltd., Publishers.
2. Unadkat Sanju, "Engineering Mechanics", Tech-Max Publications, Pune.
3. Kanitkar T P and Kulkarni , "Surveying and Levelling, Part I", Pune Vidyarthi Graha Prakashan, 24th Edition
4. Bindra and Arora, "Building Construction", Dhanpatrai and Sons, Delhi.
5. N Kumara Swamy and A Ksmeswara Rao, "Building Planning and Drawing" ,Charotar Publishing House Pvt. Ltd.
6. Satish Gopi, "Basic Civil Engineering", Pearson Education, Delhi, 2008.
7. F P Beer and E R Johnson, "Mechanics for Engineers – Statics", McGraw-Hill Publication, 5th Edition
8. F P Beer and E R Johnson, "Mechanics for Engineers – Dynamics", McGraw-Hill Publication, 8th Edition.
9. S P Timoshenko and D H Young, "Engineering Mechanics", McGraw- Hill Publications, 4th Edition
10. R C Hibbeler "Engineering Mechanics statics and dynamics", Pearson Education, 11th Edition.
11. S R Bendale, "Engineering Mechanics", John Wiley & Sons, Delhi, 1st Edition
12. Jaget Babu, "Engineering Mechanics", Pearson Education, Delhi, 1st Edition.
13. Sushilkumar, "Building Construction", Standard Publishers, New Delhi, 2010.
14. M G Shah, Kale C.M. and Patki S.Y., "Building Drawing", Tata McGraw Hill Co. Ltd., New Delhi.

Guide lines for ICA :

ICA shall be based on continuous evaluation of student performance throughout semester and practical assignment submitted by the student in the form of journal.

Guide lines for ESE:

ESE will be based on practical assignments submitted by the student in the form of journal. In ESE the student may asked to answer questions based on experiments/assignments. Evaluation will be based on performance in oral examination.

Workshop Practice- I

LAB COURSE OUTLINE

Workshop Practice I	**WP-I**	**FE 129**
Course Title	Short Title	Course Code

Course Description:

Workshop Practice I covers the basic knowledge and practices on measuring instrument, fitting shop, welding shop, Tin smithy, Black smithy, foundry shop and computer hardware workshop in order to improve the practical skill of students in different workshops.

	Hours per Week	**No. of Weeks**	**Total Hours**	**Semester Credits**
Laboratory	2	11	22	1

Prerequisite Course(s): 11th, 12th Physics, Mathematics, Engineering Drawing, Engineering Materials.

General Objective:

In workshop practice, students will get familiar with use of different workshop practices like fitting, welding, tin smithy, black smithy, foundry and computer hardware workshop. Students will also get familiar with different tools, machines, equipments, job holding devices, job drawing, job material, job manufacturing operations and processes in different workshops.

Objective to develop following Intellectual skills:

a. Identification and selection of manufacturing processes/operations according to job requirement in different workshops.
b. Identification, selection and understanding of tools, equipments, machines and job material according to job drawing for different workshops.
c. Understanding working principle and construction of process planning sheet.
d. Identification, understanding of the working principle of computer hardware components.

Objective to develop following Motor skills:

a. Ability to handle measuring instruments.
b. Ability to read the job drawing.

c. Ability to understand the basic working principle of fitting operations, tools and equipments in fitting shop.
d. Ability to understand the basic working principle of welding operations, tools and equipments in welding shop.
e. Ability to understand the basic working principle of sheet metal operations, tools and equipments in tin smithy shop.
f. Ability to understand the basic working principle of black smithy operations, tools and equipments in black smithy shop.
g. Ability to understand the basic working principle of moudling and casting operations, tools and equipments in foundry shop.
h. Ability to understand working principle of computer hardware and its application.

Learning Outcomes:

Upon successful completion of these practical's the student will be able to hand

a) Measuring Instruments and fitting shop
b) Welding Shop
c) Tin smithy shop
d) Black smithy shop
e) Foundry shop
f) Computer Hardware Workshop

LAB COURSE CONTENT

1 Measuring Instruments

a. Demonstration of handling measuring instruments like steel rule, measuring tape, try- square, vernier caliper, micrometer, vernier height gauges, bevel protector etc.

b. **Fitting shop**

One job on finishing two sides and make right angles of square job by filling operation, one drilling and taping operations.

2 Welding Shop

a. One Job on T-joint: one side of T-joint welded by Gas welding and another by Electrical Arc Welding
b. Demonstration of Brazing.

3 Tin Smithy

One job including soldering, Riveting etc. For example- letter box, Waste paper basket, tray, Funnel etc.

4 Black Smithy

One job on black smithy including Bending and Flattening etc. For example: S-shape, hook shape, U shape job.

5 Foundry Shop

Demonstration of preparation of molding, casting of any simple pattern.

6 Computer Hardware Workshops

a. Introduction to Personal Computers, PC Main Parts: CPU, Input and Output devices.
b. Introduction of Floppy & CD drives, HDD, CD, DVD, USB Flash Drives, and Memory cards.
c. Introduction of Motherboard, I/O connectors. Installation of cards, devices and connecting cables, Identification of cables of computers (connecting media)

Reference Books

1. Hajara Chaudhary and Bose S K, "Element of Workshop Technology Volume I and II", Asia Publishing House.
2. P N Rao, "Production Technology Volume I and II", Tata McGraw Hill Publication.
3. R K Jain, "Production Technology", Khanna Publications.
4. P C Sharma, "Production Technology", Khanna Publication.
5. Chapman W A J, "Workshop Technology", ELBS Publication.
6. HMT, "Production Technology", Tata McGraw Hill Publication.
7. Kannaiah K L, Narayana, "Workshop Manual", Scitech Publications, Chennai, 2nd Edition.

Guide lines for ICA:

ICA shall be based on continuous evaluation of student performance throughout semester and practical assignment submitted by the student in the form of journal.

Soft Skills - I

LAB COURSE OUTLINE

Soft Skills-I	**SS I**	**FE 130**
Course Title	Short Title	Course Code

Course Description:

Through this course we have tried to bridge the gap of industry and institution by bringing in an awareness and practical approach to soft skills such as communication skills, presentation skills and written language. This course stresses on ability to communicate, public speech, e-presentations and structure of English language.

	Hours per Week	**No. of Weeks**	**Total Hours**	**Semester Credits**
Lecture	1	15	15	2
Laboratory	2	15	30	

Prerequisite Course(s): Fundamental knowledge of English of 11th and 12th.

General Objectives:

We have tried to achieve the following objectives through this course:

a) To make the student industry ready in terms of his/her ability to communicate effectively

b) To augment the ability of the student to create, compose and render presentations with or without the help of media

c) To understand the importance of public speech and the role language plays in that

d) To enhance the ability of written communication by giving a primer on English

Learning Outcomes:

Upon successful completion of this course the student will be able to:

a) Understand the importance of communicating effectively

b) Communicate effectively by removing barriers

c) Address an audience effectively and deliver speeches without inhibition

d) Create and deliver effective e-presentations

e) Understand the meaning and utility of Active Listening in communication

f) Use the vocabulary more effectively

g) Expand and enrich grammatical structure and vocabulary in English

h) Comprehend thoughts through body language and use it as a tool to understand non-verbal signals for better communication

LAB COURSE CONTENT

1 Communicate With Confidence No of Lect. – 9, Marks: 10

a Communication Skills and Barriers to Communication

b Listening Skills

c Assertion Skills

2 Speaking to be Understood No of Lect. – 9, Marks: 10

a Basic Corpus for Formatted Feeding

b A Matter of Pronunciation

c Pattern Drills and Dialogues

3 Public Speech No of Lect. – 9, Marks: 10

a Influencing Others

b Speaking in Public

c Learning to Read Through Body and Voice

4 Effective Presentations No of Lect. – 9, Marks: 10

a Formulas and Advanced Techniques of Presentations

b E-Presentations

c The Fear Factor

5 Eloquent Writing - I No of Lect. – 9, Marks: 10

a Comprehension of Passages

b Understanding of English Language

c Vocabulary Enhancement Practice

Reference Books:

1. Allan and Barbara Pease, "A Definitive Book on Body Language", Publication Bantam Books.
2. Robert Bolton, "People Skills: How to Assert Yourself, Listen to Others and Resolve Conflicts", Publication Simon and Schuster.
3. R K Iyer, "Spoken English", IU Publications.
4. Sethi and Dhamija , "A Course in Phonetics and Spoken English", Prentice Hall of India.
5. Matthew McKay , "The Communication Skills", Publisher: New Harbinger Publications Inc.
6. Frank Paolo , " How to Make a Great Presentation in 2 Hours", Pustak Mahal.
7. Kaplan's GRE, Kaplan Publications.
8. Barron's GRE, Galgotia Publications.

Guide lines for ICA :

ICA shall be based on continuous evaluation of student performance throughout semester and assignment submitted by the student in the form of journal.

NORTH MAHARASHTRA UNIVERSITY, JALGAON (M.S.)

First Year Engineering

(Common to all branches)

Faculty of Engineering and Technology

SEMESTER-II

W.E.F 2012 – 2013

Engineering Physics - II

COURSE OUTLINE

Engineering Physics – II	**EP- II**	**FE221**
Course Title	short Title	course code

Course Description:
This course is aimed at introducing the fundamentals of basic sciences (Engineering Physics-II) to undergraduate students. The background expected includes a prior knowledge of physics from HSC (science) and familiarity with various laws, principles and theories. The goals of the course are, to understand the basic principles of science (Engineering Physics -II) and their applications in different areas.

Lecture	**Hours / Week**	**No. of Weeks**	**Total Hours**	**Semester Credits**
	03	15	40	03

Prerequisite Course(s): HSC Physics, Different Laws, Principles and Theories.

General Objective:

The objective of this course is to provide learner with basic concepts and knowledge of sciences (various principles theories laws etc.) and to analyze it from experiments. The learner can apply the same in various branches of Engineering and Technology.

Learning Outcomes:

After successful completion of this course the student will be able to:

a) Understand the impact of Engineering Solutions in global, economic, environmental and societal contexts.
b) Design and conduct experiments, analyze and interpret data.
c) Use the latest techniques, skills, and modern tools necessary for engineering practices.
d) Design a component, system or process to meet desired needs with in realistic constraints.
e) Identify, formulate and solve problems.

f) Describe the basics of acoustics and its use in designing/ planning of Hall, Building, and Theaters etc. Various factors affecting acoustics of building and its remedy.
g) Understand the concept of ultrasonic waves , its production and applications.

h) Describe the different properties, classification and applications of magnetic materials and super conductors.
i) Understand and describe the concepts of Modern Physics and Spectroscopy and their applications in various fields.
j) Understand the state of micro particles, its physical parameters, Uncertainty Principle, Schrodinger's wave equation and their applications
k) Understand the basic concepts of nano science, nano particles properties and classification of nano materials, their advantages and applications.

COURSE CONTENT

Engineering Physics - II **Semester-II**

Teaching Scheme	**Examination Scheme**	
Lectures -3 Hrs/week	**End Semester Exam (ESE)**	**: 80 Marks**
	Duration of (ESE)	**: 3 Hours.**
	Internal Sessional Exam (ISE)	**: 20 Marks.**

Unit –I- Acoustics & Ultrasonic's **No of Lectures: 8 Hours, Marks: 16**

A) Acoustics- Elementary acoustics, Echo, Reverberation, Reverberation time, Sabine's formula(without derivation). Coefficient of absorption, Intensity Level, Loudness, decibel, Acoustic Intensity, Limits of Audibility, Acoustical planning of building, Factors affecting the architectural acoustics of building, Limits of audibility, Numericals

B) Ultrasonic's -Ultrasonic waves, Production of ultrasonic waves -by 1) Piezoelectric generator its merit & Demerit 2) Magnetostriction oscillator- Its merits & demerits Properties of ultrasonic. Engineering applications of ultrasonic, Numericals

Unit –II- Magnetic Materials and Superconductivity

No of Lectures: 8 Hours, Marks: 16

A) Magnetic Materials – Origin of Magnetism, Classification of magnetic materials into Para magnetism, Diamagnetism & Ferromagnetism, Hysteresis loop, Hard and Soft magnetic materials. Ferrites – production, properties & applications, Numericals

B) Superconductivity- Superconductor, Type-I & Type –II superconductor, Properties of superconductor, effect of impurity, magnetic field, pressure, stress etc on super conductor, Meissner's effect, Applications of superconductor. Numericals

Unit-III Modern Physics & Spectroscopy **No of Lectures: 8 Hours, Marks: 16**

A) Modern Physics: Motion of Charged particle in electric field, magnetic field, and Combined field, Electron microscope (SEM) , Positive rays, Block diagram, principle, and

working of Cathode ray oscilloscope, Bainbridge Mass Spectrograph(Principle ,Construction and Working) , Numericals

B) Spectroscopy- Zeeman Effect (normal and anomalous) experimental arrangement for Normal Zeeman Effect, Nuclear Magnetic Resonance, Magnetic Resonance Imaging, Numericals

Unit- IV Quantum Physics No of Lectures: 8 Hours, Marks: 16

Wave nature of matter, wave particle duality, De- Broglie's Wave, Wavelength of matter wave, concept of group velocity, phase velocity & wave packet, Heisenberg's uncertainty principle with illustration, Physical significance of wave function, Schrodinger's time independent and time dependent wave equation,, Application of Schrodinger's time independent wave equation to the problem of particle in rigid box.

Unit-V Nano science & Technology No of Lectures: 8 Hours, Marks: 16

Introduction of Nano particles, Properties of Nano particles (Optical, electrical, magnetic, structural, Mechanical), Brief description of different methods of synthesis (Physical, Chemical, Biological, Mechanical), Classification of Nano materials, Fabrication Process-Top-down approach, Bottom up Approach. Applications of nanotechnology
Advantages & Limitations of Nano-materials

Reference Books:

1. R K Gaur, S L Gupta, "Engineering Physics", Dhanpat Rai.
2. M R Srinivasan, "Physics for engineers", New Age International Publishers.
3. M N Avadhanulu, P G Kshrisagar, "Text book of Engineering Physics", S.Chand.
4. Brijlalal, Subramanyam, "Atomic and Nuclear Physics", S. Chand.
5. S K Kulkarni, "Nanotechnology, principles & Practices", Capital Publication Co.
6. Rajgopal, "Engineering Physics", PHI Learning Private Limited.
7. G S Raghuvanshi, "Engineering Physics", PHI Learning Private Limited.
8. G Vijayakumari, "Engineering Physics", Vikas Publishing House.
9. Hugh D Young, Roger A Freedman, "University Physics(With Modern Physics)", Pearson.
10. Uma Mukharji, "Engineering Physics", Narosa Publishing House.
11. S O Pillai, "Solid state Physics", New Age International Publishers.
12. Beiser , "Concept of modern physics", Tata macgraw-hill.
13. R B Singh, "Introduction to modern physics", New age Publication.

Engineering Chemistry - II

COURSE OUTLINE

Engineering Chemistry-II	**EC-II**	**FE222**
Course Title	Short Title	Course Code

Course Description:

This course is aimed at introducing the fundamentals of basic sciences to undergraduate students. The background expected includes a prior knowledge of chemistry from HSC (science) and familiarity with basic fundamental theories. The goals of the course are to understand the basic principles of Engineering Chemistry –II and their applications in different branches of engineering.

Lecture	**Hours / Week**	**No. of Weeks**	**Total Hours**	**Semester Credits**
	03	15	40	03

Prerequisite Course(S): 12th Chemistry, Different laws, basic principles and theories.

General Objectives:

To apply the knowledge of science in engineering and technology and also understand the basic concepts of chemistry and to analyze it from experiments.

Learning Outcomes:

After successful completion of this course the student will be able to:

a) Design and conduct experiments, analyze and interpret data.
b) Design a component, system or process to meet desired needs within realistic constraints.
c) An ability to function on multidisciplinary terms.
d) Identify, formulate and solve problems.
e) Understand the impact of engineering solutions in global, economic, environmental and societal context.
f) Ability to appreciate contemporary issues and engages in life-long learning.
g) Use the latest techniques, skills and modern tools necessary for engineering practices.
h) Understanding of the necessity to quantitatively balance the built environment with the natural world.
i) Understand the Classification of various fuels, their analysis by Bomb and Boy's Gas calorimeter.

j) Understand the mechanism, physical and chemical properties of lubricants and its applications.
k) Understand the preparation, basic properties and applications of Refractories.
l) Understand the types of corrosion and its mechanism. It will also help us to develop the corrosion control methods.
m) Understand the Water, Air Noise and Radioactive Pollution along with its control measures.

COURSE CONTENT

Engineering Chemistry-II **Semester-II**

Teaching Scheme **Examination Scheme**

Lectures -3 Hrs/week

End Semester Exams (ESE) : 80 Marks
Duration of (ESE) : 03 Hours
Internal Sessional Exam (ISE) : 20 Marks

Unit – I Fuels and Combustion **No. of Lect. – 08, Marks: 16**

a) Introduction – Definition, classification of Fuel, Calorific value & its units,
b) Characteristics of good fuel
c) Solid Fuel: Analysis of Coal-(i) Proximate analysis – Determination & its significance(ii) Ultimate analysis – Determination & its Significance
d) Determination of Calorific Value by Bomb calorimeter (Numerical based on it). Liquid Fuel: Refining & fractional distillation of LPG, petroleum, gasoline, diesel, kerosene. Power Alcohol: - Preparation, properties & Uses, Biodiesel – preparation, properties & uses. Gaseous Fuel: Preparation, properties & uses of (i) Water gas, (ii) Natural gas.
e) Determination of Calorific Value of gaseous Fuel/Volatile liquid by Boy's Gas Calorimeter (Numerical based on it).
f) Combustion: Chemical reactions, calculation on air requirement for combustion (Numerical based on it).

Unit – II Lubricant **No. of Lect. – 08, Marks: 16**

a) Introduction: Classification, characteristics.
b) Mechanism of lubrication – Fluid Film, boundary & extreme-pressure lubrication
c) Properties of lubricant –
   A. Physical properties with Experimental determination
      i. Viscosity & Viscosity Index by Red wood viscometer.
      ii. Flash & fire point by Pensky - Marten's apparatus
      iii. Cloud & pour points

iv. Oiliness

B. Chemical properties with determination
   i. Saponification value
   ii. Acid value
   iii. Emulsification

d) General Criteria for selection of lubricants for delicate machine, IC engine, gears, cutting tools, transformer & refrigeration system.

Unit – III Refractories **No. of Lect. – 08, Marks: 16**

a) Introduction,
b) Types of Refractories, Characteristics of Refractories
c) Preparation, Properties & application of acidic, basic & neutral Refractories
   (i) Acidic - Alumina, Silica, Fireclay.
   (ii) Basic - Magnesite, Dolomite.
   (iii) Neutral - Carbon, graphite.

Unit – IV Corrosion and Its control **No. of Lect. – 08, Marks: 16**

a) Introduction – definition, causes, consequences of corrosion
b) Dry & Wet Corrosion - explanation with mechanism.
c) Types of corrosion – Pitting, waterline, soil, inter granular, Stress corrosion.
d) Corrosion Control - Design & material selection, anodic & cathodic protection, hot dipping, galvanizing , tinning, electroplating , powder coating& surface coating.

Unit – V Environmental Pollution and Its control **No. of Lect. – 08, Marks: 16**

a) Introduction
b) Water Pollution: Methods to determine the extent of water pollution –BOD, COD, DO.
c) Causes, Effects and Control measures of water pollution,
d) Air Pollution: Acid Rain, Green house effects, Depletion of Ozone
e) Causes, Effect and Control measures of air pollution.
f) Noise Pollution :Causes, effects & Control of noise pollution
g) Radioactive pollution: Causes, effects & Control of Radioactive pollution.

Reference Books:

1. B K Sharma, “Engineering Chemistry”, Krishna Prakashan Media (P) Ltd.
2. Suba Ramesh “Engineering Chemistry”, Wiley India Pvt. Ltd.
3. Jain & Jain, “Engineering Chemistry “, Dhanpat Rai Publishing Co.
4. S S Dara, “A Text Book of Engineering Chemistry”, S. Chand & Co. Ltd.

5. R. Gopalan, “A Text book of Engineering Chemistry (Third Edition)”, Vikas Publishing House Pvt. Ltd.
6. B S Chauhan, “Engineering Chemistry”, University Science Press. Third Edition.
7. Shashi Chawla, “A Text book of Engineering Chemistry”, DhanpatRai Publishing Co.
8. Abhijit Mallick, “Engineering chemistry”, Viva books.
9. Sunita Ratan, “Engineering chemistry”, SK Kataria & Sons.
10. R K Das, “Industrial Chemistry”, Asia Publishing House
11. S Deswal, A Deswal, “Basic Course in Environmental Pollution”, Dhanpath Rai Publications.

Engineering Mathematics - II

COURSE OUTLINE

Engineering Mathematics -II	**EM-II**	**FE223**
Course Title	Short Title	Course Code

Course Description:

This course is aimed at introducing the fundamentals of basic Mathematics to undergraduate students. The background expected includes a prior knowledge of Mathematics from 12th science and familiarity with various laws, principles and theories. The goals of the course are to understand the basic principle of Mathematics and its application in different area.

Lecture	**Hours / Week**	**No. of Weeks**	**Total Hours**	**Semester Credits**
	03	15	40	03
Tutorial	01	15	13	01

Prerequisite Course(s): 12th Mathematics, different laws, principles and theorems.

General Objective:

The basic necessity for the foundation of Engineering and Technology being Mathematics, the main aim is to teach mathematical methodologies and models, develop mathematical skill and enhance thinking and decision making power of student.

Learning Outcomes:

After completion of this course learner will be able to:

a. Apply knowledge of mathematics in engineering and technology.
b. Identify, formulate and solve engineering problems.
c. Design Mathematical models for engineering problems and solve them.
d. Use partial derivative to find total derivative of implicit functions.
e. Use partial derivative to find Jacobians
f. Find error and approximate values of problems related to engineering field.
g. Draw the rough sketch of Cartesian and polar curves.

h. Evaluate multiple integrals using spherical polar and cylindrical polar coordinates.

i. Solve ordinary differential equations using numerical methods.

COURSE CONTENT

Engineering Mathematics-II **Semester-II**

Teaching Scheme	**Examination Scheme**	
Lecture: 3 hours / week	**End Semester Examination (ESE)**	**: 80 Marks**
Tutorial: 1 hour / week	**Paper Duration (ESE)**	**: 03 Hours**
	Internal Sessional Exam (ISE)	**: 20 Marks**

Unit-I: Calculus of function of several variables **No. of Lect.-08, Marks- 16**

a) Definition of Partial Derivative, Rules & Theorems of Partial Derivatives.
b) Euler's Theorem on homogeneous function.
c) Change of Independent Variable, Differentiation of Composite Function (1st order only).
d) Total Differentiation.
e) Differentiation of Implicit Function.

Unit-II: Application to Calculus of functions of several variables
No. of Lect.-08, Marks- 16

a) Jacobian and its applications. (Definition of Jacobian, chain Rule of Jacobian, Jacobian of implicit function, Functional dependence & independence).
b) Errors & approximations.(Problems related to engineering field)
c) Lagrange's method of undetermined multipliers for single constraint.

Unit-III: Curve Tracing and Fourier series **No. of Lect.-08, Marks- 16**

a) Curve Tracing
Cartesian & polar curves.
b) Fourier series
Full range Fourier series on $c \leq x \leq c + 2l$.
Half range Fourier series on $0 \leq x \leq l$.

Unit-IV: Multiple Integrals and its Applications **No. of Lect.-08, Marks- 16**

a) Introduction to three co-ordinate system.
b) Double integration.

(Cartesian form, polar form & change of order of integration).

c) Triple integration.

d) Application of multiple integrals to area & volume.

Unit-V: Numerical solution of ordinary Differential equation (first order and first degree)

No. of Lect.-08, Marks- 16

a) Numerical solution by Taylor's series method.

b) Runge -Kutta method (fourth order).

c) Picard's method.

d) Modified Euler's method.

Reference Books:

1. Erwin Kreyszig, "Advanced Engineering Mathematics", Wiley Eastern Ltd, 7th Edition.
2. C R Wylie, L C Barrett, "Advanced Engineering Mathematics", TMH 6th Edition.
3. B S Grewal, "Higher Engineering Mathematics", Khanna Publication.
4. H K Das, "Advanced Engineering Mathematics", S. Chand & Company.
5. B V Ramana , "Engineering Mathematics", TMH,2nd Edition.
6. N P Bali, "A Text Book of Engineering Mathematics", Laxmi Publication, New Delhi.
7. Babu Ram, "Engineering Mathematics", Pearson Education.
8. S S Shastri , "Numerical Methods", Printice Hall of India.
9. Kandasamy , "Numerical Methods", S. Chand & Company.

Elements of Electrical & Electronics Engineering

COURSE OUTLINE

Elements of Electrical & Electronics Engineering	EEEE	FE224
Course Title	Short Title	Course Code

Course Description:
This course provides an introduction to electrical and electronics engineering covering: basic electric circuit quantities and circuit analysis techniques; semiconductor devices such as diodes, transistors and operational amplifiers and their application; logic gates and their applications, introduction to Microprocessor and Micro-controller; and study of different transducers.

Lecture	Hours / Week	No. of Weeks	Total Hours	Semester Credits
	03	15	45	03

Prerequisite Course(s): knowledge of Physics at HSC level.

General Objective:

The objective of the course is to provide students with a firm grasp of the essential principles of electric circuit analysis and basic electronics. This course will help student to understand the concepts and terminology that are used in electrical and electronics engineering. It is not an in-depth electrical/electronic course but, rather a course aimed at acquiring an understanding of basic principles that are used in electrical/electronic engineering.

Learning Outcomes:

Upon successful completion of this course the student will be able to:

a) Cary out circuit reduction using series parallel, star delta and/or source transformation method.
b) Analyze DC circuits by using Loop analysis and Nodal analysis method and DC circuit Theorems.
c) Explain various terms related to AC quantities such as R.M.S. value, Average value, Form factor, Crest factor. Phase and phase difference.
d) Draw and Explain phasor diagrams of sinusoidal AC quantities and explain the terms impedance, reactance, admittance, conductance and susceptance. Active, reactive and apparent power.
e) Understand generation of 1-ϕ & 3-ϕ EMF.

f) Understand working principle of PN junction diode, Zener diode and their applications.
g) Describe different configuration of Bipolar Junction Transistor.
h) Understand CE amplifier and working of transistor as a switch.
i) Describe and Understand difference between unregulated and regulated power supplies, DC power supply and its various building blocks.
j) Understand operating principle of various transducers and their applications.
k) Understand operational amplifier and its applications.
l) Describe use of the Basic gate and Universal gate.
m) Understand block diagram of 8085 and 8051.
n) Describe types of Earthing, Fuses and lamps.

COURSE CONTENT

Elements of Electrical & Electronics Engineering **Semester-II**

Teaching Scheme	**Examination Scheme**	
Lecture: 3 hours / week	**End Semester Examination (ESE)**	**:80 Marks**
	Paper Duration (ESE)	**: 03 Hours**
	Internal Sessional Exam (ISE)	**: 20 Marks**

Unit-I: DC Circuits **No of Lect. – 9, Marks: 16**

a) Review of series and parallel circuits.
b) Kirchhoff's current and voltage law and their applications.
c) Loop analysis and Nodal analysis.
d) Ideal/practical voltage/current sources and Source conversion.
e) Superposition, Thevenin's, Norton's and Maximum power transfer theorem.
f) Star to Delta and Delta to star conversion.

Unit-II: AC Circuits **No of Lect. – 9, Marks: 16**

a) Generation of single phase AC and terms related to sinusoidal waveforms.
b) Definitions and derivation of RMS value, Average value, Form factor, Crest factor.
c) Phasor representation of AC quantities, voltage-current phasor diagram, addition of AC quantities, complex notation (rectangular and polar form) for AC quantities.
d) AC through pure resistance, pure inductance, pure capacitance, RL, RC, RLC series/parallel circuits- concept of impedance, reactance, admittance, conductance, susceptance and their voltage / current phasor diagram.
e) Concept of active, reactive, apparent power and power f\actor.
f) 3-ϕ EMF generation and equation of 3-ϕ EMFs.

g) Relation between line/phase voltages, currents in Star /Delta connected system with phasor diagrams and relation for three phase power.

Unit-III: Semiconductor Devices **No of Lect. – 9, Marks: 16**

a) Introduction to PN junction diode.
b) Application as a rectifier: Half wave, Full wave and Bridge rectifier.
c) Introduction to Zener diode, its working and Characteristics.
d) Transistor configurations: CB , CE & CC.
e) Transistor specifications: - alpha, beta and gamma and their relation.
f) Working of transistor as a switch and CE amplifier.
g) Transistor biasing – Voltage Divider Bias.

Unit-IV: D C Power Supplies, Transducers & Op-Amp. **No of Lect. – 8, Marks: 16**

a) DC Regulated power supplies Block diagram.
b) Zener shunt regulator and Transistor series regulator.
c) Definition and operating principle of RTD, Thermistor, LVDT, Potentiometer, strain gauge transducers.
d) Virtual ground concept of Op-Amp, applications - Inverting, non-inverting amplifier & as a comparator.

Unit-V: Digital Electronics, Automation, Earthing, Fuses and Lamps
No of Lect. – 9, Marks: 16

a) Definition of: Generation of Integrated Circuits- SSI, MSI, LSI and VLSI.
b) Logic gates - AND, OR, NOT, NAND, NOR, X-OR, X- NOR their truth table.
c) De-Morgan's theorem. Adder & Subtractor circuit.
d) Microprocessor-8085 and Microcontroller-8051 block diagram.
e) Safety precautions, types of Earthing and Fuses.
f) Operating principle of lamps.

Reference Books:

1. B L Theraja and A K Theraja, "A Text book of Electrical Technology- Vol-I", S Chand, 1st Edition, 2001
2. S Salivahanan, N Sureshkumar and A Vallavaraj, "Electronics Devices and Circuits", TMH, 2nd Edition, 2009
3. R S Sedha, "Applied Electronics", S Chand, 1st Edition, 2005
4. H S Kalsi, " Electronic Instrumentaion", TMH, 2nd Edition, 2007
5. R A Gaikwad, "Op-Amps and Linear Integrated Circuits", PHI, 4th edition, 2001
6. R P Jain, "Modern Digital Electronics", TMH, 4th Edition, 2010
7. R S Gaonkar, "Microprocessor Architecture, Programming and Application with the 8085", Penram International, 4th Edition, 2000

8. S K Bhattacharya, “Basic Electrical and Electronics Engineering”, Pearson Education, 1st Edition, 2012
9. J B Gupta, “ A Course in electrical Power ”, S K kataria and Sons, 12th Edition, 2002

Engineering Drawing & Elements of Mechanical Engineering

Course Outline

Engineering Drawing & Elements of Mechanical Engineering	ED & EME	FE225
Course Title	Short Title	Course Code

Course Description:

This course provides the elementary level knowledge of Engineering Drawing and Elements of Mechanical Engineering. Course includes introduction to Engineering Drawing, Orthographic Projection, Isometric view and Isometric Projection. The course also introduces students to concept of Energy and energy conservation, Energy management & Audit, Conventional Energy Sources, Working Principle of Work producing devices, work absorbing devices and various mechanical devices.

Lecture	Hours / Week	No. of Weeks	Total Hours	Semester Credits
	03	15	45	03

Prerequisite Course(s): Fundamental knowledge of Physics of 11^{th} and 12^{th}.

General Objective:

This course covers introduction to Engineering Drawing, Orthographic Projection, Isometric view and Isometric Projection. The course also introduces students to concept of Energy and energy conservation, Energy management & Audit, Conventional Energy Sources, Working Principle of Work producing devices, work absorbing devices and various mechanical devices.

Learning Outcomes: Upon successful completion of this course the student will be able to:

a) Use various drawing instruments to layout and draw a sheet.
b) Explain various types of lines used, Lettering, Numbering and Dimensioning and Scales.
c) Draw and explain Planes of projection, quadrants and first angle & third angle method of projection.
d) Illustrate Principles of Orthographic projection by Projection of straight line and plane in 1^{st} and 3^{rd} quadrant.
e) To draw front view, Top View and side View of Simple objects.
f) Orthographic projection with different sections and Conversion of simple views into orthographic views.
g) Illustrate Principles of Isometric projection and Isometric view.
h) Conversion of given orthographic view into isometric view.
i) Describe Energy, Different forms of energy and mass conservation laws.
j) Understand non Renewable energy sources and Renewable energy sources.
k) Explain energy management strategy and energy audit.

l) Illustrate with principle various conventional energy producing devices and energy absorbing devices.

m) Illustrate with principle various power transmission elements, drives, direction and flow control valves.

n) Explain types of Actuators, Simple Hydraulic & Pneumatic power unit with its applications, merits and demerits.

COURSE CONTENT

Engineering Drawing & Elements of Mechanical Engineering Semester-II

Teaching Scheme	**Examination Scheme**	
Lecture: 3 hours / week	**End Semester Examination (ESE)**	**: 80 Marks**
	Paper Duration (ESE)	**: 03 Hours**
	Internal Sessional Exam (ISE)	**: 20 Marks**

Unit-1 Introduction to Engineering Drawing No of Lect. – 9, Marks: 16

a Significance and scope of Engineering Drawing, use of Drawing instruments, Sheet layout.

b Types of lines used, Lettering, Numbering and Dimensioning - aligned and unidirectional systems, Scales.

c Planes of projection, Horizontal Plane, Vertical Plane, four quadrants and first angle & third angle method of projection.

d Principles of Orthographic projection.

e Projection of a point in different quadrants.

f Projection of straight line and plane in 1st quadrant strictly INCLINED TO ONE PLANE only.

Unit-2 Orthographic Projection No of Lect. – 9, Marks: 16

a Introduction to Orthographic Projection.

b To draw front view, Top View and side View of Simple objects in different positions using both 1st angle method and 3rd angle method.

c Orthographic projection with different sections (Full section, half section, revolved section, offset section, etc) and Conversion of simple views into orthographic views.

Unit-3 Isometric projection No of Lect. – 9, Marks: 16

a Introduction, Isometric axes, lines and planes

b True scale and isometric scale.

c Isometric projection and Isometric view.

d Conversion of given orthographic view into isometric view.

Unit-4 Energy No of Lect. – 9, Marks: 16

a Energy, energy and mass conservation laws, Different forms of energy, Heat Transfer, Work Transfer and it form.

b Energy management strategy, energy audit: types and methodology,

energy audit reporting format. Energy producing devices.

c Conventional energy Sources – Heat Engines such as I. C. Engine (2S and 4S Engines, Diesel and Petrol engines),

d Steam Power Plant, hydroelectric power plant, water turbine

e Nuclear power plant, gas turbine power plant.

Unit-5 Energy absorbing devices and Mechanical devices

No of Lect. – 9, Marks: 16

a **Energy absorbing devices** – reciprocating air compressor and pump, centrifugal pump, rotary pump, blower, air motors, household refrigerator and window air conditioner.

b **Mechanical devices:**

Elements: power transmission shafts, axles, keys, couplings, bearings

c **Drives**: types of drives, belt drive, rope drive, chain drive, gear drive and friction clutches.

d **Valves**: Various types of Pressure, Direction & Flow control valves & their applications, On-off valves, flow control valves, non return valve, pressure regulating valve, throttle valve, butterfly valve, and solenoid operated valve.

e Various types of Actuators, Simple Hydraulic power unit and Pneumatic power unit.

f Applications, advantages and disadvantages of Hydraulic and Pneumatic systems.

Reference Books:

1. Bhatt N D, Panchal V M, "Engineering Drawing – Plane and Solid Geometry", Charotar Publishing House.
2. Rajan T S, "Basic Mechanical Engineering", New Age International, New Delhi.
3. T Jeyapoovan, "Engineering Drawing and Graphics Using Autocad", Vikas Publication Noida, New Delhi.
4. Kannaiah K L, Narayana, "Engineering Graphics", Scitech Pub, Chennai, 2nd Edition
5. H G Phakatkar, "Engineering Graphics", Nirali Publication, Pune.
6. Nag P K, "Engineering Thermodynamics", McGraw Hill.
7. Thomas Beven, "Theory of Machines", Pearson.
8. Rattan S S, "Theory of Machines", McGraw Hill.
9. Khan B H, "Non Conventional Energy Resources", Tata McGraw Hill, New Delhi.
10. Rai G D, "Non Conventional Sources of Energy", Khanna Publication, New Delhi.
11. David G Alciatore, Michael Histand, "Introduction to Mechatronics and Measurement Systems", McGraw-Hill, 2003
12. H L Stewart, "Hydraulics and Pneumatics Power for Production", Industrial Press Inc. N.Y. USA, 2001

(Engineering Science Lab-II)

LAB COURSE OUTLINE

(Engineering Science Lab-II)

Engineering Science Lab-II	**ES-II LAB**	**FE 226**
Course Title	Short Title	Course Code

Laboratory (Alternate week)	**Hours/ Week**	**No. of Weeks**	**Total Hours**	**Semester Credits**
	02	15	26	1

Engineering Physics – I

Course Description:

In this laboratory, course emphasis is on the understanding of basic principles, working of ultrasonic interferometer, ultrasonic detector, sound level meter, motion of charged particle (e/m), hysteresis curve, properties of magnetic material, production of magnetic field, working of CRO synthesis and characterization of metal nano particles etc. The learner here can use this knowledge and apply in various branches of engineering as required.

Prerequisite Course(s): Course of Physics at HSC level.

General Objective:

The objective of the laboratory is to impart the fundamental knowledge of physics to the students and develop their ability to apply the specific procedures to analyze the experimental results.

In this lab, students will be familiar with the use of different equipments, basic principles, properties etc which they can apply in various disciplines of engineering during their studies and in future.

Learning Outcomes: After successful completion of this lab; student will be able to:

a) Use the latest techniques, skills, and modern tools necessary for engineering practices.

b) Design a component, system or process to meet desired needs with in realistic constraints

c) Describe the use of sound level meter

d) Describe ultrasonic wave and analyze its velocity

e) Analyze e/m of an electron and describe motion of electron in electric field.

f) Can understand and draw Hysteresis curve (B-H curve)
g) Describe and analyze the magnetic materials and their properties.
h) Describe working CRO and its uses.
i) Can understand the synthesize & characterization of Nano composites and describe its properties.

LAB COURSE CONTENT

(Engineering Science Lab-II)

Practical -2 Hrs/Alternate weeks (Alternate with Engg. Chemistry- II)

(Note: Minimum FIVE Experiments from the following)

1. Sound Level Meter

a) To measure sound pressure in decibel
b) To study the use of sound level meter

2. Ultrasonic Interferometer.

a) Determine velocity of ultrasonic wave in water
b) Study the properties of ultrasonic waves and its application
c) Compare analytical and practical values.

3 Ultrasonic Detectors

a) Determine distance, wavelength and velocity of ultrasonic wave.
b) Study the production of ultrasonic wave.
c) Compare analytical and practical values.

4. e/m by Thomson's method.

a) To determine specific charge of electron by using Thomson's method.
b) To study motion of electron in electric field.
c) Compare analytical and practical values.

5) To Study B-H curve

a) To study and draw hysteresis curve using solenoid method.
b) Find remanance and coercive force.

6) Determination of Magnetic Susceptibility.

a) To determine magnetic susceptibility of given solution.
b) To study the properties of magnetic materials.
c) To study working of electromagnet to produce magnetic field.

7) Uses of CRO

a) To study working of CRO.
b) Use of CRO to find frequency and amplitude.

c) Compare analytical and practical values.

8) Synthesis and Characterization of Nano Composites

Synthesis and characterization of metal nanoparticle like ZnO, CdP, Fe, Ag or Core shell by electrochemical reduction process/ultrasonic cavitation/microwave/sol-gel technique at room temperature. Size of metal nanoparticles can be calculated from XRD and Shearer's formula. Shape and exact size of metal nanoparticles can be confirmed using Transmission Electron Microscope (TEM).

Reference Books:

1. R K Gaur, S L Gupta, Dhanpat Rai, "Engineering Physics".
2. M R Srinivasan, "Physics for engineers", New Age International Publishers.
3. M N Avadhanulu, P G Kshrisagar,"Text book of Engineering Physics", S.Chand.
4. Brijlalal, Subramanyam, "Atomic and Nuclear Physics", S. Chand.
5. S K Kulkarni, "Nanotechnology, principles & Practices", Capital Publication Co.
6. Rajgopal, "Engineering Physics", PHI Learning Private Limited.
7. G S Raghuvanshi, "Engineering Physics", PHI Learning Private Limited.
8. G Vijayakumari, "Engineering Physics", Vikas Publishing House.
9. Hugh D Young, Roger A Freedman, "University Physics(With Modern Physics)", Pearson.
10. Uma Mukharji, "Engineering Physics", Narosa Publishing House.
11. S O Pillai, "Solid state Physics", Wiley Eastern.
12. Beiser , "Concept of modern physics", Tata macgraw-hill.
13. R B Singh, "Introduction to modern physics", New age Publication.
14. Satyapraksah, "Quantum Mechanics", Pragati Prakashan

Engineering Chemistry-II

LAB COURSE OUTLINE

Course Description:

In this laboratory, course emphasis is on the understanding of basic principles, working of pH-meter, Bomb calorimeter, Ostwald's Viscometer, various properties of lubricating oils, proximate analysis of fuels etc. The learner here can use this knowledge and apply in various branches of engineering as required.

Prerequisite Lab Course(S): 12th Chemistry, Different laws, basic principles and theories.

General Objectives:

This course is intended to provide engineering students with a background in important concepts and principles of chemistry and emphasis on those areas considered most relevant in an engineering context, and practical applications in engineering and technology.

Learning Outcomes:

Upon successful completion of lab Course, student will be able to:

a) Analyze the partition Coefficient of Iodine between water & CCl_4.
b) Analyze the saponification value of given oil sample.
c) Analyze the viscosity of given liquid by Ostwald's Viscometer.
d) Analyze the Calorific value of fuel sample by using Bomb calorimeter.
e) Identify the Moisture content, Volatile matter, Ash content and Fixed carbon in coal sample by proximate analysis.
f) Identify the acidic and basic solution by using pH-meter.
g) Analyze the acid value of Vegetable Oil sample.
h) Analyze the strength of $NaHCO_3$ and NA_2CO_3 in alkali mixture.
i) Analyze the Aniline point of lubricating oil.
j) Analyze the Iodine value of an Oil sample by Wij's method.

LAB COURSE CONTENT

(Engineering Science Lab-II)

Practical: 2 hour/ week (Alternate with Engineering Physics-II)

***ICA (Internal Continuous Assessment) marks of 25 are for practical's in Engineering Physics - II &Engineering Chemistry – II.**

(Note: Minimum FIVE Experiments from the following)

1. Determination of partition Coefficient of Iodine between water & CCl_4.
   a. Preparation of different composition of saturated Iodine solution in CCl_4.
   b. Separation of Aqueous and CCl_4 layer from each bottle.
   c. Titration of Aqueous layer against N/100 Sodium Thiosulphate solution.
   d. Titration of CCl_4 layer against N/20 Sodium Thiosulphate solution.
   e. Calculation of Iodine in both the layers.

2. Determination of saponification value of oil.
   a. Preparation of std. KOH solution.
   b. Standardisation of Std. KOH solution against 0.5N HCL solution using Phenolphthalein indicator.
   c. Add KOH solution in 2 gm of Oil sample and reflux for 2 hours.
   d. Titrate the above solution against 0.5N HCL solution using Phenolphthalein

indicator.

e. Using two titrate values calculate the saponification number.

3. Determination of Viscosity by Ostwald's Viscometer.
   a. Find out the density of given liquid by using specific gravity bottle.
   b. Measure the flow time required for liquid and water by using Ostwald's Viscometer.
   c. Calculate the relative viscosity from the above observed values.

4. Determination of Calorific value of fuel sample by using Bomb calorimeter.
   a. Burn the known mass of solid fuel in Bomb pot.
   b. Observe the temperature difference of water in bomb pot.
   c. Calculate the actual and corrected calorific value of solid fuel sample from above observations.

5. Determination of Moisture, Volatile matter & Ash in a given sample of Coal (Proximate analysis).
   a. Determine and calculate the moisture content from the given coal sample.
   b. Determine and calculate the Volatile matter from the given coal sample.
   c. Determine and calculate the Ash content from the given coal sample.
   d. Determine and calculate the Fixed Carbon from the given coal sample.

6. Use of pH meter.
   a. Calibrate the pH-meter using buffer solution at room temperature.
   b. Measure the pH-values of given solutions.
   c. From the measured pH-values of solution, conclude which are acidic or basic solutions.

7. Acid Value of vegetable Oil sample.
   a. Add neutral alcoholic solution in given Oil sample and heat in water bath for 30 minutes.
   b. Titrate above solution against 0.1N KOH solution using phenolphthalein indicator.
   c. Calculate the acid value of given Vegetable Oil sample from above observations.

8. Determination of $NaHCO_3$ & Na_2CO_3 in given alkali mixture.
   a. Titration of alkali mixture solution against 0.1N HCl using methyl orange indicator.
   b. Titration of alkali mixture solution against 0.1N HCl using phenolphthalein indicator.
   c. Calculate the strength of $NaHCO_3$ and NA_2CO_3 from the above observed titrate values.

9. Determination of Aniline point of lubricating oil.
    a. Mixed Aniline and lubricating oil sample in Aniline point apparatus.
    b. Maintain the apparatus at constant temperature using water bath.
    c. Observe the temperature at which cloudiness and hazy appearance in the solution.
    d. Report the observed values as Aniline point.

10. Determination of Iodine value of an Oil sample (Wij's method).
    a. Back Titration: Dissolve the given oil sample in CCl_4 solution then add Wij's solution.
    b. Titrate the above solution against std. 0.1N Sodium Thiosulphate solution.
    c. Blank Titration: In Wij's solution add KI solution and titrate it against 0.1N sodium Thiosulphate solution.
    d. Calculate the Iodine value of an oil sample from above observed titrate values.

Reference Books:

1. B K Sharma, "Engineering Chemistry", Krishna Prakashan Media (P) Ltd.
2. Subaramesh, "Engineering Chemistry, Wiley India Pvt. Ltd.
3. Jain & Jain, "Engineering Chemistry ", Dhanpat Rai Publishing Co.
4. S S Dara, "A Text Book of Engineering Chemistry", S. Chand & Co. Ltd.
5. R. Gopalan, "A Text book of Engineering Chemistry (Third Edition)", Vikas Publishing House Pvt. Ltd.
6. B S Chauhan, "Engineering Chemistry", University Science Press. Third Edition.
7. Shashi Chawla, "A Text book of Engineering Chemistry", DhanpatRai Publishing Co.
8. Abhijit Mallick, "Engineering chemistry", Viva books.
9. Sunita Ratan, "Engineering chemistry", SK Kataria & Sons.
10. R K Das, "Industrial Chemistry", Asia Publishing House.
11. S Deswal, A Deswal, "Basic Course in Environmental Pollution", Dhanpat Rai Publishing Co.

Guide lines for ICA :

ICA (Internal Continuous Assessment) marks of 25 are for practicals in Engineering Physics -II & Engineering Chemistry – II.

ICA shall be based on continuous evaluation of student performance throughout semester and practical assignment submitted by the student in the form of journal.

Engineering Drawing & Elements of Mechanical Engineering Lab

LAB COURSE OUTLINE

Engineering Drawing & Elements of Mechanical Engineering	ED & EME LAB	FE227
Course Title	Short Title	Course Code

Course Description:

This lab includes drawing sheets related to Engineering Drawing and labs related to elementary level knowledge of Elements of Mechanical Engineering.

	Hours per Week	No. of Weeks	Total Hours	Semester Credits
Laboratory	4	15	60	2

ESE Pattern: Oral (OR)

Prerequisite Course(s): 11th Physics, 12th Physics

General Objective:

In this lab, students will imbibe essentials of Engineering Drawing through progressive practice of Orthographic Projection, Isometric view and Isometric Projection. Students will also get familiar with principle and working of boilers, boiler mountings & accessories and mechanical devices used to transmit power.

Objective to develop following Intellectual skills:

a) Identify elements of given Engineering Drawing.
b) Interpretation of given engineering drawing.
c) Understand Orthographic projection.
d) Understand Isometric projection and Isometric view.
e) Understand principle and working of Boiler, its mountings & accessories.
f) Understand principle and working of power transmission devices.
g) Understand principles of energy audit of domestic devices.

Objective to develop following Motor skills:

a) Ability to layout a drawing sheet and apply basic drawing concepts to it.
b) Ability to draw Orthographic projection of given object.
c) Ability to draw Orthographic projection with section view.
d) Ability to draw Isometric projection and Isometric view of given object.
e) Ability to perform energy audit of domestic devices.

Learning Outcomes:

Upon successful completion of these practical the student will be able to

a) Read the given engineering drawing sheet.
b) Interpret different views of given engineering object.
c) Construct an orthographic projection i.e. front view, top view, side views of an object.
d) Prepare an orthographic projection with section of an object.
e) Construct an isometric projection of an object.
f) Prepare an isometric view of an object.
g) Convert orthographic projections of given object into isometric drawing.
h) Illustrate principle and working of fire tube and water tube boiler.
i) Illustrate principle and working of boiler mountings and accessories.
j) Explain principle and working of power transmission devices.
k) Illustrate energy audit of simple domestic appliances.

LAB COURSE CONTENT

Engineering Drawing Lab

1 Sheet No. 01 - Lines, Lettering and methods of dimensioning.

A. Illustration of lettering, numbering, types of lines.
B. Sketch of symbols for 1st and 3rd angle method of projection.
C. Illustration with a simple drawing with at least 2 views to show uses of line types and methods of dimensioning.

2 Sheet No. 02 – Projection of lines and planes.

A. Illustration of projection of straight line in 1st quadrant strictly INCLINED TO ONE PLANE only. [Minimum 02 solved examples]
B. Illustration of projection of plane in 1st quadrant strictly INCLINED TO ONE PLANE only. [Minimum 02 solved examples]

3 Sheet No. 03 – Orthographic Projection.

A. Illustration of simple orthographic projection using both 1st angle and 3rd angle method. [Minimum 02 solved examples]
B. Illustration of sectional orthographic projection using both 1st angle and 3rd angle method. [Minimum 02 solved examples]

4 Sheet No. 04 – Isometric Projection

A. Illustration of Isometric projection with natural scale.
   [Minimum 02 solved examples]
B. Illustration of Isometric projection with isometric scale.
   [Minimum 02 solved examples]

5 Sheet No. 05 – freehand sketches of Machine elements.

A. Free hand sketches of machine elements including screw threads, screwed fasteners, nuts, bolts, riveted and welded joints, Keys, shaft, couplings. (With constructional details.)
B. Introduction to limits, fits and tolerance.

Elements of Mechanical Engineering Lab

6 Demonstration and Study of Cochran and Lancashire boiler.

a. Study the principle, construction and working of Cochran boiler.
b. Demonstrate construction and working of Cochran boiler using chart/model/multimedia.
c. Study the principle, construction and working of Lancashire boiler.
d. Demonstrate construction and working of Cochran boiler using chart/model/multimedia.
e. Discuss relative merits and demerits.

7 Demonstration and Study of Babcock and Wilcox boiler.

a. Study the principle, construction and working of Babcock and Wilcox boiler.
b. Demonstrate construction and working of Babcock and Wilcox boiler using chart/model/multimedia.
c. Discuss relative merits and demerits with fire tube boilers.

8 Demonstration and Study of boiler mountings.

a. Study the principle, construction and working of various boiler mountings.
b. Demonstrate various boiler mountings using chart/model/multimedia.

9 Demonstration and Study of boiler accessories.

a. Study the principle, construction and working of various boiler accessories.
b. Demonstrate various boiler mountings using chart/model/multimedia.

10 Demonstration and Study of power transmission - Single plate clutch, oldham coupling, Hook's Joint.

a. Study the principle, construction and working of Single plate clutch, Oldham coupling, Hook's Joint.
b. Demonstrate various Single plate clutches, Oldham coupling, and Hook's Joint using chart/model/multimedia.

11 Measurement of energy consumption of domestic appliances.

a. Lab demonstration of measurement of energy consumed in kWh for simple household appliances.
b. Students will conduct such experiment at home and submit a case study.

12 Measurement of thermal efficiency of domestic cooking devices.

a. Lab Demonstration of measurement of energy consumed and thermal efficiency of simple household appliances using simple measurement techniques.
b. Students will conduct such experiment at home and submit a case study.

Note: FIVE drawing sheets from ED Lab and FIVE practical from EME Lab shall be conducted during 15 weeks available during semester.

Reference Books:

1. Bhatt N D, Panchal V M, "Engineering Drawing – Plane and Solid Geometry", Charotar Publishing House.
2. Rajan T S, "Basic Mechanical Engineering", New Age International Pvt. Ltd, New Delhi.
3. T Jeyapoovan, "Engineering Drawing and Graphics Using Autocad", Vikas Publication Noida, New Delhi.
4. Kannaiah K L, Narayana, "Engineering Graphics", Scitech Publications, Chennai, 2nd Edition
5. H G Phakatkar, "Engineering Graphics", Nirali Publication, Pune.
6. Nag P K, "Engineering Thermodynamics", McGraw Hill.
7. Thomas Beven, "Theory of Machines", Pearson.
8. Rattan S S, "Theory of Machines", McGraw Hill.
9. Khan B H, "Non Conventional Energy Resources", Tata McGraw Hill, New Delhi.
10. Rai G D, "Non Conventional Sources of Energy", Khanna Publication, New Delhi.
11. David G Alciatore, Michael Histand, "Introduction to Mechatronics and Measurement Systems", McGraw-Hill, 2003
12. H L Stewart, "Hydraulics and Pneumatics Power for Production", Industrial Press

Inc. N.Y. USA, 2001

Guide lines for ICA:

ICA shall be based on continuous evaluation of student performance throughout semester and practical assignment submitted by the student in the form of journal.

Guide lines for ESE:

ESE will be based on practical assignments submitted by the student in the form of journal. Evaluation will be based on paper work.

Elements of Electrical & Electronics Engineering Lab

LAB COURSE OUTLINE

Elements of Electrical & Electronics Engineering Lab	**EEEE LAB**	**FE228**
Course Title	Short Title	Course Code

Course Description:

In this laboratory course emphasis is on the understanding of the characteristics of basic circuits that use resistors, capacitors, diodes, bipolar junction transistors, Op-Amp, logic gates, transducers etc. The students can use this knowledge to analyze more complex circuits such as complex electrical networks, rectifiers, amplifiers, digital circuits, circuits using transducer etc.

	Hours per Week	No. of Weeks	Total Hours	Semester Credits
Laboratory	2	15	30	1

ESE Pattern: Practical (PR)

Prerequisite Course(s): Course on physics at HSC level.

General Objective:

The objective of this lab is to impart the fundamental knowledge of electrical and electronics engineering to the students and to develop the students ability to apply the specific procedures to analyze the electrical and electronics engineering Systems.

In this lab, students will be familiar with use of different theorems to analyze electrical networks. Students will also become familiar with various basic analog and digital electronic circuits.

Learning Outcomes:

Upon successful completion of the lab student will be able to

a) Analyze DC networks by using Kirchhoff's Voltage Law and Current Law.
b) Analyze RLC series circuit.
c) Apply superposition theorem to a D.C. network.
d) Apply Thevenin's Theorem to a D.C. network and develop Thevenin's equivalent circuit.
e) Describe operation and construction of different types of lamps.
f) Describe the need and types of earthing.
g) Identify Electronics Components.
h) Analyze half, full and bridge wave rectifier.

i) Analyze transistor, Op-Amp and Digital Circuits.
j) Describe operating principle of LVDT and its application for displacement measurement.

LAB COURSE CONTENT

(Note: Minimum FOUR Experiments from each group.)

Group A

1. Verification of Kirchhoff's laws.

a. Measure Voltage and current in a dc circuit for each element.
b. Find the analytical solution for the circuit to calculate the voltages and currents for each element.
c. Compare analytical and the practical values.
d. Verification of Kirchhoff's voltage law and current law.

2. Study of RLC series circuit.

a. Measure voltages and current of series RLC circuit. (V_R, V_L, V_C, I)
b. Calculate/measure the values for resistance, inductive reactance, and capacitive reactance of the circuit. .
c. Calculate the impedance, inductance, capacitance and power factor of circuit.
d. Draw the phasor diagram for the circuit quantities.

3. Verification of Superposition Theorem.

a. Apply superposition theorem to find analytical values of the branch currents for the given D.C. network.
b. Measure the branch current of the network with both the sources acting simultaneously and also with each source alone at a time.
c. Compare the analytical and measured values of the currents.

4. Verification of Thevenin's Theorem.

a. Find the analytical solution for the load current for the given DC circuit using Thevenin's theorem.
b. Measure the open circuit voltage, equivalent resistance and load current in network.
c. Develop Thevenin's equivalent circuit from measured values.
d. Compare the analytical and practical values.

5. Study of lamps.

a. Describe operation and construction of filament lamp.
b. Describe operation and construction of Mercury vapor lamp.
c. Describe operation and construction of fluorescent tube.
d. Describe operation and construction of Sodium vapor lamp.
e. Describe operation and construction of CFL lamp.

6. Study of Earthing.

a. Describe the Need of Earthing.
b. Describe the Earthing types.
c. Describe types of Fuse and safety precaution working with electricity.

Group B

7. Study and testing of electronics components and their terminals.

a. Identify the values of resistance, inductance, capacitor (mica, electrolyte etc) and identify terminals of diode and transistor.
b. Testing of resistance, inductance, capacitor (mica, electrolyte etc), diode, and transistor using multi meter.

8. Displacement measurement using LVDT.

a. Describe working principle of displacement transducer.
b. Describe how displacement is converted into voltage.
c. Find out the output voltage.

9. Study of half wave, full wave and bridge rectifier.

a. Compare the input and output voltage waveforms for half wave, full wave and bridge rectifier.
b. Measure output DC voltage for half wave, full, and bridge rectifier.

10. Implementation of inverting and non inverting amplifier using Op-Amp.

a. Describe use of Op-Amp as amplifier.
b. Calculate theoretical output voltage of inverting and non-inverting amplifier and find out gain of Op-Amp.
c. Compare measured values and Theoretical values.

11. Input output characteristics curve for CE configuration of transistor.

a. Describe use of Transistor as amplifier.
b. Draw Input Output Characteristics curves for CE configuration of transistor.
c. Describe which configuration is commonly used and why?
d. Compare CC, CB, & CE configuration.

12. Implementation of simple Boolean expression using logic gates.

a. Simplification of any Boolean expression.
b. Implementation of any Boolean expression using basic gate.
c. Implementation of any Boolean expression using universal gate.

Reference Books:

1. B L Theraja and A K Theraja, "A Text book of Electrical Technology- Vol-I", S Chand, 1st Edition, 2001
2. S Salivahanan, N Sureshkumar and A Vallavaraj, "Electronics Devices and Circuits", TMH, 2nd Edition, 2009
3. R S Sedha, "Applied Electronics", S Chand, 1st Edition, 2005
4. H S Kalsi, " Electronic Instrumentaion", TMH, 2nd Edition, 2007
5. R A Gaikwad, "Op-Amps and Linear Integrated Circuits", PHI, 4th edition, 2001
6. R P Jain, "Modern Digital Electronics", TMH, 4th Edition, 2010
7. R S Gaonkar, "Microprocessor Architecture, Programming and Application with
   the 8085", Penram International, 4th Edition, 2000
8. S K Bhattacharya, "Basic Electrical and Electronics Engineering", Pearson Education, 1st Edition, 2012
9. J B Gupta, " A Course in electrical Power ", S K kataria and Sons, 12th Edition, 2002

Guide lines for ICA:

ICA shall be based on continuous evaluation of student performance throughout semester and practical assignment submitted by the student in the form of journal.

Guide lines for ESE:

ESE will be based on practical assignment submitted by the student in the form of journal. In ESE the student may be asked to perform any one practical out of Group A and Group B. Evaluation will be based on paper work and performance in the practical.

Workshop Practice- II

LAB COURSE OUTLINE

Workshop Practice II	**WP-II**	**FE229**
Course Title	Short Title	Course Code

Course Description:

Workshop Practice II covers the basic knowledge and practices on Carpentry shop, Plumbing shop, Machine shop, and Electronics and Electrical workshop in order to improve the practical skill of students in different workshops.

	Hours per Week	**No. of Weeks**	**Total Hours**	**Semester Credits**
Laboratory	2	11	22	1

Prerequisite Course(s): 11th, 12th Physics, Mathematics, Engineering Drawing, Engineering Materials.

General Objective:

In workshop practice, students will get familiar with use of different workshop practices like carpentry shop, plumbing shop, machine shop, electronics and electrical workshop. Students will also get familiar with different tools, machines, equipments, job holding devices, job drawing, job material, job manufacturing operations and processes in different workshops.

Objective to develop following Intellectual skills:

a. Identification and selection of manufacturing processes/operations according to job requirement in different workshops.
b. Identification, selection and understanding of tools, equipments, machines and job material according to job drawing for different workshops.
c. Understanding working principle and construction of process planning sheet.
d. Identification, repairing, maintenance and understanding of the working principle of electronic and electrical components/devices.

Objective to develop following Motor skills:

a. Ability to handle measuring instruments.
b. Ability to read the job drawing.
c. Ability to understand the basic working principle of carpentry operations, tools and equipments in carpentry shop.

d. Ability to understand the basic working principle of Plumbing operations, tools and equipments in Plumbing shop.
e. Ability to understand the basic working principle of lathe machine operations, tools and equipments in Machine shop.
f. Ability to understand the basic working principle of Electronics components used in electronics workshop.
g. Ability to understand the repair and maintenance of domestic appliances in electrical workshop.

Learning Outcomes:

Upon successful completion of these practical's the student will be able to hand

a) Carpentry shop
b) Plumbing shop
c) Machine shop
d) Electronics workshop
e) Electrical workshop

LAB COURSE CONTENT

A. Carpentry shop

1. Introduction to carpentry operations, equipment and tools.
2. One job involves lap joint, bridle joint.

B. Plumbing shop

1. Introduction to the tools and equipments like pipe vice, pipe bending machine, pipe dies, cutting dies, pipe wrench etc. used for plumbing operations on G.I. pipe.
2. One Job having both side threading and like bending operations.

C. Machine shop

1. One job on lathe machine involving operations like Facing, plain turning, step turning, taper turning, chamfering and drilling.

D. Electronics workshop

Types of PCB, PCB making, soldering, testing of electronic component like diode, transistor, R.L.C. etc and desoldering of a simple electronic circuit; probe making; Use of multimeter (each function)

E. Electrical workshop

1. Introduction and Difference between 1 Φ AC, DC; Transformers;
2. Repair and maintenance of domestic appliances like electric fan, tube light etc;
3. MCB, ELCB; Different types of wiring, Demonstration on preparation of extension boards, tube light wiring etc; demonstration of earthing and neutral.

Reference Books:

1. Hajara Chaudhary and Bose S K, "Element of Workshop Technology Volume I and II", Asia Publishing House.
2. P N Rao, "Production Technology Volume I and II", Tata McGraw Hill Publication.
3. R K Jain, "Production Technology", Khanna Publications.
4. P C Sharma, "Production Technology", Khanna Publication.
5. Chapman W A J., "Workshop Technology", ELBS Publication.
6. HMT, "Production Technology", Tata McGraw Hill Publication.
7. Kannaiah K L, Narayana, "Workshop Manual", Scitech Publications, Chennai, 2nd Edition

Guide lines for ICA:

ICA shall be based on continuous evaluation of student performance throughout semester and practical assignment submitted by the student in the form of journal.

Soft Skills - II

LAB COURSE OUTLINE

Soft Skills-II	**SS II**	**FE230**
Course Title	Short Title	Course Code

Course Description:

This course is a continuation of SSAD1 in the first semester. We continue to empower the language capabilities of the students. Strengthening of grammatical structure of English and advanced level vocabulary are introduced and consolidated in this course. Students are introduced to basics of business writing and etiquette. They are also made to undergo group discussions and learn the art of debating. Personal Interviews and their subtle nuances are taught to the students. Laws of leadership and team-workmanship are enforced.

	Hours per Week	**No. of Weeks**	**Total Hours**	**Semester Credits**
Lecture	1	15	15	2
Laboratory	2	15	30	

Prerequisite Course(s): Fundamental knowledge of English of 11th and 12th.

General Objectives:

We have tried to achieve the following objectives through this course:

a) To make the students effective team workers with a capacity to lead in any circumstances
b) To augment the ability of the student to render logically good arguments in support of their opinion during debates
c) To understand and become adept in corporate communication of writing letters and memos etc.
d) To enhance the ability of written communication by continuing to advanced level in English
e) To be successful in an HR or Personal Interview and to be a better communicator in technical interviews

Learning Outcomes:

Upon successful completion of this course the student will be able to:

a. Detect errors in simple and complex sentences of English.
b. Expand their vocabulary in English.
c. Debate and discuss cordially but fervently on any given issue.
d. Write corporate letters and take further other corporate communication.
e. Augment his/her performance in personal as well as technical interviews.
f. Increase the ability to calmly handle the pressure in Interviews and discussions.
g. Understand the basic laws of team-workmanship viz. its importance and excellence.
h. Augment the ability to lead a team under any circumstances and create an example for others.

LAB COURSE CONTENT

Unit-1 Eloquent Writing – II **No of Lect. – 9, Marks: 10**

a Comprehension of Passages
b Understanding of English Language
c Vocabulary Enhancement Practice

Unit-2 Corporate Communication **No of Lect. – 9, Marks: 10**

a Corporate Letter
b Resume and Curriculum Vitae Writing
c Writing Report

Unit-3 Discussions and Debates **No of Lect. – 9, Marks: 10**

a Basics of a Group Discussion
b Group Discussion Models
c Debates – Value and Process

Unit-4 Successful Interviews **No of Lect. – 9, Marks: 10**

a Pre-Interview Strategies
b Strategies During the Interview
c Strategies After the Interview

Unit-5 Leadership and Team-Building **No of Lect – 9, Marks: 10**

a Laws of Successful Leadership
b Becoming a Motivator
c Principles of Team-workmanship

Reference Books:

1. Allan and Barbara Pease, "A Definitive Book on Body Language", Publication Bantam Books.

2. Robert Bolton, "People Skills: How to Assert Yourself, Listen to Others and Resolve Conflicts", Publication Simon and Schuster.

3. R K Iyer, “Spoken English”, IU Publications.
4. Sethi and Dhamija, “A Course in Phonetics and Spoken English”, Prentice Hall of India.
5. Matthew McKay, “The Communication Skills”, Publisher: New Harbinger Publications Inc.
6. Frank Paolo, “How to Make a Great Presentation in 2 Hours”, Pustak Mahal.
7. Kaplan’s GRE, Kaplan Publications.
8. Barron’s GRE, Galgotia Publications.

Guide lines for ICA:

ICA shall be based on continuous evaluation of student performance throughout semester and practical assignment submitted by the student in the form of journal.

Faculty of Engineering & Technology

।।अंतरी पेटवू ज्ञानज्योत।।

NORTH MAHARASHTRA UNIVERSITY, JALGAON.

Syllabus For

SECOND YEAR ENGINEERING

BIOTECHNOLOGY

(W.E.F.2007-2008)

NORTH MAHARASHTRA UNIVERSITY, JALGAON

STRUCTURE OF TEACHING & EVALUATION

S.E. (BIOTECHNOLOGY) W.E.F.2007-2008

First Term

Sr. No.	Subject	Teaching Scheme Hours/ Week		Examination Scheme				
		Lectures	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Concepts in Biotechnology	04	--	03	100	--	--	--
2	Microbiology	04	04	03	100	50	50	--
3	Fluid Flow and Solid Handling	04	02	03	100	25	--	25
4	Process Calculations	04	02	03	100	25	--	--
5	Engineering Mathematics-III	04	--	03	100	--	--	--
6	Computer Applications	--	02	--	--	25	50	--
		20	10		500	125	100	25
	Grand Total	**30**			**750**			

Second Term

Sr. No	Subject	Teaching Scheme Hours/ Week		Examination Scheme				
		Lectures	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Biochemistry	04	02	03	100	25	50	-
2	Chemistry	04	02	03	100	25	--	-
3	Immunology	04	02	03	100	25	50	-
4	Biostatistics	04	02	03	100	25	--	-
5	Process Heat Transfer	04	02	03	100	25	--	25
		20	10		500	125	100	25
	Grand Total	**30**			**750**			

NORTH MAHARASHTRA UNIVERSITY, JALGAON

STRUCTURE OF TEACHING & EVALUATION

T.E. (BIOTECHNOLOGY) **W.E.F.2008-2009**

First Term

Sr. No.	Subject	Teaching Scheme Hours/Week		Examination Scheme				
		Lectures	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Bio Process Principles	04	--	03	100	25	--	--
2	Chemical Reaction Engineering	04	04	03	100	25	--	50
3	Mass Transfer-I	04	04	03	100	25	50	--
4	Molecular Biology and Genetic Engineering	04	04	03	100	25	--	25
5	Enzyme Engineering	04	--	03	100	25	--	--
		20	12		500	125	50	75
	Grand Total	32			750			

Second Term

Sr. No.	Subject	Teaching Scheme Hours/Week		Examination Scheme				
		Lectures	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Instrumentation and Process Control	04	02	03	100	25	--	25
2	Biological Thermodynamics	04	02	03	100	25	--	--
3	Mass Transfer-II	04	04	03	100	25	50	--
4	Biotechnology of Waste Treatment	04	04	03	100	25	--	25
5	Fermentation Biotechnology- I	04	--	03	100	25	--	--
6	Practical Training/Mini Project/Special Study	--	--	--	--	25	--	--
		20	12		500	150	50	50
	Grand Total	32			750			

NORTH MAHARASHTRA UNIVERSITY, JALGAON

STRUCTURE OF TEACHING & EVALUATION

B.E. (BIOTECHNOLOGY) W.E.F.2009-2010

First Term

Sr. No.	Subject	Teaching Scheme Hours/Week		Examination Scheme				
		Lectures	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Bioprocess Engineering -- I	04	--	03	100	25	--	--
2	Bioprocess Modeling and Simulation	04	04	03	100	25	25	--
3	Bioseparation Processes	04	--	03	100	25	--	--
4	Elective –I	04	--	03	100	--	--	--
5	Fermentation Biotechnology-II	04	04	03	100	25	--	50
6	Project –I	--	02	--	--	25	--	25
7	Seminar	--	02	--	--	25	--	--
		20	12		500	150	25	75
	Grand Total	32			750			

Second Term

Sr. No.	Subject	Teaching Scheme Hours/Week		Examination Scheme				
		Lectures	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Bioprocess Engineering -II	04	04	03	100	25	--	25
2	Bioprocess Engineering and Economics	04	02	03	100	25	--	25
3	Bioinformatics	04	04	03	100	25	25	--
4	Elective –II	04	--	03	100	25	--	--
5	Project –II	--	04	--	--	100	--	50
6	Industrial Visit / Case Study	--	--	--	--	25	--	--
		16	14		400	225	25	100
	Grand Total	30			750			

Subjects:

Elective-I
1)Advanced Biomaterials
2)Plant Tissue Culture & Plant Biotechnology
3)Protein Engineering
4)Food Biotechnology

Elective-II
1)Metabolic Engineering
2)Biosafety & Bioethics
3)Biomedical Fluid Dynamics
4)Applied Genetic Engineering

S.E. BIOTECH. TERM I

1. CONCEPTS IN BIOTECHNOLOGY

Teaching Scheme: **Examination Scheme:**
Lectures: 4 Hrs./ Week **Paper: 100 Marks**
(3Hrs)

UNIT- I

Introduction to Biotechnology:

Definitions, Historical perspectives, Scope and importance, Commercial potential, An interdisciplinary challenge, A Quantitative approach, Classical vs. Modern concepts, Manufacturing quality control, Product safety, Good manufacturing practices, Good laboratory practices, Marketing,Biotechnology in India and Global trends.

Concept of pH, Buffer, Process flow diagrams, Material and energy balances, fluid flow and mixing, Heat transfer, Mass transfer, Unit operations,Homogeneous reactions, Heterogeneous reactions, Reactor engineering.

Protein Structure and Engineering:

Introduction to the world of Proteins, 3-D Shape of Proteins, Structure Function relationship in Proteins, Purification of Proteins, Characterization of Proteins, Protein based products, Designing Proteins, Proteomics. **(10 Hrs, 20 Marks)**

UNIT- II

Recombinant DNA Technology:

Introduction, Tools of rDNA Technology, Making Recombinant DNA, DNA Library, Introduction of Recombinant DNA into host cells, Identification of Recombinants, Polymerase Chain Reaction (PCR), DNA Probes, Hybridization Techniques, DNA Sequencing, Site-directed mutagenesis.

Genomics and Bioinformatics:

Introduction, Genome Sequencing Projects, Gene prediction and Counting, Genome similarity, SNPs and comparative genomics, Functional Genomics, History of Bioinformatics, Sequences and Nomenclature, Information Sources, Analysis using Bioinformatics tools. **(10 Hrs, 20 Marks)**

UNIT- III

Microbial Culture and Applications:

Introduction, Microbial Culture Techniques, Measurement and Kinetics of Microbial Growth, Scale up of Microbial Process, Isolation of Microbial Products, Strain Isolation and Improvement, Applications of Microbial Culture Technology, Bioethics in Microbial Technology. **(10 Hrs, 20 Marks)**

UNIT-IV

Plant Cell Culture and Application:

Introduction, Cell and Tissue Culture Techniques, Applications of Cell and Tissue Culture, Gene Transfer Methods in Plants, Transgenic Plants with Beneficial Traits, Diagnostics in Agriculture and Molecular Breeding, Bioethics in Plant Genetic Engineering.

(10 Hrs**,** 20 Marks)

UNIT- V

Animal Cell Culture and Applications:

Introduction, Animal Cell Culture Techniques, Characterisation of Cell Lines, Scale-up of Animal Culture Process, Applications of Animal Cell Culture, Stem Cell Technology, Bioethics in Animal Genetic Engineering.

Biotechnology and Society:

Public perception, Role of sciences, Engineering, Arts, Commerce, Patenting - Criterion for patents, Discovery vs Invention,Product and process patent, Reading a patent, National and International Patent Laws, Varietal protection, Patenting of biological systems, Ethical issues in agriculture and health care.

(10 Hrs**,** 20 Marks)

REFERENCES

1. P. K Gupta, Introduction to Biotechnology. Rastogi Publications
2. Smith, Biotechnology. Cambridge Press.
3. Ed. Young M.M., Comprehensive Biotechnology (Vol. I,II.III and IV), Pergamon Press, London.
4. Hammand J., Mc Gravery P. and Yusibov V. (Eds.). Plant Biotechnology. Springer Verlag, 2000

2. MICROBIOLOGY

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practicals : 4 Hrs./ Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Practical: 50 Marks
Term Work : 50 Marks

UNIT-I

Microbiology and its scope, microscopy. classification, morphology and physiology of bacteria, yeast, molds, algae and viruses. **(10 Hrs, 20 Marks)**

UNIT-II

Microbial growth kinetics, growth curve, diauxic growth factors influencing growth, continuous and synchronous culture, microbial nutrition and reproduction.

(10 Hrs**,** 20 Marks)

UNIT-III

Pure culture techniques – microbial culture media, isolation, identification and maintenance of cultures, characteristics of pure culture, enumeration techniques.

(10 Hrs**,** 20 Marks)

UNIT-IV

Physical and chemical methods of control of microorganisms, immune response, antigen-antibody interaction. Microbial defense mechanisms under adverse conditions.

(10 Hrs**,** 20 Marks)

UNIT-V

Microbial ecology, incidences of microorganisms in soil, water, air, food and sewage, food spoilage organisms, food borne infections and poisoning organisms.

(10 Hrs**,** 20 Marks)

REFERENCES:

1. M.J. Pelczar, Jr. E.C.S. Chan and N.R. Krieg, Microbiology 5th Ed. , TMH Book Company.
2. Kathleen Talaro and Arthur Talaro. Foundation in Microbiology. W.C.B. Wm. C. Brown Publishers (1994).
3. Stainer R.Y., Ingraharn J.L., Whoolis M.L. and Painter P.R. General Microbiology. The Mc Millan Press Ltd.
4. Robert F. Byod (1984). General Microbiology. Times Mirror / Mosby College Publication.

TERM WORK / PRACTICALS

Term Work Shall be based on any 10 experiments mentioned below.

1-2. Microscopy : Use & care of microscope, examination of prepared slides and wet mounts of bacteria, yeast, molds. Microbial Identification & examination of food samples. Other biomaterials of bacteria, yeast and molds.

3. Micrometry: Measurement of microbial cells.

4. Staining techniques: Simple staining, Gram staining, Endospore staining, Capsule staining.

5-7. Enumeration techniques: Microscopic count using haemocytometer, Viable cell count (By pour plate method) Turbidity measurement as direct expression of growth.

8-9. Culture techniques: Culture media preparation, Cultivation of microorganisms.

10. Isolation of microorganisms by streak plate method.

11. Isolation by serial dilution method, maintenance & preservation.

12. Influence of antimicrobial agent on growth effect of UV radiation & heat on microbial growth.

13. Microbiological examination of water: Coliform & Salmonella counts.

14. Microbiological assay of a growth factor.

REFERENCES:

1. H.W. Seeley Jr. and Paul J.Van Demark, "Microbes in action". A laboratory manual of Microbiology.D.B. Taraporevala Sons & Co. Pvt. Ltd.

2. Ed. J.R. Norris and D.W. Ribbons, "Methods in Microbiology", Vol. 3 A, Academic Press, London & New York.
3. Ronald M. Adas, Alfred E. Brown, Kenneth W. Dobra and Llnas Miller (1986). Basic Experimental Microbiology. Prentice Hall.
4. Aneja K.R.(2nd Edn., 1996). Experiments in Microbiology, Plant pathology, Tissue Culture and Mushroom Cultivation. Wishwa Prakashan, New Age International (P) Ltd.
5. S. Harisha. An Introduction to Practical Biotechnology. Laxmi Publications (P) Ltd. New Delhi.

3. FLUID FLOW AND SOLID HANDLING

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practicals :2 Hrs./ Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Oral: 25 Marks
Term Work : 25 Marks

Unit-I

Solids and Their Handling

Properties of solids ,screening, industrial screening equipment. Determination of particle size, screen analysis, size reduction of solids,stages of reduction , operating variables, intermediate and fine size reduction, power requirement and mechanism.

Power driven machines: Crushers, grinders, and conveyors.

Problems based on above (10 Hrs**,** 20 Marks)

Unit –II

Filtration: Theory, continuous and batch equipments. Flow of solids through fluids, Equipments for classification of solids. Sedimentation.

Problems based on above. (10 Hrs**,** 20 Marks)

Unit – III

Fluid flow: Properties of fluids, Flow through pipeline.

Fluid statics : Euler's equation, Hydrostatic Law and Pressure Measurement

Transport of fluids,energy relationships, pipe fittings, minor losses in pipe flow.

Problems based on above. (10 Hrs**,** 20 Marks)

Unit IV

Flow measurements: Orifice meter. Nozzle and Venturi meters, Rotameter and Pitot tube.

Other flow measuring devices such as Ultrasonic flow meters, Anemometers, Electromagnetic flow meters, Flow meters using thermistors.

(10 Hrs**,** 20 Marks)

UNIT-V:

Pumping of fluids:

Pumping equipments for liquid, the reciprocating pump, positive displacemement pump, rotary pumps, centrifugal pumps, design & operating characteristics, NPSH calculations, airlift pumps, pumping equipments for gases:

Pumping equipment for gases:

Reciprocating piston compressors, rotary blowers & compressors, centrifugal blowers & compressors including turbo compressors, vacuum-producing equipment.

Power required for compression of gases, clearance volume, multistage compressor efficiency, the power requirement for pumping through pipeline for liquids & gases.

Inroduction to fluidization. **(10 Hrs, 20 Marks)**

REFERENCES

1. W.L. McCabe & J.C. Smith, Unit Operations in Chemical Engineering, McGraw Hill / Kogakusha Ltd.
2. P.Chattopadhaya. Unit Operations of Chemical Engineering-Volm.I, Khanna Publication New Delhi,
3. R.K. Bansal. Fluid Mechanics, Khanna Publications, New Delhi
4. V.P.Gupta, Alam Singh and Manish Gupta, Fluid Mechanics and hydrostatics, CBS Publishers, New Delhi.
5. R.S.Hiremath & A.P.Kulkarni Unit operation of Chemical Engineering (Mechanical Operations Vol-I) : Everest Publication, Pune
6. J. M. and Coulson and R.F. Richardson; Chemical Engg. Vol. I and II : Butter worth and Heinemann.

TERM WORK / PRACTICALS

Term Work Shall be based on any 08 experiments mentioned below.

1. To study the separation of solid by sedimentation
2. Sieve Shaker: To ascertain the fineness number and to study the differential & cumulative screen analysis of the sand
3. Ball Mill :To verify the laws of crushing & grinding
4. Jaw Crusher : To verify the laws of crushing & grinding
5. Plate & Frame Filter Press: To determine the rate of filtration ,specific cake resistance and filter medium resistance
6. Rotary Vacuum Filter: To find out the rate of filtration
7. Fluidization : To observe the and study the behavior of the bed during fluidisation and to calculate minimum fluidization velocity
8. To determine the coefficient of Venturimeter
9. To determine the coefficient of Orificemeter
10. To determine the coefficient of Nozzlemeter
11. To Verify Bernoulli equation.
12. Reynolds Experiment

4. PROCESS CALCULATIONS

Teaching Scheme:
Lectures: 4 Hrs./ Week
Term Work :2 Hrs./ Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Term Work : 25 Marks

UNIT-I :

Units and Dimensions:

Basic and derived units, dimensional analysis, dimensional and empirical equations. Different ways of expressing units of quantities and physical constants.

Properties of Gases , Liquids and Solids:

Ideal and real gas laws, critical properties, properties of mixtures & solutions & plane equilibria, Kay's rule.

(10 Hrs**,** 20 Marks)

UNIT-II :

Basic Concept:

Humidity and saturation, Psychometric chart, solubility diagrams.

Thermo Physics:

Concept and calculations of involving energy, heat, work & enthalpy of reversible & irreversible process.

(10 Hrs**,** 20 Marks)

UNIT-III :

Material Balances:

Concept of limiting &excess reactants, Tie element, Recycle, Purging, Bypass etc. in batch, stagewise and continuous operations in systems with and without chemical reactions in unit operations.

(10 Hrs**,** 20 Marks)

UNIT-IV :

Thermo Chemistry:

Heat of formation, combustion, solution, dilution etc. and its effects of pressure and temperature on them. Temp. of reaction, Energy balance for system with and without chemical reaction. Process efficiency.

(10 Hrs**,** 20 Marks)

UNIT-V :

Unsteady material and energy balances in Bioprocesses, Energy balances for nuclear, electro chemical and photo chemical processes

Combustion: Introduction, fuels, calorific value of fuels, air requirements.

(10 Hrs**,** 20 Marks)

REFERENCES

1. Bhat B.I. and Vora S.M ; Stoichiometry ; Tata McGraw Hill Publication ; New Delhi

2. Durga Prasad Rao & DVS Murthy ,Process Calculations for Chemical Engineers. McMillan India, New Delhi .
3. K A Gavahane ; Introduction to Stoichiometry ; Nirali Prakashan.
4. Hougen O.A, Watson K.M, & Ragatz R.A.Chemical Process Principles Part-I Asia Publishing House, Mumbai.
5. Himmelbleau D.M. Basic principles and calculations in Chemical Engineering. Prentice Hall Publication.
6. Shekhar Pandharipande and Samir Mushrif, Process Calculations. Pune Vidyarthi Griha Prakashan, Pune
7. Doran Paulin M. Bioprocess Engineering Principles. Academic Press, An Imprint of Elsevier.

TERM WORK

Term Work Shall be based on any 08 assignments on the following.

1. Properties of solids/liquids/gases.
2. Humidity & Saturation.
3. Thermo physics.
4. Thermo chemistry.
5. Material balances.
6. Energy balances.
7. Nuclear, photo chemical and electro chemical processes.
8. Combustion.
9. Steady state and Unsteady state Material and Energy Balances in Bioprocesses

5. ENGINEERING MATHEMATICS –III

Teaching Scheme: Examination Scheme:
Lectures: 4 Hrs./ Week Paper: 100 Marks (3 Hrs)

UNIT-I:

Liner Differential Equation:

Liner differential equation of order "n" with constant co-efficient , Method of variations, Homogeneous liner differential equation , Legendre's LDE, Application to chemical engineering. Problems involving batch reactor. **(10 Hrs, 20 Marks)**

UNIT-II:

Simultaneous Linear Differential Equations of form :

1) $f1(D)x + f2(D)y = (t)$

$(D)x + (D)y = (t)$

Where, $D=d/dt$.

2) $dx/P = dy/Q = dz/R$.

Partial Differential Equations:

Solutions of (i) One dimensional heat flow equation.

(ii) Two dimensional heat equation (Laplace Equation)

(iii) Laplace Equation in Polar form.Differential equation of first order & higher degree. **(10 Hrs, 20 Marks)**

UNIT-III:

Laplace Transform :

Definition of Laplace Transform, Inverse Laplace transform, Properties and theorems, Laplace transforms of standard functions, Unit step functions, Ramp functions, Impulse functions, Error functions , Jump functions, Laplace Inverse Transform.

Applications to the solutions of liquid systems, consisting of single tank & two tanks in series (Interacting & non-Interacting), Second order systems (Damped vibrator).

(10 Hrs**,** 20 Marks)

UNIT-IV:

Vector Integration :

(i) Line Integral, Surface Integral, Volume Integral.

(ii) Greens Lemma, Stoke's Theorem, Gausse's Divergence Theorem.

Finite Fourier Cosine & Sine transforms, Complex Fourier transforms , Infinite Fourier sine and Cosine transforms, Applications of Fourier transforms to boundary value problems such as one dimensional and two dimensional heat flow problems

(10 Hrs**,** 20 Marks)

UNIT-V:

Numerical Solution of Ordinary Differential Equations :

Taylor's series method, Runga-Kutta method, Piccard's method, Eulers method andLeast square method

Numerical Integration :

Trapezoidal rule, Simpson's $1/3^{rd}$ rule, Simpson's $3/8^{th}$ rule and Weddle's rule.

(10 Hrs**,** 20 Marks)

REFERENCES

1. P .N. Wartikar and J.N. Wartikar, Engineering Mathematics III : Pune Vidyarthi Griha Prakashan, Pune
2. Dr. B.S.Grewal, Higher Engineering Mathematics : Khanna Publications ,New Delhi
3. Wylie and Barrott, Advanced Engineering Mathematics : Tata McGraw Hill Publications.
4. Erwin Kreegszig, Advanced Engineering Mathematics : New age International ,New Delhi
5. Dr.Gokhale and A.N. Singh , Engineering Mathematics III : Nirali Publications.
6. Coughnour Donald R , Process System analysis & control : McGraw Hill, 1991.

6. COMPUTER APPLICATIONS

Teaching Scheme:	Examination Scheme
Practicals : 2 Hrs./ Week	Practical: 50 Marks
	Term Work: 25 Marks

TERM WORK / PRACTICALS

Term work & practical should be based on following

1. Introduction to computer, O.S, M.S Office, Programming languages
2. History, C editor – C language
3. a+b, a-b ,a*b , a/b , a % b using keyboard
4. Using conditional operator find out largest number
5. If – else – program using if – else
6. For or while or Do while / nesting of for to print table of 1 to 10
7. Addition using function
8. Array - program using array

REFERENCES

1. Kanetkar Yashawant P. Let us C, BPB Publication, New Delhi.
2. Kanetkar Yashawant P. Let us C Solutions, BPB Publication, New Delhi.
3. Byron Gottfried, Schaum's Outlines Programming with C, Tata McGraw Hill Publication.
4. Fielding A. Computing for Biologists.
5. Wool E.J. Microcomputers in Biochemical Education.

S.E. BIOTECH. TERM II

1. BIOCHEMISTRY

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practicals : 2 Hrs./ Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Practical: 50 Marks
Term Work : 25 Marks

UNIT I

Structure and function of biomolecules; carbohydrates, proteins, lipids and nucleic acids. Biochemical separation methods. Vitamins, enzymes and coenzymes.

(10 Hrs**,** 20 Marks)

UNIT-II

Biological membranes and transport across them. Bioenergetics. Major anabolic and catabolic pathways of carbohydrate metabolism and their regulation; glycolysis, TCA cycle, pentose phosphate pathway, galactose metabolism, electron transport and oxidative phosphorylation, gluconeogenesis.

(10 Hrs**,** 20 Marks)

UNIT-III

Lipid metabolism; transport and oxidation of fatty acids in animal tissues, glycerol metabolism, biosynthesis of fatty acids and triacylglycerol.

Protein metabolism; out lines of amino acid metabolism and their significance.

(10 Hrs**,** 20 Marks)

UNIT-IV

Nucleic acid metabolism; mechanism and biosynthesis of DNA and RNA, reverse transcription. Protein biosynthesis, inhibitors of protein synthesis, transport of proteins and signal peptides.

(10 Hrs**,** 20 Marks)

UNIT-V

Typical metabolic pathways of microbes; Entner-Duodoroff pathway, glyoxilate cycle, phosphoketolate pathway.

Biochemical aspects of Hormone Action.

(10 Hrs**,** 20 Marks)

REFERENCES:

1. Lehninger A.L., Neston D.L., “Principles of Biochemistry”, N.M. Cox, CBS Publishers & Distributors.
2. Lubert Stryer “Biochemistry”, W.H. Freemen & Co. , New York.
3. Weil J.H. “General Biochemistry”, New Age International (Pvt. Ltd.).
4. Murray R.K. and others (Eds). Harper’s Biochemistry, 25th Edn. Appleton and Lange Stanford.

TERM WORK / PRACTICALS

Term Work Shall be based on any 10 experiments mentioned below.

1 Estimation of carbohydrates.
2. Estimation of proteins.
3. Estimation of nucleic acids:
4. Isoelectric precipitation.
5. Separation of amino acids by paper chromatography.
6. Separation of sugars by paper chromatography.
7. Extraction of Lipids.
8. Thin layer Chromatography.
9. Gel Electrophoresis.
10-11. Assay of enzyme activity and enzyme kinetics.
12. Identification and estimation of an intermediate of EMP pathway.
13. Cell fractionation.
14. Vitamin Assay.

REFERENCES

1. Plummer David T. "An Introduction to Practical Biochemistry", Tata McGraw-Hill Pubblishing Co. Ltd., New Delhi.
2. Jayraman J. A Laboratory Manual in Biochemistry. New Age International Publishers.
3. Sadasivan S. and Manikam K. Methods in Agricultural Biochemistry. Wiley Eastern Ltd., New Delhi.
4. S. Harisha. An Introduction to Practical Biotechnology. Laxmi Publications (P) Ltd. New Delhi.

2. CHEMISTRY

Teaching Scheme:
Lectures: 4 Hrs./ Week
Term Work : 2 Hrs./ Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Term Work : 25 Marks

UNIT- I:

Reaction Mechanism:

Covalent Bond, Homolytic & Heterolytic Fission of Covalent Bond,Electrophiles & Nucleophiles.

Study of reactions with reference to the mechanism involved:

Aldol condensation, Cannizzaro& cross Cannizzaro reactions, Claisen ester condensation, Reimer Tiemann reaction, Grignard reagents & reactions.

SN^1 & SN^2 reactions.

Electrophilic substitution in aromatic rings: Nitration, Sulphonation, Halogenations, Fridel Crafts alkylation& acylations.

Elimination reactions:E_2 , E_1 mechanism.

(10 Hrs**,** 20 Marks)

UNIT-II:

Stereochemistry:

Basic concept of stereochemistry, Structural Isomerism, Different methods of representation of three dimensional molecule on paper, Conformational isomerism: Conformations of Ethane & n-Butane & their relative stability.

Geometrical isomerism: Cis-Trans isomerism shown by alkenes.

Optical isomerism: Measurement of Optical activity by Polarimeter , Specific rotation, Enantiomerism , Necessary conditions of optical activity, Optical isomerism of Lactic acid & Tartaric acid., Distereoisomerism. Baeyer's angle strain concept , Conformations of Cyclohexanes: Equatorial & axial bonds in cyclohexane.

(10 Hrs**,** 20 Marks)

UNIT-III:

Chemical kinetics:

Objective of chemical kinetics, rate of reaction, velocity constant of a reaction, elementary reaction steps & rate expressions, order & molecularity of reaction, factors influencing the reaction rates, integrated rate expressions for 1^{st}, 2^{nd} , 3^{rd} , & zero order reaction (with example), methods for determining order of reactions, experimental investigation of reaction kinetics.

Arrhenius equation, relationship between chemical kinetics & thermodynamics, problem based on above topics.

Fast reactions , Set up for study of Fast reactions

(10 Hrs**,** 20 Marks)

UNIT-IV:

Classical chemical thermodynamics:

Objective & scope, definition of thermodynamic systems.

Heat work reversibility, maximum work, isothermal & adiabatic process, I^{st} law of thermodynamics, II^{nd} law of thermodynamics, entropy, entropy changes, enthalpy & free energy, Gibbs Helmholtz equation, Third law of thermodynamics. Problems based on above topics.

Criteria of chemical equilibrium, Le Chatelier's theorem, its application to some systems likes ammonia, sulphuric acid, and nitric acid.

(10 Hrs**,** 20 Marks)

UNIT-V:

Surface phenomenon:

Surface tension of liquids, adsorption, adsorption of gases by solids, adsorption isotherm, Freundlich adsorption isotherm, the Langmueirs adsorption isotherm, application of adsorption.

Colloids & emulsion:

Types, methods of preparation, determination of particle size, properties, solution of micro molecules, properties of micro molecular solutions.

(10 Hrs**,** 20 Marks)

REFERENCES

1. Glasstone, Thermodynamics for chemist :McMillan India Ltd.
2. Maron-Prutton, Principles of Physical chemistry: Oxford & IBH publishing Co.Pvt.Ltd. New Delhi
3. Puri & Sharma, A textbook of physical chemistry : S. Chand & Co. Delhi
4. B.S.Behl, Physical Chemistry, S. Chand & Co. Delhi
5. Morrison & Boyd, Organic Chemistry: Allyn Bacon Inc.
6. Pine, Organic Chemistry: McGraw Hill Int.Co.

TERM WORK

Term Work Shall be based on any 08 experiments mentioned below.

1. Preparation of p-nitro acetanilide by nitration.
2. Preparation of Quinone.
3. Determination of rate constant of Hydrolysis of Methyl Acetate.(1^{st} Order)
4. Determination of rate constant of Saponification of Ethyl Acetate.(2^{nd} Order)
5. Determination of surface tension liquids by Stalagmometer.
6. Preparation of colloidal solution of starch.
7. To verify Freundlich adsorption Isotherm
8. Estimation of Acetone
9. Estimation of Aniline
10. Stability of emulsions

REFERENCES

1. S.S.Dara, Experiments and Calculations in Engineering Chemistry, S. Chand & Co. Delhi
2. S.K.Bhasin, Laboratory manual on engineering Chemistry: Dhanpat Rai Pub.New Delhi.

3. IMMUNOLOGY

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practicals : 2 Hrs./ Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Practical: 50 Marks
Term Work : 25 Marks

UNIT-I

Introduction to Immunology: Properties of immune response, Innate and acquired immunity, active and passive immunity.

Cells & Tissues of Immune System: Lymphocytes, Classes of lymphocytes, antigen presenting cells, NK Cells, Mast Cells, Dendritic Cell, Organs of the Immune System, Bone marrow, Thymus, Lymph node, Spleen, CALT, MALT.

(10 Hrs**,** 20 Marks)

UNIT-II

Molecular Immunology: - Molecular structure of antibody, Classification, Isotypes, Synthesis assembly and expression of immunoglobulin molecules, Nature of antigens, function and diversity, Generation of anti-body diversity.

Antigens: Different characteristics of antigens, mitogens, Hapten, Immunogen, Adjuvants.

(10 Hrs**,** 20 Marks)

UNIT-III

MHC: Discovery of MHC complex, Role of MHC, Structure of MHC molecule, Binding of peptides to MHC molecules, MHC restriction.

Effecter Mechanism of Immune Response: Cytokines, T- cell receptors, cell activation, complement system, antigen processing and presentation, regulation of immune response.

(10 Hrs**,** 20 Marks)

UNIT-IV

Immunological Techniques:- antigen- antibody reactions, Immuno diffusion, immunoelectrophoresis, ELISA, RIA, fluorescence activated cell sorter.

(10 Hrs**,** 20 Marks)

UNIT-V

Applied Immunology:- Immune system in health and disease, autoimmunity, hypersensitivity, tumor immunity, tissue and organ transplant, Synthetic vaccines.

Hybridoma technology: - Fusion of myeloma cells with lymphocytes, production of monoclonal antibodies and their application.

(10 Hrs**,** 20 Marks)

REFERENCES

1. R. A. Goldsby, T.J. Kindt, B.A. Osborne Kuby- Immunology (4th Edition)
2. Ivan Riot- Essentials of Immunology (6th Edition), Blakswell Scientific Publications, Oxford, 1988.
3. Paul W.E. (Eds.), Fundamentals of Immunology, Raven Press, New York, 1988.
4. Roitt I.M. (1998) Essentials of Immunology. ELBS, Blackwell Scientific Publishers, London.
5. Barrett J.T. (1983). Text book of Immunology. Mosby, Missouri.
6. Kuby J.(1994). Immunology., 2nd Edn. W.H.Freeman and Company, New York.

TERM WORK / PRACTICALS

Term Work Shall be based on any 08 experiments mentioned below.

1. Immunoelectrophoresis
2. Radial immunodiffusion
3. Antigen –Antibody interaction: The Ouchterlony procedure
4. Introduction to ELISA reactions
5. AIDS KIT-1: Simulation of HIV-1 detection
6. Western Blot Analysis – demo

7. Immunology of pregnancy test – demo
8.Viral antigen detection by rapid immuno-chromatographic cassette assay
9. Latex agglutination test
10. Precipitin reaction
11. Antibody titer test
12. Agglutination reaction

REFERENCE

1. Harlow and David Lane Antibodies A laboratory Manual: (1988), Cold spring harbor laboratory.
2.Talwar G.R. and Gupta S.K. (Eds.). A Handbook of Practical and Clinical Immunology, Vol. 1 and 2 (2^{nd} Edn.). CBS Publishers and Distributors.

4. BIOSTATISTICS

Teaching Scheme:
Lectures: 4 Hrs./ Week
Term Work : 2 Hrs./ Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Term Work : 25 Marks

UNIT-I

Presentation of Data: Frequency distribution, graphical presentation of data by histogram, frequency curve and cumulative frequency curves.

Measure of Location and Dispersion: Mean, Medium, Mode and their simple properties (without derivation) and calculation of median by graphs: range, mean deviation, Standard deviation, Coefficient of variation.

(10 Hrs**,** 20 Marks)

UNIT-II

Probability and Distribution: Random distributions, events-exhaustive, mutually exclusive and equally likely, definition of probability (with simple exercises), definition of binomial, Poisson and normal distributions and their inter-relations, Simple properties of the above distributions (without derivation).

(10 Hrs**,** 20 Marks)

UNIT-III

Correlation and Regression: Bivariate data – simple correlation and regression coefficients and their relation, Limits of correlation coefficient, Effect of change of origin and scale on correlation coefficient, Linear regression and equations of line of regression, Association and independence of attributes.

Sampling: Concept of population and sample, Random sample, Methods of taking a simple random sample. **(10 Hrs, 20 Marks)**

UNIT-IV

Tests of Significance: Sampling distribution of mean and standard error, Large sample tests (test for an assumed mean and equality of two population means with known S.D.); small sample tests (t-test for an assumed mean and equality of means of two populations when sample observations are independent, Paired and unpaired t-test for correlation and regression coefficients, T-test for comparison of variances of two populations, Chi-square test for independence of attributes, Goodness of fit and homogeneity of samples.

(10 Hrs**,** 20 Marks)

UNIT-V

Experimental Designs: Principles of experimental designs, Completely randomized, Randomized block and latin square designs, Simple factorial experiments of 22, 23, 24 and 32 types, Confounding in factorial experiments (mathematical derivations not required); Analysis of variance (ANOVA) and its use in the analysis of RBD.

(10 Hrs**,** 20 Marks)

REFERENCES

1. Statistical methods in biology by Norman T.J. Bailey (3rd Edition), Cambridge University Press (1995).
2. Gupta S.C. Fundamentals of Statistics. Himalaya Publishing House, New Delhi.
3. Khan. Biostatistics. Tata Mc Graw Hill Publishers.
4. Daniel W.W.(7^{TH} Edn., 1999). Biostatistics: A Foundation for Analysis in the Health. John Wiley and Sons Inc. New York.
5. Sharma N.K.(1996). Statistical Techniques. Mangal Deep Publications, Jaipur, India.

TERM WORK

Any eight assignments based on the following.

1.Mean , Median, Mode and their properties
2.Calculation of median by graphs, range, mean deviation, standard deviation and coefficient of variation.
3. Exercises on probability, bionomial distribution, Poisson and normal distribution.
4. Problems on coefficient of correlation and regression.
5. Problems on line of regression.
6. Sampling distribution of mean and standard error and Problems on large sample tests.
7. Problems on small sample tests and t- tests for correlation and regression coefficients.
8. T- tests for comparison of variances and goodness of fit.
9. Problems on experimental design.
10. Problems on analysis of variances (ANOVA) and its use in R.B.D.

5. PROCESS HEAT TRANSFER

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practicals: 2 Hrs. / Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Oral: 25 Marks
Term Work: 25 Marks

UNIT- I:

Heat transfer by conduction in solids;

Fourier's law of heat conduction ,steady state heat conduction through walls (single and multilayer), heat flow through cylinder ,unsteady state heat conduction ,Derivation of Fourier's heat conduction equation in three dimensions , equation for one dimensional conduction , heat conduction through a semi infinite slab , lumped capacity method of unsteady state conduction . Principles of heat flow in fluids.

(10 Hrs, 20 Marks)

UNIT-II:

Typical heat exchange equipment ,counter current and parallel flows, energy balances, overall heat transfer coefficient , log mean temperature difference, individual heat transfer coefficient, calculation of overall coefficient from individual coefficients , transfer units in heat exchangers. Heat transfer to fluids without phase change.

(10 Hrs, 20 Marks)

UNIT- III:

Regimes of heat transfer in fluids, heat transfer by forced convection in laminar and turbulent flow, dimensional analysis method, use of imperials equations heat transfer by forced convection outside tubes, natural convection.

Heat transfer to fluids with phase change.

Dropwise and film type condensation, coefficient for film type condensation, practical use of Nusselt's equations, application to petroleum industries

(10 Hrs, 20 Marks)

UNIT- IV:

Heat transfer to boiling liquids:

Boiling of saturated liquids maximum flux and critical temperature drop, maximum Flux and film boiling.

Radiation heat transfer:

Fundamental of radiation, black body radiation, Kirchoff's law, radiant heat exchange between non black surfaces. Combined heat transfer by conduction, convection, radiation.

(10 Hrs, 20 Marks)

UNIT- V:

Heat exchange equipments:

Heat exchanger single pass 1-1 exchanger, 1-2 shell and tube heat exchanger, correction for LMTD for cross flow, design calculation (Kern Method) in heat exchanger.

Evaporation:

Liquid characteristics and types of evaporator, single effect evaporator calculation, pattern of liquor flow in multiple effect evaporators.

(10 Hrs, 20 Marks)

REFERENCES

1.W.L.McCabe and J.C.Smith , Unit operations in chemical engineering. McGraw Hill/Kogakusha Ltd.

2.Coulson & Richardson , Chemical engineering. – Volume. I , Pergamon Press

3.Kern D.Q. Process Heat Transfer, McGraw Hill Book 1NC New York, 1950

4.D.S.Kumar, Process Heat Transfer, S.K.Kataria and Sons Publisher, New Delhi

5.Dawande S.D. Principals of Heat Transfer and Mass Transfer. Central Techno Publications, Nagpur.

TERM/PRACTICALS

Term Work Shall be based on any 08 experiments mentioned below.

1) Conductivity of metals and / or insulator.
2) Experiment on Pin fins.
3) Experiment on forced convection apparatus.
4) Experiment on natural convection apparatus.
5) Determination of emmisivity of test plate.
6) Stefan Boltzman apparatus .
7) Parallel / counter flow heat exchanger.
8) Study of pool boiling phenomenon and critical heat flux.
9) Study of heat transfer in evaporator .
10) Temperature profile in a rod .
11) Study of evaporators .
12) Dropwise and filmwise condensation .

========()X()X()==========

NORTH MAHARASHTRA UNIVERSITY,

JALGAON (M.S.)

THIRD YEAR ENGINEERING(T.E.)

BIOTECHNOLOGY

TERM – I & II

W.E.F. 2008-2009

NORTH MAHARASHTRA UNIVERSITY, JALGAON

STRUCTURE OF TEACHING & EVALUATION

T.E. (BIOTECHNOLOGY) W.E.F.2008-2009

First Term

Sr. No.	Subject	Teaching Scheme Hours/Week		Examination Scheme				
		Lectures	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Bio Process Principles	04	--	03	100	25	--	--
2	Chemical Reaction Engineering	04	04	03	100	25	--	50
3	Mass Transfer-I	04	04	03	100	25	50	--
4	Molecular Biology & Genetic Engineering	04	04	03	100	25	--	25
5	Enzyme Engineering	04	--	03	100	25	--	--
		20	12		500	125	50	75
	Grand Total	32			750			

Second Term

Sr. No.	Subject	Teaching Scheme Hours/Week		Examination Scheme				
		Lectures	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Instrumentation & Process Control	04	02	03	100	25	--	25
2	Biological Thermodynamics	04	02	03	100	25	--	--
3	Mass Transfer-II	04	04	03	100	25	50	--
4	Biotechnology of Waste Treatment	04	04	03	100	25	--	25
5	Fermentation Biotechnology- I	04	--	03	100	25	--	--
6	Practical Training/Mini Project/Special Study	--	--	--	--	25	--	--
		20	12		500	150	50	50
	Grand Total	32			750			

T.E. BIOTECH TERM I

1. BIOPROCESS PRINCIPLES

Teaching Scheme:
Lecturers: 4Hrs/week.

Examination Scheme
Paper: 100 marks (3Hrs)
Term work: 25 marks

Unit: I

Introduction: Bioprocess development, Material balance: Procedure for material balance calculations, material balances – worked examples, Material balance with recycle, By pass and purge systems, Growth stoichiometry and elemental balance. Biomass yield, Theoretical O_2 demand, worked out examples on above**,** Energy Balance: Procedure for energy balance calculations without and with reaction, worked out examples, Energy balance equation for cell culture, Fermentation energy balance, worked out examples, Unsteady state material and energy balance (USMEB): Unsteady state material balance equations, unsteady state energy balance equations and worked examples on USMEB.

(10 Hrs, 20 Marks)

Unit: II

Heat transfer in Bioprocess: Design equation for heat transfer process, Energy balance, Logarithmic and arithmetic mean temperature difference, Calculation for heat transfer coefficient for flow outside tubes, without phase change and for stirred liquids, Applications of design equations, Relationship in between heat transfer, cell concentrations and stirring conditions, Numerical based examples on above.

Mass transfer in Bioprocess: Role of diffusion in bioprocessing, Different equations in mass transfer (liquid-solid, liquid-liquid and gas-liquid) , Oxygen uptake in cell culture: Factors affecting cellular oxygen demand, Oxygen transfer from gas bubble to cells, Oxygen transfer in fermenter, measuring dissolved oxygen concentrations, Measurement of K_La: Oxygen balance method, Gassing out techniques (static method of Gassing out and dynamic method of Gassing out) Sulphite oxidation, Factors affecting K_La, Oxygen transfer in large vessels, Numerical based examples on above.

(10 Hrs, 20 Marks)

Unit: III

Fermentation broth: Viscosity, Viscosity measurement, types of viscometers, uses of viscometer with fermentation broths, Rheological properties of fermentation broths, Factors affecting broth viscosity (Cell concentration, cell morphology, and osmotic pressure, product and substrate concentrations).

Mixing in Fermenters: Mechanism of mixing, Assessing mixing effectiveness, estimation of mixing time, Power requirement for mixing: Ungassed Newtonian fluids, ungassed non-Newtonian fluids, Gassed fluids, Calculation of power requirements, Scale up of mixing systems, Improving mixing in Fermenters, Effect of rheological properties on mixing, Role of shear in stirred fementers: Interaction between cells and turbulent eddies, Bubble shear, operating conditions for shear damage.

(10 Hrs, 20 Marks)

Unit: IV

Kinetics of Substrate utilization, product formation and biomass production in cell cultures, General reaction kinetics for biological systems: Zero order kinetics, First order kinetics, Numerical based examples on this, Yields in cell cultures: Overall and instantaneous yields, Theoretical and observed yields, Numerical based examples on this. Cell growth kinetics: Batch growth kinetics, kinetics of balanced growth, Monod growth kinetics, factors affecting growth kinetics with plasmid instability, kinetic implication of endogenous and maintenance metabolisms, transient growth kinetics, unstructured batch growth model, Growth of filamentous organisms, structured kinetic model, Product formation Kinetics: unstructured model, chemically structured product formation kinetics, model, product formation kinetics by filamentous organisms, segregated kinetics models of growth and product formation, Biomass production: Biomass yield from substrate, Kinetics of cell death, Numerical based examples on this.

(10 Hrs, 20 Marks)

Unit: V

Heterogeneous reactions in bioprocessing, Concentration gradient and reaction rates in solid catalyst: True and observed reaction rates, Interaction between mass transfer and reaction, Mass transfer and reaction: Steady state shell mass balance, first order kinetics and spherical geometry, zero order kinetics and spherical geometry, Michaelis-Menten Kinetics and spherical geometry, Prediction of observed reaction rates, The Thiele modulus and effectiveness factor: Zero order kinetics, First order kinetics, Michaelis-Menten Kinetics, The observable Thiele Modulus, Weiss's criteria, Minimum intracatalyst substrate concentration, External mass transfer, Liquid-solid mass transfer correlations: Free moving spherical particles, Spherical particles in packed bed, Minimizing mass transfer effect: Internal mass transfer and external mass transfer, Evaluation of true kinetic parameters, General comments on Heterogeneous reaction in bioprocessing.

(10 Hrs, 20 Marks)

References

1. Pauline M. Doran, Bioprocess Engineering Principles, Academic Press an Imprint of Elsevier.
2. James E. Bailey, David F. Ollis, Biochemical Engineering Fundamentals, Mc Graw-Hill Book Company.
3. Michael L. Shuler, Fikret Kargi, Bioprocess Engineering, Basic concepts, Prentice Hall India Pvt. Ltd., New Delhi.
4. J. F. Richardson and D. G. Peacock, Coulson and Richardson's Chemical Engineering (Vol: 3) Asian Books Pvt. Ltd., New Delhi.
5. Murray Moo-Young, Comprehensive Biotechnology (Vol: 1), Pergamon Press, An imprint of Elsevier.

Term Work shall be based on the following assignments:

1. Material and Energy balances in Bioprocesses
2. Unsteady state material and Energy balances and fermentation energy balances
3. Heat and Mass transfer in bioprocesses
4. Oxygen transfer in fermenter

5. Fermentation broth(Viscosity and Rheological properties)
6. Mixing in fermenter
7. Kinetics of Substrate utilization, product formation and biomass production in cell Cultures
8. Heterogeneous reactions in bioprocesing

2. CHEMICAL REACTION ENGINEERING

Teaching Scheme:
Lectures: 4 Hrs. / Week
Practical: 4 Hrs. / Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Oral: 50 Marks
Term Work: 25 Marks

Unit: I
Introduction to chemical reaction engineering: Review of chemical reaction equilibrium, Classification of chemical reaction, rate of reaction, order and molecularity of reaction, rate constant, Temperature dependent term of rate equation, comparison of theories, Activation energy and temperature dependency, rate of reaction predicted by theories, Reaction mechanism.

(10 Hrs, 20 Marks)

Unit: II
Collection and interpretation of kinetic data, Constant volume batch reactor, integral and differential method of analysis of data, Variable volume batch reactor, integral and differential method of analysis of data, The search for rate equation.

(10 Hrs, 20 Marks)

Unit: III
Ideal batch reactor, mixed flow reactor, plug flow reactor, space time and space velocity, holding time and space time for batch, mixed and plug flow reactors, comparison in mixed and plug flow reactors, Combined flow system, Recycle reactor, Autocatalytic reaction, Introduction to multiple reactions: Series and parallel reactions. Introduction to non-ideal flow.

(10 Hrs, 20 Marks)

Unit: IV
Introduction – Rate equations for heterogeneous systems, Contacting patterns in Two – Phase system, Introduction to fluid particle reaction non-catalytic reactions, unreacted core model for Spherical particle of unchanging size, Rate of reaction for shrinking spherical particles, Determination of rate controlling step, Various contacting patterns in fluid solid reactors for fluid-particle non-catalytic reactions

(10 Hrs, 20 Marks)

Unit: V
Introduction to solid catalyzed reactor, Rate equation for adsorption, desorption and surface reaction, Diffusion and reaction in spherical catalyst pellets, Internal effectiveness factor, Over all effectiveness factor, Estimation of diffusion and reaction limited

regimes, Mass transfer and reaction in a packed bed, The determination of limiting situation from reaction data, Introduction to heterogeneous catalytic reactors with applications.

(10 Hrs, 20 Marks)

References

1. Octave Levenspiel, Chemical reaction engineering, John Wiley and sons.
2. J.M. Smith, Chemical engineering kinetics, McGraw Hill
3. S.D. Dawande, Principles of reaction engineering, Central Techno publication, Nagpur.
4. H.Scott Fogler, Elements of chemical reaction engineering, Prentice Hall New Jersy.
5. Lanny D. Schimdt , Chemical reaction engineering, Oxford University Press.

Practical and Term work shall consist of minimum eight experiments from list given below.

1. To determine the reaction rate constant {k} for given reaction.(CSTR / BATCH / SEMIBATCH / PFR)
2. To determine the effect of temperature on reaction rate constant. .(CSTR / BATCH / SEMIBATCH / PFR)
3. To determine the activation energy {E} for the given reaction. .(CSTR / BATCH / SEMIBATCH / PFR)
4. To draw C [t], E [t] and F [t] curve and to calculate the mean residence time {tm} variance { σ^2} and skew ness { S^3} for plug flow reactor.
5. To draw C [t], E [t] and F [t] curve and to calculate the mean residence time {tm} variance {σ^2} and skew ness {S^3} for packed Bed reactor.
6. To study the cascade CSTR.
7. To study the reaction of solid liquid system for an instantaneous reaction for benzoic acid, NaOH and calculate the enhancement factor.
8. To study the isothermal decomposition of ethyl alcohol in tubular reactor packed with activated alumina catalyst.
9. Adsorption: To study the adsorption of Acetic acid on charcoal.

3. MASS TRANSFER-I

Teaching Scheme:
Lectures: 4 Hrs. / Week
Practical: 4 Hrs. / Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Practical: 50 Marks
Term Work: 25 Marks

Unit: I

Introduction to mass transfer operations, Steady state molecular diffusion in fluid at rest, Multicomponent mixture diffusion, Maxwell's law of diffusion. Diffusion in solids, unsteady state diffusion

(10 Hrs, 20 Marks)

Unit: II

Eddy (turbulent) diffusion: Relation between mass transfer coefficients. Mass transfer coefficient in laminar and turbulent flow. Theories of mass transfer. Equipments for gas liquid operation

(10 Hrs, 20 Marks)

Unit: III

Equilibrium for mass transfer process: Local two phase mass transfer. Local overall mass transfer coefficient, Use of local overall coefficient. Material balances for steady state co current, countercurrent, cross flow cascade, counter flow cascade. Application of mass transfer processes.

(10 Hrs, 20 Marks)

Unit: IV

Introduction to Gas Absorption Operation: Equilibrium solubility of gases in liquids. Material balance for one component transferred in countercurrent flow and co current flow. Countercurrent multistage operation, one component transferred. Continuous contact equipment. Introduction to multi component system. Absorption with chemical reaction. Different absorption operation equipments (plate tower, packed tower, venturiscrubber) Operational difficulties like coning weeping, dumping, priming, flooding in plate and packed tower.

(10 Hrs, 20 Marks)

Unit: V

Introduction to Humidification: Vapour liquid equilibrium, Humidification terms. Determination of humidity, Humidification and dehumidification. Water cooling operation equipment. Introduction to Drying operation: Rate of drying, Mechanism of moisture movement during drying, Drying equipments, Different methods of drying

(10 Hrs, 20 Marks)

Practicals and term work shall be based on experiments mentioned below.

1. Diffusion in Still Air: To estimate mass transfer coefficient for given system at room temperature.
2. Liquid – Liquid Diffusion: To determine diffusion coefficient for given system as function of concentration.
3. Solid – Liquid Diffusion: To determine mass transfer coefficient for dissolution of benzoic acid without chemical reaction.
4. Wetted Wall Column: To determine mass transfer coefficient for air – water system.
5. Absorption in Packed Column: To find mass transfer coefficient of given system.
6. Cooling Tower: To determine volumetric mass transfer coefficient for air – water system.
7. Natural Drying (Batch): To obtain drying curve for batch drying operation.

8. Fluidized Bed Dryer: To determine the rate of drying and to obtain mass transfer coefficient for the given material.

References:

1. R.E.Treybal , Mass transfer operation ,McGraw Hill Publication
2. Coulson and Richardson Chemical Engineering (Vol. I and II), Pergamon Press
3. Christie J.Geankoplis ,Transport Processes and Unit Operations ,Prentice Hall inc
4. P. Chattopadhayay ,Unit operation in Chemical Engg. (Vol. I and II), Khanna Publications Delhi.

4. MOLECULAR BIOLOGY AND GENETIC ENGINEERING

Teaching Scheme:
Lecturers: 4Hrs/week.
Term work: 4Hrs/week

Examination Scheme
Paper: 100 marks (3Hrs)
Oral: 25 marks
Term work: 25 marks

Unit: I

Introduction, Replication, DNA repair and DNA recombination:

C-value paradox, organization of genes (overlapping genes, antigens), central dogma, one gene – one polypeptide hypothesis. Replication: Enzymes and proteins involved in DNA replication: Structure and functions of DNA polymerase I,II,III, primase, polynucleotide ligase, endonuclease, helicase, single stranded binding proteins, topoisomerase. Types of DNA replication: Semi conservative method of replication, Meselson and Stahl experiment, bidirectional DNA replication, generalized model for the DNA replication, replication of E.Coli and eukaryotes chromosomes. DNA repair: Mismatch repair, base-excision repair, nucleotide excision repair, direct repair. DNA recombination: Homologous genetic recombination, site –specific recombination. Enzymes in DNA recombination

(10 Hrs, 20 Marks)

Unit: II

Gene expression

Transcription: RNA polymerase of prokaryotes and Eukaryotes (structure, types and function), transcription factors, Basal transcription factors, mechanism of transcription in eukaryotes and prokaryotes, Eukaryotic promoters, the enhancers.

RNA processing: Introduction, processing of the ribosomal RNA, transfer RNA, and the messenger RNA (eukaryotic),RNA splicing by group 1 and group 2 introns (mechanism).

Translation:-Genetic code; wobble hypothesis, ambiguity, degeneracy, universality of the genetic code. Protein synthesis:-Structure of Ribosome, t –RNA, messenger RNA. Steps in the protein synthesis: Activation of the amino acids, initiation (formation of amino acyl t –RNA), Elongation; termination and release, folding and post translational processing

(10 Hrs, 20 Marks)

Unit: III

Regulation of gene expression in prokaryotes and eukaryotes:

Introduction, levels of DNA regulation:-DNA replication in gene regulation, regulation of the transcription, Operon concepts (lac, tryptophan and arabinose operon) regulatory proteins, DNA binding proteins (zinc finger and helix –turn- helix), protein binding domains (leucine-Zipper and basic helix -loop-helix), Regulation of translation, regulation of genes expression in eukaryotes.

(10 Hrs, 20 Marks)

Unit: IV

Genetic engineering

Introduction, Brief outline of the genetic engineering (rDNA)

Properties of good vectors, vectors used in genetic engineering: plasmid vectors (PBR 322, PUC plasmids, M13 vectors), cosmids, bacteriophages, yeast artificial chromosomes, bacterial artificial chromosomes. Enzymes used in genetic engineering: Restriction endonuclease (type I, II and III), DNA ligase, DNA polymerase, Reverse transcriptase, polynucleotide kinase, terminal deoxynucleotidyl transferase, alkaline phosphatase. Integration of the DNA insert into the vector: Both ends of the cohesive and the compatible, Both ends cohesive and separately matched, Both ends cohesive and mismatched, both ends flush / blunt one end cohesive and compatible.

(10 Hrs, 20 Marks)

Unit: V

Construction of the DNA libraries: Isolation and purification of nucleic acids, isolation of plasmids, construction of the genomic and cDNA libraries, methods of gene transfer: direct transformation (polyethylene glycol, Ca++, microinjection, nuclear transplantation), Using vectors (Ti plasmids in plants,SV40 vectors for animals), using viruses (cauliflower mosaic virus, Gemine virus, papilioma virus, retro virus), Gene transfer in bacteria (conjugation, transformation and transduction), analysis and expression of cloned gene ,Gene amplification ,PCR and its application: Basic PCR and inverse PCR, molecular probes and its application, Labeling of probes: radioactive and non radioactive probe labeling.

(10 Hrs, 20 Marks)

References:

1. B.D. Singh, Genetics –Rastogi publication
2. Lehninger , Principles of the biochemistry- Nelson MacMillan press
3. B.D. Singh Basic biotechnology , Kalyani Publisher.
4. Primrose S. B. Principles of gene manipulation- Blackwell scientific publication
5. Bruse Albertis , Molecular biology of the cell , Garland publication.

Practical and Term work shall consist of minimum eight experiments from list given below .

1. Isolation of genomic DNA from bacteria.
2. Isolation of RNA from yeast.
3. Isolation of total plasmid DNA from bacteria.
4. Restriction digestion of genomic DNA of bacteria.
5. Ligation of bacterial DNA.

6. Calculation of molecular weight by using DNA marker with agrose gel electrophoresis.
7. DNA extraction from Blood.
8. Plasmid preparation.
9. DNA fingerprinting (by RFLP)
10. To study Bacterial transduction.

References:
1. S. Harisha. An Introduction to Practical Biotechnology. Laxmi Publications (P) Ltd. New Delhi.
2. Aneja K.R.(2nd Edn., 1996). Experiments in Microbiology, Plant pathology, Tissue Culture and Mushroom Cultivation. Wishwa Prakashan, New Age International (P) Ltd.
3. Plummer David T. "An Introduction to Practical Biochemistry", Tata McGraw-Hill Pubblishing Co. Ltd., New Delhi.
4. Jayraman J. A Laboratory Manual in Biochemistry. New Age International Publishers

5. ENZYME ENGINEERING

Teaching Scheme:
Lecturers: 4Hrs/week.

Examination Scheme
Paper: 100 marks (3Hrs)
Term work: 25 marks

Unit: I
Introduction, Nomenclature and classification of enzyme, Chemical nature and properties of enzymes: General basis of catalysis (Activation energy), Thermodynamic definition of enzyme catalysis, Binding energy, Transition state, Specificity (Substrate Specificity , Stereo specificity and Geometric specificity), Active site, allosteric site. Structure and Function of some cofactor and coenzymes. Factors effecting enzymes activity, Models of enzyme activity: Lock and key model, Induced fit, Substrate Strain model. Isoenzyme, with example and its application.

(10 Hrs, 20 Marks)

Unit: II
Kinetics of enzyme:
Enzyme kinetics, rate equation, Rate of reaction, First order and second order reaction, Michaelis – menten equation (Steady state kinetics) and Haldane relationship, Significance of Km, Lineweaver – Burk or Double – reciprocal plot, Eadie-Hofstee plot, Hanes plot, Turnover number, Specificity constant, Bisubstrate reaction, Inhibition kinetics : Reversible inhibition (Competitive, uncompetitive and Mixed inhibition) with kinetics, Irreversible inhibition, Application of enzyme inhibition, Regulation of enzyme activity (coarse control and fine control) and it's types, Allosteric enzymes, Kinetic properties of Allosteric enzymes , models for allosteric behaviors (MWC model and KNF model), Feedback inhibition, Cascade system (Genetic regulation) ,Numerical on above kinetics.

(10 Hrs, 20 Marks)

Unit: III

Enzymatic catalysis**:**

Catalytic mechanism : Acid-base catalysis, Covalent catalysis, Metal ion catalysis, Electrostatic catalysis, Proximity and Orientation effects, preferential binding of the transition state complex, Mechanism and action of some enzymes: chymotrypsin, RnaseA, Lysozyme, Hexokinase, Enolase, Lactate dehydrogenase, Alcohol dehydrogenase, Glutathione reductase, Pyruvate dehydrogenase.

Bisubstrate or Multisubstrate reaction: Ping – Pong mechanism, sequential mechanism, (Compulsory ordered and Random ordered), Enzyme model

(Host guest complexation chemistry).

(10 Hrs, 20 Marks)

Unit: IV

Immobilization of enzymes**:**

Techniques of enzyme Immobilization : Adsorption, Covalent linkage, Matrix entrapment, Encapsulation with example, Kinetics of immobilized enzyme, effect of solute Partition and diffusion on the kinetics of immobilized enzymes, Immobilized enzyme in bioconversion process (Production of L-amino acid from racemic mixture), Bioreactors using immobilized enzymes.

Enzyme Purification –

Introduction, objective in enzyme Purification, Steps involved in enzyme purification: Choice of source, Method of homogenization, Methods of separation: Depends on size or mass (Centrifugation, Gel filtration), Method depend on Polarity (Ion-exchange, electrophoresis, Iso-electric focusing), depends on changes in solubility (change in pH, ionic strength, Dielectric constant), Based on specific binding (Affinity chromatography)

Example of purification procedure (Adenylate kinase, RNA polymerase).

(10 Hrs, 20 Marks)

Unit: V

Enzyme engineering and Industrial uses of enzymes:

Design and construction of novel enzymes (protein engineering), Artificial Enzymes, Enzymes used in detergents, use of Proteases in food, Leather and wood industries, methods involved in production of Glucose syrup from starch, production of maltose and sucurose, glucose from cellulose, Use of Lactase in dairy industry, glucose oxidase and catalase in food industry, medical application of enzymes, Enzymes in biosensors.

(10 Hrs, 20 Marks)

References:

1. Lehninger, Nelson and cox. Principles of Biochemistry –Macmillan publishers.
2. Voet and Voet, Biochemistry, Wiley publisher.
3. Biotol series, Principles of Cell energetics , Butterworth- Heinemann Ltd,Jordan Hill, Oxford.

4. Biotol Series, Principles of enzymology and its application, Butterworth-Heinemann Ltd,Jordan Hill, Oxford.
5. Nicholascprice and Tewis stereous, Fundamentals of Enzymology, Oxford University press.
6. Palmer, Enzymes, Oxford University press.
7. Michael L. Shuler, Fikret Kargi, Bioprocess Engineering, Basic concepts, Prentice Hall India Pvt. Ltd., New Delhi.. .
8. J. F. Richardson and D. G. Peacock, Coulson and Richardson's Chemical Engineering (Vol: 3) Asian Books Pvt. Ltd., New Delhi
9. Murray moo-young, Comprehensive Biotechnology Pergemon Press(Vol 2)
10. Pauline M. Doran, Bioprocess Engineering Principles, Academic Press an Imprint of Elsevier.
11. James E. Bailey, David F. Ollis, Biochemical Engineering Fundamentals, Mc Graw-Hill Book Company.

Term work shall be based on following assignments:

1. Enzymes: Nomenclature, Classification and Properties.
2. Enzyme Kinetics: Michaelis – Menten Equation and evaluation of parameters of Michaelis – Menten Equation.
3. Inhibition kinetics of enzyme.
4. Enzymatic catalysis.
5. Bisubstrate or Multisubstrate reaction.
6. Immobilization of enzyme.
7. Enzyme purification.
8. Enzyme engineering and Industrial application of enzymes.

T.E. BIOTECH TERM II

1. INSTRUMENTATION AND PROCESS CONTROL

Teaching Scheme:
Lectures: 4 Hrs. / Week
Practical: 2 Hrs. / Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Oral: 25 Marks
Term Work: 25 Marks

Unit: I

Qualities of Measurement: The meaning of measurement, the elements of instruments, Static Characteristics, Dynamic characteristic. Expansion Thermometers: Introduction, Temperature scales, Constant volume gas thermometer, Bimetallic Thermometer, Industrial pressure spring thermometer, Response of Thermometer.

Thermoelectric Temperature Measurement: Introduction, Simple thermocouple circuit, Industrial thermocouples, Thermocouple lead wires, thermal wells, response of thermocouples. Resistance Thermometer: Introduction, Industrial resistance-thermometer bulbs, Resistance Thermometer element, Resistance thermometer circuit, RTD.

(10 Hrs, 20 Marks)

Unit: II

Pressure and Vacuum Measurement: Introduction, Indicating pressure gage, Bellows pressure element, Useful ranges of absolute pressure measuring gages, Mclead vacuum gage.

Measurement of Level: Float and tape liquid level gage, Float and shaft liquid level unit, Level measurement in pressure vessels, Gamma ray method, Ultrasonic method and resistive method.

Introduction, Theory, Instrumentation, advantages, and Application of: pH measurement, Refractrometry, Potentiometry, colourometry and Flame photometry.

(10 Hrs, 20 Marks)

Unit: III

Characteristics of Chemical Process Control, Mathematical Modeling of Chemical Processes, State Variables and State Equation for Chemical Processes. Input –Output Model, Linearization of non linear systems, Solution of Linear differential equation using Laplace Transform.

First order system and their transfer functions. Dynamic behavior of first order system , Pure capacity process, First order system with variable time constant and gain, Response of first order system in series :Interacting and Non-interacting.

(10 Hrs, 20 Marks)

Unit: IV

Second order system and their transfer function. Dynamic behavior of second order system: under damped and over damped and critically damped systems, Transportation lag. Higher order systems.

(10 Hrs, 20 Marks)

Unit: V

Introduction to feedback control, Controllers and final control elements. Control action block diagram of chemical reactant control systems.

Dynamic behavior of feedback control processes: P, PD, PI, and PID.

Stability analysis by Routh criteria, Root Locus Diagram

Frequency response analysis of linear processes: Bode's diagram, Nyquist plots.

(10 Hrs, 20 Marks)

Reference:

1. D.P.Eckman, Industrial Instrumentation, Willey Eastern Ltd., New Delhi.
2. Patranabis D. Industrial Instrumentation, Tata – Mcgraw Hill Publications, New Delhi.
3. Gurdeep Chatwal and Sham Anand, Instrumental methods of Chemical analysis, Himalaya publication House, Mumbai.
4. V.P. Kudesia and S.S. Sawhaney, Instrumental methods of chemical analysis Pragati Prakashan, P.O.Box No. 62, Begum Bridge,Meerut250001,U.P.
5. Nakra B.C. and K.K. Chaudhary, Instrumentation Measurement and Analysis, Tata – McGraw Hill, New Delhi.
6. B.K.Sharma.Goel, Instrumentation methods of chemical analysis, Publishing House,11,Shivaji Road, Meerut-250001,U.P.
7. George Stephanpolous, Chemical Process Control, Prentice Hall of India.
8. D.R. Coughnour, Process System Analysis and Control, McGraw-Hill.
9. R.P.Vyas, Process Control and Instrumentation {2nd edition}. Central Techno publication, Nagpur.
10. K. Krishnaswamy, Process Control, New age International.

Practical and term work shall consist of minimum eight experiments given below.

1. To study the response of bimetallic thermometer.
2. Calibration of thermocouple.
3. To measure the pH of given solution..
4. To determine concentration of given solution by colorimeter
5. Flame photometry
6. Abbey's refractometer
7. Dynamic behavior of first order system: Single tank system.
8. Dynamic behavior of first order system in series: Two tank non-interacting system.
9. Two tank interacting system.
10. Dynamic behavior of second order system: Mercury Manometer
11. Dynamic behavior of final control Element: Pneumatic control valve.
12. Study of Pneumatic controllers: Proportional Controller/ Proportional Derivative Controller/ Proportional Integral Controller/ Proportional Integral Derivative Controller

2. BIOLOGICAL THERMODYNAMICS

Teaching Scheme:	Examination Scheme
Lecturers: 4Hrs/week.	Paper: 100 marks (3Hrs)
Term work: 2Hrs/week	Term work: 25 marks

Unit: I

Introduction:

Distribution of energy, system boundary and surroundings, energy and biological world, energy flow (transformation), mass and energy recycling, energy conversions, energy (nutritional) requirements of living systems, cell structure and division of labor in cells, metabolism (anabolism, catabolism), energy relations between catabolic and anabolic pathways, intermediary metabolism, three types of non linear metabolic pathways, Energy production and consumption in metabolism, flow of electrons in organisms, energy coupling reactions, activation energy(enzyme reaction), living cells as self regulating chemical engines, assembly of information macro molecules .

(10 Hrs, 20 Marks)

Unit: II

Biological Thermodynamics Concepts:

Types of systems, biological thermodynamics, zeroth law and first law of thermodynamics, internal energy, enthalpy, Hess's law, entropy and second law of thermodynamics, entropy in biological world, Gibb's free energy, Gibb's and Helmholtz function(derivation), relation between Gibb's energy and equilibrium, standard free energy change in biochemical reactions, additive nature of standard free energy with examples, effect of pH and temperature on Gibb's function and equilibrium, third law of thermodynamics, thermodynamic aspects of protein folding, thermodynamics of renaturation and denaturation of DNA, Thermodynamics of transport systems through membranes.

(10 Hrs, 20 Marks)

Unit: III

Energy Currency:

Structure and properties of ATP, ADP and AMP, ATP-hydrolysis and free energy change, calculation of ultimate standard free energy change during ATP-hydrolysis, standard free energy of hydrolysis of phosphate containing compounds (4 examples), energy production by group transfer (ATP), ranking of biological phosphatic compounds in cell, nucleophilic displacement reaction of ATP, ATP and active transport system, ATP and muscle contraction, conditions affecting the standard free energy change of hydrolysis of ATP, dynamics of phosphate group turnovers in cell, Transphosphorylation between nucleotides, inorganic polyphosphate, requirement of ATP (energy currency) in signal transduction processes (Insulin receptor, Epinephrine cascade) and others.

(10 Hrs, 20 Marks)

Unit: IV

Oxidation – Reduction:

Thermodynamics and compartmentalization, biological oxidation and reductions, flow of electrons to do biological work, conjugate redox pair, electrochemical cell, electromotive force (emf), electrode potential, standard reduction potential measurement, standard

reduction potentials of some biological important half reactions, standard potentials and Gibbs free energy , standard reduction potential to calculate free energy change, effect of concentration, pH, temperature on redox potential, structure and function of electron carriers in cells: NADH, NADPH, FADH, FMN.

(10 Hrs, 20 Marks)

Unit: V

Oxidative Phosphorylation and photophosphorylation:

Structure of mitochondria, electron transport system through complex I, II, III and IV in detail with structure, proton gradient and proton-motive force, ATP synthesis (chemiosmotic model), structure of ATP synthetase, mechanism of ATP synthesis by ATPase, shuttle system (malate aspartate shuttle, glycerol 3-phosphate shuttle), regulation of oxidative phosphorylation .

Photosynthesis: Introduction, ultra-structure of chloroplast, primary and secondary photo-pigments, Hills reaction, light dependant reactions, cytochrome complex, Photo system I and II, ATP synthesis by photophosphorylation, stoichiometry of photophosphorylation, carbon fixation reaction or dark reaction.

(10 Hrs, 20 Marks)

Reference:

1. Lehninger, Nelson and cox. Principles of Biochemistry Macmillan publishers.
2. Voet and Voet, Biochemistry, wiley publisher.
3. Biotol series, Principles of Cell energetics , Butterworth- Heinemann Ltd,Jordan Hill, Oxford.
4. Robert K.Murray, Daryl K.Granner, Harpers Illustrated Biochemistry, Mc Graw Hill.
5. Lubert Strayer, Jeremy M.Berg, Biochemistry , W.H.Freeman and Company. Newyork.
6. K.V.Narayan, Chemical Engineering Thermodynamics, PHI.

Term work shall consist of any eight assignments from the following

1. Enthalpy and First law of thermodynamics.
2. Entropy and second law of thermodynamics.
3. Calculation of Standard Gibbs free energy in biological reaction.
4. Energy production during metabolism.
5. Study of Energy Currency in Living organism.
6. Biological oxidation-reduction reaction.
7. Calculation of Standard electrode potential in biological system.
8. Oxidative Phosphorylation
9. Photophosphorylation.

3. MASS TRANSFER-II

Teaching Scheme:	Examination Scheme:
Lectures: 4 Hrs. / Week	Paper: 100 Marks (3 Hrs)
Practical: 4 Hrs. / Week	Practical: 50 Marks
	Term Work: 25 Marks

Unit: I

Introduction to distillation process, Vapor liquid equilibrium, The methods of distillation (Binary mixture), The fractionating column, Condition for varying overflow in non-ideal system(Binary), Batch distillation, Multi component mixture, Azeotropic, extractive and steam distillation, Introduction to distillation equipments.

(10 Hrs, 20 Marks)

Unit: II

Introduction to extraction process, Liquid equilibria, Material balances for stage wise contact methods, Extraction with reflux, Fractional extraction, Stage contact and continuous contact type extractors.

(10 Hrs, 20 Marks)

Unit: III

Introduction to crystallization, Growth and properties of crystals, Effect of impurities in crystallization, Effect of temperature on solubility, Fractional crystallization, Caking and yield of crystals, Different type of crystallizers.

(10 Hrs, 20 Marks)

Unit: IV

Introduction to adsorption operation, Type of adsorption operation, Nature of adsorbents, Adsorption equilibria, Adsorption of vapor, gas mixture and liquids, Material balances for stage wise for operation, Continues contact process for adsorption, Unsteady state fixed bed adsorption, Principle of ion exchange operation, Equilibria for ion exchange operation, Rate of ion exchange operation, Application of ion exchange operation.

(10 Hrs, 20 Marks)

Unit: V

Introduction to leaching operation, Mass Transfer in leaching operation, Calculation of stages for different processes, Graphical method for calculation of no. of stages ,counter current washing process, Equipments for leaching operation, Introduction to membrane separation process, Different Types of membrane separation process, (Ultrafilteration , Reverse Osmosis, Dialysis, Electro Dialysis, Pervaporation), General membrane equation, Liquid membrane

(10 Hrs, 20 Marks)

Practical and Term Work shall consists of any eight experiments from the following

1. Simple Distillation: To verify Rayleigh's equation for simple distillation
2. Ternary Diagram: To construct ternary diagram for acetic acid –water – benzene
3. Tie Lines

4. Liquid – Liquid Extraction: To study and determine the efficiency of cross current liquid- liquid extraction.
5. Leaching
6. Crystallization
7. Adsorption: To study adsorption of acidic acid on activated charcoal
8. Determination of HTU, HETP and NTU
9. Spray Column
10. Ion Exchange
11. Bubble Cap Distillation
12. Study of Mass Transfer Equipments

Reference:

1. Coulson and Richardson, Chemical Engineering (Vol. II), Pergamon Press
2. R. E. Tryebal, Mass Transfer Operation, McGraw hill.
3. Christie J. Geankoplis ,Transport Processes and Unit Operations ,Prentice Hall inc
4. P. Chattopadhyay, Unit operations in Chemical Engg. Vol. I and II, Khanna Publication,New Delhi.

4. BIOTECHNOLOGY OF WASTE TREATMENT

Teaching Scheme:
Lecturers: 4Hrs/week.
Term work: 4Hrs/week

Examination Scheme
Paper: 100 marks (3Hrs)
Oral: 25 marks
Term work: 25 marks

Unit: I
Introduction:
Introduction to waste treatment, site surveys for waste treatment programme, strengths of fermentation waste, disposal of effluents, treatment process(physical, chemical and biological),introduction to microorganisms,bacterial growth and factors affecting growth kinetics, introduction to stoichiometry and kinetics of waste treatment, important biological reactions: Aerobic heterotrophic reaction, nitrification, denitrification, anaerobic digestion.

(10 Hrs, 20 Marks)

Unit: II
Biochemistry of Waste Treatment:
Introduction, oxygen uptake, dissolved oxygen, enzymes, inhibition, nitrogen metabolism, phosphorus and sulphur, elements and growth factors, fate of individual chemicals, structure-activity relationships, multisubstrates and species interactions, biochemical indicators, precipitation in waste treatment, coagulation in waste treatment, ecology of polluted water (physical, chemical and biotic effects) in brief. Problems on measurement of dissolved oxygen.

(10 Hrs, 20 Marks)

Unit: III

Waste Treatment Processes:

Characteristics of activated sludge, theory of activated sludge process, design, operation and control, operation and design features of trickling filters , rotating biological contractor, aerated lagoons, anaerobic digestion, packed beds, land farming.

(10 Hrs, 20 Marks)

Unit: IV

Nitrification and Denitrification and Anaerobic Treatment:

Introduction, forms of nitrogen, nitrifying and denitrifying bacteria, stoichiometry of nitrification and denitrification, process variables in nitrification and denitrification process, Nitrification processes: plug flow v\s complete mix, single stage v\s two stage systems, biofilm nitrification, denitrification using methanol, organic matter and thiosulfate and sulfide. Anaerobic treatment by methanogenic method, anaerobic reactor system.

(10 Hrs, 20 Marks)

Unit: V

Biological Degradation:

Introduction, determination of biological degradability, Pilot studies: PCB (polychlorinated biphenols) biodegradation, methyl ethyl ketone, Aerobic biodegradation: TCE (trichloro ethane) degradation, polycyclic aromatic hydrocarbon degradation, oil degradation, phenanthrene degradation, Treatment scheme of some industrial waste: dairy, paper, tannery distillation, and sugar. Biodegradation of waste by fungi, anaerobic biodegradation, engineering strategies for bioremediation.

(10 Hrs, 20 Marks)

Reference:

1. Bruce E Rittmann, Rurry L.Mc carty, Environmental Biotechnology:Principles and applications (Mcgraw Hill international)
2. A.K.Chatterji, Introduction to environmental biotechnology (Eastern Economy edition)
3. Nicholas P.Cheremisinoff, Biotechnology for waste water treatment (Eastern Economy edition)
4. Murray Moo - Young, Comprehensive biotechnology, vol 4- (Pergamon Press)
5. P. F. Stanbury, A. Whitaker and S. J. Hall, Principles of fermentation technology (Aditya book private limited)

Term Work shall consists of any eight experiments from the following

1. To determine alkalinity and pH of given sample.
2. To determine total solids and suspended solids of given sample.
3. To determine dissolved oxygen of given sample.
4. To determine initial oxygen demand.
5. To determine B.O.D. of the given sample.
6. To determine C.O.D. of the given sample.
7. To determine sludge volume index of the sample.
8. To determine M.P.N test of the given water sample.
9. To study Microorganisms of the given water sample.
10. Estimation of inorganic ion in water.

11. Evaluation of the effect of process, variables in the performance of activated sludge process (DEMO) / Study of activated sludge process
12. Evaluation of performance of anaerobic digestor (DEMO)/ Study of anaerobic digester

5. FERMENTATION BIOTECHNOLOGY- I

Teaching Scheme:
Lecturers: 4Hrs/week.

Examination Scheme
Paper: 100 marks (3Hrs)
Term work: 25 marks

Unit: I
An introduction to fermentation process, Isolation methods for Industrial microorganisms, Culture preservation and stability, the improvement of industrial microorganisms.

(10 Hrs, 20 Marks)

Unit: II
Media for Industrial fermentation, Introduction ,typical media, Medium fermentation: Water, Energy sources, Carbon sources, Nitrogen sources, Minerals, Growth factors, Nutrient recycle, Buffers, Precursors, Metabolic regulators, Oxygen requirement and antifoams, Medium optimization: Animal cell media, serum, serum free media, supplement, protein free media, trace element, osmality, pH, Non-nutritional media supplements.

(10 Hrs, 20 Marks)

Unit: III
Sterilization: Introduction, Medium sterilization, Design of Batch sterilization process: Calculation of Del factor during heating and cooling, Calculation of holding time at constant temperature, Richard's rapid method for the design of sterilization cycles, the scale up of batch sterilization processes, Method of batch sterilization, Design of continuous sterilization process, Sterilization of the fermenter, Sterilization of the feeds, Sterilization of liquid wastes, Filter sterilization: Filter sterilization of fermentation media, air and fermenter exhaust air, the theory and design of depth filters.

(10 Hrs, 20 Marks)

Unit: IV
The development of Inocula for industrial fermentation: Introduction, Criteria for the transfer of inoculums, The development of inocula for yeast processes, The development of inocula for bacterial processes, The development of inocula for mycelial processes, The aseptic inoculation of plant fementers, Solid state fermentation.

(10 Hrs, 20 Marks)

Unit: V
Ageing and Death in microbes, Basic principles: Ageing of microbes, Death of microbes, Viability among microbes, Survival and populations: Cryptic growth, Injury among microbes, Stress and survival: The physiological status of the population, overt and acheal stress, Starvation: Substrate accelerated death (SAD), Metabolic and substrate injury, Thymine – Len death, survival of slowly growing bacteria, Differentiation and

survival, Effect of Environment on microbial activity: Introduction, mechanism of microorganism response to the environment, dissolved oxygen, redox potential, and response to CO_2, water activity, effects of pH, temperature and shear, General control strategies, Mixed culture and mixed substrate systems: Introduction, mixed cultures, mixed substrate, co metabolism.

(10 Hrs, 20 Marks)

References

1. P. F. Stanbury, A. Whitaker and S. J. Hall, Principle of Fermentation Technology, Aditya Books (P) Ltd, New Delhi.
2. Murray Moo-Young, Comprehensive Biotechnology (Vol: 1), Pergamon Press, An imprint of Elsevier.
3. L. E. Casida, Industrial Microbiology, New Age Industrial Publishers.
4. Pauline M. Doran, Bioprocess Engineering Principles, Academic Press an Imprint of Elsevier.

Term Work shall consist of any eight assignments from the following.

1. Isolation methods of industrial microorganisms
2. Maintenance and preservation of cultures
3. Media for industrial fermentation
4. Sterilization of media
5. Air sterilization
6. Inoculum development
7. Solid state fermentation
8. Ageing and death in microorganisms
9. Effect of environment on microbial activity

6. PRACTICAL TRAINING / MINI PROJECT / SPECIAL STUDY

Examination Scheme
Term work: 25 marks

• Every student has to undergo industrial/practical training for a minimum period of two weeks during summer vacation between (S.E Second Term) fourth and (T.E. First Term) fifth term or during winter vacation between fifth and sixth term (T.E. First Term and Second Term).
• The industry in which practical training is taken should be a medium or large scale industry.
• The paper bound report on training must be submitted by every student in the beginning of (T.E. Second Term) sixth term along with a certificate from the company where the student took training.
• The report on training should be detailed one.
• Maximum number of students allowed to take training in company should be five. Every student should write the report separately.

• In case if a student is not able to undergo practical training , then such students should be asked to prepare special study report on a recent topic from reported literature
Or
A mini project related to the Biotechnology.
Fields includes like Microbiology, Immunology, Molecular biology, Bioprocess, Biochemistry and on Enzyme technology.
Project report should be details of work, carried out by student.
• The practical training/special study/ mini project shall carry a term work of 25 marks. Every student shall be required to present a seminar in the respective class in the presence of two teachers. These teachers (fixed by the head of department in consultation with the Principal) shall award marks based on the following:
(a) Report 10 marks
(b) Seminar presentation 10 marks
(c) Viva-voce at the time of Seminar presentation 05 marks

Total 25 marks

==========XXXXX==========

NORTH MAHARASHTRA UNIVERSITY,

JALGAON (M.S.)

SYLLABUS OF

FINAL YEAR ENGINEERING (B.E.)

BIOTECHNOLOGY

TERM – I and II

W.E.F. 2009-2010

NORTH MAHARASHTRA UNIVERSITY, JALGAON

STRUCTURE OF TEACHING and EVALUATION

B.E. (BIOTECHNOLOGY) **W.E.F.2009-2010**

First Term

Sr. No.	Subject	Teaching Scheme Hours/Week		Examination Scheme				
		Lectures	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Bioprocess Engineering - I	04	--	03	100	25	--	--
2	Bioprocess Modeling and Simulation	04	04	03	100	25	25	--
3	Bioseparation Processes	04	--	03	100	25	--	--
4	Elective –I	04	--	03	100	--	--	--
5	Fermentation Biotechnology-II	04	04	03	100	25	--	50
6	Project –I	--	02	--	--	25	--	25
7	Seminar	--	02	--	--	25	--	--
		20	12		500	150	25	75
	Grand Total	32			750			

Second Term

Sr. No.	Subject	Teaching Scheme Hours/Week		Examination Scheme				
		Lectures	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Bioprocess Engineering -II	04	04	03	100	25	--	25
2	Bioprocess Engineering and Economics	04	02	03	100	25	--	25
3	Bioinformatics	04	04	03	100	25	25	--
4	Elective –II	04	--	03	100	25	--	--
5	Project –II	--	04	--	--	100	--	50
6	Industrial Visit / Case Study	--	--	--	--	25	--	--
		16	14		400	225	25	100
	Grand Total	30			750			

Elective – I

1. Advanced Biomaterials.
2. Plant Tissue Culture and Plant Biotechnology.
3. Protein Engineering.
4. Food Biotechnology.

Elective – II

1. Metabolic Engineering.
2. Biosafety and Bioethics.
3. Biomedical Fluid Dynamics.
4. Applied Genetic Engineering

B.E.BIOTECH. TERM-I

1. BIOPROCESS ENGINEERING-I

Teaching Scheme:
Lectures: 4 Hrs. / Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Term Work: 25 Marks

Unit: I

Design of bioreactors and scale up:

Introduction, Basic objective in design of a reactor, aseptic operation and containment, body construction, aeration and agitation, stirrer glands and bearings, baffles design, sparger system, achievement and maintenance of aseptic conditions, valves and steam traps, types of valves and pressure control valves.

Scale up of fermenters, design condition for scale up, scale-up methods.

(10 Hrs, 20 Marks)

Unit II

Bioreactors

Types of bioreactors: Batch bioreactors, Continuous bioreactors, Semicontinuous bioreactors, Stirred tank bioreactors, Airlift bioreactor systems, Trickle bed bioreactor, Airlift external loop bioreactors, waldhof-type fermenter, Tower fermenter, Cylindro-conical vessel, Deep jet fermenters, Cyclone column, Rotating disc fermenters, Reactor dynamics: Dynamic models and stability.

Solid state fermenter: Introductions, types of solid state fermenter, few examples of bioproducts produced from solid state fermenter.

(10 Hrs, 20 Marks)

Unit III

Bioreactors configuration:

Enzyme reactors, batch growth of microorganisms, continuous culture of microorganisms, stirred tank reactor with recycle of biomass, continuous stirred tank fermenters in series, Fed batch fermenters, plug flow fermenters, problems on above, estimation of kinetic parameters (batch and continuous culture experiments).

(10 Hrs, 20 Marks)

Unit IV

Bioreactor Design Considerations:

Design consideration: Design codes, maximum working pressure, design pressure, design temperature, design stress, factor of safety, and selection of factors of safety, design of wall thickness, corrosion ratio, Poisson ratio, criteria of failure.

Materials of construction: mechanical properties, materials, corrosion, protective coating, choice of materials, corrosion prevention.

Brief introduction to pipe joints. (10 Hrs, 20 Marks)

Unit-V

Process design of bioreaction vessel: Introduction, materials of construction, agitation, classification of bioreaction vessels, heating systems, design of bioreaction vessels.

Agitators: Introduction, types of agitators, baffling, power requirements, design of turbine agitator.

(10 Hrs, 20 Marks)

REFERENCES:

1. Cooney and Humphery, Comprehensive Biotechnology, Volume-2, Elsevier Publication.
2. Syed Tanveer Ahmad Inamdar, Biochemical Engineering Principles and Concepts, , PHI Publication.
3. James E. Bailey, David F. Ollis, Biochemical Engineering Fundamentals, Mcgraw –Hill, International Edition.
4. Paulin.M.Doran, Bioprocess Engineering Principles, Elsevier Publication.
5. Michael L. Shuler, Fikret Kargi, Bioprocess Engineering - Basic Concepts, PHI Publishers.
6. P. F. Stanbury, A. Whitaker and S. J. Hall, Principles of Fermentation Technology, Aditya books, Private Limited New Delhi.
7. B.D Singh, Biotechnology- Expanding Horizons, Kalyani Publications.
8. Operational Mode of Bioreactors- Biotol series ,Elsevier Publications.
9. B.C.Bhattacharya, Introduction to Chemical Equipment Design (Mechanical Aspects), CBS publisher and Distributors, New Delhi.
10. M.V.Joshi, V.V.Mahajan, Process Equipment Design, Macmilan India Ltd.
11. S.D.Dawande, Process Design of Equipments (vol 1and2) Central Techno Publications, Nagpur.
12. J.H.Perry, Chemical Engineer's Hand Book, Mcgraw Hill, New Delhi
13. H.C.Vogel, Woyes Coulson and Richardson,Principles, Process Design of Equipment, (vol 6).

Term Work shall be based on the following assignments:

1. Design of Bioreactors and Scale up.
2. Types of Bioreactors by taking example of product produced.
3. Solid state fermenter with example of bioproduct produced.
4. Bioreactor Design consideration.
5. Pipe joints and types of pipe joints.
6. Process design of bioreaction vessel.
7. Design of Agitators.
8. Types of Agitators.

2. BIOPROCESS MODELING AND SIMULATIONS

Teaching Scheme:
Lectures: 4 Hrs. / Week
Practical: 4 Hrs. / Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Practical: 25 Marks
Term Work: 25 Marks

Unit I

Introduction to modeling:

Introduction: Role of process dynamics and control, historical background, Laws and Languages of process control, Mathematical Modeling of Bioprocess Engineering System: Fundamentals uses of mathematical model, scope of coverage, principles of formulation; Fundamental Laws of Modeling: continuity equation, energy equation,

equation of motion, transport equation, equation of state, phase and chemical equilibrium, chemical kinetics;
Lumped parameter and distributor parameters.

(10 Hrs, 20 Marks)

Unit II

Study of mathematical models of Biochemical Engineering Systems:
Introduction, modeling of CSTRs (isothermal, constant hold up, variable hold up), Batch reactors, non isothermal CSTR, Plug flow reactor, Fluidized bed reactor, Reactors used in effluent treatments, Trickle bed reactor, Fermenter.

(10 Hrs, 20 Marks)

Unit III

Computer aided design of heat and mass transfer equipment:
Batch distillation with hold up, Ideal binary distillation column, Multicomponent nonideal distillation column, Reactor with mass transfer, Design of shell and tube heat exchangers, Double pipe heat exchangers, Design of gas dryer.

(10 Hrs, 20 Marks)

Unit IV

Biological Models:
Modeling of gene regulation, Modeling of signal transduction in prokaryotes and eukaryotes, Models for inheritance, Genetic inbreeding model, Simple logistic models, Simple prey predator models, Volterra's model of an interacting species, Microbial population models (growth model, product formation), Pharmaceutical models, Blood glucose in diabetic patients.

(10 Hrs, 20 Marks)

Unit V

Simulation:
Introduction, Computer programming, Computational methods, Runga-Kutta Method, Newton Raphson Method; Simulation of reactors, Simulation of Double pipe and Shell tube heat exchangers, Simulation for catalyst surface temperature, Simulation of rotary dryer.

(10 Hrs, 20 Marks)

REFERENCES:

1. Luyben W.L. "Process Modeling Simulation and Control for Chemical Engineers", McGraw Hill, 1988.
2. Chapra S.C., R.P. Canale, "Numerical Methods for Engineers", Tata-McGraw Hill Publications.
3. Franks R.E.G., "Modeling and Simulation in Chemical Engineering", Wiely Instscience, NY
4. John Ingam, Irving J. Dunn., "Chemical Engineering Dynamic Modeling with PC simulation", VCH Publishers.
5. J.R. Leigh, Modeling and Control of Fermentation Processes, Peter Peregrinus, London, 1987.
6. J.N.Kapur, Mathematical Models in Biology and Medicine.
7. Cooney and Humphery, Comprehensive Biotechnology,Volume-2,Elsevier Publication.

8. James E. Bailey, David F. Ollis, Biochemical Engineering fundamental, Mcgraw –Hill, International edition.
9. Pevzner, Computational Molecular Biology- An Algorithmic Approach, PHI, New Delhi.
10. Setubal, Introduction to Computational Molecular Biology, Cengage Learning PVT.
11. Vose, Simple Genetic Algorithms, The- Foundations and Theory, PHI, New Delhi.

Practical and Term work: Practical and term work shall consist of minimum eight experiments from list given below.

1) CAD of shell and tube exchanger.
2) CAD of adsorption column.
3) CAD of single effect evaporator.
4) Computer controlled heat exchanger.
5) CAD for rotary dryer.
6) Simulation of temperature on surface catalyst.
7) Simulation of reactor design.
8) Simulation of ammonia production system.
9) Modeling and simulation of protein.
10) Drug designing.

3. BIOSEPARATION PROCESSES

Teaching Scheme:
Lectures: 4 Hrs. / Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Term Work: 25 Marks

Unit I

Introduction and separation of particles:

Role and importance of downstream processing in biotechnology, characteristics of biological mixtures (broth), criteria of recovery process, process design criteria.

Separation of particles:

Introduction, filtration, filter media, theory of filtration, types of filters (vacuum filter, plate and frame filter, leaf filter),centrifugation, theory of centrifugation, types of centrifuge (tubular bowl centrifuge, basket centrifuge, ultra centrifuge), sedimentation, precipitation and flocculation.

(10 Hrs, 20 Marks)

Unit II

Cell disruption methods:

Introduction, types of intracellular products and importance, methods of cell disruption, physico-mechanical cell disruption: liquid shear (high pressure homogenizer), solid shear agitation and abrasives (bead mill, kinetics of bead mill), freezing - thawing, ultrasonication (ultrasonic vibrators), thermal shock, osmotic shock, chemical treatment: alkali treatment, detergent solubilization, lipid solubilization, enzymatic method.

(10 Hrs, 20 Marks)

Unit III

Extraction and Concentration:

Extraction, modes of extraction, liquid-liquid extraction, two phase aqueous extraction, super critical extraction, solvent recovery, extraction application.

Concentration of products:

Evaporation, types of evaporation, membrane process, design and configuration of membrane separator equipment, ultrafiltration, reverse osmosis, dialysis, nanofiltration, sorption, sorption mechanism, materials of sorption, modes of operation in sorption process, adsorption.

(10 Hrs, 20 Marks)

Unit IV

Purification of product:

Fractional precipitation, Chromatography: Types of chromatography: Adsorption, Ion exchange, Gel permeation, Affinity, Molecular Exclusion, High Performance Liquid Chromatography (HPLC), Gas Liquid Chromatography (GLC); Crystallization, Drying, types of drying (spray drying, vacuum drying, freeze drying), Electrophoresis: Theory of electrophoresis, gel electrophoresis, SDS-page electrophoresis, isoelectric focusing, immunoelectrophoresis.

(10 Hrs, 20 Marks)

Unit V

Formulation and Case studies:

Introduction, importance of formulation, formulation of baker's yeast, enzymes (glucose isomerase, detergent enzymes), formulation of pharmaceutical products, application research, Granulation: wet granulation, dry granulation or slugging, Tabletting: compressed tablets, tablet formulation, coating, pills, capsules, Case studies of recovery process of penicillin, cephatomycin, nuclease, citric acid, proteins, etc.

(10 Hrs, 20 Marks)

REFERENCES:

1. Biotal series, Product Recovery in Bioprocess Technology, Elsevier Publisher
2. Murray Moo-Young, Comprehensive Biotechnology (Vol: 1), Pergamon Press, An Imprint of Elsevier.
3. Michael R Ladisch, Bioseparation Engineering Principles, Practice and Economics, Wiley-Inter science
4. Syed Tanveer Ahmad Inamdar, Biochemical Engineering Principles and Concepts, , PHI Publication
5. Gary Walsh, Biopharmaceuticals: Biochemistry and Biotechnology.
6. P. F. Stanbury, A. Whitaker and S. J. Hall, Principles of Fermentation Technology, Aditya Books (P) Ltd, New Delhi
7. Belter P.A. and Cussier E, Bioseparations, Wiley, 1985.

Term Work shall be based on the following assignments:

1. Role and importance of downstream processing in biotechnology.
2. Separation of particles.
3. Cell disruption methods.
4. Extraction methods.
5. Concentration of products.
6. Chromatography and its types.

7. Electrophoresis and its types.
8. Case studies of recovery process of some bioproducts.

ELECTIVE – I
1. ADVANCED BIOMATERIALS

Teaching Scheme
Theory: 4 Hours/Week

Examination Scheme
Paper: 100 Marks (3Hrs)

Unit-I

Applications of biomaterial, tissue engineering for artificial organs, Types of biomaterials and their applications for the human body, issues of biocompatibility and its evaluation, Surface characterization of biomaterials, biomaterials-blood (bio-fluid) interface, Surface modification for improved compatibility.

(10 Hrs,20 Marks)

Unit-II

Biomaterials in cardiovascular System: Collagen hyaluronic acid and other biopolymer applications, Cardiovascular implant biomaterials: artificial heart valves, Mechanicals and bioprosthetic valves; Vessel grafts, Endothelial cell seeding as a surface modification of biomaterials.

Orthopedic implant materials: Materials for reconstruction of cartilage, ligaments and tendons, Bone replacement and bone cement, Artificial joint replacement.

(10 Hrs, 20 Marks)

Unit-III

Artificial red blood cells, artificial lung surfactants, artificial saliva, artificial synovial fluid, dialysis membranes, artificial liver, artificial pancreas, biodegradable block copolymers and their applications for drug delivery materials used for neuronal reconstruction and regeneration.

(10 Hrs,20 Marks)

Unit- IV

Polhydroxyallalkaloids and polylactides, Biodegradable plastic: characteristics, production and application.

Cyclodextrins: Properties, production and applications.

Biomaterials for development of biosensors enzymes, pigments etc.

(10 Hrs,20 Marks)

Unit - V

Bionanomaterials: Silver and Gold nanoparticles, other nanoparticles, its biological properties, its production, agents for its dispersion and application.

Ophthalmology: Artificial cornea, intraocular lenses, artificial tears, Tissue engineering and artificial organs, Wound dressings, artificial skin, facial implants, Dental restorative materials, implanted dental interfaced.

(10 Hrs,20 Marks)

REFERENCES:

1. D.L. Wise et al. (Eds.): "Encyclopedic Handbook of Biomaterials and Bioengineering (4Vols.)", Marcel Dekker, New York, 1995.
2. S. Fredrick: "Biomaterials, Medical Devices and Tissue Engineering": An Integrated Approach. Chapman and Hall, 1994.
3. L.L. Hench, E.C. Ethridge: "Biomaterials", An interfacial Approach. Academic

Press, New York, 1982.
4. S. Frederick, H. Chrstiansen, L. Devid: "Biomaterial Science and Biocompatibility".

ELECTIVE – I
2. PLANT TISSUE CULTURE AND PLANT BIOTECHNOLOGY

Teaching Scheme:
Lectures: 4 Hrs. / Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)

Unit I

Introduction to plant tissue culture:

Introduction, history of tissue culture, general techniques (about aseptic conditions), requirements (equipments), media, media constituents, media selection, types of media, totipotency of cells, explant, criteria for selection of explant, surface sterilization of explant, classification of tissue culture, callus culture, cell suspension culture, application of callus culture and cell suspension culture, regeneration of plantlet by callus culture.

(10 Hrs, 20 Marks)

Unit II

Tissue culture methods:

Meristem culture, anther culture, ovary culture, embryo culture, somatic hybridization, protoplast culture (isolation of protoplast, purification of protoplast and culture media of protoplast), protoplast fusion methods, Micro propagation, Somatic embryogenesis, somaclonal variation, haploid plants, cybrids, Gynogenesis, synthetic seeds and preservatives, cryopreservation.

(10 Hrs, 20 Marks)

Unit III

Plant Biotechnology:

Plant viruses, classification of plant viruses, virus as a tool to deliver foreign DNA, gene construction of plants, vectors for production of transgenic plant, transformation techniques: Agro bacterium mediated gene transfer, Agro infection, direct gene transfer method; integration of the transgenes, analysis of transgene integration, Nitrogen fixation, nif gene.

(10 Hrs, 20 Marks)

Unit IV

Transgenic plants I:

Introduction, characteristics of transgenic plants, herbicide resistance, insect resistance, virus resistance, drought resistance, microbial disease resistance, stress tolerance, genetic manipulation of flowers pigmentation, fruit ripening and flower wilting.

(10 Hrs, 20 Marks)

Unit V

Transgenic plants II:

Modification of starch, plant nutritional content, food plant taste and appearance, oil and seed protein quality, male sterility, biochemical production, pharmaceutical products, plant derived vaccines, biofertilizers.

(10 Hrs, 20 Marks)

REFERENCES:

1. R.A.Dixon and Gonzales, Plant cell culture : A Practical Approach, IRL Press.
2. S.S.Purohit, Biotechnology Fundamentals and Applications, Agrobios (India), 4th Edition, 2005.
3. B.D.Singh, Biotechnology-Expanding Horizons, Kalyani Publishers, New Delhi, Second Revised Edition, 2008.
4. S.S.Bhojwani and M.K.Razdan, Plant Tissue Culture : Theory and Practical, (1996) Elsevier, Amsterdam.
5. J.Hammond,P.McGarvey and V.Yusibov (Eds.), Plant Biotechnology New Products and Applications, Springer.
6. S.B Primrose and R.M.Twyman, Principles of Gene Manipulation and Genomics, Blackwell publishing, 7th edition, 2006.
7. Bernard R. Glick, Molecular Biotechnology 3rd edition, CBS Publishers Distributors.

ELECTIVE – I
3. PROTEIN ENGINEERING

Teaching Scheme: Examination Scheme:
Lectures: 4 Hrs. / Week Paper: 100 Marks (3 Hrs)

Unit I
Introduction to Proteins:
Introduction, biosynthesis of protein, post translation modification, primary, secondary, tertiary and quaternary structure of proteins, conformational analysis and forces that determine protein structure, energy status of a protein , effect of amino acids on structure of proteins with example, structure and functional relationship.

(10 Hrs, 20 Marks)

Unit II
Structure Determination:
Methods of protein isolation, purification and quantification, physical methods to determine protein structure: X-ray crystallography, NMR spectroscopy; amino acid sequencing methods.

(10 Hrs, 20 Marks)

Unit III
Protein Engineering:
Mutagenesis, types of mutagenesis, site directed mutagenesis, protein engineering, modifications to 3D structure of proteins, design and synthesis of peptides, PCR, PCR in site directed mutagenesis.

(10 Hrs, 20 Marks)

Unit IV
Application of Protein Engineering:
Specific examples of engineered enzymes, Tryesyl tRNA synthetase, Dihydrosolate reductase, Subtilisin, Pepsin class of enzymes, Lysozyme, charging tRNA, Peptide vaccines, Engineered Proteins in medical application, Chemical modifications: phosphorylation, glycosylation, methylation, formylation, Application of engineered proteins.

(10 Hrs, 20 Marks)

Unit V

Protein Modeling and Drug Design:

Protein database, structure database, alignment methods to determine protein function and similarity, structure prediction, molecular modeling, structural similarities and super-imposition techniques, Molecular interactions: docking, calculation of molecular properties, energy calculation in docking, introduction to software used in protein modeling and drug design.

(10 Hrs, 20 Marks)

REFERENCES:

1. Klaus Demobowsky, "Novel Therapeutic Proteins": Wiley Publications.
2. Messer- Schmidt, "Handbook of Metaloproteins" – Wiley Publications.
3. Ronald Kellner et al., "Microcharacterisation of proteins", 2nd ed. Wiley, Publications
4. Susane Brakmann, "Directed Molecular Evolution of Proteins"- Wiley Publications
5. Walsh, " Protein: Biotechnology and Biochemistry", 2nd ed., Wiley Publications
6. Westermeier – "Proteomics in Practice"- Wiley Publications.
7. Buchanan B.B. Grussem. W. and Jones. R.L. 2000. 'Biochemistry and Molecular Biology of Plants". American Society of Plant Physiologists, Maryland, USA.

ELECTIVE – I
4. FOOD BIOTECHNOLOGY

Teaching Scheme: Examination Scheme:

Lectures: 4 Hrs. / Week Paper: 100 Marks (3 Hrs)

Unit I:

Introduction, world food requirement, aims of food biotechnology, interdisciplinary approach, constituents of food, functional properties of dietary carbohydrates and their sources, fatty acids in food, functions of dietary proteins and their sources, dietary requirement of vitamins, Food quality: evaluation (sensory) of food quality, quality factors for the consumers safety, food safety standards.

(10 Hrs, 20 Marks)

Unit II:

Microorganisms in food:

Types of microorganisms in food, role and significance of micro organisms in foods, factors influencing microbial activity.

Microbial examination of foods, food borne diseases: food infection, viral infections, food borne parasites, food intoxication.

(10 Hrs, 20 Marks)

Unit III:

Food spoilage and Preservation:

Food fit for consumption, deterioration of food quality, causes of food spoilage, spoilage of various foods and food products; food preservation using high temperature, evaporation ,drying, low temperature and irradiation.

(10 Hrs, 20 Marks)

Unit IV:
Food Biotechnology:
Food fermentation, microbial culture in food industry, fermented dairy products (milk, yogurt and cheese), fermented meat products and vegetable products, fermentation for flavor production, idali, vinegar, colors, vitamins, beverage, single cell proteins, sauerkraut, deoxygenation and desugaring by glucose oxidase.

(10 Hrs, 20 Marks)

Unit V:
Unit operations:
Food engineering operations, size reduction, screening, mixing, emulsification, filtration, membrane separation, centrifugation, extraction, expression, crystallization, heat processing.

(10 Hrs, 20 Marks)

REFERENCE:

1. B. Sivashankar, Food Processing and Preservation, Prentice Hall ,India.
2. Powar and Daginawala, General Microbiology (vol 2), Himalaya Publishing House.
3. Murray Moo-Young, Comprehensive Biotechnology (Vol: 3), Pergamon Press, An imprint of Elsevier.
4. S.S. Purohit, Microbiology: Fundamentals and Application, Agrobios India.
5. Fraizer, Food Microbiology ,TMH publication
6. Hiller, Genetic Engineering of Food: Detection of Genetic Modifications, Willy Publication.

5. FERMENTATION BIOTECHNOLOGY-II

Teaching Scheme:
Lectures: 4 Hrs. / Week
Practical: 4 Hrs. / Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Oral: 50 Marks
Term Work: 25 Marks

Unit I
Beverage products:
Fermentative production Alcoholic beverages: Beer, Wine, Rum, Gin, Whisky, Brandy, Champaign.
Industrial Chemicals:
Fermentative production of citric acid, acetic acid, lactic acid, ethanol, acetone and butanol, gluconic and itaconic acid, fumaric acid, steroid biotransformation.

(10 Hrs, 20 Marks)

Unit II
Fermentation of food products:
Fermentative production of food products: cheese and types of cheese, fermented soyabean foods, biomass production (single cell protein, baker's yeast), fermented dairy products like yogurt, cultured buttermilk;
Microbial flavors and fragrances (methyl ketones, lactones, butyric acid, terpenes and terpene transformation).
Biofertilizers: Production of Rhizobium, Bacillus thuringienesis, Trichoderma viride.

(10 Hrs, 20 Marks)

Unit III

Biomolecules:

Enzyme production- Amylases, Proteolytic enzymes, Invertase enzyme, Pectinases, Lipases; Vitamins: Vitamine B12, Riboflavin, Vitamin A, Amino acid production: L-Glutamic acid, L-Lysine, L-Threonine; Microbial pigments, Microbial polysaccharides.

(10 Hrs, 20 Marks)

Unit IV

Biopharmaceuticals and Biotransformation:

Production of penicillin, B-Lactum antibiotics, Streptomycin, Cephalosporins, Aminoglycoside, Tetracyclines, Steroid Biotransformation.

(10 Hrs, 20 Marks)

Unit 5

Important products through r-DNA technology:

Hepatitis B, vaccine, interferons, Insulin, somatotrophic hormone, therapeutic proteins Vaccines.

Production of biodiesel and biogas, Biological production of hydrogen and biofuel cells Biological waste treatment (utilization of mixed culture).

(10 Hrs, 20 Marks)

REFERENCES:

1. L.E.Casida,JR ,Industrial Microbiology, New Age International (P) Ltd Publication.
2. Jayanta Achrekar, Fermentation Biotechnology, Dominant Publishers and Distributors
3. D.Lanch,Drew,Wang, Comprehensive Biotechnology-Volume 3,Elsevier Publication.
4. B.D.Singh, Biotechnology, Kalyani Publication.
5. Michael L. Shuler, Fikret Kargi, Bioprocess Engineering: Basic Concepts, Prentice Hall India Pvt. Ltd., New Delhi.
6. Prescot and Dun, Industrial Microbiology, McGraw-Hill Book Company, Inc. New York.

Practical and Term work: Practical and term work shall consist of minimum eight experiments from list given below.

1. Study of growth curve of microorganisms.
2. Production of ethyl alcohol using yeast.
3. Citric acid production using Aspergillus niger.
4. Penicillin production using Penicillium crysogenum.
5. Production of enzyme by solid state fermentation.
6. Isolation of bacterial pigments.
7. Production of enzyme by submerged fermenter.
8. Production of bakers yeast (biomass production).
9. Vinegar production by fermentation.
10. Analysis of molasses.
11. Analysis of finished product (rectified spirit, beer, etc.).

6. PROJECT-I

Teaching Scheme: Examination Scheme:
Practical: 2 Hrs./ Week Oral : 25 Marks
Term Work: 25 Marks

The project topic shall consists of either some investigation work or design problem or experimental set up of some development work or prototype equipment or dissertation related to field of Biotechnology, Biochemical Engineering and allied fields.
Project shall be taken in the beginning of the seventh term in consultation with concerned guide and must be completed in eighth term. The project proposal must be submitted in the beginning of the seventh term by every student or a group of students (not more than five students in a group).
The students shall submit the report to the corresponding guide, present their work in due time based on following points,

- Introduction.
- Literature survey.
- Physical / chemical properties etc.
- Experimental setup and procedure.
- Extent of project completed.

Presentation can be performed with OHP slides / LCD.
The progress of the project shall be evaluated by a committee of internal teachers which shall include concerned guide also and shall award the term work marks.
The oral examination of the project shall be conducted by concerned guide and external examiner jointly.

7. SEMINAR

Teaching Scheme: Examination Scheme:
Practical: 2 Hrs./ Week Term Work: 25 Marks

During seventh term, every student individually will study a topic assigned to him and submit a report in a typed form and shall deliver a short lecture / seminar on the topic at the time of seminar oral examination .The topic assigned will be related to the field of Biotechnology, Biochemical Engineering and allied fields.

The students shall deliver the seminar (10 to 15 minutes) and submit the seminar report to the staff member on different technical subjects during the semester. The assessment of the term work shall be based on the: -

1. Attendance to the seminar
2. Performance of the seminar delivery
3. Seminar reports and
4. Viva voce during the seminar.

The staff member/members shall guide the students in:

1. Selecting the seminar topic.
2. Information retrieval (literature survey)
    a) Source of Information i.e. names of the journals, reports, books etc.
    b) Searching for the information i.e. referring to chemical abstracts etc.

3. Preparing the seminar report
4. Delivering the seminar

The oral examination shall be conducted by a committee of teachers internally which shall include the concerned guide also and shall award the oral marks (in the seventh term / at the end of seventh term).

B.E. BIOTECH. TERM II.

1. BIOPROCESS ENGINEERING – II

Teaching Scheme:
Lectures: 4 Hrs. / Week
Practical: 4 Hrs. / Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Oral: 25 Marks
Term Work: 25 Marks

Unit-I

Plant Tissue Engineering-I:
Introduction to tissue engineering, media components (micro and macro nutrients) and preparation, media selection, cellular totipotency,practical application of cellular totipotency, criteria for selection of explant, classification of tissue culture, callus culture, cell suspension culture, application of callus culture and cell suspension culture, single cell culture, meristem culture.

(10 Hrs, 20 Marks)

Unit-II

Plant Tissue Engineering-II:
Bioprocess consideration in using plant cell cultures, bioreactors for suspension cultures, bioreactors for organized tissue, production of secondary metabolites, anther culture, ovary culture, embryo culture, protoplast culture, synthetic seeds and preservations.

(10 Hrs, 20 Marks)

Unit-III

Animal Tissue Engineering-I:
Introduction, Culture environment: substrate, gas phase, media, constituents of media, types of media; isolation of tissue, primary culture, culturing and maintenance of different cell lines, cloning and selection of specific cell types, stem cell isolation and culture, instability, variation and preserving of cell lines, short term lymphocyte culture, fibroblast cultures from chick embryo, epithelial cells culture.

(10 Hrs, 20 Marks)

Unit-IV

Animal Tissue Engineering-II:
Bioreactors considerations for animal cell cultures, Bioreactors for animal cell lines: Monolayer culture (Air lift fermenter, Roux flask, Roller bottle, Hollow fiber cartridge), Suspension cultures (stirred tank bioreactors, packed glass bead reactors), Immobilized cell reactors; Products of animal cell cultures, culture of tumor tissue. Three dimensional culture systems: organ culture, Histotypic culture; a brief about transgenic animals.

(10 Hrs, 20 Marks)

Unit V

Instrumentation and control:
Introduction, methods of measuring process variables, In-line measurements: parameters like temperature, pressure, agitator speed and power consumption, foam detection, liquid and gas flow rates, volume, chemical environment like pH, dissolved oxygen ,dissolved CO_2, redox probe, ion probe, microbial biomass; On line measurement: Ion specific

sensors, enzyme and microbial electrodes, infrared spectroscopy, mass spectrometers; off line analytical methods, computer applications in fermentation technology, Biosensors.

(10 Hrs, 20 Marks)

REFERENCES:

1. R.A.Dixon and Gonzales, Plant Cell Culture : A Practical Approach, IRL Press.
2. S.S.Purohit, Biotechnology: Fundamentals and Applications, Agrobios (India), 4th Edition, 2005.
3. B.D.Singh, Biotechnology: Expanding Horizons, Kalyani Publishers, New Delhi, Second Revised Edition, 2008.
4. S.S.Bhojwani and M.K.Razdan, Plant Tissue Culture : Theory and Practical, (1996) Elsevier, Amsterdam
5. J.Hammond,P.McGarvey and V.Yusibov (Eds.), Plant Biotechnology New Products and Applications, Springer.
6. S.B Primrose and R.M.Twyman, Principles of Gene Manipulation and Genomics Blackwell Publication, 7th Edition, 2006.
7. Bernard R. Glick, Molecular Biotechnology 3rd edition, CBS Publishers and Distributors.
7. P.F.Stanbury, A.Whitkar and S.J.Hall, Principles of Fermentation Technology, Aditya Book House, New Delhi.
9. R. Ian Freshney,Culture of Animal Cells: A Manual of Basic Technique, A John Wiley and Sons Publications

Practical and Term work: Practical and term work shall consist of minimum eight experiments from list given below.

1. Growth kinetics of microorganisms using shake flask method.
2. Determination of specific thermal death rate constant (Ka).
3. Determination of Volumetric oxygen transfer coefficient (K_La), effect of aeration and agitation speed.
4. Preparation of Immobilized enzymes and cells and evaluation of kinetic parameters.
5. Kinetics study of Product formation.
6. Effect of substrate and product concentration on biomass yield for bakers yeast production.
7. Studies on settling characteristics of various microbial cultures.
8. Explant preparation and their inoculation on suitable plant growth media.
9. Callus induction technique and regeneration of plant from callus culture.
10. Artificial seed production.
11. Shake flask studies of plant cell culture.

2. BIOPOCESS ENGINEERING AND ECONOMICS

Teaching Scheme:
Lectures: 4 Hrs. / Week
Practical: 2 Hrs. / Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Oral: 25 Marks
Term Work: 25 Marks

Unit I

Bio process Design Considerations**:**

Technical feasibility survey, process development, flow diagram, equipment design and specifications, marketability of product, availability of technology, raw material equipment, human resources, land and utilities, site characteristics, waste disposal, government regulations and other legal restrictions, community factors and other factors affecting investment and production cost, Indian Bioprocess Industry - Current Status and Trends.

(10 Hrs, 20 Marks)

Unit II

Cost Estimation:

Factors affecting investment and production cost, capital investment, fixed investment and working capital, estimating equipment cost by 6/10 factor rule, method of estimating capital investment. Different costs involved in total product cost, computer automization in costing.

(10 Hrs, 20 Marks)

Unit III

Investment Cost and Profitability:

Interest and investment cost, type of interest, types of taxes and tax returns, types of insurance and legal responsibility, depreciation, types of depreciation, methods of determining depreciation.

Profitability, mathematical methods of profitability evaluation, cash flow diagram, break even analysis, balance sheet, pricing issue method and income statement.

(10 Hrs, 20 Marks)

Unit IV

Fermentation Economics:

Introduction, isolation of microorganisms of potential industrial interest, strain improvement, market potential, effects of legislation on production of antibiotics and recombinant proteins, plant and equipment, media, air sterilization, heating and cooling, aeration and agitation, batch process cycle times, continuous culture, recovery costs, water usage and recycling, effluent treatment.

(10 Hrs, 20 Marks)

Unit V

Bioproduct Economics:

Bioproduct regulation, Fermentation process economics: A complete example, Economic consideration of commercial Bioproduct: Enzymes, Proteins via rDNA, Antibiotics, Vitamins, Alkaloids, Nucleosides, Steroids, Monoclonal antibodies, Brewing and wine making, Fuel Alcohol Production, Organic and Amino acid manufacture, Single cell protein, Anaerobic methane production.

(10 Hrs, 20 Marks)

REFERENCES:

1. Peter M.S. Timmerhaus K.D. Plant Design and Economics for Chemical Engineers. McGraw Hill.
2. Vilbrandt F.C. and C.E. Dryden , Chemical Plant Design. McGraw Hill
3. T.R. Banga and S.C.Sharma, Industrial Organization and Engineering Economics, Khanna Publications, New Delhi.
4. O.P.Khanna Industrial Engineering and Management, Dhanpat Rai Publications Pvt. Ltd. New Delhi.
5. Dewett and Varma, Elementary Economic Theory, S Chand and Company Ltd New Delhi
6. James E. Bailey, David F. Ollis, Biochemical Engineering Fundamentals, Mc Graw-Hill Book Company.
7. P. F. Stanbury, A. Whitaker and S. J. Hall, Principles of Fermentation Technology, Aditya Book Private Limited.

TERM WORK: Term work shall be based on any eight of the following:

1. Indian Bioprocess (biotech) industry.
2. Location of bioprocess plant.
3. Cost estimation.
4. Interest and investment cost.
5. Taxes and insurance.
6. Profitability.
7. Break even analysis.
8. Fermentation economics.
9. Bioproduct economics.

3. BIOINFORMATICS

Teaching Scheme:
Lectures: 4 Hrs. / Week
Practical: 4 Hrs. / Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Practical: 25 Marks
Term Work: 25 Marks

Unit -I

Introduction:

Entropy and information, Shannon's formula, Ergodic process-Redundancy concepts, Introduction to bioinformatics, bioinformatics and internet, DNA sequencing methods.

Databases:

Introduction, primary and secondary databases, format v/s contents, the database, the Gen bank flat files and its format, database at NCBI, Databases : DDBJ, EMBL, Genbank, submitting DNA sequence to database; Structure database: PDB, Molecular modeling database at NCBI, structure file format, Database structure viewers.

(10 Hrs, 20 Marks)

Unit-II

Sequence alignment:

Introduction, types of sequence alignment, evolutionary basis of sequence alignment, Algorithms for sequence alignment: Needlemen-Wunsch and Smith-Waterman

algorithm, methods of pair wise sequence alignment, Database similarity searching: FASTA, BLAST, Substitution Score and Gap penalties, PAM matrix, multiple sequence alignment, Hidden markov models and threading methods.

(10 Hrs, 20 Marks)

Unit-III

Phylogenetic analysis:

Introduction, elements of phylogenetic models, phylogenic data analysis, relation between Phylogenetic analysis and multiple sequence alignment, evolutionary trees, methods for Phylogenetic prediction: Maximum Parsimony method, Distance methods, Maximum likelihood approach, Phylogenetic software.

(10 Hrs, 20 Marks)

Unit-IV

Gene prediction:

Introduction, open reading frame based gene prediction, procedure for gene prediction, gene prediction in microbial genomes, gene prediction in eukaryotes, neural networks and pattern, Discrimination methods, Promoter prediction in E.Coli, Promoter prediction in eukaryotes, gene finding methods: GRAIL, GENSCAN, PROCRUSTES, Gene parser.

(10 Hrs, 20 Marks)

Unit-V

Structure prediction:

Prediction of RNA structure:-

Introduction, features of RNA secondary and tertiary structure, sequence and base pairing patterns for structure prediction, methods predicting RNA structure: Energy minimization and identification of base covariation.

Prediction of protein structure :-

Introduction, protein structure description, classes of protein structure, protein structure classification in databases, structural alignment methods, protein structure prediction by amino acid sequence: use of sequence patterns, prediction of secondary structure, prediction of 3D structure.

(10 Hrs, 20 Marks)

REFERENCES:

1. Andreas D. Boxevanis, Bioinformatics, Wiley International.
2. David W. Mount, Bioinformatics: Sequence and Genome analysis, Cold Spring Harbour.
3. T.K.Attwood and Parry – Smith D.J, Introduction to Bio Informatics, Pearson Education Ltd, South Asia.
4. Vittal.R.Srinivas, Bioinformatics: A Modern Approach, PHI.
5. S.C.Rastogi, N.Mendiratta, P.Rastogi, Bioinformatics: Methods and Applications, PHI.

Practical and Term work: Practical and term work shall consist of minimum eight experiments from list given below.

1. Databases search: protein and nucleic acid database.
2. Restriction mapping.

3. Sequence (FASTA and BLAST) searches.
4. Pair wise comparison of sequences.
5. Multiple alignments of sequences.
6. Phylogenetic analysis.
7. Gene structure prediction.
8. Protein database retrieval and visualization.
9. RNA structure prediction.
10. Protein structure prediction.

ELECTIVE II
1. METABOLIC ENGINEERING

Teaching Scheme:
Lectures: 4 Hrs. / Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Term Work: 25 Marks

Unit-I

Basic concepts of metabolic engineering, overview of cellular metabolism, introduction to various metabolic pathways, primary and secondary metabolites, medical and agriculture, importance of secondary metabolites.

(10 Hrs, 20 Marks)

Unit-II
Metabolic Regulation:
Metabolic regulation of genome level, Jacob and Monad model, coordinate regulation of prokaryotic gene expression, lactose operon, tryptophan operon, feed back regulation, cumulative feed back regulation, regulation of gene expression.

(10 Hrs, 20 Marks)

Unit-III
Computational Methods for Pathways:
Introduction, Analysis of pathways: metabolic pathways, genetic pathways, signaling pathways, pathway resources, metabolic control analysis, simulation of cellular activities, biological markup languages.

(10 Hrs, 20 Marks)

Unit-IV
Metabolic Flux:
Metabolic pathway synthesis algorithms, metabolic flux analysis and its application, mathematical calculation for the flow of carbon and nitrogen fluxes, methods for experimental determination of metabolic fluxes by isotope labeling, stereochemistry of regulatory molecules, concepts of regulatory analogs.

(10 Hrs, 20 Marks)

Unit-V

Different models for cellular reactions, genetic regulation of metabolic fluxes, examples of metabolic pathway manipulations and engineering, analysis of metabolic control and structure metabolic networks, thermodynamics of cellular processes.

(10 Hrs, 20 Marks)

REFERENCE:

1. James Bower and Itamid Bodour, Computational modeling of Genetic and Biochemical Networks,
2. Valino, Metabolic Flux Analysis.
3. Vittal.R.Srinivas, Bioinformatics: A Modern Approach, PHI.
4. S.C.Rastogi, N.Mendiratta, P.Rastogi, Bioinformatics: Methods and Applications, PHI.
5. D. Voet and J.G. Voet 1990, Biochemistry, John Willey and Sons.
6. Szallasi, Stelling, Periwal, System Modeling in Cellular Biology: From Concepts to Nuts and Bolts, PHI, New Delhi.

TERM WORK: Term work shall be based on any eight of the following:

1. Overview of cellular metabolism and metabolic pathway.
2. Primary and Secondary metabolites.
3. Metabolic regulation.
4. Regulation of gene expression.
5. Computational analysis of metabolic pathway.
6. Metabolic flux analysis.
7. Metabolic pathway synthesis algorithms.
8. Examples of metabolic pathway engineering.

ELECTIVE II
2. BIOSAFETY AND BIOETHICS

Teaching Scheme:
Lectures: 4 Hrs. / Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Term Work: 25 Marks

Unit I

Biosafety:

Introduction, objectives of biosafety guidelines, risk assessment, risk regulation, containment, planned introduction of genetically modified organism, biosafety during industrial production, Biosafety levels: experiment with microorganism, research involving plants, research involving animals, Good manufacturing and Good Laboratory practices.

(10 Hrs, 20 Marks)

Unit II

Biosafety regulation and guidelines:

Biosafety guidelines and regulation, biosafety guidelines in India, National and International guidelines with regard to rDNA technology, transgenic science, GM crops,

hazardous material from bioprocess, pharmaceutical product; GM food debate, Biosafety assessment procedures for Biotech food and related products, ecological safety assessment of recombinant organism and transgenic crops, Bioterrorism and convention on biological weapons.

(10 Hrs, 20 Marks)

Unit III

Introduction:

Bioethics: Legality, morality and ethics, principle of bioethics: autonomy, human rights, beneficence, privacy, justice, equity etc; Biotechnology and society: Introduction to science, technology and society, public acceptance issues in biotechnology

Ethical conflicts in biotechnology: Fear of unknown, black face of biotechnology? When transgenes wander, should we worry? BT cotton creating resistance to biotechnology? Conflicts of BT cotton, some case studies, unequal distribution of risk and benefit of biotechnology.

(10 Hrs, 20 Marks)

Unit IV

Bioethics in animal genetic engineering: Introduction, Issues concern to use of animals, case studies, Animal as a tennis ball? Gene therapy and transgenic animal. Should animal be patentable?

Bioethics in plant genetic Engineering, bioethics and moral concern, Gene flow in crops, BT-cotton case studies, transgenic plants are not absolutely safe, Public education of biotechnology.

Bioethics in Microbial Technology.

(10 Hrs, 20 Marks)

Unit V

Intellectual property rights:

Introduction, IPR in India , intellectual property , protection of IPR : Trade secret, Patent, Copyright, Plant variety protection , International Harmonization of patent laws: Trips, India and Trips ,WTO-GATT; methods of application of patent, protection of biological inventions, plant breeders right ,examples of patents in biotechnology, choice of IPR protection, management of IPR, benefits and problems from IPR, Indian response to the IPR upheaval.

(10 Hrs, 20 Marks)

REFERENCES:

1. Thomas J A Fucnh – Biotechnology and Safety Assessment, Academic Press.
2. Fleming D A, Hunt D L, Biological Safety Principles and Practices, Assm Press Washington.
3. Singh K ,Intellectual Property Rights on Biotechnology, BCIL New Delhi.
4. Moo-Young ,Compressive Biotechnology Vol.4, Elsevier Publisher.
5. B D Singh , Biotechnology, Kalyani Publishers.
6. S S Purohit, Biotechnology, Agro Bios.

TERM WORK: Term work shall be based on any eight of the following:

1. Biosafety, risk assessment and regulation.
2. Good manufacturing and Good Laboratory practices.
3. Biosafety guidelines and regulation.
4. National and International biosafety guidelines.

5. Bioethics and public acceptance issues in biotechnology.
6. Bioethics in animal and plant genetic engineering with Case studies.
7. Intellectual property rights.
8. Examples of patent in biotechnology.

ELECTIVE II
3. BIOMEDICAL FLUID DYNAMICS

Teaching Scheme:
Lectures: 4 Hrs. / Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Term Work: 25 Marks

Unit-I
Introduction to fluid mechanics: Fluid properties, basic laws governing conservation of mass momentum and energy; Laminar flow, Couette flow and Hagen-Poiseulille equation, turbulent flow.

(10 Hrs,20 Marks)

Unit-II
Flow dynamics study of circulatory system, heart and blood vessels, anatomy and physiological considerations

(10 Hrs,20 Marks)

Unit-III
Components and functions of arterial and venous systems; Lymphatic system; Body fluids and their motions; Flows of Newtonian and non-Newtonian fluids in rigid tubes, flexible tubes and collapsible tubes.

(10 Hrs,20 Marks)

Unit-IV
Blood flow through arteries and veins; Holt and Conrad's experimental investigations. Kinetic energy, flow, pressure-flow, pressure-flow relations in vascular beds.

(10 Hrs,20 Marks)

Unit-V
Cardiac cycle; Cardiac value dysfunctions; Blood pressure,regulation and controlling factors; Coronary Circulation, heart failure.

(10 Hrs,20 Marks)

REFERENCES:

1. J.F. Green, "Fundamental Cardiovascular and Pulmonary Physiology", Lea and Febiger, Philadelphia, 1982.
2. C.A. Keele, E. Neil and N. Joels: Samson Wright's Applied Physiology 13th Ed., Oxford University Press, Delhi 1982.
3. A. Noordergraft: 1978., "Circulatory System Dynamics" Academic Press, New York,
4. R.R. Puniyani: , , 1996. , "Clinical Haemorheology" New Age Int. Publishers. New Delhi.

TERM WORK: Term work shall be based on any eight of the following:

1. Introduction to fluid mechanics.
2. Anatomy and physiological of circulatory system.
3. Flow dynamics study of circulatory system.
4. Components and functions of arterial, venous and lymphatic system.
5. Body fluids and their motion.
6. Pressure – flow relations in body fluids flow.
7. Cardiac value dysfunction.
8. Blood pressure regulation and controlling factors.

ELECTIVE II
4. APPLIED GENETIC ENGINEERING.

Teaching Scheme:
Lectures: 4 Hrs. / Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Term Work: 25 Marks

Unit I

Genetic Engineering Techniques:

Blotting methods: Western, Northern and Southern blotting; DNA sequencing methods, synthesis of DNA (gene), PCR, Types of PCR: Inverse, RT-PCR, site directed mutagenesis using PCR, overlap extension PCR, asymmetric PCR, nested PCR, PCR application, Antisense technology, microarrays.

(10 Hrs, 20 Marks)

Unit II

Genomics:

Human genome project, mode of human inheritance, genetic linkage and gene mapping, molecular markers in genome analysis: RFLP, AFLP, RAPD, SCAR, micro satellites, protein based markers; detection of mutations in human genes: single-strand conformation analysis, denaturing gradient gel electrophoresis, heteroduplex analysis, chemical mismatch cleavage, direct DNA sequencing; applications of molecular markers.

(10 Hrs, 20 Marks)

Unit III

Transgenic Animals:

Animal vectors, artificial chromosome (MAC) vectors, transaction methods, embryonic stem cell transfer, detection of transgenic and transgene function, transgenic animals: mice, rabbits, cattle, goat, sheep, pigs and fish; Invitro fertilization and embryo transfer.

(10 Hrs, 20 Marks)

Unit IV

Gene Therapy:

Introduction, types of gene therapy: Somatic and Germline therapy; methods of gene therapy, gene therapy in immuno deficiency disease and cancer, targeting and destroying artificial clotting (thrombosis) by using plasminogen, curing Severe Combined Immunodeficiency (SCID) by Adenosine Deaminase (ADA) gene, breast cancer

treatment (genetically modified antibody), prevention of tissue and organ graft rejection, gene augmentation therapy, gene medicine, transgenic animals as models of human disease.

(10 Hrs, 20 Marks)

Unit V

Genetic Engineering for Human Welfare:

Production of human peptide hormone, insulin, somatotropin, somatostatin, human interferon genes, human growth hormone, tumor necrosis factor alpha, vaccines for hepatitis B virus, vector vaccines, vaccines for rabies, polio virus, foot and mouth disease, malaria vaccines, monoclonal antibodies as therapeutic agents, nucleic acid as therapeutic agents, animal bioreactors and molecular farming, DNA profiling (DNA fingerprinting):methods and applications.

(10 Hrs, 20 Marks)

REFERENCES:

1. S.B.Primrose and R.M.Twyman, Principles of Gene Manipulation and Genomics, 7th Edition, Blackwell Publishing.
2. Bernard R.Glick and Pasternak , Molecular Biotechnology, CBS publishers Distributors , New Delhi
3. B.D Singh, Biotechnology – Expanding Horizons, Kalyani Publishers.
4. R.C.Dubey, A Textbook of Biotechnology, S.Chand Publishers, New Delhi
5. S.S.Purohit , Biotechnology, Agrobios India.

TERM WORK: Term work shall be based any eight of the following:

1. Genetic Engineering Techniques.
2. PCR and its types, Antisense technology, Microarrays.
3. Molecular markers in genome analysis.
4. Transgenic Animals.
5. Invitro fertilization and embryo transfer.
6. Gene Therapy.
7. Genetic Engineering for Human Welfare.
8. DNA profiling (DNA fingerprinting): methods and applications.

5. PROJECT- II

Teaching Scheme	Examination Scheme
Practical: 4 hrs / week	Oral: 50 Marks
	Term Work: 100 Marks

The students are required to carry out one of the following projects.

1. Processes based Project: Manufacture of Bioproduct.
2. Equipment based Project: Detailed design and fabrication of the equipment for a given capacity.
3. Experimental based Project: Experimental investigation of basic or applied research problem in the field of Microbiology, Immunology, Molecular biology, Bioprocess, Biochemistry, Genetic Engineering, Bioinformatics, Enzyme technology and Environmental Biotechnology.

4. Industrial Problems: Any problem or project directly related to existing plants for modification of process or equipment or regarding pollution control and energy conservation under the guidance of a staff member and /or staff members and submit a typed report in duplicate.

The Project Work consists of collection of literature, study of various processes, selection of the process, computation of material and energy balances, process design of important equipments, detailed design of one of the main equipment, plant location and layout, cost estimation, economic analysis, details of experimental set up, analysis of data, pollution control, safety, marketing, conclusions and recommendations, bibliography, etc., as applicable to the individual problem.

The object of the project is to make use of the knowledge gained by the student at various stages of the degree course. This helps to judge the level of proficiency, originality and capacity for application of the knowledge attained by the student at the end of the course.

Each group should consist of maximum 5 students. For term-work (Internal) of 100 marks, the assessment should be by conducting frequent written tests, seminars during the year and an oral examination at the end of the year conducted by all the staff members of the department. The Head of the Department should see that the assessment procedure should be the same for all the students of the class. For external 50 marks, the project work shall be assessed by an oral examination by at least two examiners, one internal and one must by external at the end of the year.

The object of the VIVA VOCE examination (Internal and External Orals) is to determine whether the objectives of the project work have been met by the student as well as to assess the originality and initiative of the student as demonstrated in the project work.

6. INDUSTRIAL VISIT / CASE STUDY

Examination Scheme:
Term Work: 25 Marks

During seventh term, every student shall visit minimum two to three industries or organization pertaining to the Biotechnology arranged by College and accompanied by departmental teachers as per AICTE and University norms. The report of technical visit shall be submitted by every student at the end of eighth term which shall be evaluated by the concerned teachers through internal Viva Voce.

NORTH MAHARASHTRA UNIVERSITY, JALGAON
STRUCTURE OF TEACHING AND EVALUATION
S.E .(CIVIL ENGINEERING)
First term

Sr. No.	Subject	Teaching Scheme Hours/week			Examination Scheme				
		Lectures	Tutorial	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Strength of Material	4	1	--	3	100	25	--	--
2	Surveying-I	4	--	2	3	100	25	50	--
3	Building Construction and Materials	4	--	4	3	100	25	--	25
4	Concrete Technology	4	--	2	3	100	25	--	25
5	Engineering Mathematics-III	4	1	--	3	100	25	--	--
6	Computer Graphics	--	--	2			25		
	Total	**20**	**2**	**10**	**--**	**500**	**150**	**50**	**50**
	Grand Total	**32**			**750**				

SECOND TERM

Sr. No.	Subject	Teaching Scheme Hours/week			Examination Scheme				
		Lectures	Tutorial	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Theory of Structures-I	4	1	--	3	100	25	--	--
2	Surveying-II	4	--	2	3	100	25	50	--
3	Building Design and Drawing	4	--	4	4	100	50	--	25
4	Fluid Mechanics-I	4	1	2	3	100	25	--	25
5	Engineering Geology	4	--	2	3	100	25	--	--
	Total	**20**	**2**	**10**	**--**	**500**	**150**	**50**	**50**
	Grand Total	**32**			**750**				

NORTH MAHARASHTRA UNIVERSITY, JALGAON.

SYLLABUS OF SECOND YEAR (CIVIL)

TERM-IST (w.e.f. 2006-07)

STRENGTH OF MATERIALS

Teaching Scheme:	**Examination Scheme:**
Lectures: 4 Hours/Week	Theory Paper: 100 Marks(3 Hrs)
Tutorials: 1 Hour/Week	Term Work: 25 Marks

UNIT-I: **(11 Hrs., 20 marks)**

Normal stress & strain, Hooke's law. Axial force diagrams. Deformation in prismatic, stepped, linearly varying & composite members under concentrated load & self-weight. Stress & strain in indeterminate members. Temperature stresses.

UNIT-II: **(9 Hrs., 20 marks)**

[A] Shear stress & strain. Modulus of rigidity. Poison's ratio, relation between E & G. Generalized Hooke's law. Bulk modulus, stress strain diagram, working stress, factor of safety.

[B] Thin cylindrical & spherical shells.

[C] Stresses due to impact load using strain energy method.

UNIT-III: **(10 Hrs., 20 marks)**

[A] Shear force & bending moment. Relation between SF, BM & loading. SFD & BMD for determinate beams viz. cantilever, simply supported, overhanging and compound beams under various loads viz. concentrated, uniformly distributed & varying, couples etc. Determination of critical SF & BM and points of contra-flexure. Construction of loading diagrams from shear force & beading moment diagram.

[B] Bending stresses in beams. Theory of bending. Flexural formula. Section modulus. Moment of resistance.

UNIT-IV: **(10 Hrs., 20 marks)**

[A] Shear stresses in beams. Shear stress formula, shear stress determination in symmetrical section.

[B] Shear stresses in shafts due to torsion. Stress, strain & deformation in determinate & indeterminate shafts of hollow or solid cross-sections. Composite shafts.

[C] Axially loaded columns. Buckling effect. Euler's formula. Various end conditions & concept of equivalent length. Rankine's formula. Limitations of formulae.

UNIT-V: **(10 Hrs., 20 marks)**

[A] Direct & bending stresses in short columns & other structural components due to eccentric or lateral loads. Core of section.

[B] Principle stresses & strain. Stresses on inclined plane. Graphical method. Theories of Failure.

[C] Stresses due to combined bending and torque in shafts.

TERM WORK:-

It shall consist of at least two assignments for each unit of above syllabus.

REFERENCE BOOKS:-

1) E.P.Popov - Mechanics of Solids
2)Timoshenko - Strength of Materials
3) V.L.Shah - Strength of Materials
4) Ramamrutham - Strength of Materials

SURVEYING -I

Teaching Scheme:
Lectures: 4 Hours/Week
Practical: 2 Hour/Week

Examination Scheme:
Theory Paper: 100 Marks(3 Hrs)
Term Work: 25 Marks
Practical: 50 Marks

UNIT-I **(10 Hrs., 20 marks)**

LEVELLING:

a. Instruments used in levelling, Dumpy level, Automatic Level, Types of levelling staves.
b. Principal axes of Dumpy level. Testing and adjustments of Axis of Bubble tube, a line of collimation of dumpy level.
c. Reciprocal levelling , curvature and refraction correction, Distance to the visible horizon .
d. Profile levelling : L - section and cross -sections.

ROUTE SURVEY:

Reconnaissance survey; Locating obligatory points, preliminary Survey, fixing gradients, paper and field location survey, Plotting L -section and cross -section, construction survey.

UNIT-II **(10 Hrs., 20 marks)**

THEODOLITE:

a. Principal axes and permanent adjustments of transit theodolite.
b. Uses of theodolite : measurement of horizontal angles , vertical Angles, magnetic bearings, prolonging a line, lining in, measuring deflection angles, setting out the angles.
c. Theodolite Traversing: Computation of consecutive and independent co-ordinates, Adjustments of closed traverse, Gales Traverse by co-ordinate method, omitted measurements.

UNIT-III **(10 Hrs., 20 marks)**

TACHEOMETRY:

a. Principle of stadia method, fixed hair method with vertical staff to determine horizontal distances and elevations of the points.
b. Use of Tacheometry in surveying, Tacheometric contour survey, use of tacheometric tables.

UNIT-IV **(10 Hrs., 20 marks)**

CURVES:

a. Horizontal and vertical curves and their purposes.
b. Simple circular curves - Elements and setting out by linear & angular methods.
c. Compound curves -Elements and setting out of compound curves.
d. Introduction to reverse curves (No numerical problem to be asked). Elements, Location and uses.
e. Transition curves -Types and uses, Length of transition curves, Elements of cubic parabola, Length of combined curve, setting out the combined curve by deflection angle method.

(No numerical problem to be asked).

UNIT-V **(10 Hrs., 20 marks)**

PLANE TABLE SURVEY:

a. Objective and equipment required for plane table survey.
b. Methods of plane tabling - Radiation, Intersection, Traversing and Resection .

c. Two point & Three point problems and their solutions by different methods, strength of fix.
d. Advantages, disadvantages, limitations and errors of plane Table surveying.

Minor Instruments:

Study and use of Abney Level, Box sextant, Indian pattern clinometer and pantagraph

TERM WORK:

Details of practical Exercises and projects:

1. Measurements of horizontal and vertical angles by transit Theodolite,
2. Measurements of horizontal angles of a triangle by repetition method.

Project-1

3 Theodolite Traverse survey project of a closed traverse with at least four sides.
4 Computation of horizontal distances and elevations by Tracheometry for horizontal and inclined sights.

Project-2

5 Tacheometric contouring project with at least two instrument stations at 60 m apart.
6 Radiation and intersection method in plane Table survey.

Project-3

7 Plane table survey project of a closed traverse of minimum four sides.
8 Solution of three - Point problem in plane tabling.
9 Use of box sextant and Abney level.
10 Study and use of Indian pattern clinometer and pantagraph.

Project-4

11 Road project for minimum length of 500m, including fixing of alignment, profile leveling, and cross sectioning.

Note: The Term Work will consist of:

(i) Field book containing record of all exercises and projects listed above.
(ii) File of full imperial size drawing sheets as mentioned below

1) Theodolite Traverse survey project. 1 sheet
2) Tacheometric contouring project……..1 sheet
3) Plane Table Traverse survey project…..1 sheet
4) Solution of three -point problem…… 1 sheet
5) Road project showing L- section, plan of road and Typical cross -section …….Min -1 sheet

REFERENCES BOOKS

1) Prof. T.P. Kanetkar and prof. S.V.Kulkarni. - Surveying and leveling Vol. I & II
2) Prof. B.C. Punmia - Surveying vol. I & II
3) Late David clark. - Plane and Geodetic Surveying for Engineers, Vol. I
4) Cliver and clendening - Principles of surveying
5) P.B. Shahani - Advance surveying , Vol.I & II

Handbook

S.P.Collins - A handbook of accurate surveying methods .

BUILDING CONSTRUCTION & MATERIALS

Teaching Scheme:
Lectures: 4 Hours/Week
Practical: 4 Hour/Week

Examination Scheme:
Theory Paper: 100 Marks(3 Hrs)
Term Work: 25 Marks
Oral/Sketches: 25 Marks

UNIT I **(10 Hours, 20 marks)**

a) Types of building, load bearing , framed structure, steel structure, timber structure, composite structure. Various parts of building- sub structure & super structure. Plinth & plinth level, sill & sill level, lintel & lintel level, floor & floor level, roof & roof level, plinth height, plinth protection, cornice, coping etc. function of each.

b) Foundation- purposes & classification (detailed) , advantages & disadvantages of each & circumstances under which each is used. Factors considered for selection of foundation.
Design considerations for spread footing(load bearing structure) Design of wall footing.

c) Bearing capacity of soil, safe B.C. of soil, factor of safety, methods of improvement of B.C. of soil, types of soil & bearing capacity of each type of soil.

UNIT II **(10 Hours, 20 marks)**

a) Masonry:- Principles of masonry construction, types of masonry, types of walls i.e. load bearing, partition and retaining walls, various types of partition walls such as brick partition , timber partition, glass partition etc.

b) Stone masonry:- types of stone masonry & construction method, Dressing and bonding , precast stone masonry, through stone, proportions of mortars used for stone masonry.

c) Brick and Block Masonry:- various types of bonds in brick masonry, reinforced brick masonry, precautions to be taken in masonry constructions, composite masonry , solid & hollow blocks used for masonry , methods of preparation of blocks, cavity wall & cavity wall construction.

d) form and formwork: function of forms, form erection, oiling and stripping of form, requirement of form and form work, form work for various civil engineering structures, materials used for form work.

UNIT III **(10 Hours, 20 marks)**

Super Structure

a) Types of lintels and arches, stability consideration for arches, laying of arch, detailing of R.C.C. lintel and chajja.

b) Doors and windows: types of each and circumstance under which each is used, minimum area of windows openings for different climatic conditions, various materials used for doors and windows, fixtures and fastenings used. I.S. notations for doors & windows.

Special flooring: marble, Granite, kota, ceramic tiles, artificial granite, acid proof floors.

c) Circulation:- Horizontal & vertical , stair and staircase planning & design , types of staircases as per shape and material used. Design of staircase.

Details of ramps, ladders, lifts & escalators used for vertical circulation.

d) Floor and Roof:- ground floor, upper floors, mezzanine floor, design & construction requirements, various types of floor finishes used, advantages & disadvantages & circumstances under which each is used. Damp proof construction of floors, walls & finishes.

Types of roof & roof covering, flat roof & its drainage, water proofing, false ceiling & method of fixing.

Different types of shell structures, barrel arch, cone, hyperbolic, parabolic, folded plate, space frame, & their uses.

UNIT IV **(10 Hours, 20 marks)**

a) Steel trusses, various sections used for steel work method of connections i.e. riveted, bolted & welded, types of trusses & their uses, roofs, covering materials & method of fixing tubular structures.
b) Building finishes, objective & processes, pointing, plastering & painting, white wash & co lour wash, distempering etc, on old & new surfaces, repairs & maintenance.
c) Scaffolding, shoring, under pinning & strutting, types, purposes & precautions.
d) R.C.C. framed structure, column, beam, footing, slab & their connections, general requirement and details.

Industrialization of Building:-

Modular co-ordination: modular planning & recommendation, modular tolerances, prefabrication, advantages of prefabrication, prefabrication systems, principles of design of prefabrication, components of precast construction, Ferro cement & Ferro concrete construction.

UNIT- V **(10 Hours, 20 marks)**

a)Stone :- natural bed of stones, stone quarrying uses of stones, qualities of good building stone ,test on stone, preservation of stone.

b)Bricks:- composition of good brick earth, classification of burnt brick, manufacture of bricks, uses of bricks, qualities of good bricks, tests of bricks.

c)Timber:- properties and uses, testing, conversion and sawing, defects. in timbers,

d)Artificial timber, Veneers, Plywood and Block board.

Aluminum, Glass. Heat insulating materials, Sound absorbent materials.

TERMWORK:- shall consist of sketch book having 1/4 imperial size sheets showing following details.

1) Free hand sketching practice: different type of lines, squares, rectangle, circles, plans of buildings.
2) Lettering 6 mm, 4mm , 2mm with technical terms regarding construction.
3) Different types of lines, method of dimensioning as per I.S. code
4) Symbols & conventional sign of materials.
5) Orthographic, isometric, oblique & axonometric views.
   Sketches after actual measurements (6 to 9) on drawing sheets.
6) C.C.T.W. paneled door: plan, elevation, section.
7) Flush door: plan, elevation, section.
8) Arches in stone & brick.
9) Stone masonry: U.C.R, C.R., Ashlar.
10) Bonds in brick work with isometric view for one bond for one brick.
11) Different types of roofs.
12) Steel trusses, shells, folded plate, space frames etc. orthographic and three dimensional sketches.
13) Types of stairs.
14) Report regarding visits to the construction sites.(minimum two visits)
15) Materials & their rates.

REFERENCES BOOKS:

1. Rangwala - Building construction
2. Sushil kumar - Building construction
3. Bindra and arora - Building construction
4. Punmia - Building construction

5. Rangwala - Engineering Materials
6. Dr.S.V.Deodhar - Civil Engineering Materials

CONCRETE TECHNOLOGY

Teaching Scheme:
Lectures: 4 Hours/Week
Practical: 2 Hour/Week

Examination Scheme:
Theory Paper: 100 Marks(3 Hrs)
Term Work: 25 Marks

UNIT-I **(10 Hours 20 marks)**

A) Cement: - Manufacture of cement, chemical composition, setting and hydration of cement. Types of cement, properties and testing of cement.

B) Aggregates – Classification, properties, grading and testing of aggregates, requirements of aggregate for mortar and concrete, impurities in aggregates and its effect on strength of concrete.

C) Water:- Characteristics of water, suitability to be used in concrete, tests on water, mixing of water, Seawater

UNIT-II **(10 Hours 20 marks)**

Concrete:

A) Fresh Concrete:- Definition and its ingredients, grades of concrete, concreting process, significance of water cement ratio. Properties of fresh concrete, form work for good concreting, Tests on fresh concrete.

B) Hardened Concrete:

Various properties of hardened concrete, factors affecting various properties, micro cracking, and stress - strain relation, testing of hardened concrete, creep and shrinkage of concrete.

C) Quality control during concreting.

UNIT-III **(10 Hours 20 marks)**

A) Admixtures, classification and their effects on various properties of concrete.

B) Types of Concrete: -

Light weight concrete, polymer concrete, fiber reinforced concrete, ready mixed concrete, self compacting and high performance concrete, Ferro cement.

C) Special concreting techniques:

Pipe Crete concrete, under water concreting, concreting in extreme weather conditions.

UNIT-IV **(10 Hours 20 marks)**

Concrete mix design

A) Introduction, object of mix design, factors to be considered, statistical quality control. introduction to different methods of mix design.

B) Concrete mix design by I.S. method and IRC method., High strength concrete mix design.

UNIT-V **(10 Hours 20 marks)**

A) Introduction to Non-destructive testing of concrete, rebound hammer, ultrasonic pulse velocity, pull out test, impact echo test.

B) Deterioration of concrete, Permeability, Durability, Chemical attack, Carbonation of concrete , corrosion of reinforcement.

C) Repair – Symptoms and diagnosis of distress, Evaluation of cracks, common types of repair, shotcrete.

D) Introduction to lime & lime concrete.

LIST OF EXPERIMENTS:-

1. Testing of Cement - a). Fineness of cement
   b) Setting time
   c) Compressive strength
   d) Soundness
2. Testing of aggregate -

a) Fineness modulus and sieve analysis,
b) Crushing value
c) Impact value
d) moisture content
e) Abrasion test,
f) shape test,
g) specific gravity

3. Testing of concrete –

a) Workability of concrete (Slump cone and compaction factor)
b) Compressive strength (Cubes and cylinders),
c) Split test ie tensile test of cylinders
d) Modulus of rupture (flexural strength)
e) Concrete mix design by I.S. method

TEXT BOOKS:-

Concrete Technology by

1. M.S.Shetty (S Chand Publication)
2. M.L.Gambhir (T M H Publication)
3. S.V.Deodhar (Central Techno Publication)

REFERENCE BOOKS:-

1. A.N. Neville, J.J. Brooks - Concrete Technology - Addition Weslley
2. R.S. Varshney - Concrete Technology - Oxford & I B H.
3. P Kumar Mehta - Concrete - Gujrat Ambuja

ENGINEERING MATHEMATICS – III

Teaching Scheme:
Lectures: 4 Hours/Week
Tutorials: 1 Hour/Week

Examination Scheme:
Theory Paper: 100 Marks(3 Hrs)
Term Work: 25 Marks

UNIT-I **(10 Hours, 20 marks)**

Linear Differential Equations:

Linear Differential equation of order n, Solution of LDE with constant coefficient, method of variation of parameters, equations reducible to linear form with constant co-efficients, Cauchy's linear equation, Legendre's linear equation. Applications of linear differential equations to cantilever, loaded beams, whriling of shafts.

UNIT-II **(10 Hours, 20 marks)**

A. Simultaneous linear differential equations of the forms:
   (i) $f_1(D)\,x + \Phi_1(D)\,y = \psi_1(t)$
   $f_2(D)\,x + \Phi_2(D)\,y = \psi_2(t)$, where $D \equiv d/dt$
   (ii) $\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$ (Symmetrical form)
B. Differential equation of 1st order, and higher degree (Clauriats form)
C. Applications of Partial Differential equations to:
   (i) Vibration of strings or wave equations:
   $\frac{\partial^2 y}{\partial t^2} = a^2 \frac{\partial^2 y}{\partial x^2}$
   (ii) One dimensional heat flow equation
   $\frac{\partial u}{\partial t} = a^2 \frac{\partial^2 u}{\partial x^2}$
   (iii) Laplace equation Two dimensional heat flow equation.
   $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial x^2} = 0$
   by separating variables only.
   Applications of partial Differential equations to problems of civil and allied engineering.

UNIT-III: **(10 Hours, 20 marks)**

Statistics: Mean, Mode, Median standard deviation, Variance, co-efficient of variation, Moments, Skewness and kurtosis, Bivariate distribution, Correlation and Regression, Rediability of Regression estimates.

UNIT-IV **(10 Hours, 20 marks)**

Probability:Theorems on Probability, Binominal Distribution, Poisson distribution , Normal distribution, Beta distribution, Gamma distribution, Chi-Square distribution.

UNIT-V **(10 Hours, 20 marks)**

Theory of Sampling: Sampling, Types of sampling, Sampling distribution, Testing Hypothesis, Null Hypothesis level of Significance, Test of significance, Test of Significance of large sample. Decision quality control.

TEXT BOOKS:

1. H.K. Dass - Advanced Engineering Mathematics 5th Revised Edition 2006 (S. Chand Publication) New Delhi.
2. Erwin Kreyszig - Advanced Engineering Mathematics (Wiley Eastern Ltd.)
3. B.S. Grewal - Higher Engineering Mathematics, Khanna Publication, Delhi

REFERENCE BOOKS:

1. Wylie C.R. & Barrett - Advanced Engineering Mathematics - Mc Graw Hill
2. B.V. Raman - Engineering Mathematics - Tata Mc- Graw – Hill.
3. P.N. Wartikar & J.N. Wartikar - Applied Mathematics (Volume I & II) - (Pune Viduarthi Griha Prakashan, Pune)
4. Thomas L. Harman James - Advance Engineering Mathematics with MATLAB 2e - (Thomson Learing)
5. Dr. Gokhale, Dr. Chaudhari & Dr. Singh - Engineering Mathematics – III

COMPUTER GRAPHICS

Teaching Scheme: Practical : 2 Hours/Week

Examination Scheme: Term Work: 25 Marks

Study of any computer drafting software. Using Various Drawing and editing menu commands. Inserting / editing text, arrows & dimensions.

TW shall consist of drawings on A4 size sheets of the following

1) One sheet each showing use of commands viz array, arc, rotate, mirror, offset, etc.
2) A plan of 2 BHK house.
3) Typical Reinforcement details of beam & column

N O R T H M A H A R A S H T R A U N I V E R S I T Y , J A L G A O N .

SYLLABUS OF SECOND YEAR (CIVIL)

TERM-IIND (w.e.f. 2006-07)

THEORY OF STRUCTURE - I

Teaching Scheme:	**Examination Scheme:**
Lectures: 4 Hours/Week	Theory Paper: 100 Marks(3 Hrs)
Tutorials: 1 Hour/Week	Term Work: 25 Marks

UNIT-I

a) Deflection of Beams.: - **(11 Hours, 20 marks)**

Relation between BM, slope and defection , determinate beams by double integration method. Concept of moment area method, Mohr's theorem. Use of moment area method to calculate deflections of beams such as simply supported, over hanging and of uniform cross sections and different cross sections. Conjugate beam method. Application of conjugate beam method to simply supported, overhanging and compound beams. Propped cantilevers.

b) Energy methods for deflection:-

Concept of strain energy, Maxwell's reciprocal theorem of deflection. Castiglino's theorm . Use of strain energy and unit load methods for finding out of deflections for beams & bends.

UNIT-II

a) Deflection of trusses:- **(10 Hours, 20 marks)**

Deflection of statically determinate plane trusses by Castigliano's first theorem

b) Analysis of redundant trusses by Castiglino's second theorem, lack of fit and temperature changes in members, sinking of supports (degree of indeterminacy maximum upto 2 only).

UNIT-III **(10 Hours, 20 marks)**

a) Fixed Beams:- Concept, advantages and disadvantages. Nature of B.M. Diagrams. Fixed end moment due to various types of loads such as point, uniformly distributed, Uniformly varying, couples for beams of uniform c/s and stepped cross sections. Effect of sinking of support. B.M.D & S.F.D.

b) Continuous Beams:- Concept , Nature of B.M. diagrams, Clapyeron's theorem of three moments for beams due to concentrated load, UDL, couples etc. Effect of sinking of supports, plotting of B.M.& S.F. diagrams.

UNIT-IV **(9 Hours, 20 marks)**

b) Three hinged arch:- Concept of three hinged arch as a haunched beam, support reactions. B.M., S.F. and axial thrust diagrams for circular and parabolic three hinged arches. Influence lines for B.M., S.F. and axial thrust. Maximum B.M., S.F. and axial thrust due to point load & UDL.

b) Two hinged arches :-

Horizontal thrust at supports. Shear, normal thrust and BM at a point, BM diagrams for concentrated load and udl, parabolic and semicircular arches.

UNIT-V **(10 Hours, 20 marks)**

a) Influence lines:- Basic concepts , influence line for reactions, B.M.& S.F. for simply supported, overhanging, & compound beams. Influence lines for members of statically determinate plane trusses.

Calculations for S.F & B.M for beam and for force in the truss member using influence lines.

b) Moving loads:- Introduction, conditions for maximum BM and maximum S.F. at a section due to moving point loads, UDL longer or shorter than span and train of moving loads. Absolute maximum B.M. & S.F., Construction of Max. B.M. diagram.

TERM WORK:-

Term work shall consist of ten assignments given on the syllabus given above.

REFERENCE BOOKS:-

1) Junnarkar and shah - Mechanics of structures Vol – II.
2) V.N.Vazirani & M.M.Ratwani - Analysis of structures (Volume - I & II)
3) S. Rammamrutham - Theory of structures
4) C.S.Reddy - Basic structural analysis.
5) C.K.Wang - Indererminate structures

SURVEYING- II

Teaching Scheme:
Lectures: 4 Hours/Week
Practical: 2Hour/Week

Examination Scheme:
Theory Paper: 100 Marks(3 Hrs)
Term Work: 25 Marks
Practical : 50 Marks

UNIT-I **(10 Hrs., 20 marks)**

Geodetic Surveying:

Objects ; methods in geodetic surveying , Triangulation figures; Strength of figure; Classification of trangulation systems; Selection of stations ; intervisibility and height of stations, towers, signals and their classification ;phase of signals ; measurement of angles; instruments used , methods of observation of angles ; satellite station and Reduction to centre ; Eccentricity of signals ; Base line measurement , Apparatus used, Base net; equipment used for base line measurement , field work and corrections ; Reduction to mean sea level; Exetension of a base.

UNIT-II **(10 Hrs., 20 marks)**

Triangulation Adjustments :kinds of errors; laws of weights, determination of the most probable values of quantities; The method of least squares; Indirect observations on independent quantities; normal equation; conditioned quantities ; The probable error and its determination ; distribution of error to the field measurements , method of correlates, station adjustment and figure adjustment; adjustment of a geodetic triangle , figure adjustment of a triangle ; calculation of spherical triangle ; adjustment of geodetic quadrilateral, Adjustment of a quadrilateral with a central station by method of least squares .

UNIT-III **(10 Hrs., 20 marks)**

Photogrammetry: Objects ; application to various fields, terrestrial photogrammetry (only general idea) and aerial photogrammetry ; Aerial camera; comparison of map and vertical photograph ; Vertical tilted and oblique Photographs ; Concept of principal point nadir point, isocentre, horizon point and principal plane, Scale of vertical photograph; computation of length and height from the photograph; relief displacement on vertical photograph; flight planning; ground control ; radial line method; Binocular vision and stereoscopic fusion , mirror and lens Stereoscopes, parallax equation ; measurement of parallax and determining deference of elevation, Stereometers; general idea of stereoscopic plotting instruments.

UNIT-IV **(10 Hrs., 20 marks)**

Remote Sensing :-

Basic principles, importance, scope, signatures in remote sensing, electromagnetic radiation, Atmospheric effects in radiation, interaction of electromagnetic radiation with matter, electromagnetic spectrum, atmospheric windows, sensors used in remote sensing, classification of sensors, remote sensing platforms, data products, multi concept in acquiring remote sensing data, imageries, interpretation techniques, image processing. Applications of remote sensing to Civil Engineering.

UNIT-V **(10 Hrs., 20 marks)**

Hydrographic Surveying :-

Objects; establishing controls; shore line survey, river surveys; soundings, tide gauges, Equipment for taking soundings; signals. The nautical sextant; measuring horizontal and vertical angles with the nautical sextant, sounding party, ranges making the soundings, methods of locating the soundings ;reduction of soundings , the three point problem and methods of solution.

Tunnel Surveying :- Instruments used; Laying of centre line on ground, Transfer of centre line, underground checks for deviation of tunnel driving from original centre.

Mine Surveying:- Special conditions confronted; Equipment for mine surveys; Correction for side telescope horizontal angles and top telescope vertical angle; The stations and station markers; measurement of distance and difference in elevation .

Use of Electronics in Surveys:- Electromagnetic waves and their properties, phase comparison, modulation, types of EDM Instruments, the geodemeter; the tellurometer; the distomat.

LIST OF EXPERIMENTS:-

1. One Second Theodolite :-
   i)Measurement of horizontal and vertical angles.
   ii)Measurement of horizontal angles by reiteration method.
2. Hydrographic survey (Any two exercises)
   i)Study and use of nautical sextant for measurement of angles.
   ii)Plotting the cross-section of the river by sounding method
   iii)Solution of three point problem.
3. Photogrammetry (Any two exercises):
   i)To find out the scale of the photograph .
   ii)Study and use of mirror stereoscope and finding out the air base distance.
   iii)Radial line method of plotting (photo triangulation).
   iv)Use of parallax bar for measuring parallax of two points and finding out the difference of elevation between them.
4. Adjustment of Geodetic quadrilateral by any one method .
5. Study and use of E.D.M. and its principle .

Note : The practical examination will be based on the above exercises.

TERM WORK

The term work shall consists of the record of the above exercises in a journal.

REFERENCE BOOKS –

1) T.P. Kanitkar, & S.V. Kulkarni - Surveying and leveling (vol-II)
2) B.C.Punmia - Surveying Vol. II and Vol .III.
3) P.Somand , B.N.Ghosh - Advance surveying
4) Norman Thomas - Surveying
5) Wolf - Photogrammetry
6) Clarks - Surveying
7) A.N. Patel, Surendra Singh - Principles of remote sensing

BUILDING DESIGN AND DRAWING

Teaching Scheme:	**Examination Scheme:**
Lectures: 4 Hours/Week	Theory Paper: 100 Marks(4 Hrs)
Practical: 4Hour/Week	Term Work: 50 Marks
	Oral /Sketches:25 Marks

UNIT-I **(10 Hrs., 20 marks)**

a) Introduction :-Building definition and types of building as per occupancy, principles of planning of building, plan sanctioning, Tracing and ammonia print.

b) Building bylaws :- necessity of bye laws, plot size, width of road, open spaces, floor area ratio, marginal distances, building line and control line, height regulation, room sizes, types of area calculation- built-up area, floor area, carpet area, rules for ventilation, lighting, drainage, sanitation and parking of vehicles.

c) Ventilation and air conditioning of building :-
Ventilation: -necessity of ventilation, functional requirements, systems of ventilation and their choice movement of wind through building, wind effect, stack effect.
Air conditioning:- classification, comfort and comfort conditions, principles and system of comfort, object and necessity of air conditioning.

c) Fire protection :- Fire load, fire safety, grading of occupancy by fire load , considerations in fire protection, fire resistant construction of walls ,columns, roof, floor. wall openings, fire escape elements.

UNIT-II **(10 Hrs., 20 marks)**

a) Thermal insulation of buildings:-
Climate, thermal comfort, heat exchange of buildings, general principles and means of thermal insulation, structural control ,heat insulation of exposed walls, roof openings, use of sun breakers, chajja and insulating glass.

b) Noise and acoustics:-
Noise : effects of noise, types, noise control and noise insulation of structures, air borne and structural borne noise, transmission of noise, acceptable noise level.
Acoustics:- reverberation, Sabine's formula, acoustical defects, conditions of good acoustics, acoustics for various types of building.

c) Lighting: Natural and artificial, design of windows for clear daylight, sky daylight factor, necessity of artificial light, maximum light required at working table.

d) Building services: importance of building services, constructional requirements for different building services-electrical, tale communication and entertainment service, plumbing services –layout of water supply and drainage system, one pipe and two pipe system, storage disposal arrangement, septic tank, garbage disposal arrangements, solar water heater.

UNIT-III **(10 Hrs., 30 marks)**

a) Planning of residential building:-
Load bearing/ frame structure- bungalows, row houses, and apartments.

b) Working drawings :- importance of working drawings, use of working drawings.

UNIT-IV

a) Planning of public building (frame structure)- functional requirement of public buildings, following types of public buildings may be considered for planning :
Primary or secondary school building , hostel building, lodge building, hotel building, primary health center, factory building, bus stand, library building, commercial complex building, bank building ,post office building , marriage hall.

(13 Hrs., 20 marks)

b) Perspective drawings **(5 Hrs., 10 marks)**

One point and two point perspective drawings .

Note: 1) Theory questions shall be asked on Units I ,II.

2) Only drawing questions shall be asked to draw on drawing sheets from unit III and IV .

TERM WORK

A . Drawing file (full imperial sheets)

a) Planning of a small bungalows from given data load bearing or framed structure plan showing furniture arrangement, front elevation ,two sectional elevations, site plan, built up area calculation and schedules.
scale for all views (1:50) except site plan.
for site plan it is (1: 100) or suitable. (sheet no.1)

b) perspective of sheet no- 1 with suitable scale. (sheet no -2)

c) Tracing and ammonia print for (sheet no-1).

d) Drawings:-Plan and elevation using computer drafting software on A4 size sheet for (sheet no-1)

Project work

Project work shall consist of preparation of working drawings after planning and designing buildings mentioned in unit No.III-part (a) and unit No IV-part (a). Every student shall select different type mentioned.

Drawing for project work shall consist of following drawings at Scale 1:50 or suitable.

i) lay-out plan of project building showing different types of buildings, internal roads , compound walls, entrance gate ,garden ,electrical poles, free plantation etc. (project sheet no -1)

ii) Plan/typical floor plan . (Project sheet no- 2.)

iii) Car parking plan. /Terrace plan. (Project sheet no- 3.)

iv) Foundation plan. (Project sheet no-4)

v) Structural plan : (Project sheet no-5)

vi) Front elevation. : (Project sheet no-6)

vii) Sectional elevations.: (Project sheet no-7)

viii) Lay-out plan showing water supply and drainage arrangement.:(Project sheet no -8)

ix) Axonometric view . (project sheet no-9)

x) Drawings:- Layout plan and elevation using computer drafting software on A4 size sheet.

B. File work shall consist of

a) project work.
i) Data given for project work.
ii) Planning of different units of project building.
iii) Approximate cost of project building.(Cost per $m^{2.}$).

b) Report regarding visit to construction sites , preferably visit to the type of buildings given for the project. (Minimum two)

REFERENCE BOOKS:-

1) M.G. Shah, C.M. Kale, S.Y. Patki - Building Drawing.

2) Y.S.Sane - planning & Designing Building

3) Dr S.V.Deodhar - Civil Engineering Drawing .

FLUID MECHANICS - I

Teaching Scheme:
Lectures: 4 Hours/Week
Practical: 2Hour/Week

Examination Scheme:
Theory Paper: 100 Marks(3 Hrs)
Term Work: 25 Marks
Oral---------:25 Marks

UNIT-I **(13 Hrs., 20 marks)**

a) Introduction :- Scope and application of fluid mechanics, Newton's law of viscosity, classification of fluids: Newtonian and non-Newtonian fluids, ideal and real fluids. Physical properties of fluids – density, specific weight, specific volume, specific gravity, dynamic and kinematics viscosity, compressibility, surface tension, capillarity , vapour pressure.

b) Fluid statics – fluid pressure, pressure head, measurement of pressure, manometers, introduction to mechanical gauges. Civil engineering applications of pressure forces on plane and curved surfaces and buoyancy and flotation.

UNIT-II **(11 Hrs., 20 marks)**

a) Kinematics of fluid flow- types of fluid flow – steady and unsteady: uniform and non-uniform: laminar and turbulent: one, two, three dimensional flows: rotational and irrational flows, velocity & acceleration of fluid particles, stream lines and equipotential lines and flow net.
Equation of continuity for one-dimensional and three-dimensional flows. Electrical analogy method of drawing flow net related to civil engineering.

b) Dynamics of fluid flow – Forces acting on fluids in motion. Mention of various equations of motion, Euler's equation of motion, Bernoulli's theorem, simple applications of continuity and Bernoulli's equation such as Pitot tube, Venturimeter. orificemeter. Introduction to linear momentum principle.

UNIT-III **(9 Hrs., 20 marks)**

a) Dimensional analysis and Hydraulic similitude – Dimensions of physical quantities, dimensional homogeneity, Buckingham pi-theorem, important dimensionless parameters and their significance.
Model analysis: geometric, kinematics and dynamic similitude. Model laws: Reynold's and Froude's model laws. Application of dimensional and model analysis to fluid flow problems.

b) Laminar flow – Flow through pipes, flow between parallel plates, Stoke's law, various methods of measurement of viscosity, Darcy's law, Reynold's experiment. Transition from laminar to turbulent flow.

UNIT-IV **(9 Hrs., 20 marks)**

a) Flow through opening – Orifices: types, coefficients of velocity, contraction and discharge, small and large orifices, submerged orifices.
Mouthpieces: types, external cylindrical mouthpiece.

b) Flows over notches and weirs – Rectangular, triangular and trapezoidal notches and weirs, Cipolleti weir, empirical formulae for discharge over rectangular weirs, corrections for velocity of approach and end contractions, broad crested weirs.

UNIT-V **(8 Hrs., 20 marks)**

Open Channel flow – Classification of open channels, geometric elements, steady and unsteady flows, uniform and nonuniform flows, continuity and energy and momentum equations, kinetic energy and momentum correction factors.

Uniform flow: Chezy's and Manning's equations, roughness coefficients, concept of normal depth, calculation of normal depth for triangular & wide rectangular channels. Hydraulically efficient section.

Critical flow: Specific energy, specific energy diagrams, conditions for critical depth in rectangular and triangular channels.

LIST OF EXPERIMENTS:-

Experiments will be based on the critical portion as detailed below.

1. Measurement of viscosity.
2. Study of simple and differential manometers.
3. Buoyancy: metacentric height of ship model.
4. Study of Bernoulli's theorem.
5. Calibration of Venturimeter / Orificementre.
6. Electrical analogy method.
7. Study of laminar flow/ Heleshaw's apparatus.
8. Coefficients of Orifice / Mouthpiece / notches.
9. Study of Impact of jet.
10. Study of uniform flow formulae in open channel (Chezy's & Manning's formulae) / velocity distribution in open channel.
11. Specific energy and specific force.

TERM WORK: Termwork will consist of a journal giving details of experiments performed. Minimum eight experiments should be performed.

ORAL:- Oral shall be based on term work.

REFERECNE BOOKS

1) Dr. A.K.Jain - Fluid Mechanics
2) Dr. P.N.Modi , Dr. S.M. Seth - Hydraulic and Fluid Mechanics
3) R.K.Bansal - Hydraulic and Fluid Mechanics.
4) Dr. K. Subramanya. - Flow in Open channels
5) Dr. K. Subramanya - Theory and applications of Fluid Mechanics.
6) Ramamurthum - Hydraulic , Fluid Mechanics and Fluid Mechanics.
7) Dr.Garde and Mirajgaokar. - Fluid Mechanics
8) Som and Biswas - Fluid Mechanics
9) Streeter and Wylie - Fluid Mechanics

ENGINEERING GEOLOGY

Teaching Scheme:
Lectures: 4 Hours/Week
Practical: 2Hour/Week

Examination Scheme:
Theory Paper: 100 Marks(3 Hrs)
Term Work: 25 Marks

UNIT-I **(10 Hrs., 20 marks)**

Introduction :- Objects, scope, and subdivisions.

Rock and minerals :- Rock forming minerals, primary and secondary minerals.

Igneous Rocks:- Mineral composition, felsic and mafic minerals. Textures, reasons for textural variation, crystalline matter and glass; dependence of degree of crystallization and shape and size of crystals. conditions of cooling. Conditions of cooling of plutonic, hypabyssal and volcanic rocks, classification.

Study of common rock types prescribed in practical work.

Secondary Rocks:- Rock Weathering, decomposition and disintegration, favourable conditions, processes and products of decomposition and disintegration. transport and deposition.

Classification:- Residual, sedimentary, Chemical and organic deposits.

Sedimentary deposits:- Agents of transport. Textural characteristics of aqueous, aeolian and glacial deposits , clastic texture, stratification and lamination, current bedding, consolidation by welding and cementation, grain size classification, study of common rocks prescribed in practical work.

UNIT-II **(10 Hrs., 20 marks)**

Structural Geology :- Outcrop, Dip and strike, conformable series, unconformity and overlap, Different type of faults and folds in rocks, modes of occurrence of igneous rocks, joints.

Physical Geology :- Geological action of running water, river valley development, waterfalls, ox-bow lakes, flood plain deposits, deltas, rejuvenation and resulting features such as canyons, river terraces and incised meanders.

UNIT-III **(10 Hrs., 20 marks)**

Ground Water :- Meteoric, connate and juvenile water, watertable and depth zones, relation between surface relief and water table, perched water table,

Influence of textures and structures of rocks on ground water storage and movement, pervious and impervious rocks, Geological conditions favourable for natural springs and seepages, depression and contact springs, hot springs and geysers. wells and drillholes, fluctuations in water table levels, effects of dams and canals, effect of pumping, cone of depression, circle of influence, conservation of ground water, Artesian wells, geological conditions that produce artesian pressure, water bearing capacity of common rocks.

Earthquakes: geological considerations for choosing sites of buildings in seismic areas.

Indian Geology: General principals of stratigraphy, age of the earth and divisions of geological time, physiographic divisions of India and their characteristics, geological history of peninsula, study of formations in peninsula and the significance of their structural characters in major civil engineering activities, economic minerals and building stones.

UNIT-IV **(10 Hrs., 20 marks)**

Preliminary geological Investigation: use of geological maps, aerial photographs, remotely sensed imageries, verification of surface data by subsurface exploration, drill holes, test pits, trenches, exploratory tunnels, shafts, adits, drifts, etc.

Compilation and interpretation of information obtained from these. correlation of surface data with the results of subsurface exploration. Limitations of drilling, comparative reliability of data obtained by drilling and excavation.

Engineering significance of geological structures such as stratification, dip, folds, faults, joints, crush zones, fault zones, dykes etc.

Land Slides: Causes, use of remotely sensed Imageries for identification of land sides, role of water, stability of slopes in consolidated material, influence of dip and slope, safe and unsafe slopes, prevention of landslides, keeping slopes free from water, retaining walls, vegetation, slope treatment. Precautions to be taken while aligning roads etc. across hills and making cuts in hillsides.

UNIT-V **(10 Hrs., 20 marks)**

Tunneling:- Influence of geological conditions on design and construction methods. Preliminary geological investigation for tunnels. Important geological considerations while choosing alignment. Difficulties during tunneling as related with lithology, nature and structures of material to be excavated. Role of groundwater, geological conditions likely to be trouble some. Suitability of common rock types for tunneling, unlined tunnels.

Geology of Dam Sites: - Depending of strength, stability and water tightness of foundation rocks on their physical characters and geological structures, Influence of geological conditions on the choice of type and design of dam , precautions to be taken to counteract unsuitable conditions, treatment of leaky rocks, faults dykes, crush zones, joints, unfavorable dips, etc. Earthquake in regions of dam.

Geology of Reservoir sites:- Dependence of water tightness on physical properties and structure of rocks ,geological conditions suitable and suitable for reservoir sites, precautions of amount of siltation in reservoir. Conditions likely to cause leakage through reservoir rim, importance of growing water studies and effects of raising of the water table.

TERM WORK:- It shall be based upon following :-

1) Study of the following minerals in hand specimen:
   Quartz and its varieties, common varieties of cryptocrystalline ,muscovite,biotite zeolites, calcite,iceland sper, gyspem satinsper ,fluorite, barytes,tourmaline, beryl asbestos ,talc ,kyanite, garnet , galena, magnetite, haematite, limonite, iron pyrites, cchromite, bauxite, azurite, malachite.
2) Study of the following rock types in hand specimens: Granites, syenites ,diorites, gabbros rhyolites trachytes, andesites Basalts, varieties of Deccan trap rocks ,volcanic breccias, pegmatites, dolerites, Graphic granites.Laterrites , Bauxites, Conglomrates, Breccias, Sand stones, Quartzites, Grits Arkose, Shales, Mudstone , chemical and organic lime stone .
   Marbles , quartzites , varieties of Goeisses ,slates,phyllites and varieties of schists.
3) Construction of geological sections from contoured geological maps, interpreting geological features without drawing section, solution of engineering geological problems such as alignment of dams, tunnels,roads,canals, etc. based on geological maps.

REFERENCE BOOKS:-

1. R.B. Gupte - A text book of Engineering geology.
2. D.V. Reddy - Engineering geology for civil Engineers.
3. David Tood - Groundwater Hydrology
4. Keller - Environmental Geology.
5. G.B. Deshpande - Geology of Maharashtra (GSI Publication).

SYLLABUS OF

THIRD YEAR (CIVIL)

NORTH MAHARASHTRA UNIVERSITY, JALGAON.

(w.e.f. 2007-08)

N O R T H M A H A R A S H T R A U N I V E R S I T Y , J A L G A O N STRUCTURE OF TEACHING AND EVALUATION

T.E. (Civil) w. e. f. 2007 - 08

FIRST TERM

Sr. No	Subject	Teaching Scheme Hours/Week			Examination Scheme				
		Lectures	Tutorial	Practical	Paper Duration Hours	Paper	TW	P R	O R
1	Structural Design & Drawing – I	4	-	4	4	100	50	-	25
2	Fluid Mechanics- –II	4	1	2	3	100	25	-	25
3	Geotechnical Engineering – I	4	-	2	3	100	25	-	25
4	Transportation Engineering – I	4	1	-	3	100	25	-	-
5	Numerical Methods in Civil Engineering	4	-	2	3	100	50	-	-
	Total	20	2	10		500	175	-	75
	Grand Total	32			750				

SECOND TERM

Sr. No	Subject	Teaching Scheme Hours/Week			Examination Scheme				
		Lectures	Tutorial	Practical	Paper Duration Hours	Paper	TW	P R	O R
01	Structural Design & Drawing – II	4	-	4	4	100	50	-	25
02	Theory of Structures – II	4	1	-	3	100	25	-	-
03	Geotechnical Engineering – II	4	-	2	3	100	25	-	-
04	Transportation Engineering – II	4	1	-	3	100	25	-	-
05	Environmental Engineering – I	4	-	2	3	100	25	-	25
06	Testing of Materials	-	-	2	-	-		-	25
07	Practical Training/Mini Project/Special Study	-	-	-	-	-	25	-	-
	Total	20	2	10		500	175	-	75
	Grand Total	32			750				

N O R T H M A H A R A S H T R A U N I V E R S I T Y , J A L G A O N .
SYLLABUS OF THIRD YEAR (CIVIL)
TERM-IST (w.e.f. 2007-08)
STRUCTURAL DESIGN AND DRAWING-I

Teaching Scheme:
Lectures: 4 Hours/Week
Practical: 4 Hour/Week

Examination Scheme:
Theory Paper: 100 Marks
(4 Hours Duration)
Term Work: 50 Marks
Oral: 25 Marks

UNIT I **(12 Hours, 25 marks)**

A) Introduction to various design philosophies of R.C structures: working stress method, ultimate load method, limit state method , limit state of collapse, limit state of serviceability, limit state of durability, characteristic strength, characteristic load, partial safety factors for material strengths and loads. Study of structural properties of concrete.

B) Limit state method for flexure: (Singly Reinforced Rectangular Section) assumptions, stress & strain diagram, MR of Balanced, under reinforced & over reinforced RC sections.

C) MR of Doubly reinforced & flanged section

UNIT II **(12 Hours, 25 marks)**

Design of beams for flexure, shear and bond

A] for simply supported & cantilever beams.

B] for continuous beams using IS code coefficient method.

UNIT III **(12 Hours, 25 marks)**

A] Design of one way simply supported, cantilever & continuous slabs

B] Design of Two way simply supported & continuous slabs

C] Design of dog legged stair case.

UNIT IV **(12 Hours, 25 marks)**

A] Column: Introduction, strain and stress variation diagrams, axially loaded short column with minimum eccentricity requirements, Design of short column for axial load.

B] Design of short column for axial load, uniaxial & biaxial bending.

C] Design of isolated pad footing for axial load & uniaxial bending.

TERM WORK:- shall consist of following

Design of G + 2 building covering slab, beam, column, footing & stair case.

A design report shall be prepared showing details on half imperial drawing sheets. A few typical details of beam column etc. shall be shown on A4 / A3 size sheets using drafting software also.

A report on at least one site visit shall be submitted in term work.

BOOKS :

1) Limit State Analysis and Design : P. Dayaratnram – Wheeler Publishing company, Delhi.
2) Comprehensive Design of R.C. Structures : Punmia, Jain and Jain – Standard Book House –New Delhi.
3) Limit State Theory and Design : Dr.V.L.Shah and Dr.S.R. Karve – Pune Vidyarthi Publication.
4) RCC Analysis and Design Vol.II and I : Sinha – S.Chand and Co., New Delhi.

FLUID MECHANICS - II

Teaching Scheme:
Lectures: 4 Hours/Week
Practical: 2 Hour/Week
(Two lecture for unit tests)

Examination Scheme:
Theory Paper: 100 Marks
(3 Hours Duration)
Term Work: 25 Marks
Oral --------: 25 Marks

UNIT-I **(10 Hours 20 marks)**

Boundary Layer Theory : Concept of boundary layer, various thickneses of boundary layer, application of momentum equation (no derivation), boundary layer over a flat plate, laminar and turbulent boundary layers, local and average drag coefficients, hydrodynamically smooth and rough boundaries, separation of boundary layer and control of separation.

Fluid Flow around submerged Bodies : Practical problems involving fluid flow around submerged objects, definitions and expressions of drag & lift, drag & lift coefficients, types of drag, drag on sphere, cylinder, airfoil. Karman's vortex street, Lift, Magnus effect , lift on cylinder and aerofoil, polar diagram.

UNIT-II **(9 Hours 20 marks)**

Turbulence Flow Theory : Turbulence phenomenon, instantaneous velocity & temporal mean velocity, scale & intensity of turbulence, Boussinwsqs theory , Reynold's expression , Prandtls mixing length theory, velocity distribution for smooth & rough boundaries, mean velocities in pipes, Karman Prandtls equation.

Darcy Weisbach equation, friction factors for smooth, rough & transition boundaries, Moodys diagram.

Turbulent flow through pipes, minor losses, pipes in series & parallel, three reservoir problem (no trial & error solution), siphon.

Unsteady flow through pipes : Celerity of pressure wave in an elastic pipe, water hammer phenomenon, pressure changes due to changes in valve opening – simple cases neglecting friction. Surge tanks – function, locations, types (no mathematical treatment for surge tank.)

UNIT-III **(9 Hours 20 marks)**

Definition & types of non-uniform flow, Gradually varies Flow (GVF) and rapidly varied flow (RVF), differential equation of GVF- alternate forms, different types of GVF profiles, their characteristics & examples of their occurrence, control sections.

Computation of GVF surface profiles by Direct step method, venture flume, standing wave flum.

Hydraulic Jump :

Phenomenon of hydraulic jump, example of occurrence, application of momentum equation to hydraulic jump in horizontal, frictionless, rectangular channel., specific force, conjugate depths & relation between conjugate depths, energy loss in hydraulic jump, length of jump, classification & practical uses of hydraulic jump.

UNIT-IV **(10 Hours 20 marks)**

Impact of Jet : Impact of jet on stationary & moving , flat & curved surfaces using linear momentum principle, workdone, principle of angular momentum , Eulers momentum equation for turbine & pumps (No derivation)

Hydraulic Turbine :

Elements of hydro elastic power plant, unit & specific quantities, hydraulic turbines, classification of hydraulic turbines, heads & efficiencies of hydraulic turbines.

Theory & design of hydraulic turbines (Pelton, Francis & Kaplan turbines), force and torque development, cavitation, governing of turbines, speed of turbines.

UNIT-V **(8 Hours 20 marks)**

Centrifugal Pumps :

General classification of pumps, classification of centrifugal pumps, specific speed, working of centrifugal pump, priming, theory of centrifugal pump, workdone by impeller, energy losses, heads & efficiencies, minimum starting speed, priming, cavitation, multistage turbine pump.

Model analysis of turbines & pumps. Prediction of performance in terms of unit & specific quantities, characteristic curves of turbine and pump.

PRACTICALS :

Any seven of following experiments should be performed.

1) Study of boundary layer on a flat plate.
2) Flow through pipes (laminar & turbulent) and determination of friction factor.
3) Drag and lift on airfoil.
4) Drag on cylinder.
5) Measurement of different parameters of hydraulic jump (model) in laboratory, OR Study of hydraulic flume. / jump on actual hydraulic structure on canals or dam near the college by arranging visit.
6) Venture flume / standing wave flume.
7) Velocity distribution in open channel .
8) Characteristics of Pelton wheel.
9) Characteristics of Francis turbine or Kaplan turbine.
10) Characteristics of centrifugal pump.

TERM WORK:

Termwork will consist of a journal giving details of at least seven out of 10 experiments above. Minimum seven experiments should be performed.

ORAL:

Oral shall be based on term work.

REFERECNE BOOK

1) Fluid Mechanics : Dr. A.K.Jain
2) Hydraulic and Fluid Mechanics : Dr. P.N.Modi , Dr. S.M. Seth.
3) Hydraulic and Fluid Mechanics : R.K.Bansal.
4) Flow in Open channels : Dr. K. Subramanya.
5) Theory and applications of Fluid Mechanics : Dr. K. Subramanya.
6) Fluid Mechanics : Dr.Grade and Mirakgaokar.
7) Fluid Mechanics : Streeter and Wylie.
8) Hydraulic Machines – Jagdish Lal
9) Hydraulic Machines – Rajpoot.

GEOTECHNICAL ENGINEERING – I

Teaching Scheme:
Lectures: 4 Hours/Week
Practical: 2 Hour/Week

Examination Scheme:
Theory Paper: 100 Marks
(3 Hours Duration)
Term Work: 25 Marks
Oral : 25 marks

UNIT I **(9 Hrs.,20 marks)**

a) soil as engineering material:- origin and formation of soil, geological processes, soils of India, geotechnical problems, three phase system, definitions and functional relationships.
b) Geotechnical properties:- physicochemical properties, engineering properties, volume weight relationships. Atterberg's limits, sieve analysis, identification of soil, I.S. classification system

UNIT II **(9 Hrs.,20 marks)**

a) Stresses in soil:-geostatics stresses, stresses due to surface loading, Boussinesq's westerguards theories, point load, area load and strip load, newmarks chart, stress strain relation ship soil modulus, elastic settlement.
b) Soil compaction, M.D.D. and O.M.C. , standard proctors test heavy compaction test, concept of stabilization , different methods of stabilization.

UNIT III **(10 Hrs.,20 marks)**

a) flow of water through soils: soil water, capillarity, Darcy's law laboratory measurement of permeability, flow through layered soils, simple field measurement, laplace equation, flow net, its construction and uses, seepage force, quick sand, critical gradient, reverse filters.
b) Consolidation Theory:- Terzaghi theory, consolidation test, time fitting curves, rate of settlements, Normal consolidated and over consolidated deposits, Pre consolidation pressure.

UNIT IV **(9 Hrs.,20 marks)**

a) shear resistance in soil:- pore pressure and effective stresses failure theories , Mohr - Coulomb's law of shear strength direct shear test, traxial test, unconfined compression test, vane shear test, drained loading , factors affecting the shear strength.

UNIT V **(9 Hrs.,20 marks)**

a) Earth pressures:- Rankine's state of plastic equilibrium at rest, active and passive states, effect of surcharge, wall friction, back fill behind smooth wall , Rankine's theory , Coulomb's theory determination of lateral earth pressure by analytical and graphical methods.(culmann's and poncelete's construction.)
b) Stability of slopes:- finite and infinite slopes , natural and man made slopes, modes of failure, slip circle method, swedish circle method, method of slices,critical height of slopes, stability number, landslides, Remedial measures.

TERM WORK:-

Term work shall comprise of any Ten experiments out of following set :

1) Field density by core cutter method , sand replacement method.
2) Sieve analysis and particle size determination or hydrometer analysis.
3) Specific gravity determination by voluminometer/ pychnometer
4) Determination of liquid limit and plastic limit
5) Determination of shrinkage limit
6) Determination of co-efficient of permeability by constant head or by variable head permeameter
7) Direct shear test

8) Unconfined compression test
9) Vane shear test
10) Proctor's test (MDD / OMC)
11) Tri- axial test
12) C.B.R. test or Consolidation test
13) Differential free swell test or swelling test.

REFERENCE BOOK:

1) Soil Mechanics and Foundation Engineering - V.N.S. Murthy.
2) GeoTechnical Engineering- Gulhati and Datta.
3) Basic and Applied Soil Mechanics- Gopal Ranjan, A.S.R.Rao
4) Modern Geotechnical Engineering & Foundation - Dr. Alam Singh
5) GeoTechnical Engineering – T.N. Ramamurthy and T.G.Sitharam.
6) Geotechnical Engineering - Garg
7) Geotechnical Engineering – C. Venkatramaiah.

TRANSPORTATION ENGINEERING - I

Teaching Scheme:
Lectures: 4 Hours/Week
Tutorials: 1 Hour/Week

Examination Scheme:
Theory Paper: 100 Marks
(3 Hours Duration)
Term Work: 25 Marks

UNIT-I **(9 Hours 20 marks)**

Introduction to railways as a Civil Engineering transportation system, permanent way components, Gauges on Indian railways, need of uniformity of gauge in view of problems of change of gauge, track structure and standards,rails requirments, stresses, wearing, stresses in ballast, coning of wheels, tilting of rails, fuctions, axle loads, defects, rail failure, causes of rail failure, sleepers, types, sleeper density, suitability of engineering materials for use as sleepers, manufacturing, testing and handling of concrete sleepers, rails joints, types, rail fastenings, welded rails, ballast, materials for ballast, requirements, specifications and design of ballast section, typical profiles of track and permanent way, cross sections in banking and filling.

UNIT-II **(9 Hours 20 marks)**

Track geometries ,gradients, types, alignments, curves ,superelevation , equilibrium cant ,cant deficiency, maximum permissible speed, negative superelevation

Horizontal transition and vally curves, Train resistance due to friction , wave action ,track irregularities, wind ,gradient curvature, compensated gradient for curve,resistances due to starting and accelerating,tractive efforts, types of traction, necessity and essentials of good trade management, creep effect and remedy, modern methods of track management, Engineering surveys, priliminary and detailed, information for preparation of project report ,land acquisition plate laying methods requirement of materials.

UNIT-III **(9 Hours 20 marks)**

Points and crossings , functions, constituents of turnouts, types of switches, terms used in crossings , standard turnouts, types of layouts, Diamond crossing , scissor crossing ,signals and interlocking , types of signals and principles of interlocking , CTC and ATC system , types , locations and layouts of stations , equipments for stations and yard platforms , loading gauges, locosheds, need of modernisation of railways, tracks for superhigh speed trains.

UNIT-IV **(9 Hours 20 marks)**

Tunnels, need, classification, choice of open cuts and tunnels, bridge action time and pressure relief, shapes and size, tunnel cross sections, shafts, types and constructions ,Pilot tunnel, tunnelling in rocks, heading and benching method, drilling, blasting, mucking ,ground support ,rock bolting and strata anchoring, lining, shotcreting, Tunnelling in soft stratra, problems encountered, methods of tunnelling, shield method of tunnelling, loads coming on tunnel crown, modern methods of tunnelling –TBM, bentonite slurry, safety measures about dust prevention, ventilation, lighting and drainage in tunnel.

UNIT-I **(9 Hours 20 marks)**

Importance of Docks and Harbours for inland water ways and sea routes, classification of harbours,ports and docks, types of harbours, site selection effectsof winds, waves and tides, littoral drifts, defects in harbours, breakwater , types, design. Construction,quay and quay walls, wharves, fenders, dolphins, piers, slips, moles, berths , pier heads, Jetties, Quay walls, Dock walls, Design criteria, wet docks , dry docks , Reel and bilge blocks, lock purpose and types.

Marine railways, Navigational aids, signals, buoys, light houses, ware house and Transit sheds.

TERM WORK:

1) It will consist of home assignments based on above syllabus and
2) Visit to a Railway station and study its layout..
3) A problem on calculation of loads on tunnel crown.

BOOKS RECOMMENDED

1) Railway Engineering –Rangwala
2) Railway Engineering - Oza
3) Railway Engineering – S.C. Saxena
4) Railway Engineering – Antia
5) Tunnel Engineering –Rangwala
6) Tunnel Engineering – S.C . Saxena
7) Tunnel Engineering – Oza
8) Docks & Harbour- Rangwala
9) Docks & Harbour -Oza

NUMERICAL METHODS APPLICATION IN CIVIL ENGINEERING

Teaching Scheme:
Lectures: 4 Hours/Week
Practical: 2 Hour/Week

Examination Scheme:
Theory Paper: 100 Marks
(3 Hours Duration)
Term Work: 25 Marks
Oral --------: 25 Marks

UNIT-I **(9 Hours 20 marks)**

Introduction to Numerical Computation, Errors and approximation –storage, approximation, truncation, round off, absolute and percentage errors

Solution of simultaneous algebraic equation by Gauss Elimination method, Gauss Seidel method, Gauss Jordan method, partial pivoting, methods of iteration and its condition for convergence.

Solution of linear algebraic and transcendental equations by method of simple iteration, bisection, false position, Newton Raphson Method, Generalized Newton Raphson Method.

UNIT-II **(9 Hours 20 marks)**

Liner Programming–Structures, Assumptions, Advantages, Limitations, General Mathematical Model, Guidelines for formulations

Graphical Solution Method – Extreme point enumeration approach, Iso-profit(cost) function line approach, Maximization, Minimization and Mixed Constraints LP problem, Multiple Optimal solution.

Simplex Method – Standard Form of an LP problem, Reduction of Feasible solution to basic feasible solution, Simplex Algorithm for Maximization & Minimization Cases, Two phase method, Big-M method.

UNIT-III **(9 Hours 20 marks)**

Curve Fittings & Interpolation –

Linear Regression, Polynomial Regression, Multiple Linear Regression,

General Linear Least Squares,

Newton's divided difference interpolating polynomials,

Lagrange Interpolating polynomials,

Non-linear regression, Coefficient of interpolating polynomials.

Engineering Application of curve fitting.

UNIT-IV **(9 Hours 20 marks)**

Numerical Differentiation & Integration –

High accuracy differentiation formula – First Derivative & Second Derivatives, Richardson Extrapolation,

Trapezoidal rule, Simpson's one third and $3/8^{th}$ rule, Open Integration Formula, Multiple Integral,

Newton Cotes Algorithm,

Gaussian Quardature – Legendre Polynomials and Hermite Polynomials

UNIT-V **(9 Hours 20 marks)**

Solution of ordinary differential equation – Taylor's series method, Euler's method, Modified Euler's method, Runge Kutta method, Predictor Corrector Method.

Partial Differential Equation – Introduction to initial value and boundary value problem, Finite difference methods for the solution of one dimensional wave equation two dimensional (parabolic and elliptic) and higher order PDE.

TERM-WORK -

The term-work shall consist of computer programs along with the input and output file, flow chart/algorithm and numerical assignments from the list below –

COMPUTER PROGRAMS *– (Minimum five)*

(1) Gaussian Elimination Method / Gauss Jordon Method
(2) Method of Bisection / method of false position
(3) Newton Raphson Method / Method of Simple Iteration
(4) Method of Least Square / Newton Interpolation / Lagrange Interpolation
(5) Euler's Method / Modified Euler's Method / Runge Kutte Method

NUMERICAL ASSIGNMENT *– (Minimum three)*

(1) LPP – Graphical Method
(2) LPP – Simplex Method
(3) Curve Fitting
(4) Boundary Value Problem
(5) Simpson's One third/ Simpson's 3/8 rule
(6) Lagrange Formula / Gaussian quardature

BOOKS SUGGESTED –

1 –Steven C Chapra & Raymond P. Canale, "Numerical Methods for Engineers", Tata Mc-Graw HillCompany Limited, New Delhi, 2002

2 –Schilling & Harries, "Applied Numerical Methods for Engineers", THOMSON, Brooks/Cole, Newyork, 2000

3 –S.Rajasekaran, "Numerical Methods in Science & Engineering", A.H.Wheeler & Company Private Limited, 2000

4 –Sharma J.K., "Operation Research", MACMILLAN India Limited, 2003

5 –Jain, Iyenger & Jain, "Numerical Methods", New Age Publishing Company, New Delhi, 2004

6 –Sastry S.S., Introductory Methods of Numerical Analysis", Prentice Hall (India) Limited, New Delhi, 2000

7 –Kanti Swaroop & P.K.Gupta, "Operation Research", Sultan Chand & Sons, New Delhi, 1998

8 –S.S.Rao, "Optimization Theory and Application", Wiley Eastern Limited, 1999

N O R T H M A H A R A S H T R A U N I V E R S I T Y , J A L G A O N .
SYLLABUS OF THIRD YEAR (CIVIL)
TERM-IIND (w.e.f. 2007-08)
STRUCTURAL DESIGN AND DRAWING-II

Teaching Scheme:
Lectures: 4 Hours/Week
Practical: 4 Hour/Week

Examination Scheme:
Theory Paper: 100 Marks
(4 Hours Duration)
Term Work: 50 Marks
Oral: 25 Marks

UNIT I **(12 Hours, 25 marks)**

A) Introduction to steel structure, steel grades, Rolled sections. Types of connections Strength of weld & Rivet Value. connections subjected to axial force.
B) Design of axially loaded tension members
C) Design of axially loaded compression members

UNIT II **(12 Hours, 25 marks)**

A) Design of built up columns. Design of lacing. Introduction to battened column.
B) Design of Roof Truss for DL, LL & WL (Excluding purlin design)

UNIT III **(12 Hours, 25 marks)**

A) Design of Laterally restrained and unrestrained simple beams. Design of purlin.
B) Design of Welded plate Girder including Curtailment of flang plate, stiffeners, splices & welded connections.

UNIT IV **(12 Hours, 25 marks)**

A) Design of Column bases: Slab base & Gussetted base.
B) Design of connections subjected to moments. Beam to beam & beam to column connection (framed connections)
C) Design of foot over bridge.

TERM WORK:- shall consist of following

1) Design of roof Truss
2) Design of an industrial building
3) Design of welded plate Girder.
3) A report on at least one site visit.

Drawing shall be on half imperial sheets. At least one sheet of above 3 designs shall be in A3 / A4 size sheets using drafting software.

BOOKS :

1) Design of Steel Structures –L.S. Negi
2) Design of Steel Structures –S. K. Duggal.
3) Design of Steel Structures – Dr.Ram Chandra
4) Design of Steel Structures – Arya and Ajmani.
5) Design of Steel Structures – Dr. B.C.Punmiya.

THEORY OF STRUCTURE II

Teaching Scheme:
Lectures: 4 Hours/Week
Tutorial : 1 Hour/Week

Examination Scheme:
Theory Paper: 100 Marks
(3 Hours Duration)
Term Work: 25 Marks

UNIT-I **(12 Hours 20 marks)**

A) Basic concepts of Structural Analysis:- Types of skeletal structures, static and kinematics indeterminacy, equilibrium and compatibility conditions, stress-strain relations, force-displacement relations. concept of linear /non-linear structures. Energy theorem, Miller Breslau principle, concept of complementary energy, Fundamental concept of Force and the Displacement method of analysis.

B) Analysis of beams and frame by energy methods, (up to two unknown)

C) Slope deflection method, applied to continuous and rigid jointed frames, transverse and rotational yielding of supports.(up to three unknown).

UNIT-II **(10 Hours 20 marks)**

A) Moment distribution method applied to continuous beams and rigid jointed rectangular frames, transnational and rotational yielding of supports.

B) Approximate analysis of multistory frames for vertical and lateral loads, substitute frame, portal frame and cantilever method.

UNIT-III **(10 Hours 20 marks)**

Fundamental concept of flexibility :- Method for structural analysis , flexibility coefficient, matrix formulation for flexibility methods, degree of freedom. Influence coefficients, physical significance, choice of basic determinate structure and redundant forces, compatibility equations, effect of settlement and rotation of supports, temperature and lack of fit, hand solution of simple problems on beams, pin jointed plane truss and rigid jointed frames (involving not more than three unknown)

UNIT-IV **(8 Hours 20 marks)**

Fundamental concept of Stiffness:- Method of structural analysis, stiffness coefficient, matrix formulation for stiffness methods, Degree of freedom.

Influence coefficients, physical significance, effect of settlement and rotation of trusses and rigid jointed plane frames (involving not more than three unknown)

UNIT-IV **(8 Hours 20 marks)**

Plastic Analysis of Steel Structures :- introduction, Shape factor, plastic hinge, collapse mechanism, upper bound and lower bound theories, application to continuous, fixed and single bay single storey rectangular frames.

TERM WORK :

It shall consist of assignments based on above syllabus.

REFERENCE BOOKS

1. Pandit & Gupta -Structural Analysis,TataMcGrawHill,Pub. Co.Ltd ., New Delhi
2. Wang C.K.-Intermediate structural analysis, McGraw Hill, New York.
3 Kinney- Streling J. Indeterminate structural Analysis, Addition Wesley.
1. Reddy C.S.-Basic Structural Analysis Tata McGraw Hill Pub. Co. New Delhi.
2. Norris C.H. Wilbur J.B. and Utkys.-Elementary Structural Analysis, 4/e, Tata McGraw Hill Pub. Co.Ltd.
3. Weaver W & Gere J.M-Matrix Method of framed Structures CBS Publishers & Distributors, Delhi.

4. Ghali A & Neville M. Structural Analysis- A Unified classical and matrix Approach ,Chapman and Hall, New York. .

TEXT BOOKS

1. Theory of Structure – Punmia B.C.
2. Theory of Structure – Ramamrutham
3. Theory of Structure Vol II– Gupta and Gupta

GEOTECHNICAL ENGINEERING – II

Teaching Scheme:
Lectures: 4 Hours/Week
Tutorial : 1 Hour/Week

Examination Scheme:
Theory Paper: 100 Marks
(3 Hours Duration)
Term Work: 25 Marks

UNIT-I **(10 Hours 20 marks)**

Soil Exploration, Sampling and Testing:- Subsurface exploration trail pits, shafts, boring, geophysical tests wash, boring, representative and undisturbed samples, bore hole sampling, laboratory evaluation of foundation parameters, field testing, penetration tests , plate load test, bore hole tests.

Bearing Capacity:- Load settlement curve, local and ganeral shear, terzaghi b.c. analysis, B.C. factors, mayorhoff and hansel equations, rectangular, square and round footings, effects of water table and depth, bearing capacity of layered soils, effect of eccentricity, B.C. of rocks.

UNIT-II **(9 Hours 20 marks)**

Elastic settlement :- Contact pressure, elastic stresses and strains, pressure bulb, elastic settlement, empirical relation for settlement of basses, total and differential settlement, tolerable settlement, I.S. criteria, effect of lowering water table.

UNIT-III **(9 Hours 20 marks)**

Shallow Foundations :- Spread footings, minimum depth plain and R>C>C> footings, allowable soil pressure, use of SPT blow count, I>S> charts, wall footings, column footings, combined footings, raft foundations, floating foundations, grillage foundations.

UNIT-IV **(9 Hours 20 marks)**

Pile Foundation:- purpose of piles, pile classification carrying capacity – static method, pile load test, dynamic methods, use of cone test ; group action felds rule, rigid block method ; negative skin friction, shearing of loads, settlement of group.

Foundation on black cooton soils:- characteristics of B.C. soil, problems, swelling potential, under-reamed piles, design principles and construction techniques.

UNIT-V **(10 Hours 20 marks)**

Piers and Caissions :- Hand excavated and drilled piers, method of installation, use of drilling mud, caissions and foundation walls open, box, pneumatic caissons, sinking method, sand island method, caisson disease, capacity and settlement of piers and caissons, well foundation.

Sheet piles and cofferdams:- temporary supports and braced sheetings for excavations, pressure distribution cofferdams bracked and cellular, cantilever and anchored sheet piles.

Machine Foundation : Mechanical vibrations, single degree freedom systems, free and forced vibrations, damped systems, natural frequency, resonance magnification, vibration parameters , vibration test, dynamic modules ,coefficient of elestic uniformcompression, block foundation design Balken method, isolation and control of vibration screen barriers.

Problems in foundation engineering .

Tutorial: It shall consists of following based upon above syllabus.:-

A) 1) Preparation of soil exploration, programming and testing report for any two of the following including bore logs.
   i) Multy storey building.
   ii) Dam.
   iii)Bridge.
   iv) Harbour.

2) Study of plate load test and presentation of test results.
3) Study of standard penetration test and presentation of result.
4) Study of pile load test and presentation of results.
5) Sketches of various types of sheet piles and coffer dams.
6) Sketches of various types of shallow foundations and deep foundations.

B) Home assignments based upon above syllabus.

BOOKS RECOMMENDED :-

1. Foundation Engineering - Punmia B.C.
2. Foundation Engineering - Kasmalkar
3. Basic and Applied Soil Mechanics- Gopal Ranjan, A.S.R.Rao
4. GeoTechnical Engineering- Gulhati and Datta.
5. Foundation Design – Wayne. C. Teng.

TRANSPORTATION ENGINEERING–II

Teaching Scheme:
Lectures: 4 Hours/Week
Tutorials: 1 Hour/Week

Examination Scheme:
Theory Paper: 100 Marks
(3 Hours Duration)
Term Work: 25 Marks

UNIT-I **(10 Hrs.,20 marks)**

a) Role of transportation in the development of nation, component of transportation. Principal of highway planning, road development and planning in India, highway financing, Introduction to privatization in transportation projects.
b) Highway alignment:- requirements, factors controlling highway alignment, engineering surveys for highway location, basic requirements for an ideal alignment, special requirement for hill roads.
c) various types of roads, method of construction, quantity of material required and quality control. (Embankment WBM, BM, DBM Layer constructions only)
d) Geometric design:- Cross section, element width, camber, design speed, sight distance, overtaking sight distance, super elevation, gradient, requirement and design of horizontal and vertical alignment.

UNIT-II **(10 Hrs.,20 marks)**

a) Traffic Engineering:- Traffic characteristics, vehicle characteristics, traffic studies and the use, traffic operation , traffic control devices, types of road intersection.
b) Behavior of highway materials:- Properties of sub grade and pavement components, materials, material interaction. Test on sub grade soil, aggregate and bitumen material, test on bitumen and aggregate , requirements of bitumen mixes, marshal tests, stabilized soil mixes.
c) Introduction of pavement design:- Factors in design of flexible and rigid pavement, group index and C.B.R. method, westergaurd analysis of wheel load stresses in rigid pavement I.R.C. recommendations.
d) Typical problems in highway:- Drainage surface and subsoil, pavement failure, evaluation, maintenance.

UNIT-III **(9 Hrs.,20 marks)**

Airport planning:- The important characteristics of airport which influence judicious and scientific planning of airport selection of site for airport important term.

a) Airport layout: - Location of terminal building, aprons and hangers, design criteria, characteristics of good layout for an airfield, zoning requirements regarding the permissible height of constructions and the land use within the airport boundary.
b) Aviation organization and their function, airport drainage surface , subsurface drainage. Airport authority of India's bylaws.
c) Runway and Taxiway:- Influence and wing characteristics on orientation of runways, use of wind rose diagrams basic patterns of runways, basic recommendation regarding length, width and gradients of runways and taxiways.
   Lighting, marking and signs:- approach, runway, taxiway lighting, runway taxiway marking, taxiway sign systems.
d) Heliports:- Main characteristics of Helicopters, nature of helicopters transport, site selection for helicopters. Typical layouts, protection of approach and departure paths, elevated heliports.

UNIT-IV **(9 Hrs.,20 marks)**

a) Classification of bridges, selection of site , determination of design discharge, linear waterway , economical span, location of piers and abutment, afflux, scour depth.

b) Standard specification for bridges:- I.R.C. bridge code, width of carriage way and clearance, loading, Indian railway bridge loading, forces acting on bridge structures, design consideration, aesthetics of bridge design.

UNIT-V **(9 Hrs.,20 marks)**

a) Various types of bridges, culverts slab, pipe and box type, R.C.C. bridge "T" beam, half hollow girder, balanced cantilever, continuous girder, rigid framed arch, bow string girder, prestressed concrete bridges, steel bridges, plate girder, box girder, truss, arch cable stayed, cantilever and suspension bridges, temporary and movable bridges, floating pontoons bridges.

b) Selection of a suitable type of bridge, types of bridge foundation, their choice and method of construction, bearing and their types, design consideration.
Introduction to different techniques of erection of bridge , super structure and bridge maintenance.

TERMWORK:-

T.W. shall be based on Assignment given in lecterns hours.

REFERENCE BOOKS:-

1. Highway Engineering by Justo Khanna.
2. Highway Engineering by Rangwala.
3. Highway Engineering and Airports by K.L. Bhanot & S.B. Sehgal.
4. Airport Engineering by Rangawala.
5. Airport Engineering by G.Venkatappa Rao.
6. Bridge Engineering by S.P.Bindra.
7. Bridge Engineering by S.Ponnuswamy.

ENVIRONMENTAL ENGINEERING - I

Teaching Scheme:
Lectures: 4 Hours/Week
Practical: 2 Hour/Week

Examination Scheme:
Theory Paper: 100 Marks
(3 Hours Duration)
Term Work: 25 Marks
Oral --------: 25 Marks

UNIT-I **(9 Hours 20 marks)**

Introduction to Water Supply – Planning and necessity, brief description of different elements of water supply scheme

Water Demand – types, total requirement, per capita demand, factors affecting per capita demand, variations, effect of variation in different component of water supply scheme, design period,

Population – growth of population and forecasting method.

Sources of Water for WSS – Surface sources such as ponds and lakes, streams and rivers, storage reservoirs. Ground water sources such as infiltration galleries, infiltration wells and springs. Quality and quantities of water from different sources, Factors governing the selection of particular source for WSS.

UNIT-II **(9 Hours 20 marks)**

Intake structures – purpose, types such as canal intake, reservoir intake, river intake, intake tower etc, factors governing the location

Hydraulic Design of Intake well, Intake pipe, Jack well, pump house, open dug well (production well)

Pipes for conveyance of Water – (only different class of pipes, available sizes and suitability) AC pipes, MS pipes, CI/DI pipes, PVC pipes, GI pipes,

Stresses in pipes, Water Hammer Effect, Forces at Bends- Thrust Blocks

Hydraulic Design of Rising Main & Gravity Main,

Pipe Appurtenances (Purpose & Functioning) – Air Valves, Sluice Valves, Butterfly Valves, Pressure Relief Valves, Drain/Scour Valves

Pumps for WSS – Types of pumps in common use such as centrifugal, vertical turbine, submersible pumps, their suitability, Estimation of power of motor of pump, Economical diameter of pumping main

Reservoirs (Purpose, Location and Capacity)– Ground Service Reservoirs, Elevated Service Reservoirs, Master Balancing Reservoirs, Pressure Break Tank

UNIT-III **(9 Hours 20 marks)**

Quality of Water - Objectives of determination of quality, Pure water,

Physical Characteristics – Units of measurement, Reasons for their presence & Methods of determination of Colour, Taste and Odour, Turbidity (Turbidity Rod, Jakson Turbidity meter, Nephelometer), Specific Conductivity, Temperature

Chemical Characteristics – Units of measurement Reasons for their presence and determination of total solids, pH value, Hardness, Chloride Content, Nitrogen in its different forms, Alkalnity, Dissoloved Oxygen

Biological/Bacteriological/Microscopical Characteristics – Classification of Micro-organisms, Tests for Biological Characteristics of water (Total Count Test, E-Coli Test). E-Coli Test – (Presumptive Test, Confirmed Test and Completed Test) Determination of Coliform Index (E-coli index) and MPN index

Standard of water with respect to different characteristics as per norms of WHO and BIS

UNIT-IV **(9 Hours 20 marks)**

General Water Treatment of Surface Water – Objective of treatment of water, different elements of WTP for treatment of normal surface water.

Screening – Coarse and fine screens

Aeration Fountain – Types, Necessity and design

Plain Sedimentation – Theory of sedimentation (Laminar and Turbulent Settling of particles), Design Concept, Scouring of deposited particles, Different types of sedimentation tank, Inlet and outlet arrangements

Sedimentation aided with coagulation – Theory of coagulation & flocculant settling, Various types of coagulants and their suitability, Feeding Devices, Mixing Devices, Design of Flash Mixer, Flocculation tank & clarifier (Clariflocculator), Management of sludge in coagulation-sedimentation process

UNIT-V **(9 Hours 20 marks)**

Filtration – Theory of filtration – mechanical straining, flocculation and sedimentation in filter media, biological metabolism, electrolytic changes,

Filter Material – Types, characteristics and requirement of good filter material

Types of filters and their classification

Slow sand filters – Details of features, Operation and design criteria of Different elements of SSF (Tank, filter media, base material, inlet & outlet arrangements, Appurtenances. Efficiency & Performance of SSF

Rapid Sand Filters – Necessity, Details of features, Operation and design criteria of Different elements of RSF (Tank, filter media, base material, under drainage system, inlet & outlet arrangements, Appurtenances, Back wash arrangements). Operational Troubles in RSF, Efficiency & performance of RSF

Pressure Filters – Necessity, Details of Features and working, Efficiency and suitability, Advantages and Disadvantages

Disinfections – Purpose, Brief descriptions about Various Methods of disinfections (boiling, treatment with excess lime, ozone treatment, Iodine treatment, Treatment with potassium permanganate and silver treatment)

Chlorination – Disinfecting action, dosage, different forms of chlorination (Liquid chlorine, bleaching powder, chlorine di-oxide, chloramines, chlorine di-oxide), Types of Chlorination – Plain, Pre, Post, Double, Break point, Super Chlorination and Dechlorination. Importance of Chlorine residual and Testing.

TERM-WORK -

The term-work shall consist of minimum eight experiments and five assignments from the list below –

Experiments – (Any eight)

(1) Determination of pH
(2) Determination of Turbidity and optimum dose of alum
(3) Determination of Total Dissolved Solid
(4) Determination of different forms of alkalinity
(5) Determination of Total and mineral acidity
(6) Determination of Carbonate and Non-carbonate hardness in water
(7) Determination of Chlorine demand of water
(8) Determination of Dissolved Oxygen Content
(9) Determination of Fluoride Content
(10) MPN Test

Assignment – (Any five)

(1) Population Forecast of a town by three methods
(2) Design of Aeration Fountain

(3) Design of Flash Mixer
(4) Design of Clariflocculator
(5) Design of Slow Sand Filter
(6) Design of Rapid Sand Filter
(7) Visit Report of a Water Supply Scheme including WTP

BOOKS RECOMMENDED –

- Garg S.K., "Water Supply Engineering", Khanna Publisher, New Delhi
- Punamia, Jain & Jain, "Water Supply Engineering", Laxmi Publications, New Delhi
- Manual on Water Supply & Treatment, Central Public Health & Environmental Engineering, Organization, Ministry of Urban Affairs, Government of India
- Modi P.N., "Water Supply Engineering", Standard Publications, New Delhi
- Rangwala, "Water Supply and Sanitary Engineering", Charotar Publishing Company, Anand
- Raju, "Water Supply and Waste Water Engineering", Tata McGraw Hill Publishing Company, New Delhi
- Sincero & Sincero, "Environmental Engineering – A Design Approach", Prentice Hall International, New Delhi
- Therous, Eldridge & Mallmann, "Laboratory Manual for Chemical & Bacteriological Analysis of Water & Sewage", Agro Botanic Publisher, India
- Benergee & Jain, "Handbook of Technical Analysis", Jain Brothers New Delhi.
- Laboratory Manual for Environmental Quality Testing, Environmental Protection Research Foundation, Sangli

TESTING OF MATERIAL

Teaching Scheme:

Practical: 2 Hour/Week

Examination Scheme:

Term Work: 25 Marks

Oral --------: 25 Marks

List of Practicals to be conducted for Term work

1. Tension Test on metal.
   - Mild steel.
   - Tor steel
2. Hardness test on metal.
3. Impact Test on metal (Izod charpy Test)
4. Test on bricks.
   - Water absorption.
   - Compressive Strength.
5. Test on Tiles.
   - Abrasion and transverse test for floor tile.
6. Test on Timber.
   - Moisture content.
   - Bending.
7. Road Aggregates
   - Abrasion Test
   - Impact Test
8. Test on Bitumen.
   a. Penetration.
   b. Ductility.
   c. Softening point.
   d. Specific gravity.
   e. Flash and fire point.
   f. Viscosity test.
9. Bituminous mix design using Marshall stability test.

BOOKS RECOMMENDED.:-

Civil Engineering Materials by Janardhan Jha.
Civil Engineering Materials by Sushilkumar .
Civil Engineering Materials by Vazirani and Chandola.
Civil Engineering Materials by Rangwala.
Civil Engineering Materials by S.V. Deodhar.
Civil Engineering Materials by D.S. Arora.
Relevant BIS codes

SYLLABUS OF

FOURTH YEAR (CIVIL)

N O R T H M A H A R A S H T R A
U N I V E R S I T Y , J A L G A O N .

(w.e.f. 2008-09)

N O R T H M A H A R A S H T R A U N I V E R S I T Y , J A L G A O N

STRUCTURE OF TEACHING AND EVALUATION

B.E. (Civil) w. e. f. 2008 - 09

FIRST TERM

Sr. No	Subject	Teaching Scheme Hours/Week			Examination Scheme				
		Lectures	Tutorial	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Construction Management- I	4	-	2	3	100	25	-	25
2	Water Resources Engineering –I	4	-	-	3	100	25	-	-
3	Quantity Surveying & Valuation	4	-	2	3	100	25	-	25
4	Environmental Engineering - II	4	-	2	3	100	-	-	25
5	Elective- I i) Open Channel & Conduit Flow ii) Water Shed Management iii) Finite Element Method	4	-	2	3	100	25	-	--
6	Seminar	-	-	-	-	-	25	-	-
7	Project –Stage I	-	-	2	-	-	25	-	25
	Total	20	-	10	-	500	150	-	100
	Grand Total	30			750				

SECOND TERM

Sr. No	Subject	Teaching Scheme Hours/Week			Examination Scheme				
		Lectures	Tutorial	Practical	Paper Duration Hours	Paper	TW	PR	OR
01	Structural Design & Drawing – III	4	-	4	4	100	25	-	25
02	Construction Management- II	4	-	2	3	100	25	-	25
03	Water Resources Engineering. –II	4	-	2	3	100	25	-	25
04	Elective–II i) Water Power Engineering ii) Geographical Information System iii) Industrial Pollution & Control	4	-	2	3	100	25	-	-
05	Site Visit /Case Study	-	-	-	-	-	25	-	-
06	Project–Stage II	-	-	4	-	-	100	-	50
07	**Total**	16	-	14	-	400	225	-	125
	Grand Total	30			750				

N O R T H M A H A R A S H T R A U N I V E R S I T Y , J A L G A O N
SYLLABUS OF FOURTH YEAR (CIVIL)
TERM-IST (w.e.f. 2008-09)

CONSTRUCTION MANAGEMENT-I

Teaching Scheme:
Lectures: 4 Hours/Week
Tutorial: 2 Hour/Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term Work: 25 Marks
Oral: 25 Marks

UNIT--I **(10 Hours, 20 marks)**

Construction industry, construction team, Construction activities, classification of construction ,stages in construction, Need of management in construction, Ownership and entrepreneurship , Small scale industries in construction .

Jab layout, mass housing and value engineering.

Scientific management, Management technique and uses, Definition and objectives of management, levels of management, Leadership and its quality.

Organization, meaning and function , forms of organization - line, line and staff , functional ,Type A, Type B and Type C

UNIT—II **(10 Hours, 20 marks)**

Network Technique :- History, Advantages, Bar charts, S –Curve etc. various terms used in network technique, activity,. event, critical path, duration etc. Development of networks, network scheduling, to find various times and float. EST, EFT, TF etc. Monitoring of Network, Three phases of network technique.

PERT - its concept and PERT Time.

UNIT–III **(10 Hours, 20 marks)**

Cost analysis, Cost Curve, Optimization and crashing of networks. Updating of network During monitoring, resource leveling, allocation, leveling and smoothening.

Line of balance - Concept and uses.

UNIT – IV

Engineering economics, its definition and importance, demand and supply, factors affecting demand and supply. Production, its meaning, different factors of production, economics of production, cost concept, relationship of cost to level of production.

Bank, its type, uses and functions, banking systems, profit and loss account, appreciation and depreciation of money.

UNIT - V

a) Pile driving Equipments:-

Pile hammers, drop, single acting steam, double acting steam, differential acting steam, diesel, vibratory , hydraulic hammers , sonic hammers, selection of pile driving hammers.

b) Crushers – types , primary, secondary ,tertiary crushers, jaw, gyratory, cone crushers, hammer mills, roll crushers, rod and ball mills Screening aggregate, revolving, vibrating screens

c) Ready mix concrete plants :- central concrete batch plant , portable concrete batch plant, ready mixed concrete – central mixed , shrink mixed, truck mixed concrete, concrete pumps.

TERM WORK:- It shall consist of assignments based on each unit of above syllabus.

BOOKS RECOMMENDED:-

1. Mahesh Varma - Construction planning and management
2. S.V.Deodhar - Construction equipment and job planning
3. U.K.Shrivastava - Construction Management

4. Gehlot and Dhir - Construction Management
5. L.S.SrinathEngineering - CPM and PERT
6. Peurifoy - Construction Planning and Management
7. Tarachand - Engineering Economics
8. Sengupta - Construction Management and planning
9. Chitkara - Construction Project Management
10. Mukund Mahajan - Engineering Economics
11. R.L.Peurifoy - Construction planning ,Equipments and Methods.
12. Dr. Mahesh Verma - Construction equipments and its planning and application

WATER RESOURCES ENGINEERING - I

Teaching Scheme:
Lectures: 4 Hours/Week
Practical: 2 Hour/Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term Work: 25 Marks

UNIT I **(10 Hours, 20 marks)**

Hydrologic cycle, Hydrology & Water resources development, Surface hydrology and sub-surface hydrology

Precipitation – Mechanism, essential requirement for occurrence, Different Forms, Types,

Measurement of Precipitation – Different types of rain gauges- non-automatic and automatic, Radar measurement, Methods to find out the areal average depth of precipitation, Mean monthly precipitation, annual average precipitation, Optimum number of rain gauge stations, Estimation of missing data, Checking for consistency of data

Rainfall Intensity analysis, Frequency Curve, Depth Area Duration Curve

Disposal of precipitation - Factors affecting disposal, Evaporation Losses, Evapo-transpiration, Factors affecting evapo-transpiration, methods for measurement of evaporation and evapo-transpiration, Infiltration – methods for determination, factors affecting, infiltration indexes

UNIT II **(10 Hours, 20 marks)**

Discharge Measurement in Streams – Methods (Area Velocity, Moving Boat, Chemical), Selection of gauge site, Stage Discharge Relationship, Extension of Rating Curves, Slope Area Method

Run-off – Runoff Process, Runoff Cycle, Factors affecting Runoff, Estimation

Catchment -Classification & Salient Characteristics

Floods – Necessity, Causes, Factors affecting, Classification, Frequency, Estimation

Hydrographs – Definition, Components, Factors affecting the shape, Base flow separation, Flood Hydrograph, Unit Hydrograph, U.H.methods, S-hydograph (S-curve technique), Synthetic Unit Hydrograph

UNIT III **(10 Hours, 20 marks)**

Ground water hydrology: - Occurrences and distribution of ground water, specific yield of aquifers, movement of ground water, Darcy's law, permeability, yield of basins. Hydraulics of well sunder steady flow, condition in confined and unconfined aquifers, specific capacity a well, well irrigation: tube wells, open wells, their design and construction.

Water logging and drainage engineering - Causes of water logging, preventive and curative measures, drainage of irrigated lands, reclamation of water logged, alkaline and saline lands, design and spacing of the tile – drain.

UNIT IV **(10 Hours, 20 marks)**

Reservoir Planning – Advantages, Classification, Types of developments: Storage and diversion works. Single and multi-purposes reservoir, investigation for locating a reservoir, selection of site, height of the dam, reservoir, economics of reservoir planning, Benefit – cost ratio,

Reservoir Sedimentation – Process of Erosion, Factors affecting erosion, Mechanism of Sediment Transport, Sediment Yield, Distribution of sediment in reservoir, Factors affecting silting, Estimation of silt load, & Mode of sedimentation, Trap efficiency of reservoir, Control of reservoir sedimentation

Necessity and layouts of Lift Irrigation Schemes, Drip & sprinkler irrigation system

UNIT V **(10 Hours, 20 marks)**

Introduction to Irrigation - Definitions, functions, necessity, benefits, Ill effect, Irrigation System & its classification, Irrigation Methods & its classification, (Surface & Sub-sub surface Methods), Factors affecting choice of method,

Soil Water Plant Relationship – Classification of soil water, Soil moisture stress, Soil moisture tension, Saturation capacity, Field capacity, Determination of field capacity,
Major Soil Groups in India, Maintaining the soil fertility, Essential Elements for Plant Growth, Quality of Irrigation Water
Water requirement of crop :- Limiting soil moisture condition, Depth of irrigation water and frequency, Principal Indian Crops and their season, Crop and base period, Duty of water and delta, Factors affecting & methods of improving the duty of water, Commanded area their classification, Intensity of Irrigation, Paleo Irrigation, Kor watering, kor depth and kor period, outlet factor, capacity factor, time factor, crop ratio, overlap allowance, Consumptive use of water, factors affecting consumptive use, calculations of canal capacities.
Application of water, water management and distribution, National water policy, warabandi, rotational application.
Various Methods of Assessment of Canal Revenue
TERM WORK:- From each of the following groups minimum two assignments shall be performed. (At least one assignments from group 1 to 3 shall be done by using spread sheet on computer.)
Group 1: -
1) Marking catchment area on a topo-sheet and working out average annual rainfall and determining yield.
2) Checking for inconsistency of precipitation record by double mass curve technique.
3) Frequency analysis of precipitation data (plotting on semi-log graph paper)
Group 2: -
1) Development of flood hydrograph from unit hydrograph and complex storm.
2) Development of unit hydrograph from isolated and composite flood hydrograph.
3) Development of unit hydrographs of different durations use s- curve method.
Group 3: -
1) Determination of canal and reservoir capacity for water requirement of crops.
2) Determination of reservoir capacity from mass inflow and mass demand curve.
3) Benefit cost analysis of water resources project.
4) Determination of yield of well by recuperating test data.
Group 4: -
1) Design of drainage system in water logged area.
2) Design of micro – irrigation system; either sprinkler of drip irrigation system.
3) Design of lift- irrigation system.

BOOKS RECOMMENDED –

- Garg S.K., "Irrigation Engineering, Dams and Hydraulic Structure", Dhanpat Rai & Sons, New Delhi
- Modi P.N., "Water Resources, Irrigation & Water Power Engineering", Standard Publisher, New Delhi
- Punamia B.C., "Irrigation & Water Power Engineering", Laxmi Publications, New Delhi
- Raghunath H.M., "Hydrology", New Age Publications, New Delhi
- Raghunath H.M., "Ground Water", New Age Publications, New Delhi
- Mutreja, "Applied Hydrology", Tata McGraw Hill Company, New Delhi
- Arora K.R., "Irrigation Engineering", Standard Publications, New Delhi
- P.Jayaram Reddi, "A Text Book of Hydrology", Laxmi Publications, New Delhi
- Sharma R.K., "A Text Book of Hydrology & Water Resources", Dhanpat Rai and Sons

QUANTITY SURVEYING & VALUATION

Teaching Scheme:
Lectures: 4 Hours/Week
Practical: 2 Hour/Week

Examination Scheme:
Theory Paper: 100 Marks (4 Hrs)
Term Work: 25 Marks
Oral: 25 Marks

UNIT I **(08 Hours, 20 marks)**

Estimate, Detailed Estimate, types of detailed estimate, purpose, data required for preparing detailed estimate, factors to be consider during preparation of detailed estimate, methods of taking out quantities, abstracting, units of measurements, building cost index, prime cost, provisional sum, centage charges, work charged Establishment, administrative approval, technical sanction.

Approximate estimate: - Importance, purposes, approximate methods of building estimating and various civil engineering works.

UNIT II **(11 Hours, 20 marks)**

Detailed estimate of buildings (load bearing and framed structure specially RCC flat roof buildings.)

Detailed estimate of community well, septic tank, pipe culvert, earthwork in roads / cannels.

UNIT III **(11 Hours, 20 marks)**

Detailed estimate of reinforcement quantities of R.C.C. elements like slab, beam, column & Isolated column footing, staircase and preparation of bar bending schedule.

UNIT IV **(10 Hours, 20 marks)**

Task work, factors affecting task work, schedule of rate, Task work of various items of construction, Analysis of rates, factors affecting cost of an item of work, material, labour etc. Analysis of various items of construction.

Specifications, purposes, types, drafting of specifications, and specifications of a few main items of civil engineering works.

UNIT V **(10 Hours, 20 marks)**

Valuation, purposes, price cost and value, factors affecting value of a property, various types of value like market value, sentimental value, mortgage, year's purchase and outgoings, legal aspects of valuation and easement act. Methods of valuation, land and building method, rental method, belting method of valuation of land. Standard rent and Standard rent fixation.

depreciation, various methods of depreciation, sinking fund, book value, free hold and lease hold properties.

TERM WORK: - It shall consist of following

1) Units of Measurement of various items of Civil Engg. Works.
2) Approximate estimate of: -
   i) Residential Building. ii) Public Building (Any Two Types).
   iii) Elevated water service reservoir. iv) Road and Bridge.
3) Detailed estimate of a load bearing residential single story structure.
4) Detailed estimate of framed residential double story structure.
5) Detailed estimate of any two of the following:
   a) Community well. b) Pipe Culvert. c) Septic tank. d) Earth work in roads /cannels.
6) Detailed Specifications for any five items of construction.
7) Rate analysis for any five items for buildings.
8) Estimation of detailed quantities of reinforcement for any two of the following:
   i) Slab. ii) Beam. iii) Column and isolated column footing.

BOOKS RECOMMENDED

a) B.N. Dutta - Estimating and Costing.
b) M. Chatroboty - Estimating and Costing.
c) G.S. Birdie - Estimating and Costing for Civil Engg.
d) B.S.Patil - Estimating and Costing , Vol.I & II.
e) S.C Rangwala - Estimating , costing and valuations.

ENVIRONMENTAL ENGINEERING - II

Teaching Scheme:
Lectures: 4 Hours/Week
Practical: 2 Hour/Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Oral: 25 Marks

UNIT –I **(10 Hours, 20 marks)**

Definition of sewage, Necessity of sewage treatment, Requirement of a sewage management system. Composition of sewage,

Characteristics of sewage – Physical (Colour, Odour, Solids and Temperature), Chemical (Organic - Carbohydrates, Fats, Oil and Grease, Pesticides, Phenols, Proteins, Surfactants. Inorgainic – Alkalnity, Chlorides, Heavy Metal, Nitrogen, pH, Phosphorous, Sulphur, Toxic Compounds, Gases – Hydrogen Sulfide, Methane, Oxygen), Biological Characteristics

Cycle of Decomposition – Anaerobic and aerobic, Nitrogen and Carbon Cycle

Tests for determining the Oxygen Demand - Biochemical Oxygen demand, (First and Second Stage BOD), Chemical Oxygen Demand, Total Oxygen Demand. Limitation of BOD test, Population Equivalent

Self Purification of Natural Stream – Dilution, Oxidation, Reduction, Sedimentation, Action of Sunlight,

Zones of Pollution – Degradation, Active decomposition, recovery, clear water

Oxygen sag analysis – Deoxygenation and reoxygenation

UNIT –II **(10 Hours, 20 marks)**

SEWER DESIGN – Estimation of dry weather and rain water flow, hydraulic formulae, minimum and maximum velocity of flow, effect of variation in flow of sewage in velocity of flow , Forms of sewers, Design of storm water drains

CONSTRUCTION OF SEWERS – Factors affecting selection of material for sewer construction, materials & shape of sewers, Structural Loads on Sewers, Maintenance, Cleaning and ventilation of Sewers.

APPURTENANCES – Purposes and location of Inlets, catch pits, cleanouts, manholes, drop-manholes, lamp-holes, flushing devices, grease and oil traps, inverted siphons, storm water overflow devices.

UNIT –III **(10 Hours, 20 marks)**

Preliminary & Secondary Treatment of Sewage –

Screening – Purpose, Classification, Types, Cleaning, Design Consideration & Management of screenings material

Comminutors – Purpose and types

Grit Removal – Purpose, Quality and quantity of grit, Types and Design Criteria

Grease Removal – Necessity, Skimming Tanks, Vacuum Floatation, Disposal of skimmings

Flow Equalization – Location, volume Requirement and Benefits

Sedimentation – Characteristics of settleable solids, Types of settling – (Discrete, Flocculent, Zone and Compression Settling), Classification of Settling tanks, Design criteria of settling tanks, Chemical aided settling, coagulants used

UNIT –IV **(10 Hours, 20 marks)**

Biological Treatment of Sewage – Objective and classification

Activated Sludge Process – Process of Treatment, Operations and units, methods of aeration, Loading rate, oxygen requirement and transfer, Design consideration of aeration tank, secondary settling, operational difficulties

Sewage Filtration – Types of and basic functioning of different filters, Constructional features and design of standard trickling filter, Performance and efficiency of standard trickling filter, Troubles and remedies, Comparison of Tricking Filter Process versus ASP

Stabilization Ponds – Purpose and types of stabilization ponds and their functioning (aerobic, anaerobic and facultative ponds

UNIT –V **(10 Hours, 20 marks)**

Solid Waste Management –

Necessity of solid waste management, Types and Sources of solid waste

Properties – Sampling procedure, Determination of Physical (Individual Components, Particle size, Moisture content, Density) and chemical composition (Energy content, chemical content) of solid waste

Elements of Solid Waste Management - Materials flow in society, Reduction in raw material usage, reduction in solid waste quantities, reuse in solid waste material, material recovery, energy recovery.

Functional Element of SWM & their interrelationship –

Waste generation – factors affecting, estimation of quantities

Onsite handling, storage and processing – Municipal and industrial waste, Containers and their locations,

Collection – Collection service, Types of Collection system (Hauled Container System & Stationary Container System – Machine and manually loaded), Determination of Vehicle and Labour requirement, Collection route

Transfer and transport – Transfer stations, factors affecting design, classification (Direct, Storage and combined discharge), Requirements, Locations of Transfer stations, Transfer means and methods

Processing Techniques – Volume Reduction (mechanical, thermal) and recovery, Disposal – Land filling with solid waste – Methods and operations (area, trench method, depression land fills), Occurrence of gases and leachate in land fills

TERM-WORK -

The term-work shall consist of minimum seven experiments and four assignments and one technical report from the list below –

(A) Experiments – (Minimum Seven)

(1) Determination of Total solid, settleable solid, dissolved solid, fixed Soild, filterable & non filterable solids, Mixed Liquor suspended solids in a sample of waste water
(2) Determination of oil and grease in sample of sewage
(3) Determination of BOD of sewage sample
(4) Determination of COD of sewage sample
(5) Determination of Sulphate / Chloride Content
(6) Determination of Salt Content by electrical conductivity Measurement
(7) Determination of Total Nitrogen/Different forms Nitrogen
(8) Determination of Sulphate / Phosphate Content
(9) General techniques of microbiology : Determination of microbial quality of water-
    - standard plate count,
    - standard coliform test,
    - determination of coliform density by MPN method
    - fecal coliform test

(B) Assignments – (Minimum Four)

(1) Estimation of sewage quantity and design of sewer line
(2) Design of Grit Chamber & Settling Tank
(3) Design of Activated Sludge Plant / Standard Trickling Filter
(4) Drawing of Stabilization Pond showing all details
(5) Estimation of Overall Chemical Composition of Solid Waste
(6) Analyzing Hauled/Stationary - Container Collection System of Solid Waste
(7) Economic Comparison of Transport Alternative for SW

(C) Report –

(1) Technical Visit Report of a Waste Water Treatment Plant or Industrial Water Treatment Plant or Solid Waste Management System/Treatment Plant

Books Recommended –

- Punamia & Jain, "Waste Water Engineering", Laxmi Publications, New Delhi
- Modi P.N., "Sewage Treatment & Disposal and Waste Water Engineering", Standard Publications, New Delhi.
- Pevy, Rowe & Tchobanoglous, "Environmental Engineering", McGraw Hill International, New Delhi
- Garg S.K., "Sewage Disposal & Treatment & Air pollution Engineering",Khanna Publisher, New Delhi
- Hammer & Hammer, "Water & Waste Water Engineering", Prentice Hall International, New Delhi
- Sincero & Sincero, "Environmental Engineering – A Design Approach", Prentice Hall International, New Delhi
- Therous, Eldridge & Mallmann, "Laboratory Manual for Chemical & Bacteriological Analysis of Water & Sewage", Agro Botanic Publisher, India
- Benerjee & Jain, "Handbook of Technical Analysis", Jain Brothers New Delhi.
- Laboratory Manual for Environmental Quality Testing, Environmental Protection Research Foundation, Sangli

NORTH MAHARASHTRA UNIVERSITY JALGAON
UNDER GRADUATE COURSE IN CIVIL ENGINEERING (ELECTIVE– I)

OPEN CHANNEL AND CONDUIT FLOW

Lectures : - 04 Hours/ Week	Theory paper :- 100 Marks
Practical : - 02 Hours / Week	Duration :- 3 Hours
Term Works: - 25 Marks	Oral :- 25 Marks

UNIT – I **(12 Lectures, 20 Marks)**

1) Uniform flow in trapezoidal and circular channel, calculation of normal depth and critical depth in trapezoidal and circular, the first and second hydraulic exponents, hydraulically – efficient channel section for trapezoidal and circular channel sections.
2) Transitions – Rectangular channel with a hump and with change in width.

(10 Lectures, 20 Marks)

UNIT –II

1) Gradually varies flow theory and computation for trapezoidal and rectangular Prismatic channels, differential equation of G.V.F., alternate forms, different types of G.V.F. profiles and their characteristics and examples of their occurrence, control section.
Computation of G.V.F. profiles in trapezoidal channel by standard step method, Direct Integration Methods: Ven Te Chow method & Bresse's method & Bresse's method.

UNIT- III **(10 Lectures, 20 Marks)**

1) Rapidly varied flow due to weirs, sluice gates, end depths, hydraulic jump in rectangular channel, standing- wave flume, Parshall flume.
2) Unsteady flow in open channel : - Equation of continuity and equation of motion for GVUF, surges and waves in open rectangular channels – simple cases. Neglecting friction.

UNIT – IV **(08 Lectures, 20 Marks)**

1) Pipe flow : - Three reservoir problem, pipe network. Practical design methods of rising mains and gravity mains using nomograms/ charts, economical diam. Of rising main.

UNIT – V **(10 Lectures, 20 Marks)**

1) Unsteady flow in conduits: - Mention of types, equation of motion, establishment of flow, water hammer, celerity of pressure wave thought rigid and elastic pipes, sudden and gradual and partial opening and closing of valves, details of pressure cycles.
2) Surge tanks : - Necessity, location, function, types, analysis of simple cylindrical surge tank considering frictional effects.

TERM WORK: - Any six of following assignment should be performed

1) Calculation of normal depth & critical depth in trapezoidal / circular channel using graphs/ tables.
2) Example on transition in rectangular channel
3) Computation of G.V.F. profile in trapezoidal channel by standard step method or by Ven Te Chow method.
4) Developing and running computer programming for numerical method for obtaining G.V.F. profile.
5) Calculation of hydraulic jump in open rectangular channel.

6) Calculation of surges in open rectangular channel.
7) Design of gravity/rising main (Dead end system in case of gravity mains).
8) Calculation of water hammer pressures.
9) Design of simple cylindrical surge tank.

ORAL EXAM: - Based on above term work.

Book Recommended: -

1. Flow in open channels:- Dr.K.Subramanya.
Tata McGraw – Hill publishing company Ltd. New Delhi.
2. Fluid Mechanics:- V.L Streeter and E.B. Wylie.
Tata McGraw- Hill publishing company Ltd. New Delhi.
3. Fluid Mechanics: - Dr. A.K. Jain.
Khanna Publishers, Dhelhi.
4. Theory and Application of Fluid Mechanics:- Dr. K. Subramanya.
Tata McGraw – Hill publishing company Ltd. New Delhi.
5. Water power Engg.:- M.M. Dandekar and K.N. Sharma
Vikas Publishing House, Pvt. Ltd. Delhi.
6. Open Channel Hydraulics:- Ven Te Chow.
Tata McGraw – Hill Publishing Company, Ltd. New Delhi.

WATERSHED MANAGEMENT

Lectures : - 04 Hours/ Week — Theory paper :- 100 Marks

Practical : - 02 Hours / Week — Duration :- 3 Hours

Term Works: - 25 Marks

UNIT -I

Concept of Watershed. Significance of watershed based development, Watershed characteristics – geomorphology and hydrology. Drainage basin, network and channel morphology.

UNIT- II

Watershed Hydrology - Hydrologic cycle, water balance, climate and precipitation, soils and infiltration, interception and evapotranspiration, groundwater, streamflow and runoff, water quality, aquatic ecosystems (eutrophication, habitat disturbance, etc.

UNIT- III

Watershed resource appraisal – Physical, hydrological, land use/cover. Land Capability Classification.

Watershed Management and Planning – objectives

UNIT- IV

Issues in water resources - Point source pollution, agricultural and urban non-point source pollution, erosion, water scarcity, flooding, drinking water protection, wastewater treatment and septic systems

Soil and water conservation measures

Watershed Program – Benefit-Cost Analysis

UNIT- V

Urban Watershed Management – Wet weather flow, Infrastructure Integrity Testing, Effect of discharge to receiving water, Green Roof, Rain water harvesting from urban structures, Urban watershed management – goals & strategies, Sustainability & UWSM, urban stormwater-pollution-abatement technologies and sediment management, Source Loading And Management Model

List of Practical/Term work Assignments -

(Minimum six practicals /Assignments shall be performed)

1. Mapping and demarcation of watershed
2. Morphometric analysis of watershed
3. Areal Precipitation – Thiessen Polygon, Isohyetal methods. Analysis and interpretation of rainfall data.
4. Water balance estimation
5. Estimation of Runoff and streamflow. Flow duration curve, return period. Analysis and interpretation of streamflow data
6. Groundwater contouring and interpretation regarding movement and flow direction
7. Land capability classification

8. Soil loss estimation
9. Visit to a Watershed and submission of report

Text / Reference Books -

1. Murthy, J. V. S. (1994). Watershed Management in India. Wiley Eastern Ltd., New Delhi.
2. Pranjape, S. and Others. (1998). Watershed-based Development, Bharat Gyan Vigyan Samithi, New Delhi.
3. Mutreja, K. N. (1990). Applied Hydrology, Tata McGraw-Hill Pub. Co. Ltd. New Delhi.
4. Singh R. J. (2000): Watershed Planning and Management, Yash Publishing House, Bikaner.

FINITE ELEMENT METHOD

Lectures : - 04 Hours/ Week	Theory paper : 100 Marks
TW/PR : - 02 Hours / Week	Duration : 3 Hours
Term Works: - 25 Marks	Oral : 25 Marks

UNIT I.

Concept of Finite element, Classification of element for discrete and continuum structure , characteristics of an element, Displacement function , General approach for formulation of the problem , Degree of freedom , Assembly rules and boundary conditions. Gradient and divergence theorem.

Matrix's algebra, concept of local and global , coordinates, Rules of transformation of stiffness matrix from local to global axes, Variation methods of Approximations.

Approximation errors in F.E.M. various measures of errors, accuracy of solution.

Advantages and disadvantages of F.E.M.

UNIT - II.

Discretization of the domain into elements, shape function, "Pascal triangle", Selection for the order of polynominal, convergence requirements, inter element compatibility conforming and non conforming element, concept of band width. Principle of minimum potential energy, Rayleighrit method, The method of weight residuals, Saint Vasant Principal. Application of above method to civil engineering fields.

UNIT - III.

One dimensional second order and fourth order equations, Lumped and work equivalent load, Theory of work equivalent load, Shape function for one dimensional analysis, Derivation of element equations.

Analysis of one dimensional structure (beam, coloumn etc.) by F.E.M. with different loading and boundary conditions.

UNIT – IV.

Finite element method for two dimensional problems, second order equation involving scaler-valued function, Two dimensional finite elements and interpolation function.

Direct method for determination of stiffness matrix for plane truss, continuous beams and plane frame elements, solution for displacement unknowns and analysis.

UNIT – V.

Triangular and Rectangular elements for plane stress/strain conditions, effect of element aspect ratio, finite representation of infinite mass.

Formulation of stiffness matrix for slabs using triangular or rectangular elements with different boundary condition.

Introduction of Isoparmetric 1 D and 2 D elements, shape function and natural coordinate system, quadrilateral isoparametric elements for plane stress/ strain conditions.

TEXT BOOKS:-

1) The finite element method (fourth edition) Vol – I & II.

By O.C. Zinekiewice & R.L. Taylor.

2) An introduction to the finite element method.

By J.N. Reddy.

3) Introduction to the finite element method.

By C.S. Desai and J.F. Abel.

4) Rudiments of finite element method.

By V.K. Manikar Selvam, Dhanpat Rai Pub.

5) Finite element primer.

By V.K. Manikar Selvam, Dhanpat Rai Pub.

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (CIVIL)

W.E.F : 2008- 09

TERM - I
SEMINAR

Teaching scheme:
Practical: 2 hrs / week

Examination scheme:
Term Work : 25 Marks

1. For seminar every student will individually study a topic assigned to him / her and submit a report and shall deliver a short lecture / Seminar on the topic at the end of term.
2. Selection of topic should be done by students in consultation with concerned guide
3. A typed report should be submitted in paper bound copy.
    a. Size of report depends on advancement of topic.

4. ASSESSMENT OF SEMINAR for TERM WORK
   Title of seminar: _____
   Name of guide : _____

Sr. No.	Exam Seat No.	Name of Student	Assessment by examiners					Grand Total
			Topic Selection 5	Literature Survey 5	Report Writing 5	Depth of understanding 5	Presentation 5	25

5 . Assessment of Literature survey will be based on
    a. Collection of material regarding history of the topic.
    b. Implementation.
    c. Recent applications.

6. Assessment of Depth of understanding will be based on
    a. Questioning by examiners.
    b. Questioning by students.
    c. What the student understands i.e. conclusion regarding seminar.

7. Assessment of presentation will be based on;
    a. Presentation time (10 minutes)
    b. Presentation covered (full or partial)
    c. Way of presentation
    d. Questioning and answering (5 minutes)

8. Examiners should be a panel of two one of them must be guide.

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (CIVIL)

W.E.F : 2008- 09

TERM - I
PROJECT I

Teaching scheme:
Practicals: 2 hrs / week

Examination scheme:
Oral : 25 Marks
Term Work : 25 Marks

1. Every student individually or in a group shall take a project in the beginning of the (B.E. first Term) seventh term in consultation with the guide and the project must be completed in the (B.E. Second Term) eighth term.
2. The project proposal must be submitted in the institute in the beginning of the (B.E. first Term) seventh term. While submitting project proposal care is to be taken that project will be completed within the available time of two term i.e 2 Hrs per week for (B.E. first Term) seventh term and 4 Hrs per week for (B.E. Second Term) eighth semester (total time become 12*2 + 12*4 = 72 Hrs per project partner). The final title of the project work should be submitted at the beginning of the (B.E. Second Term) eighth semester.
3. The guides should regularly monitor the progress of the project work.
4. Assessment of the project for award of TW marks shall be done by the guide and a departmental committee (consisting of minimum two teachers with experience more than three years) as per the guidelines given in the following table.

A) ASSESSMENT OF PROJECT I TERMWORK B.E. FIRST TERM

NAME OF THE PROJECT _____
NAME OF THE GUIDE: _____

Sr No	Exam Seat No	Name Of Student Marks	Assessment by guide (70%)					Assessment by Departmental committee (30%)			Grand Total	Out of 25 Marks
			Literature survey	Topic Selection	Documentation	Attendence	Total	Evaluation (10%)	Presntaion (20%)	Total		
			10	05	15	05	35	05	10	15	50	25

Sign of Guide Sign. of Committee Members Sign. of H. O. D.

5. The guide should be internal examiner for oral examination.

6. The external examiner should be from the related area of the concerned project. He should have minimum of five
years of experience at degree level / industry.

7. The evaluation at final oral examination should be done jointly by the internal and external examiners.

SYLLABUS OF FOURTH YEAR (CIVIL)
TERM-IIND (w.e.f. 2008-09)
STRUCTURAL DESIGN AND DRAWING-III

Teaching Scheme:	**Examination Scheme:**
Lectures: 4 Hours/Week	Theory Paper: 100 Marks (4 Hrs)
Practical: 4 Hour/Week	Term Work: 25 Marks
	Oral: 25 Marks

UNIT I **(12 Hours, 25 marks)**

R.C. STRUCTURES

i) Ductile detailing of RC members as per Is 13920.
ii) Design of rectangular combined footing.
iii) Design of flat slabs.

UNIT II **(12 Hours, 25 marks)**

i) Design of cantilever retaining wall.
ii) Design of circular water tanks resting on ground.

UNIT III **(12 Hours, 25 marks)**

PRESTRESSED CONCRETE STRUCTURES

a) Introduction :- Basic concept, materials, prestressing systems, stages of loading, stresses in tendons.
b) Losses in prestresses :- Nature of losses, loss due to classic shortening of concrete, successive prestressing of straight cables, relaxation of stress in steel friction in a curved cable anchorage.
c) Design of one way and two way prestressed concrete slabs.

UNIT IV **(12 Hours, 25 marks)**

a) Transfer of prestres in pretensioned members, transmission length, end zone reinforcements. Anchorage Zone stresses in post –tensioned members – Guyan's method.
b) Limit state design of prestressed concrete members philosophy of design, various criteria for limit. States, design loads, strength and serviceability.
c) Design of pretensioned and post tensioned flexural members – Rectangular and flanged sections, cable profile, Design of shear reinforcement, bond partial prestressing limit state method.

TERM WORK:- It shall be based on above syllabus and will consist of

i) At least three numbers of imperial size sheets based on prestressed & R.C. structures.
ii) Demonstration of computer softwares for design of structures.
iii) Report on site visit to at least one structure based on above syllabus

TEXT BOOKS:-

1) N. Krishnaraju - Prestressed Concrete
2) S.R. Karve & V. L. Shah- 'Limit State Analysis & Design of Reinforced Concrete', Structures PublicatinsR.C.C. Structures.
3) Punmia, Jain & Jain – 'Comprehensive R.C.C. Design', Laxmi Publications.
4) S. K. Duggal – 'Earthquake Resistant Design of Structures', Oxford University Press.
5) N. C. Sinha & S. K. Roy – 'Fundamentals of Reinforced Concrete',

CONSTRUCTION MANAGEMENT –II

Teaching Scheme:
Lectures: 4 Hours/Week
Tutorial: 2 Hour/Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term Work: 25 Marks
Oral: 25 Marks

UNIT –I **(10 Hours, 20 marks)**

A) Important Acts and Laws related to Constructions Industry- Factory act, The Employees Provident Fund Act, Minimum wage Act, Workman Compensation Act, Industrial Dispute Act, Indian Trade Union Act, arbitration act, employees state insurance act.

B) Safety in Construction : Causes of accidents, Classification costs of accident, measurements of accidents ,Injury frequency rate, injury severity rate, injury index, safety programme, accident report,

Safety measures in handling of building materials, construction of elements of building, demolition of buildings, hot bituminous works, scaffolding, formwork and other equipments, excavation.

UNIT–II **(10 Hours, 20 marks)**

Materials management , its aims and functions, inventory analysis , inventory models, ABC analysis, inventory management, buffer stock, lead time, EOQ.

Material requirement, planning , market research, system of purchase of materials, stock of material at site , MAS account, working capital management.

Supervision and quality control, concept of quality, stages of control , measures of control, organization for control, quality control management, sample and sampling technique, inspection, introduction to ISO 9000 and ISO 14000.

UNIT—III **(10 Hours, 20 marks)**

Contract, essentials, types, registration and law of contract, free consent, contract documents , performance of contract, breach of contract, advances to contractor, bills of contract and payments , subletting , inspection of works, tender, tender notice ,various terms used in tender notice such as SD, EMD, estimated cost, Time period of work ,cost of tender form, invitation of tender, time schedule of calling tender, tender documents two envelopes system, scrutiny and acceptance , revocation of tender , extra items , additions and alterations , defect liability , liquidated and unliquidated damages , escalation of rates, work order.

UNIT IV **(10 Hours, 20 marks)**

Excavating & Hauling Equipments :-

a) Power shovels; size, basic parts, selection ,factors affecting output.

b) Draglines:- types, size, basic parts, effect of job and management conditions on the out put of dragline.

c) Clamshells – clamshell buckets

d) Hoes- basic parts working ranges

e) Bulldozers-types, moving earth with bull dozers.

UNIT –V **(10 Hours, 20 marks)**

a) Compacting Equipments:-

Types of compacting equipments. Such as tamping rollers, smooth wheel rollers, pneumatic tyred rollers,

b) Hoisting equipments :Chain, hoist, fork trucks

Cranes : Classification, derrick crane, mobile crane, Tower crane, Hydraulic crane, overhead or gantry crane.

Safety in crane operation
Use of cranes in steel construction
Use of cranes in concrete construction

TERM WORK : Term work shall consist of assignments based on each unit of the above syllabus

BOOK RECOMMENDED

1) R.L.Peurifoy - Construction planning ,Equipments and Methods.
2) Dr. Mahesh Verma - Construction equipments and its planning and application
3) Dr.U.K. Shrivastava - Construction planning and Management
4) Dr. S.V. Deodhar - Construction equipment and planning
5) Sengupta - Construction Management and planning.
6) Chitkara - Construction Project Management
7) B.N.Dutta - Estimating and Costing
8) M.Chakroborty - Estimating and Costing
9) S.C.Rangwala - Estimating and Costing
10) B.S.Patil - Estimating and Costing -Vol-1& 2.

WATER RESOURCES ENGINEERING - II

Teaching Scheme:
Lectures: 4 Hours/Week
Practical: 2 Hour/Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term Work: 25 Marks
Oral: 25 Marks

UNIT I **(11 Hrs., 20 marks)**

1. Dams: - Introduction, types of dams, selection of site for dam, choice of a dam, economical height of dam.
2. Gravity dams: - Introduction, forces acting on dam, elementary and practical profile, modes of failure and stability analysis and design of gravity dam, low and high dam. Construction and materials of construction, control of cracking, galleries, Joints and keys.

UNIT II **(09 Hrs., 20 marks)**

1. Introduction to arch dams (only elementary)
2. Spillways: - Introduction, spillway capacity, different types of spillways: their construction and suitability, design principles of Ogee spillway and siphon spillway.
3. Energy dissipation below spillway, types of hydraulic jump, jump height curves and tail water rating curves, various types of energy dissipators: Indian Standard stilling basins and buckets.
4. Gates: - Various types of spillway crest gates and their uses.

UNIT III **(10 Hrs., 20 marks)**

1. Earth dams :- Introduction, types ,elements of earth dam, basic design considerations, causes of failures, piping and its prevention, control of seepage, drainage in earth dams, phreatic line, stability of U/S and D/S slopes under various situations, introduction to rock-fill dam.
2. Diversion headworks :- Introduction, selection of site, types of weirs and barrages, layout of diversion headwork and its components and functions, causes of failures of weirs on permeable foundations and remedies, Hydraulic design of weir w.r.t. subsurface flow, safety against piping and uplift, Bligh`s, Lane' s and Khosla' theories.

UNIT IV **(10 Hrs., 20 marks)**

Canal irrigation :- Types of canals, canal alignment.

Design of c/s of unlined stable channels in alluvium: Kennedy's and Lacey's theory and their merits and demerits.

Preliminary sediment transport theory, critical tractive force, suspended and bed loads.

Design of c/s of unlined channels in alluvial soil according to IS 7112 – 1973 : Lacey's method and tractive force approach.

Design procedure for L – section for an irrigation canal, balancing depth, losses in canals, schedule of area statistics and channel dimensions, Garret's and Lacey's diagrams.

Lining of irrigation canals, advantages of lining, economics of linings, types of linings. Design of lined Channel, land drainage, discharge and spacing of closed drain.

UNIT V **(08 Hrs., 20 marks)**

1. Canal Masonry Works:- Cross drainage works: necessity, types, selection, comparative merits and demerits. Various types of falls: introduction and necessity (no mathematical treatment for any of above structures)

2. River training works:- necessity and types of river training works and bank protection and their construction details. (No mathematical treatment)
3. Hydropower: - general features of hydropower development, advantages of hydropower, types of hydropower plants and their layouts, assessments of power potential, load factor, capacity factor, diversity factor.

TERM WORK

Minimum six out of following assignments should be performed:-

1. Stability analysis of a gravity dam.
2. Stability analysis of slope of earth dam.
3. Design of Ogee spillway with energy dissipator
4. Analysis of weir on permeable foundation by using Khosla's charts.
5. Design of unlined canal in alluvium by using Garret;s /Lacey 's diagrams (at least three sections
   along the alignment.) and ploting L-section, also preparing schedule of area statistics and Channel dimensions.
6. Any one of the following :
   1. Analysis and layout and section of any one type of cross drainage work or fall or regulator .
   2. Any one type of river training work.
   3. A typical layout of high head hydropower plant and functions of components.
7. Report based on visit to any dam or hydropower plant.
8. Benefit - cost analysis of a water resources engineering project.

ORAL EXAM:- Based on the above T.W.

Imp. Note:- Following charts should be provided to students of B.E. (civil) during theory paper.

i) Dr. A.N. Khosla's curves for design of weir on permeable foundation.
ii) Gaarret's & Lacey's diagrams for design of canals

BOOKS RECOMMENDED:-

- Dr. P.N. Modi, Standard Book House , Delhi. - Irrigation, Water Resources and Water Power Engg.
- S.K.Garg - Irrigation Engg. and Hydraulic Structures .
- Dr. B.C.Punmia - Irrigation Engg. and Water Power Engg..
- Varshney ,Gupta, Gupta -Theory and design of Irrigation structures, Volume I and II .
- Bharat Singh - Irrigation Engg.
- K.B.Khushlani - Irrigation Engg. .
- Justin , Hinds - Irrigation Engg. and Practice

NORTH MAHARASHTRA UNIVERSITY JALGAON
UNDER GRADUATE COURSE IN CIVIL ENGINEERING (ELECTIVE– II)

WATER POWER ENGINEERING

Lectures : - 04 Hours/ Week — Theory paper :- 100 Marks
Practicals : - 02 Hours / Week — Duration :- 3 Hours
Term Works: - 25 Marks

UNIT -I

General – Conventional Source of Energy, Status of Electrical Power in the World and India, Advantages and dis-advantages of hydro-electric power over other conventional sources, Place of hydropower in the power system, Investigation and studies for hydro power development.

Estimation of Water Power Potential – Mass Curve, Flow Duration Curve, Firm Power & Secondary Power, Power Duration Curve (Available Power)

Power Plant Economics – Types, Factors affecting outline design, Useful Life, Connected Load, Maximum Demand, Demand Factor, Load Factor, Load Curve, Base & Peak Load, Plant Capacity Factor, Plant Use Factor, Diversity Factor, , Economic Load Sharing between Base Load & Peak Load Power Stations., Cost of Electrical Energy, Energy Rates (Tariff)

UNIT- II

Classification of Hydro-electric Power Plants – Run-Of -River Plant, Valley Dam Plant, Diversion Canal Plant, High Head Diversion Plant – General Arrangements & Different Layouts

Storage and Pondage, Pondage Factor

Pumped Storage Plants – Essential Requirements, Necessity, Advantages, Classification of PSP development, Relative Merits of Different Arrangements, Problems in Operation, Layout & Economics

Tidal Power Plants - Principles of power generation - components of power plant – Single and two basin systems – Turbines for tidal power - Estimation of energy – Maximum and minimum power ranges

UNIT- III

Surface Power Stations – Structure, Dimensions, Lighting & Ventilation, Variations in design Underground Power Station – Location, Types of Layout, Components, Advantages

Penstock & Accessories – Classification, Design Criteria, Economical Diameter, Anchor Blocks, Conduit Valves, Bends & Manifolds Water Hammer & Surges in Penstocks – Phenomenon, Resonance, Surge Tanks Intakes – Types, Losses, Air Entrainment, Inlet Aeration

UNIT- IV

NON CONVENTIONAL ENERGY -

Biomass energy - Bio fuel classification – Examples of thermo chemical, Pyrolysis, biochemical and agrochemical systems – Energy farming – Direct combustion for heat – process heat and electricity – Ethanol production and use – Anaerobic digestion for biogas – Different digesters – Digester sizing – Applications of Biogas

Solar Energy - Availability - Solar radiation data and measurement - Estimation of average solar radiation - Solar water heater types - Heat balance – Flat plate collector efficiency – Efficiency of heat removal - Thermo siphon flow calculation - Forced circulation calculation - Evacuated collectors - Basics of solar concentrators Solar Energy Applications - Solar air

heaters – Solar Chimney - Crop driers - Passive solar system - Active solar systems - Water desalination - Output from solar still – Principle of solar ponds.

UNIT- V

Wind Energy – Nature of wind – Characteristics – Variation with height and time – Power in wind –Aerodynamics of Wind turbine – Momentum theory – Basics of aerodynamics – Aerofoils and their characteristics – HAWT – Blade element theory – Prandtl's lifting line theory (prescribed wake analysis) VAWT aerodynamics – Wind turbine loads – Aerodynamic loads in steady operation – Yawed operation and tower shadow.

Wind Energy Conversion System – Siting – Rotor selection – Annual energy output – Horizontal axis wind turbine (HAWT) – Vertical axis wind turbine (VAWT) – Rotor design considerations – Number of blades – Solidity - Blade profile – Upwind/Downwind – Yaw system – Tower – Braking system - Synchronous and asynchronous generators and loads – Integration of wind energy converters to electrical networks – Inverters – Control system – Requirement and strategies – Noise – Applications of wind energy

Term Work - Assignment –

The term work shall consist of eight assignments, which should include minimum one assignment from each unit.

The term work shall include a visit report on Hydroelectric Power Station and Wind Farm.

References:

1. Water Power Engineering / M. M. Dandekar & K. N. Sharma
2. A text Book of Water Power Engineering / R.K.Sharma & T.K.Sharma
3. Renewable Energy Resources / John Twidell and Tony Weir / E & F.N.Spon
4. Solar Energy - Principles of thermal collection and storage/ S.P. Sukhatme / TMH
5. Solar Heating and Cooling / Kreith & Kreider

Wind Energy Handbook / Tony Burton, David Sharpe, Nick Jenkins and Ervin Bossanyi / WileyWind Electrical Systems / S.N.Bhadra, D.Kastha and S.Banerjee / Oxford

GEOGRAPHICAL INFORMATION SYSTEM (GIS)

Lectures : - 04 Hours/ Week
Practical : - 02 Hours / Week
Term Works: - 25 Marks

Theory paper :- 100 Marks
Duration :- 3 Hours

UNIT -I

Introduction to GIS – Definition, Sources & types of data, Concept of Space and Time, Spatial Information Theory, History of GIS, Objectives, Elements, Hardware & Software requirements and applications of GIS

Data Models of Spatial Information – Layers and Coverages, Conceptual model, Object based network and field model,

Representation of SDM in computer – Raster & Vector models, Comparision

Data Models of Non-Spatial Information – Database Management Systems, Hierarchical Structures, Network Structures, Relational Structures

UNIT- II

Digitizing Editing and Structuring of Map Data – Digitizing manual, semi-automatic

Editing – Error detection and correction

Tolerances – TIC Match, Fuzzy, Node Snap, Arc Snap, Weed, Grain Tolerance

Topology creation, Attribute Map Generation

Digital Elevation Model – Needs of DEM, Various Structures of DEM- Line, TIN, Grid, Products derived from DEM

UNIT- III

Spatial Data Analysis –

General – Attribute quarry, and spatial quarry, Single and Multi-layer operations, Spatial modeling, Network and surface analysis

Vector based spatial data analysis – Topographical overlays, logical operators, conditional operators, proximity operators.

Raster based spatial data analysis – Local functions, focal functions, zonal functions, global functions, area numbering, cost surface analysis, optimal path analysis, proximity search

UNIT- IV

Use of GIS for Water Resources and Management – Water Resources Potential Estimation, Analysis & Estimation of Sediment in Reservoirs, Water Supply Systems Planning and Management, Waste Water Planning and Management, Role of Remote Sensing and GIS in Ground Water exploration, Use of GIS for Watershed Planning and management

UNIT- V

LAND RESOURCES: Land evaluation and suitability studies by Remote Sensing and GIS. Techniques of Landuse/Land cover map preparation. Landuse/ Landcover mapping and planning.

Municipal GIS - Landuse - Statistics as a basis for Environmental Planning, Solid and Hazardous waste disposal site selection.

Use of GIS for Agricultural Practices and Management

List of Practical / Term work Assignments –

The term work shall consist of any six practical/ assignments.

1. Data quality and sources of errors
    i) Nature of sources of geographical data

ii) Sources of errors in GIS database

iii) Data quality parameters

2. Map scale and projections

i) Information on various scales

ii) Need of projection

iii) Spherical co-ordinate system

iv) Properties of map projections

3. Preparation of vector database and maps: manual method for point line and area entities.
4. Preparation of a raster database and map: manual method for point line and area entities.
5. Measurement of distance between two points for vector and raster data.
6. Measurement of area - vector and raster data.

i) Image enhancement

ii) Filtering - Low Frequency

iii) Linear edge enhancement

iv) Band rationing

v) Ground truth data collection

7. GIS operations

i) Overlay Analysis

ii) Buffer Analysis

iii) Map Algebra

iv) Multicriteria and Querry Analysis

v) GPS

Text / Reference Books -

1. Burroughs, P. A (1986): Principles of Geographical Information Systems for land Resources Assessment, Oxford University Press
2. Environmental Systems Research Institute (1993): Understanding GIS: The Arc Info method
3. Training Course for GIS for resource management and development planning: Lecture notes, V1: GIS Fundamentals and Techniques, Government of India
4. Bernhardsen, Tor (1999): Geographic Information Systems: An Introduction, John Wiley and Sons
5. Clarke, Keith C. (1999): Getting Started with Geographic Information Systems, Prentice Hall
6. Demers, Michael N. (2000): Fundamentals of Geographic Information Systems, John Wiley
7. Haywood, Ian (2000): Geographical Information Systems, Longman
8. Chang, Kang-taung (2002): Introduction to Geographic Information Systems, Tata McGraw-Hill
9. Williams, Jonathan (1995): Geographic Information from Space: Processing and Applications of Geocoded Satellite Images, John Wiley and Sons

10. Geographic information Systems by Jeffery star, John Esstes Prentice Hall 2004.
11. Fundamental of Geographic Information Systems -Demers 2001 Edition.
12. Geographic Information Systems: An Introduction, By Tor Bernhardsen, Jhon Wiley and Sons, 2005
13. Remote Sensing and Image Interpretation by T.M.Lillesand and R.W.Kiefer, John Wiley, Third Edition, 2005
14. GIS Applications for Water, Wastewater, and Stormwater Systems, U.M. Shamsi, A CRC Press Book, 2004

INDUSTRIAL WATER POLLUTION CONTROL

Lectures : - 04 Hours/ Week
Practical : - 02 Hours / Week
Term Works: - 25 Marks

Theory paper :- 100 Marks
Duration :- 3 Hours

UNIT -I

Sources and Characteristics of Industrial water – Source and characteristics of waste water, Industrial waste survey, In-plant waste control and water reuse, Estimation of organic contents, Measurement of effluent toxicity.

Different water quality requirements of various industries for different pressure boiler feed waters, cooling water and process water. Waste generation and characterization from different industries like paper and pulp, breweries and distilleries, tanneries, textile, dairy, fertilizer, sugar mill, steel, oil refinery, petrochemical and pharmaceutical industries.

Pre & Primary Treatment – Equalization, Neutralization, Sedimentation, Oil separation, Sour water strippers, Floatation, Coagulation, Precipitation and Heavy Metal Removal

UNIT- II

Aeration and Mass Transfer – Mechanism, Equipment, Air Stripping of VOC.

Aerobic Biological Oxidation – Mechanism of Organic Removal,, Bio-oxidation mechanism, Sludge Quality Consideration, Soluble Microbial Product formation, Bio inhibition of ASP, Nitrification and De-nitrification, Development of Process Design Criteria

Biological WW Treatment Process – Lagoons and Stabilization basins, Aerated Lagoons, Activated Sludge Process, Tricking Filtration, Anaerobic Decomposition, Rotating Biological Contractor, Evaluation of Anaerobic Treatment

UNIT- III

Adsorption – Theory of Adsorption, Properties of activated carbon, The PACT process

Ion Exchange – Theory of Ion Exchange, Plating Waste Treatment

Chemical Oxidation – Introduction to stereochemistry and applicability, Hydro thermal process

Sludge Handling & Disposal – Characteristics of Sludge for disposal, Aerobic digestion, Gravity thickening, Floatation thickening, Gravity belt thickener, Centrifuge – Disk, Basket,

Filtration – Vacuum, Pressure

Sand Bed Drying, Land disposal of sludge, Incineration

UNIT- IV

Air Pollution – Definition of Air Pollution, Definition of Air Pollutants, Measurement of Air Pollution, Classification of Air Pollutants, Primary and Secondary Air Pollutants, Properties of major air pollutants,

Effects of Air Pollutants on Man, Vegetation, Animals and Materials

Meteorology and Plume Dispersion – Atmosphere, Zones of Atmosphere, Scale of Meteorology and different meteorological parameters affecting pollutnant's dispersion in atmosphere, Temperature Lapse Rate, Plume behavior, Gaussian Plume Model, Plume Rise in Atmosphere, Different formulae for estimation of stack height.

UNIT- V

Global Effects of Air Pollution – Green House Effect, Effects of Particulate on earth-atmosphere heat balance, Heat Islands, Acid rains and Ozone holes

Air Pollution Control – Atmospheric Cleansing Process, Approaches to Contaminant Control, Control Devices for Particulate Contaminants – Gravitational Settling Chambers, Centrifuge Collectors, Wet Collectors, Bag house filters & Electrostatic Precipitators
Control Devices for Gaseous Contaminants – Adsorption, Absorption, Condensation, Combustion, Automotive Emission Control

Practical & Term Work - Assignment –
(Total 12 = 7 Experiments + 3 Assignments)

GROUP – A "Experiments" - (Minimum Seven Practical should be performed – (4 from Water Pollution Monitoring and 3 from Air Pollution Monitoring)

WATER POLLUTION MONITORING - Estimation of -

i) Hardness by EDTA Method
ii) Ammonia/Nitrogen
iii) Nitrite/Nitrogen
iv) Estimation of phosphates
v) Sulfate by Spectrophotmetric & Turbiditimetric Method
vi) Biological Oxygen Demand
vii) Chemical Oxygen Demand
viii) Fluorides by SPADNS Reagent
ix) Heavy metals by AAS
x) Pesticide Residue Estimation

AIR POLLUTION MONITORING : Estimation of -

i) NOx
ii) SOx
iii) Particulate matter
iv) Hydrocarbon

GROUP – B "Assignments" - (Minimum three assignments)

1. Determination of Concentration of Air Pollutants by using the Air Pollution Dispersion Models
2. Design of Height of Stacks
3. Design Problems on Air Pollution Control Equipments

References:

1. Pevy et al Environmental Engineering, McGraw Hill International, New Delhi, 2004,
2. W.Wesley Eckenfelder, Industrial Water Pollution Control, McGraw Hill International Edition, 2003
3. Sincero & Sincero, Environmental Engineering – A Design Approach, Prentice Hall India, 2002
4. Sewage Disposal and Air Pollution Engineering, Khanna Publisher, New Delhi, 2004
5. Goel PK, Water Pollution – Causes, Effects and Control, New Age Publications, New Delhi 2001
6. Waste Water Treatment , M.N.Rao and A.K. Dutta, 1987, Oxford & IBH Pub.Co.
7. Environmental Pollution Control, C.S.Rao, 1993, Wiley Eastern Ltd.
8. Industrial wastes their disposal and treatment W. Rudolfs 1997.
9. Industrial environment, assessment and strategies S.K. Agarwal 1996.

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (CIVIL)

W.E.F : 2008- 09

TERM - II
SITE VISIT / CASE STUDY

Teaching scheme:
NIL

Examination scheme:
Term Work : 25 Marks

EDUCATION TOUR / TECHNICAL VISITS / CASE STUDY AND ITS EVALUATION

1. During (B.E. First Term / Second Term) seventh and / or eighth terms or during vacation between (B.E. First Term / Second Term) seventh and eighth terms, every student; shall visit minimum two construction sites / industries arranged by college and accompanied by teachers. The colleges should obtain appropriate certificates of visit from the concerned organizations just after the visits.

2. Students should submit written report about the visits individually at the end of (B.E. Second Term) eighth term.

3. The report should contain information about the following points:

   (a) The organization - activities of organization and administrative setup technical personnel and their main duties.
   (b) The project / industry brief description with sketches and salient technical information.
   (c) The work / processes observed with specification of materials, products, equipments etc. and role of engineers in that organization.
   (d) Suggestions (if any) for improvement in the working of those organizations.

4. The evaluation of the report of technical visits will be made by panel of two teachers appointed by principal.

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (CIVIL)

W.E.F : 2008- 09

TERM - II
PROJECT II

Teaching scheme:
Practicals: 4 hrs / week

Examination scheme:
Oral : 50 Marks
Term Work :100 Marks

1. The Project group in (B.E. first Term) seventh term will continue the project work in (B.E. Second Term) eighth term and complete project in all respect .
2. The guides should regularly monitor the progress of the project work.
3. The project work along with project report should be submitted as part of term work in (B.E. Second Term) eighth term on or before the last day of the (B.E. Second Term) eighth term
4. Assessment of the project for award of TW marks shall be done by the guide and a departmental committee (consisting of minimum two teachers with experience more than three years) as per the guidelines given in the following table.

B) ASSESSMENT OF PROJECT II TERMWORK (B.E. SECOND TERM)

NAME OF THE PROJECT: _____

NAME OF THE GUIDE: _____

Sr. No	Exam. Seat No	Name Of Students	Assessment by guide (70%)						Assessment by department (30%)			Grand Total
			Fabrication /software / actual work	Execution of project	Project report	Scope/ Cost / Utility	Attende-nece	Total	Evaluation (10%)	Prese-ntaion (20%)	Total	
		Marks	20	10	20	10	10	70	10	20	30	100

Sign of Guide Sign. of Committee Members Sign. of H. O. D.

7. The guide should be internal examiner for oral examination.
8. The external examiner should be from the related area of the concerned project.
9. The evaluation at final oral examination should be done jointly by the internal and external examiners.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

STRUCTURE OF TEACHING & EVALUATION

S.E. (CHEMICAL ENGINEERING) W.E.F.2006-2007

First Term

Sr. No.	Subject	Teaching Scheme Hours/Week		Examination Scheme				
		Lectures	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Chemistry-I	04	02	03	100	25	50	--
2	Chemistry-II	04	02	03	100	25	50	--
3	Unit Operation-I (Fluid Mechanics)	04	02	03	100	25	--	25
4	Strength of Materials	04	02	03	100	25	--	--
5	Engineering Mathematics- III	04	--	03	100	--	--	--
6	Computer Applications	--	02	--	--	25	--	--
		20	10		500	125	100	25
	Grand Total	30			750			

Second Term

Sr. No.	Subject	Teaching Scheme Hours/Week		Examination Scheme				
		Lectures	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Chemical Processes-I	04	02	03	100	25	50	--
2	Chemistry-III	04	02	03	100	25	50	--
3	Unit Operation-II (Mechanical Operations)	04	04	03	100	50	--	25
4	Process Calculation	04	02	03	100	25	--	--
5	Industrial Economics & Management	04	--	03	100	--	--	--
		20	10		500	125	100	25
	Grand Total	30			750			

1. CHEMISTRY-I

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practicals : 2 Hrs./ Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Practical: 50 Marks
Term Work : 25 Marks

UNIT- I:

Kinetic theory of gases: Gas Laws, Kinetic gas equation, Equation of state of ideal & real gases, principle of corresponding states, compressibility factor, estimation of molecular diameters, critical constants, mol. velocities, probability distribution of velocities, mean free path, collision diameter, collision no., diffusion, Graham's law of diffusion, liquefaction of gases, viscosity of gases & liquids.

Heat capacity of gases: C_p & C_v problems. (10 Hrs**,**20 Marks)

UNIT-II:

Chemical kinetics: Objective of chemical kinetics, rate of reaction, velocity constant of a reaction, elementary reaction steps & rate expressions, order & molecularity of reaction, factors influencing the reaction rates, integrated rate expressions for 1^{st}, 2^{nd} , 3^{rd} , & zero order reaction (with example), methods for determining order of reactions, experimental investigation of reaction kinetics. Arrhenius equation, relationship between chemical kinetics & thermodynamics, problem based on above topics.

Photochemical reactions , Set up for study of Photochemical reactions (10 Hrs**,**20 Marks)

UNIT-III:

Classical chemical thermodynamics:

Objective & scope, definition of thermodynamic systems, state property etc.

Heat work reversibility, maximum work, isothermal & adiabatic process, first law of thermodynamics, thermo chemistry, thermo chemical law, standard heat of formation, second law of thermodynamics, entropy, entropy changes, enthalpy & free energy, Gibbs Helmholtz equation, Third law of thermodynamics. Problems based on above topics.

Criteria of chemical equilibrium, Le Chatelier's theorem, its application to some systems likes ammonia, sulphuric acid, and nitric acid. (10 Hrs**,**20 Marks)

UNIT-IV:

Colligative properties:

Colligative properties, lowering of vapour pressure, determination of molecular weights from vapour pressure, lowering, measurement of vapour pressure lowering,

Osmosis, osmotic pressure, measurement of osmotic pressure, the law of osmotic pressure, determination of molecular weight from osmotic pressure, osmosis & semipermeability, reverse osmosis.

Elevation in boiling point, determination of molecular weight from boiling point elevation, depression in freezing point, determination of molecular weight from freezing point depression, determination of freezing point depression.

Electrolytes: conductors and nonconductors, metallic conduction, electrolytic conductance, determination of conductance, migration of ions, transport, number, determination of transport number, Kohlrausch's law & its application. Arrhenius theory of dissociation. (10 Hrs**,**20 Marks)

UNIT-V:

Surface phenomenon:

Surface tension of liquids, adsorption, adsorption of gases by solids, adsorption isotherm, freundlich adsorption isotherm, the langmueirs adsorption isotherm, application of adsorption.

Colloids & emulsion:

Types, methods of preparation, determination of particle size, properties, solution of micro molecules, properties of micro molecular solutions. Determination of molecular weight by osmometry, molecular weight by light scattering , molecular weight from viscosity measurements.

(10 Hrs**,**20 Marks)

PRACTICALS:

Term Work Shall be based on any 08 experiments mentioned below.

1) Determination of molecular weight of substance by depression in freezing point method.
2) Determination of equivalent weight of metal by eudiometer.
3) Determination of heat of solution of KNO_3.
4) Determination of rate constant of hydrolysis of ethyl acetate by NaOH & show that the reaction is second order.
5) Determination of rate constant of hydrolysis of methyl acetate by dilute HCl & show that the reaction is first order.
6) Determination of surface tension liquids by Stalagmometer.
7) Determination of strength of acid by conductometric titration.
8) Determination of heat of neutralization of strong acid & strong base by calorimeter.
9) Determination of water equivalent of the calorimeter taking heat of neutralization of strong acid & strong base.
10) Preparation of colloidal solution of starch.

REFERENCES

1) G.M. Barrow, Physical Chemistry: Benjamin publishers.
2) Glasstone, Thermodynamics for chemist :McMillan India Ltd.
3) Maron-Prutton, Principles of Physical chemistry: Oxford & IBH publishing Co.Pvt.Ltd. New Delhi
4) S. Glasstone & Lewis, Elements of physical chemistry : McMillan India Ltd.
5) Puri & Sharma, A textbook of physical chemistry : S. Chand & Co. Delhi

2.CHEMISTRY-II

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practicals : 2 Hrs./ Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Practical: 50 Marks
Term Work : 25 Marks

UNIT-I :

Basic Concept of organic chemistry.
Importance of organic chemistry.
Sources of Organic Compounds.
Purification of organic compounds by Crystallization, Distillation, Fractional distillation.
Tests of purity by Melting point & Boiling point.determination methods.
Determination of molecular Weight of organic compounds by Victor Mayor method.
Types of bonds: Ionic & Covalent bonds , Bond fission,
Types of intermediates: Structure & formation of Carbonium ion & Carbanion , Free radicals & their stability. Factors affecting electron availability : Inductive, Resonance, Hyperconjugation & Steric effects., Electrophiles & Nucleophiles,
Acidity & Basicity of Organic compounds. (10 Hrs**,**20 Marks)

UNIT-II :

Study of reactions with reference to the mechanism involved.
Aldol condensation, Cannizzaro& cross Cannizzaro reactions, Claisen ester condensation, Reimer Tiemann reaction, Chloromethylation & Formylation reactions.,Grignard reactions. SN^1 & SN^2 reactions, Role of solvent in SN^2 reaction.
Electrophilic substitution in aromatic rings: Nitration, Sulphonation, Halogenations , Fridel Crafts alkylation& acylations.
Elimination reactions:E_2 , E_1 mechanism.
Rearrangement reactions: Fries , Beckman , Claisen rearrangement reaction. (10 Hrs**,**20 Marks)

UNIT-III :

Stereochemistry:

Basic concept of stereochemistry , Structural Isomerism, Different methods of representation of three dimensional molecule on paper , Conformational isomerism: Conformations of Ethane & n-Butane & their relative stability.
Geometrical isomerism: Cis-Trans isomerism shown by alkenes.
Optical isomerism: Measurement of Optical activity by Polarimeter , Specific rotation, Enantiomerism , Necessary conditions of optical activity, Optical isomerism of Lactic acid & Tartaric acid., Distereoisomerism.
Baeyer's angle strain concept , Conformations of Cyclohexanes: Equatorial & axial bonds in cyclohexane. (10 Hrs**,**20 Marks)

UNIT-IV :

Chemistry of heterocyclic compounds:

Classification of heterocyclic compounds,Structure,Preparation,Properties,Reactions& Uses of five membered rings: Furan,Pyrrole,& Thiophene.
Six membered rings :Pyridine.
Fused rings of Quinoine & Isoquinoine.

Aspects of oxidation & reduction:

Basic concept of Oxidation & its mechanism , Applications of oxidizing agents such as $KMnO_4$, $K_2Cr_2O_7$, OsO_4

Baeyer Villiger oxidation , Oxidation of alcohol, Oxidation of alkenes.

Basic concept of Reduction & its mechanism, Applications of reducing agents such as $LiAl_4$, Zn, Fe with acid combination. Clemmensen & Wolff-Kishner reduction. (10 Hrs**,**20 Marks)

UNIT-V :

Macromolecules:

Polymer-Monomer basic concept., Classification of Polymers., Addition & Condensation polymerization & their mechanisms , Coordination polymerization , Bulk,Emulsion, Solution, Suspension techniques ,Copolymers., Tacticity of polymers.

Study of Industrially important polymers with respect to synthesis, properties & applications: Polystyrene, PolyVinyl Chloride, Teflon, Urea Formaldehyde , Phenol Formaldehyde , Styrene-Butadiene rubber, Epoxy resins, Polyethylene Terepthalate. (10 Hrs**,**20 Marks)

REFERENCES

1) Peter Sykes. A guide book to mechanism in organic chemistry: Orient Longman Ltd.
2) Pine, Organic Chemistry: McGraw Hill Int.Co.
3) Morrison & Boyd, Organic Chemistry: Allyn Bacon Inc.
4) L.Finar, Organic Chemistry: Vol.I&II ELBS with Longman.
5) Arun Bahl & B.S.Bahl, Textbook of organic chemistry: S.Chand & Co.Ltd. New Delhi.
6) V.R. Gowarikar, N.V.Vishwanathan, Jayadev Sreedhar, Polymer Science: Wiely Eastern Ltd., New Delhi

PRACTICALS:

List of Experiments

Term Work Shall be based on the following.

1. Identification of an Organic compound.(Any Four)
2. Estimation of selected organic compounds like Aniline, Acetone , Glucose, Glycerol. .(Any Two)
3. Preparations (Any Two)
   Preparation of p-nitro acetanilide by nitration.
   Preparation of Quinone.
   Preparation of Urea Formaldehyde resin
   Preparation of Nylon

REFERENCES FOR PRACTICALS

1) Kulkarni , A laboratory handbook of organic quantitative analysis & separation : Dastane Ramchandra & Co., Pune
2) S.K.Bhasin, Laboratory manual on engg. Chemistry: Dhanpat Rai Pub.New Delhi

3. UNIT OPERATION-I (FLUID MECHANICS)

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practicals : 2 Hrs./ Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Oral: 25 Marks
Term Work : 25 Marks

UNIT-I:

Unit systems, conversion of units

Fluid properties- definition of fluid, viscosity concept, properties of fluid like mass density, specific weight, specific volume, vapour pressure, surface tension, capillarity Types of fluid- compressible and incompressible, Newtonian and non newtonian, laminar-turbulent, steady-unsteady, two and three dimensional flows.

Fluid pressure: at a point, Pascal's law, hydrostatic equilibrium, Atmospheric, Gauge, Absolute and vacuum pressure.

Velocity Concept, the continuity equation, Eulers equation of motion a long streamline, Bernoullis equations for different conditions. (10 Hrs**,**20 Marks)

UNIT-II:

Flow through pipeline system: Reynolds experiment, Laws of friction, Major and minor losses, friction factor chart, effect of heat transfer on friction factor, distribution of flowing fluids through branched pipes, hydraulic gradient line and total energy line.

Laminar flow: steady laminar flow in circular pipes (Hagen-Poiseuille equation), through annulus, parallel plates, around a sphere (Stokes law), relations between shear and pressure gradient, average velocity and maximum velocity, momentum correction factor.

Turbulent flow: velocity distribution in turbulent flow in pipes, velocity distribution equation in turbulent flow in terms of mean velocity for smooth and rough pipes, resistance to flow of liquid in smooth and rough pipes, variation of frictional factor for commercial pipes, types of problems in pipes designs. (10 Hrs**,**20 Marks)

UNIT-III:

Flow of compressible fluids:

Continuity equation, total energy balance, mechanical energy balance, ideal gas equations. Flow past immersed bodies, drag coefficient-friction in flow through bed of solids.

Boundary layer theory:

Simple concepts of boundary layer, boundary layer growth along a flat plate, thickness of boundary layer (definition and formulae only), separation of boundary, hydro dynamically smooth and rough boundaries. (10 Hrs**,**20 Marks)

UNIT-IV:

Dimensional analysis and model studies:

Dimensional analysis, Buckingham's PI theorem, dimensionless numbers, application to fluid flow problem.

Two phase co-current and counter current flow, liquid-liquid and gas-liquid systems, flow patterns (no mathematical treatment).

Flow and Pressure measurement:
Principle and types of manometers, the flow through nozzles orifice meter, Venturimeter, pilot tube, Rotameter, notches and weirs.
Other flow measuring devices such as ultrasonic flow meters, anemometers, electromagnetic flowmeter, Recording Rotameter, flowmeter using thermistors.

(10 Hrs**,**20 Marks)

UNIT-V:

Pumping of fluids:
Pumping equipments for liquid, the reciprocating pump, positive displacement pump, rotary pumps, centrifugal pumps, design & operating characteristics, NPSH calculations, airlift pumps, pumping equipments for gases:
Pumping equipment for gases:
Reciprocating piston compressors, rotary blowers & compressors, centrifugal blowers & compressors including turbocompressors, vacuum-producing equipment.
Power required for compression of gases, clearance volume, multistage compressor efficiency, the power requirement for pumping through pipeline for liquids & gases. (10 Hrs**,**20 Marks)

REFERENCES

1) W.L. McCabe & J.C. Smith, Unit operations in chemical engineering: McGraw Hill/Kogakusha Ltd.
2) I P. Chattopadhyay Unit operations of chemical engineering-volume I: Khanna Publication New Delhi, 2nd edition 1996.
3) Dr.R.K. Bansal,. Fluid Mechanics: Laxmi Publications, New Delhi
4) V.P. Gupta, Alam Singh and Manish Gupta Fluid Mechanics, Fluid mechanics and hydrostatics: CBS publishers New Delhi.

TW / Practicals :
Term Work Shall be based on any 08 experiments mentioned below.
List of the Experiments.
1. Determination of Viscosity
2. Study of Manometers
3. Verification of Bernoulli's theorem
4. To determine the coefficient of Venturimeter
5. To determine the coefficient of Orificemeter
6. To determine the coefficient of Nozzlemeter
7. Reynolds Experiment
8. Minor losses in pipe
9. To determine the fanning friction factor for given pipe
10. Notches & Weirs
11. To Study the Characteristics curves of Centrifugal Pump
12. Study of the different types of Fans ,Blowers & Compressors

REFERENCE FOR PRACTICALS

V.P. Gupta , Laboratory Manual of Fluid Mechanics :CBS Publications New Delhi.

4. STRENGTH OF MATERIAL

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practicals : 2 Hrs./ Week

Examination Scheme:
Παπερ: 100 Μαρκσ (3 Ηρσ)
Term Work : 25 Marks

UNIT-I:
Introduction : Concept of stress ,strain, elastic limit , stress –strain curve for steel, Hooke`s law. Relation between different elastic constant.
Stresses &strains in determinate axially loaded members,
Axial force Diagram , Stresses due to changes of temperature in simple & composite members
(10 Hrs**,**20 Marks)

UNIT-II:
Introduction to stresses in composites :
Shear force & bending moment diagrams, Bending stresses &Shear Stresses developed in determinate beam subjected to transverse loading .
Slope and Deflection of Beam (introduction and treatment only)
Double integration method , moment area method ./ Derivation of formula for slope and deflection for Standard cases. (10 Hrs**,**20 Marks)

UNIT-III:
Stresses under combined loading :
Stresses on inclined sections , Principal Stresses &strains (analytical &Mohr`s circle method)
Stresses & Strains in Determinate circular shafts Subjected to Twisting moment , Power Transmitted by shafts , Flanged coupling . Combined Torsion and Bending Moment (10 Hrs,20 Marks)

UNIT-IV:
Thin and Thick walled pressure vessel :Stresses ,Strain and Deformation in thin walled seamless cylinder and spherical vessels due to internal fluid , change in volume constants ,Effects of additional compressible or incompressible fluid under pressure.
Lame`formulae,Στραιν ενεργψ &ιμπαχτ :Τψπεσ οφ λοαδινγ ,Γραδυαλλψ λοαδ ,συδδενλψ λοα δ ανδ λοαδ
αππλιεδ ωιτη Ιμπαχτ
(10 Ηρσ,20 Μαρ κσ)

UNIT-V:
Axially Loaded Column: Concept of Buckling of column, Derivation of Euler`s & Rankine`s formula.
Direct and Bending Stresses **:** concept of core of a section (10 Hrs,20 Marks)

TW / Practicals :
Term Work Shall be based on any 05 experiments mentioned below.
List of the Experiments.
1. Tension test on mild steel
2. Izod and Charpy test on mild steel, copper, brass, alluminium.
3. Bending test on Timber.
4. Different type of hardness tests on metals
5. Torsion test on mild steel and cast iron
6. Shear test: Single and double shear teston mild steel.

REFERENCES

1) Beer and Johnson, Mechanics of Material: McGraw Hill/Kogakusha Ltd.
2) Dr.Ramamrutham- Strength of Material Dhanpat rai & sons Publication New Delhi
3) Dr.R.K. Rajput , Strength of Material : S. Chand Publications New Delhi
4) Timoshenko & Young, Strength of Material : CBS Publishers and distributors New Delhi .
5) H Somayya, Strength of Material : Nirali Prakashan Pune.

5. ENGINEERING MATHEMATICS-III

Teaching Scheme: Examination Scheme:
Lectures: 4 Hrs./ Week Paper: 100 Marks (3 Hrs)

UNIT-I:
Liner Differential Equation:
Liner differential equation of order "n" with constant co-efficient , Method of variations, Homogeneous liner differential equation , Legendre's LDE, Application to chemical engg. Problem involving batch reactor's. (10 Hrs**,**20 Marks)

UNIT-II:
Simultaneous Linear Differential Equations of form :

1) $f1(D)x + f2(D)y = (t)$
$(D)x + (D)y = (t)$
Where, $D=d/dt$.
2) $dx/P = dy/Q = dz/R$.

Partial Differential Equations:
Solutions of (i) One dimensional heat flow equation.
(ii) Two dimensional heat equation (Laplace Equation)
(iii) Laplace Equation in Polar form.
Differential equation of first order & higher degree. (10 Hrs**,**20 Marks)

UNIT-III:
Laplace Transform :
Definition of Laplace Transform, Inverse Laplace transform, Properties & theorems, Laplace transforms of standard functions, Unit step functions, Ramp functions, Impulse functions, Error functions Jump functions, Laplace Inverse Transform.
Applications to the solutions of liquid systems, consisting of single tank & two tanks in series (Interacting & non-Interacting), Second order systems (Damped vibrator). (10 Hrs**,**20 Marks)

UNIT-IV:
Vector Integration :
(i) Line Integral, Surface Integral, Volume Integral.
(ii) Greens Lemma, Stoke's Theorem, Gausse's Divergence Theorem.
Finite Fourier Cosine & Sine transforms, Complex Fourier transforms , Infinite Fourier sine & Cosine transforms, Applications of Fourier transforms to boundary value problems such as one dimensional & two dimensional heat flow problems (10 Hrs**,**20 Marks)

UNIT-V:
Numerical Solution of Ordinary Differential Equations :
Taylor's series method, Runga-Kutta method, Piccard's method, Eulers method, Least square method
Numerical Integration :
Trapezoidal rule, Simpson's $1/3^{rd}$ rule, Simpson's $3/8^{th}$ rule, Weddle's rule (10 Hrs**,**20 Marks)

REFERENCES

1) P .N. Wartikar & J.N. Wartikar, Engineering Mathematics III : Pune Vidyarthi Griha Prakashan, Pune
2) Dr. B.S.Grewal, Higher Engineering Mathematics : Khanna Publications ,New Delhi
3) Wylie & Barrott, Advanced Engineering Mathematics : Tata McGraw Hill Publications.
4) Erwin Kreegszig, Advanced Engineering Mathematics : New age International ,New Delhi
5) Dr.Gokhale & A.N. Singh , Engineering Mathematics III : Nirali Publications.
6) Coughnour Donald R , Process System analysis & control : McGraw Hill, 1991

.

6. COMPUTER APPLICATIONS

Teaching Scheme:
Practical: 2 Hrs./ Week

Examination Scheme:
Term Work : 25 Marks

The Term work should be based on following,

1. Introduction to computer.
2. Introduction to ‘C’ language.
3. Program for addition, subtraction of variables.
4. Program for multiplication, division of variables.
5. Program to find the greatest value.
6. Program to find odd and even numbers.
7. Program to print no. 1 to 10.
8. To calculate area of triangle by using function.
9. Use of ‘if-else’.

1. CHEMICAL PROCESSES – I

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practicals : 2 Hrs./ Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Practical: 50 Marks
Term Work : 25 Marks

UNIT-I:
Chemical Processing and work of chemical engineer.
Industrial Gases: Hydrogen, Oxygen, Nitrogen, Carbon Dioxide, Acetylene.
Ceramic Industries: Basic raw materials, Chemical Conversions, White wares
Manufacture of Cement (10 Hrs**,**20 Marks)

UNIT– II :
Structural clay products: Manufacture of Building bricks.
Refractories : Properties of refractories, manufacture of refractories,
Glass: Raw materials, Methods of manufacture, Manufacture of special glasses, Types & applications.
Fuel Cells: Principle& Efficiency of Fuel cells, Kinds of Fuel cells & advantages of Fuel cells.
Fuels and Fuel gases: Natural gas, Water gas, Producer gas, LPG.
(10 Hrs**,**20 Marks)

UNIT– III :
Salt and sodium compounds: Sodium chloride, Sodium sulphate and byproducts.
Chlor Alkali and electrolytic industries: Soda ash, caustic soda, Chlorine.
Bleaching powder, Sodium bicarbonate, Aluminum, Sodium, Chlorates and perchlorates.
(10 Hrs**,**20 Marks)

UNIT -IV :
Phosphate industries: Elemental phosphorous, Raw materials and process for phosphoric acid, Manufacturing of ammonium phosphate, Baking powder.
Potassium industries: Potassium, Potassium chloride, Potassium sulfate, Potassium nitrate.
(10 Hrs**,**20 Marks)

UNIT– V :
Nitrogen industries: Synthetic ammonia, Nitric acid, Ammonium nitrate, Urea.
Hydrochloric acid: Hydrochloric acid, Aluminum sulphate and alums.
Sulfur industries: Raw materials, Manufacture of sulfur, sulfuric acid. (10 Hrs**,**20 Marks)

TW / Practicals :

Term Work Shall be based on any 08 experiments mentioned below.
List of the Experiments.
1. Purification of common salt.
2. Analysis of fertilizers.
3. Determination of sodium hydroxide and sodium carbonate in the given alkali mixture solution.
4. Determination of sodium bicarbonate and sodium carbonate in the given alkali mixture solution.
5. To determine the loss per gram and the percentage purity of the given sample of sodium bicarbonate by heating.
6. Estimation of available chlorine in bleaching powder.

7. Flue gas analysis by Orsat’s Apparatus.
8. Preparation of some compounds such as
   i. Ferrous ammonium sulphate
   ii. Sodium thiosulphate
   iii. Copper sulphate
9. Analysis of cement

REFERENCES

1) George T. Austin , Shreve's Chemical Process Industries : McGrawHill Book Company,1985. 5th edn.
2) G.N. Pandey, A Text book of Chemical Technology : Vol.I, Vikas Publishing House Pvt.Ltd., New Delhi
3) C.E. Dryden, Outlines of Chemical Technology : Affiliated East-West Press,1973.
4) D. Venkteshwaralu, Chemical Technology, I & III manuals of Chemical Technology : Chemical Engg. Ed. Dev. III Madras ,1977.
5) B.K.Sharma , Industrial Chemistry: Goel Publishing House Meerut
6) M.M.Uppal , Engineering Chemistry: Khanna Publications New Delhi

2. CHEMISTRY-III

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practicals : 2 Hrs./ Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Practical: 50 Marks
Term Work : 25 Marks

UNIT-I :

Chemical Bonding:

Ionic bond : The ionic model, Lattice energy, The Born- Haber cycle, Applications of lattice energy.
Metallic bond: Electron sea model , explanation of metallic properties on the basis of electron sea model, Valence bond model.
Covalent bond: Polarity in covalent bonds ,important characteristics of covalent bond : Bond length, bond angle, bond strength, Atomic orbital overlap concept,Valence bond & Molecular Orbital treatment of covalent bond, VSEPR theory.
Hybridisation ,Resonance , Wander Wall's forces.
Hydrogen bond: Intramolecular & intermolecular hydrogen bonding. (10 Hrs,20 Marks)

UNIT-II :

The Main Group Elements:

Modern form of periodic table, General characteristics of S & P block elements,Position of Hydrogen in periodic table.
Study of first representative element of each group.
Position of Noble gases in periodic table.
Study of compounds of non transition metals such as diboranes, Borazine , Sillicones., Zeolites.
Oxides & Oxoacids of Nitrogen,Phosphorous,Sulphur,& Halogens , Xenon compounds.
(10 Hrs,20 Marks)

UNIT-III :

Transition metal Chemistry:

Introduction : Elements of first & second transition series., General charecturistics of d block elements.
Titanium: Occurrence, Extraction, Properties.
Preparation of TiO , $TiCl_2$, TiO_2 ,$TiCl_4$, Ziegler Natta catalyst.
Vanadium: Occurrence, Extraction, Properties & Uses.
Preparation of vanadium metal, V_2O_5 , Ferro vanadium alloy.
Chromium: Occurrence, Extraction, Properties, Industrial applications.
Preparation of CrO_3 , $K_2Cr_2O_7$
Nickel : Occurrence, Extraction, Preparation by Mond process,
Electrolytic process, Uses
Zirconium: Extraction, Properties & Uses.
Preparation of ZrO_2 , $ZrCl_4$
Molybdenum: Extraction, Properties, Uses, Interstitial compounds.
Silver: Occurrence, Extraction, Properties, Uses. Silver Plating.
Platinum: Occurrence, Extraction, Properties, Uses. (10 Hrs,20 Marks)

UNIT-IV :.

Principal & processes of metallurgy

Occurrence of metals, Mineral wealth of India, Ore dressing, Roasting, Calcination, Smelting, Fluxes, Slag, Types of Furnaces , Refining of metals.

Metallurgical Industries:

Iron & Steel Industries: Production of Pig Iron, Production of Steel

Aluminium Industries: Alumina production by purification of alumina from bauxite by Bayer process, Production of Aluminium by electrolytic reduction of alumina.

Copper: Occurrence, Extraction of copper , Electrolytic refining of blister copper, Uses of copper.

Lead: Occurrence, Extraction of lead from galena, Liquation process for refining of lead.

Zinc: Occurrence, Extraction, Electrolytic process for the extraction of zinc, refining of zinc.

(10 Hrs**,**20 Marks)

UNIT-V :

Phase rule: Definition of phase rule, definitions of terms used in phase rule, Derivation of phase rule, one component Water system, two component systems.

Phase diagrams: Definition, Usefulness of phase diagrams, Classification of phase diagram, Construction of phase diagrams.

Phase diagram of Steel, heat treatment of Steel, Phase diagram of brass, Cu-Ni. (10 Hrs**,**20 Marks)

REFERENCES

1) J. D. Lee ,Concise Inorganic Chemistry : D.Van Nostrand Co.
2) B. R. Puri , L. R. Sharma ,Principles of Inorganic Chemistry: S.Chand & Co.Delhi.
3) P.L.Soni ,Textbook of Inorganic Chemistry: S.Chand & Sons ,New Delhi.
4) Dryden's .Outlines of Chemical Technology, Editors Gopal Rao& Marshall Sitting : East West Press, New Delhi.
5) Jain & Jain, Engineering Chemistry :Dhanpat Rai & Sons, New Delhi.
6) M.M.Uppal , Engineering Chemistry :Khanna Publications, New Delhi.
7) V. Raghavan , Material Science & Engineering,Prentice Hall of india New Delhi.

PRACTICALS

Term Work Shall be based on the experiments mentioned below.

List of Experiments:

1. Acid base reaction titration of a mixture of (any one)
   (a)Hydrochloric & Acetic acid
   (b)Carbonate & Bicarbonate
2. Oxidation & reduction titration involving Permangnate, Dichromate, Potassium bromate.(any two)
3. Precipitation Titration: Mohr's method
4 Precipitation Titration :Volhard's titration.
5. Complexiметric titration involving EDTA
6. Gravimetric determination of Fe as Fe_2O_3
7 Gravimetric determination Ni as Ni-DMG

REFERENCE FOR PRACTICALS

VOGEL. , Text book Quantitative Inorganic Analysis : ELBS with Longman.

3. UNIT OPERATION – II
(MECHANICAL OPERATIONS)

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practicals : 4 Hrs./ Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Oral : 25 Marks
Term Work : 50 Marks

UNIT-I :

Size Reduction :

Properties of solids , Particle size ,Specific surface area of the Mixture , Average particle size. Mechanism of size reduction , Energy utilization , crushing Efficiency , Energy for size reduction , Laws of crushing ,Types of equipment on the various stages of reduction such as Jaw crushers, Gyratory crusher, Hammer mill , Ball mill ,Tube mill , Ultra fine grinders etc., Power requirement , Problems based on above.

Screening :

Separation of solids by screening , Different types of screens , Capacity and efficiency of screen , Actual & ideal screens ,Screen analysis , Screening equipments such as Grizzly, Gyratory screens , Trommels , Shaking screens , Oscillating Screens. Material Balance over screen , Calculation of screen Effectiveness . Problems based on above . (10 Hrs**,**20 Marks)

UNIT-II :

Flow of solids through fluids :

Introduction , Drag force on spherical particle , terminal falling velocities of spherical particles , terminal falling velocities of non spherical particles , Equal settling velocities Free settling and hindered settling. Problems based on above.

Classification of solids:

Equipments for classification such as Gravity settling tank, Spitzkasten , Drag classifier , Elutriator , Cone classifier , Double cone classifier, Rake classifier, Cyclone separator, Magnetic separators, Electrostatic separator, Floatation Equipment , jigging , tabling etc Sedimentation , Laboratory batch sedimentation , Thickeners ,

Calculation of area & depth for continuous thickeners. (10 Hrs**,**20 Marks)

UNIT-III :

Filtration :

Equipments for filtration , constant pressure & constant rate filtration , filter calculations , Optimum time cycle , Handling of compressible cakes and use of filter aids , Washing of Cake .Problems based on above . Centrifugation , Centrifugation calculations, Filtration in a centrifuge , Equipments of centrifugal filtration .Problems on centrifugal Filtration. Comparison of sedimentation & centrifugation . (10 Hrs**,**20 Marks)

UNIT-IV :

Mixing And Agitation :

Introduction , Mixing equipments , Impellers , Turbine , Paddles , Draft tubes , Flow Patterns of mixing, Baffles, Impeller location, Standard turbine design, Equipments for Mixing of pastes and viscous materials, mixers for dry powder, Mixing in Liquid-Liquid, Liquid-solid and gas-solid.

Power requirement, Mixing index, mixing of solids, Degree of Mixing & rate of mixing, Mixing index in granular solids. Problems based on above. Type & selection of agitators. (10 Hrs**,**20 Marks)

UNIT-V :

Fluid Solid Systems:

Fluidization : Characteristics of fluidized systems, Effect of fluid velocity on pressure Gradient, Minimum fluidization velocity, types of fluidization, Fixed Bed systems and Spouted bed. Problems based on above.

Handling of solids :

Nature & characteristics of bulk solid, conveyor, Types of conveyor such as belt conveyor , Chain and flight conveyors, Screw conveyors and pneumatic conveyors, Design of belt & screw conveyors. Problems based on above.

(10 Hrs**,**20 Marks)

REFERENCES

1) R. S. Hiremath and A.P. Kulkarni , Unit operations of Chemical engg. (Mechanical operations Vol.-I): Everest publication
2) W.L. McCabe and J.C. Smith, Unit operations of Chemical engg. : Tata McGraw Hill
3) J. M. Coulson and R.F. Richardson, Chemical Engg. Vol. I & II : Butter worth & Heinemann.
4) I. P. Chattopadhyay, Unit Operations of Chemical Engg. Vol. I :Khanna Publications, Delhi.

TW / Practicals :

Term Work Shall be based on any 08 experiments mentioned below.

List of the Experiments.

1. To study the separation of solid by sedimentation
2. Sieve Shaker: To ascertain the fineness number and to study the differential & cumulative screen analysis of the sand
3. Ball Mill :To verify the laws of crushing & grinding
4. Jaw Crusher : To verify the laws of crushing & grinding
5. Plate & Frame Filter Press: To determine the rate of filtration ,specific cake resistance and filter medium resistance
6. Rotary Vacuum Filter: To find out the rate of filtration
7. Fluidization : To observe and study the behavior of the bed during fluidisation and to calculate minimum fluidization velocity
8. Sigma Kneader Mixer : To study the sigma Kneader Mixer
9. Vibrating Shifter : To find out the effectiveness of the Vibrating Shifter
10. Mini Pulveriser : To study the Mini Pulveriser
11. Cyclone Separator : To study the operating behaviour of cyclone separator and to find out its efficiency
12. Ribbon Blender : To study the Ribbon Blender & to find out the mixing index

4. PROCESS CALCULATION

Teaching Scheme:
Lectures: 4 Hrs./ Week
Term Work : 2 Hrs./ Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Term Work : 25 Marks

UNIT-I :
Units & Dimensions:
Basic & derived units, dimensional analysis, dimensional & empirical equations. Different ways of expressing units of quantities & physical constants.
Properties Of Gases , Liquids & Solids:
Ideal & real gas laws, critical properties, properties of mixtures & solutions & plane equilibria, Kay's rule. (10 Hrs**,**20 Marks)

UNIT-II :
Basic Concept:
Humidity & saturation, Psychometric chart, solubility diagrams.
Thermo Physics:
Concept &calculations of involving energy, heat, work & enthalpy of reversible & irreversible process. (10 Hrs**,**20 Marks)

UNIT-III :
Material Balances:
Concept of limiting &excess reactants, Tie element, Recycle, Purging, Bypass etc. in batch, stagewise & continuous operations in systems with & without chemical reactions in unit operations. (10 Hrs**,**20 Marks)

UNIT-IV :
Thermo Chemistry:
Heat of formation, combustion, solution, dilution etc.& its effects of pressure & temperature on them. Temp. of reaction, Energy balance for system with & without chemical reaction. Process efficiency. (10 Hrs**,**20 Marks)

UNIT-V :
Unsteady material & energy balances, Energy balances for nuclear, electro chemical, photo chemical & bio chemical processes.
Combustion: Introduction, fuels, calorific value of fuels, air requirements. (10 Hrs**,**20 Marks)
Heat of formation, combustion, solution, dilution etc.& its effects of pressure & temperature on them. Temp. of reaction, Energy balance for system with & without chemical reaction. Process efficiency.
Term Work:
Term work shall consist study of & solutions to typical industrial problems:
1. Properties of solids/liquids/gases.
2. Humidity & Saturation.
3. Thermo physics.
4. Thermo chemistry.
5. Material balances.
6. Energy balances.
7. Nuclear, photo chemical & bio chemical & electro chemical processes.

8. Combustion.

REFERENCES:

1) Himmelblau D M,Basic principle & calculations in Chemical Engineering : Prentice hall.
2) Hougen O A, Watson K M & Ragatz RA;Chemical Process Principles, part–1 :Asia Publishing House , Mumbai.
3) Chemical Engineering Education Development Centre, IIT Madras. Process Calculation for Chemical Engineers.
4) Bhat & Vora ,Stoichiometry :Tata McGraw Hill.
5) Durga Prasad Rao & DVS Murthy ,Process Calculations for Chemical Engineers :McMillan India, New Delhi .
6) K A Gavhane , Introduction to Stoichiometry : Nirali Prakashan.
7) Shekhar Pandharipande & Samir Mushrif, Process calculations :Pune Vidyarthi Griha Prakashan Pune

5. INDUSTRIAL ECONOMICS & MANAGMENT

Teaching Scheme: Examination Scheme:
Lectures: 4 Hrs./ Week Paper: 100 Marks (3 Hrs)

UNIT- I:
Nature & Scope of economics, usefullness to engineering organisations.
Economy : Types, Problems and Functioning, Basic Terms & Concepts
Economic system Socialism, Capitalism, Mixed Economy.
Demand & supply schedule- Equilibrium, Law of Diminishing& Equimarginal Utility, Laws of returns. (10 Hrs**,**20 Marks)

UNIT- II:
Factor of Production, Land, Labour, Capital & Organisation
Market & Market Forms, Price determinations: Perfect & Imperfect Competitions
National Income: Concept, Factors & Measurement, Keynesian Model, Types of banks & Role of Banks in economic development, Theories of Money (10 Hrs**,**20 Marks)

UNIT- III:
Industrial Economics, Prime Cost, Overhead Cost, Total Cost, Standard Cost & Variances
Forms of Business Organisations, Sources of Finance: Shares & Debentures & other Sources of Finance
Management Concept : Difference between Management, Administration, Organisation. Scientific Management : Contributions by Henri Fayol, Elton Mayo, Gilbreth, Gantt. Principles & Functional areas of Management. Management by Objectives.
Plant Maintenance. Material, Purchase and Stores Management (10 Hrs**,**20 Marks)

UNIT-IV :
Marketing Management, Concept, Sales Management, Function of sales Manager, Salemans quota, Marketing Research
Personnel Management: Manpower Planning, Recruitment, selection & Training, Job Evaluation Methods, merit rating Role of trade Unions in Industrial Relations, Settlement of Industrial Disputes (10 Hrs**,**20 Marks)

UNIT-V:
Leadership, Motivation, Communication, Human Relation Approach. Introduction to PERT & CPM, Professional & Business Ethics, Management Information Systems (10 Hrs**,**20 Marks)

REFERENCES
1. Banga & Sharma, Industrial Engineering Science & Management : Khanna Publishers New Delhi
2. Dewett & Varma, Elementary Economic Theory : S Chand & Company Ltd New Delhi

3. O.P.Khanna, Industrial Engineering & Management : Dhanpat Rai Publications (P) Ltd New Delhi

Faculty of Engineering & Technology

NORTH MAHARASHTRA UNIVERSITY,

JALGAON (M.S.)

THIRD ENGINEERING (T.E.)

CHEMICAL ENGINEERING
TERM – I & II

W.E.F. 2007-2008

NORTH MAHARASHTRA UNIVERSITY, JALGAON
STRUCTURE OF TEACHING & EVALUATION
T.E. (CHEMICAL ENGINEERING)
W.E.F.2007-2008

First Term

Sr. No.	Subject	Teaching Scheme Hours/ Week		Examination Scheme				
		Lectures	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Chemical Processes-II	04	02	03	100	25	50	--
2	Process Heat Transfer	04	02	03	100	25	--	25
3	Mass Transfer-I	04	04	03	100	25	50	--
4	Process Equipment Design and Drawing -I	04	04	04	100	50	--	--
5	Chemical Engineering Thermodynamics	04	--	03	100	--	--	--
		20	12		500	125	100	25
	Grand Total	**32**			**750**			

Second Term

Sr. No.	Subject	Teaching Scheme Hours/ Week		Examination Scheme				
		Lectures	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Instrumentation and Instrumental Analysis	04	02	03	100	25	--	25
2	Chemical Reaction Engineering-I	04	02	03	100	25	--	25
3	Mass Transfer-II	04	04	03	100	25	50	--
4	Process Equipment Design and Drawing -II	04	04	04	100	50	--	--
5	Mathematical Methods in Chemical Engineering	04	--	03	100	--	--	--
6	Practical Training/Mini Project/Special Study	--	--	--	--	25	--	--
		20	12		500	150	50	50
	Grand Total	**32**			**750**			

T.E. (CHEMICAL ENGINEERING)
1. CHEMICAL PROCESSES-II

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 2 Hrs./ Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Practical: 50 Marks
Term Work : 25 Marks

UNIT- I:

Food Industries: Types of food processing, preservation method, Food Products.
Sugar and Starch Industries: sugar and starches.
Fermentation Industries: Absolute alcohol, Beer, Wines and liquors, vinegar, citric acid lactic acid. (10 Hrs, 20 Marks)

UNIT- II:

Oil, Fat and Waxes: Vegetable oils, animal Fats and oils, Waxes.
Soaps and detergents.
Pulp and paper industries: Manufacturing of pulp, manufacturing of paper, and structural boards. (10 Hrs, 20 Marks)

UNIT- III:

Agrochemical Industries: Insecticides, pesticides, Herbicides, plant growth , Nutrients and regulators, compound fertilizers, Bio fertilizers, complex fertilizers, various grades of N.P.K. fertilizer.
Pharmaceuticals Industries: Classification of Pharmaceuticals products.
Manufacture of Antibiotics, Isolates from plant and animal, vitamins. (10 Hrs, 20 Marks)

UNIT- IV:

Explosives: Types of Explosives, Explosive characteristics, Industrial explosives, propellants, rockets, missiles, pyrotechnics, matches, toxic chemical weapons.
Plastic industries: Raw Materials, general polymerization processes, manufacturing processes, compounding and Moulding operation. (10 Hrs, 20 Marks)

UNIT- V:

Dyes: Classification and manufacturing of dyes.
Petroleum and Petrochemicals : Petroleum production and Refining , Manufacturing of Methanol , Formaldehyde , Ethylene and Acetylene , Ethylene dioxide, Isopropanol, Acetone , Isopropyl , Benzene ,Butadiene, Phenol styrene . (10 Hrs, 20 Marks)

REFERENCES

1) George T. Austin, "Shreeve's Chemical Process Industries", 5th Edition , Mc Graw Hill Book Company.
2) C.E. Dryden, Outline of Chemical Technology, Affiliated East WestPress.1973.
3) S.D.Shukla, G.N.Pandey, A text book of Chemical technology, 3rd Edition.

PRACTICAL and TERM WORK :

Practical and Term Work Shall be based on any 08 experiments mentioned below.

1) Estimation of sugar / glucose
2) Determination of saponification value of an oil
3) Determination of acid value of an oil
4) Determination of iodine value of an oil
5) Preparation of azo dye
6) Preparation of soap
7) Preparation of green pigment
8) Preparation of yellow pigment
9) Preparation of blue pigment
10) Preparation of drug aspirin

2. PROCESS HEAT TRANSFER

Teaching Scheme:
Lectures: 4 Hrs. / Week
Practical: 2 Hrs. / Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Oral: 25 Marks
Term Work: 25 Marks

UNIT- I:

Heat transfer by conduction in solids;
Fourier's law of heat conduction ,steady state heat conduction through walls (single and multilayer), heat flow through cylinder ,unsteady state heat conduction ,Derivation of Fourier's heat conduction equation in three dimensions , equation for one dimensional conduction , heat conduction through a semi infinite slab , lumped capacity method of unsteady state conduction . Principles of heat flow in fluids. (10 Hrs, 20 Marks)

UNIT-II:

Typical heat exchange equipment ,counter current and parallel flows, energy balances, overall heat transfer coefficient , log mean temperature difference, individual heat transfer coefficient, calculation of overall coefficient from individual coefficients , transfer units in heat exchangers. Heat transfer to fluids without phase change.

(10 Hrs, 20 Marks)

UNIT- III:

Regimes of heat transfer in fluids, heat transfer by forced convection in laminar and turbulent flow, dimensional analysis method, use of imperials equations heat transfer by forced convection outside tubes, natural convection.

Heat transfer to fluids with phase change.

Dropwise and film type condensation, coefficient for film type condensation, practical use of Nusselt's equations, application to petroleum industries (10 Hrs, 20 Marks)

UNIT- IV:

Heat transfer to boiling liquids:

Boiling of saturated liquids maximum flux and critical temperature drop, maximum Flux and film boiling.

Radiation heat transfer:

Fundamental of radiation, black body radiation, Kirchoff's law, radiant heat exchange between non black surfaces. Combined heat transfer by conduction, convection, radiation. (10 Hrs, 20 Marks)

UNIT- V:

Heat exchange equipments:

Heat exchanger single pass 1-1 exchanger, 1-2 shell and tube heat exchanger, correction for LMTD for cross flow, design calculation (Kern Method) in heat exchanger.

Evaporation:

Liquid characteristics and types of evaporator, single effect evaporator calculation, pattern of liquor flow in multiple effect evaporators. (10 Hrs, 20 Marks)

REFERENCES

1) W.L.McCabe and J.C.Smith , Unit operations in chemical engg. McGraw Hill/Kogakusha Ltd.
2) Coulson & Richardson , Chemical engg. – Volume. I , Pergamon Press
3) Kern D.Q. Process Heat Transfer, McGraw Hill Book 1NC New York, 1950
4) D.S.Kumar, Process Heat Transfer, S.K.Kataria and Sons Publisher, New Delhi

PRACTICALS

Term Work Shall be based on any 08 experiments mentioned below.

1) Conductivity of metals and / or insulator.
2) Experiment on Pin fins.
3) Experiment on forced convection apparatus.
4) Experiment on natural convection apparatus.
5) Determination of emmisivity of test plate.
6) Stefan Boltzman apparatus .
7) Parallel / counter flow heat exchanger.
8) Study of pool boiling phenomenon and critical heat flux.
9) Study of heat transfer in evaporator .
10) Temperature profile in a rod .
11) Study of evaporators .
12) Dropwise and filmwise condensation .

3. MASS TRANSFER-I

Teaching Scheme:
Lectures: 4 Hrs. / Week
Practical: 4 Hrs. / Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Practical: 50 Marks
Term Work: 25 Marks

UNIT- I:
Introduction to mass transfer operations, Steady state molecular diffusion in fluid at rest, Multicomponent mixture diffusion, Maxwell's law of diffusion
Diffusion in solids, Unsteady state diffusion (10 Hrs, 20 Marks)

UNIT- II:
Eddy (turbulent) diffusion: Relation between mass transfer coefficients.
Mass transfer coefficient in laminar and turbulent flow
Theories of mass transfer
Equipments for gas liquid operation (10 Hrs, 20 Marks)

UNIT- III:
Equilibrium for mass transfer process.: Local two phase mass transfer
Local overall mass transfer coefficient, Use of local overall coefficient.
Material balances for steady state co current, countercurrent, cross flow cascade, counter flow cascade.
Application of mass transfer processes (10 Hrs, 20 Marks)

UNIT- IV:
Introduction to Gas Absorption Operation: Equilibrium solubility of gases in liquids
Material balance for one component transferred in countercurrent flow and co current flow
Countercurrent multistage operation, one component transferred
Continuous contact equipment
Introduction to multi component system
Absorption with chemical reaction
Different absorption operation equipments (plate tower, packed tower, venturiscrubber)
Operational difficulties like coning weeping, dumping, priming ,flooding in plate and packed tower. (10 Hrs, 20 Marks)

UNIT- V:
Introduction to Humidification: Vapour liquid equilibrium, Humidification terms
Determination of humidity, Humidification and dehumidification
Water cooling operation equipment
Introduction to Drying operation: Rate of drying, Mechanism of moisture movement during drying, Drying equipments, Different methods of drying (10 Hrs, 20 Marks)

PRACTICALS

Term Work Shall be based on experiments mentioned below.

1) Diffusion In Still Air: To estimate mass transfer coefficient for given system at room temperature.
2) Liquid – Liquid Diffusion: To determine diffusion coefficient for given system as function of concentration.
3) Solid – Liquid Diffusion: To determine mass transfer coefficient for dissolution of benzoic acid without chemical reaction.
4) Wetted Wall Column: To determine mass transfer coefficient for air – water system.
5) Absorption in Packed Column: To find mass transfer coefficient of given system.
6) Cooling Tower: To determine volumetric mass transfer coefficient for air – water system.
7) Natural Drying (Batch): To obtain drying curve for batch drying operation.
8) Fluidized Bed Dryer: To determine the rate of drying and to obtain mass transfer coefficient for the given material.

REFERENCES

1) R.E.Treybal , Mass transfer operation ,McGraw Hill Publication
2) Coulson & Richardson Chemical Engineering (Vol. I and II), Pergamon Press
3) Christie J.Geankoplis ,Transport Processes & Unit Operations ,Prentice Hall inc
4) P. Chattopadhayay ,Unit operation in Chemical Engg. (Vol. I and II), Khanna Publications Delhi

4. PROCESS EQUIPMENT DESIGN & DRAWING –I

Teaching Scheme:
Lectures: 4 Hrs./ Week
Term Work: 4 Hrs./ Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Term Work: 50 Marks

UNIT- I:

Design Considerations: Design codes, Maximum working pressure, Design pressure, Design Temperature, Design stress, Factors of safety, Selection of factor of safety, Design wall thickness, Corrosion ratio, Poisson ratio, Criteria of failure, Elastic stability.
Materials of construction : Mechanical properties, Materials, Corrosion, Protective coating, Corrosion prevention, Choice of materials (10 Hrs, 20 Marks)

UNIT- II:

Keys: Introduction, Types of keys, Strength of sunk key, Effect of key ways, Design of keys
Design of Heads: Introduction, Analysis and design of conical head, Flat cover head, Standard dished heads.
Gaskets & Flanges: Introduction, Types of Gaskets & Flanges. (10 Hrs, 20 Marks)

UNIT- III:

Pipe joints: Standard pipe flanges for steam, Hydraulic pipe joints for high pressure, Introduction to gaskets and flanges, Design of circular flange pipe joints.
Welded Joints
Riveted joints
Storage vessels: Introduction, Design fixed conical roof cylindrical tank, Storage of gases in Spherical vessels
Supports for vessels: Introduction, Bracket or Lug supports, Leg Supports, Skirt Supports
(10 Hrs, 20 Marks)

UNIT- IV:

Design of Cylindrical Vessels under internal Pressure: Introduction, Thin wall vessels, Design Equations.
Design of process vessels and pipes under external pressure: Introduction, Determination of safe pressure against elastic failure, Determination safe external pressure against plastic deformation, Circumferential stiffness, Pipes and tubes under external pressure.
(10 Hrs, 20 Marks)

UNIT- V:

Process Hazards and Safety Measures in Equipment Design: Introduction, Hazards in Process Industries, Hazards Analysis, Safety Measures, Safety Measures in Equipment Design, Pressure relief Devices
Design of packed absorption tower: Introduction, Design of circular & diameter of Packed Absorption Tower (10 Hrs, 20 Marks)

TERM WORK:

The term work shall consist of drawing of at least 8 half imperial size sheets from the following

1) Standard equipment symbols

2) Standard instrumentation symbols

3) Pipe fittings

4) Heads and closures

5) Keys and couplings

6) Pressure relief devices

7) Supports for vessels-Bracket Support

8) Supports for vessels-Leg Support

9) Supports for vessels-Skirt Support

10) Design and drawing of packed absorption tower

11) Riveted joints

12) Welded joints

REFERENCES:

1 B.C. Bhattacharya, Introduction to Chemical Equipment Design (Mechanical Aspects), CBS Publisher and Distributors, New Delhi.

2 M.V.Joshi, V.V. Mahajan, Process Equipment Design, 3rd Edition, Macmillan India Ltd.

3 Coulson & Richardson, Chemical Engineering (Vol. VI), Pergamon Press

4 R. S. Khurmi, J.M. Gupta, A Text Book of Machine Design, S. Chand & Company Ltd, New Delhi.

5 S.D. Dawande, Process Design of Equipments (Vol. I),Central Techno Publications, Nagpur.

5. CHEMICAL ENGINEERING THERMODYNAMICS

Teaching Scheme: Examination Scheme:
Lectures: 4 Hrs./ Week Paper: 100 Marks (3 Hrs)

UNIT- I :
Fundamental Concepts : Introduction to the subject, The laws of Thermodynamics, Cyclic rule, Coefficient of Thermal Expansion, Compressibility Coefficient
First Law of Thermodynamics : Basic Laws, Law of corresponding state, Heat Capacities, Variation of energy with Temperature and Volume, Enthalpy as a function of Temperature & Pressure, Joule-Thomson Coefficient Relation between Cp and Cv, Thermodynamic relations, Generalized Equation of State, Redlich-kwong equation of state, Soave-Redlich-Kwong equation of state. (10 Hrs, 20 Marks)

UNIT- II :
The Second Law of Thermodynamics: Introduction, Mathematical Treatment of Entropy Concept, Combined form of First and Second Law of Thermodynamics, Thermodynamic Relations based on Second Law of Thermodynamics, Calculations of Entropy Changes, Third Law of Thermodynamics. (10 Hrs, 20 Marks)

UNIT- III :
Multicomponent Mixture: Partial Molar Quantities: General Aspects, Determination of Partial Molar Volume, Determination of Partial Molar Enthalpy, Fugacity and Fugacity Coefficient, Fugacity coefficient through equation of state, Fugacity coefficient through virial coefficient correlation.
Properties of Solutions: Ideal solution: General Aspects, Phase equilibrium: General Aspects, Gibbs-Duhem Equation, Gibbs-Duhem-Margules Equation, Application of Gibbs-Duhem Equation, Application of Gibbs-Duhem-Margules Equation. (10 Hrs, 20 Marks)

UNIT- IV :
Vapour-Liquid Equilibria (VLE) : Basic equations for VLE, Reduction of VLE data, VLE at low to moderate pressure, Excess Gibbs free energy Model, Margules Equation & Van Laar Equation, Thermodynamic consistency test of VLE data
Phase Equilibria for Single Component System: Gibbs-Helmholtz Equation, The Clapeyron Equation, Clausious-Clapeyron Equation, Application of Clapeyron Equation.
(10 Hrs, 20 Marks)

UNIT- V:
Chemical Reaction Equilibria: The criteria for chemical equilibrium, Equilibrium constant, Law of chemical equilibrium, Thermodynamic treatment of the law of mass action, Van't Hoff reaction isotherm, Relations between equilibrium constant, Homogeneous gaseous equilibria, Temperature dependence of the equilibrium constant (The Van't Hoff Equation), Integrated form of the Van't Hoff equation, Pressure dependence of the equilibrium constant.
Applications of Phase Equilibrium in Ideal Solutions: To construct pressure-composition and boiling point diagrams. (10 Hrs, 20 Marks)

REFERENCES:

1 Y.V.C. Rao, Chemical Engineering Thermodynamics, University Press (INDIA) Ltd., Orient Longman Ltd., Hyderabad.

2 K.V. Narayanan, A Text book of Chemical Engineering Thermodynamic, Prentice Hall India Pvt. Ltd., New Delhi.

3 R.R.Rastogi and R.R.Mishra, An Introduction to Chemical Thermodynamics, Vikas Publishing House Pvt.Ltd, New Delhi.

4 D.Shrinivasan, Chemical Engineering Thermodynamics, New Age International Publisher New Delhi.

5 G.N. Pandey and J.C.Chaudhari, Chemical Engineering Thermodynamics, Khanna Publishers, Delhi.

6 J.M.Smith, H.C.Vanness, M.M.Abbott Introduction to Chemical Engineering Thermodynamics, 5^{th} edition, McGraw Hill International Editions.

6 B.G.Kyle, Chemical and Process Thermodynamics, Prentice Hall India Pvt. Ltd., New Delhi.

1. INSTRUMENTATION & INSTRUMENTAL ANALYSIS

Teaching Scheme:
Lectures: 4 Hrs. / Week
Practical: 2 Hrs. / Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Oral: 25 Marks
Term Work: 25 Marks

UNIT- I :

Qualities of Measurement: The meaning of measurement, The elements of instruments, Static Characteristics, Dynamic characteristic.

Expansion Thermometers: Introduction, Temperature scales, Constant volume gas Thermometer, Bimetallic Thermometer, Industrial pressure spring thermometer, Response of Thermometer. (10 Hrs, 20 Marks)

UNIT- II :

Thermoelectric Temperature Measurement: Introduction, Simple thermocouple circuit, Industrial thermocouples, Thermocouple lead wires, thermal wells, response of thermocouples.

Resistance Thermometer : Introduction, Industrial resistance-thermometer bulbs, Resistance thermometer element, Resistance thermometer circuit, RTD. (10 Hrs, 20 Marks)

UNIT- III:

Radiation Temperature Measurement: Introduction, Black body conditions, Black body devices, Radiation receiving elements, Thermopile, Vacuum thermocouples, Radiation pyrometers , Lens type thermal radiation receiver , Photoelectric pyrometers, Photoelectric radiation receiver, Optical pyrometer.

Pressure and Vacuum Measurement: Introduction, Indicating pressure gage, Bellows pressure element, Useful ranges of absolute pressure measuring gages, Mclead vacuum gage.

Measurement of Pressure's in Corrosion Fluids: The steam gage siphon, Diaphragm seal in Pressure measurement, Liquid seal in pressure measurement, Response of mechanical pressure gages. (10 Hrs, 20 Marks)

UNIT- IV:

Measurement of Level: Float and tape liquid level gage, Float & shaft liquid level unit, Level measurement in pressure vessels, Gamma ray method, Ultrasonic method & resistive method.

Introduction, Theory, Instrumentation, advantages, and Application of: pH measurement, Refractrometry, Potentiometry, colourometry and Flame photometry.(10 Hrs, 20 Marks)

UNIT- V:

Introduction, Theory, Instrumentation, Advantages and Application of: Gas chromatography, Thin layer chromatography, Amerometric titration, Infrared spectrography, Atomic absorption spectrography.

Introduction to turbidimetry, Karl-Fischer titrimetry, Conductometric titrations and HPLC. (10 Hrs, 20 Marks)

PRACTICAL and TERM WORK:

Practical and Term work shall consist of minimum eight experiments given below.

1) To study the response of bimetallic thermometer.
2) Calibration of thermocouple.
3) To measure the PH of given solution.
4) To measure the conductance of given solution.
5) To determine concentration of given solution by colorimeter
6) Flame photometry
7) Thin layer chromatography
8) Paper chromatography
9) Abbey's refractometer

REFERENCE:

1. D.P.Eckman, Industrial Instrumentation, Willey Eastern Ltd., New Delhi.
2. Fatranabis D. Industrial Instrumentation, Tata – Mcgraw Hill Publications, New Delhi.
3. Gurdeep Chatwal and sham Anand, Instrumental methods of Chemical analysis, Himalaya publication House, Mumbai.
4. V.P. Kudesia and S.S. Sawhaney, Instrumental methods of chemical analysis Pragati Prakashan, P.O.Box No. 62, Begum Bridge,Meerut250001,U.P.
5. Nakra B.C. and K.K. Chaudhary, Instrumentation Measurement & Analysis, Tata – McGraw Hill, New Delhi.
6. Dr. B.K.sharma.Goel, Instrumentation methods of chemical analysis, Publishing House,11,Shivaji Road, Meerut-250001,U.P.

2. CHEMICAL REACTION ENGINEERING-I

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 2 Hrs./ Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Oral: 25 Marks
Term Work : 25 Marks

UNIT-I :
Introduction to chemical reaction engineering: Review of chemical reaction equilibrium, Classification of chemical reaction, rate of reaction, order and molecularity of reaction, rate constant, Temperature dependent term of rate equation, comparison of theories, Activation energy and temperature dependency, rate of reaction predicted by theories, Reaction mechanism. **(10 Hrs, 20 Marks)**

UNIT- II :
Collection & interpretation of kinetic data, Constant volume batch reactor, integral and differential method of analysis of data, Variable volume batch reactor , integral and differential method of analysis of data, The search for rate equation. **(10 Hrs, 20 Marks)**

UNIT- III :
Ideal batch reactor ,mixed flow reactor ,plug flow reactor, space time and space velocity, holding time and space time for batch , mixed and plug flow reactors, comparison in mixed and plug flow reactors, Combined flow system, Recycle reactor, Autocatalytic reaction.
(10 Hrs, 20 Marks)

UNIT- IV :
Introduction to multiple reactions: Reaction in parallel, Reaction in series, Series parallel reaction. Optimum temperature progression for single reaction, Isothermal, adiabatic, non adiabatic operation. Product distribution and temperature for multiple reactions.
(10 Hrs, 20 Marks)

UNIT- V :
Residence time distribution of fluid in vessel, Conversion directly from tracer information, Models for non-ideal flow, Dispersion models, Tank in series model, Concept of micro and macro mixing. **(10 Hrs, 20 Marks)**

PRACTICAL and TERM WORK:
Practical and Term work shall consist of minimum eight experiments from list given below.

1) To determine the reaction rate constant {k} for given reaction.(CSTR / BATCH / SEMIBATCH / PFR)
2) To determine the effect of temperature on reaction rate constant. .(CSTR / BATCH / SEMIBATCH / PFR)
3) To determine the activation energy {E} for the given reaction. .(CSTR / BATCH / SEMIBATCH / PFR)

4) To draw C [t], E [t] & F [t] curve and to calculate the mean residence time {tm} variance { σ^2} and skew ness { S^3} for plug flow reactor.
5) To draw C [t], E [t] and F [t] curve and to calculate the mean residence time {tm} variance { σ^2} and skew ness { S^3} for packed Bed reactor.
6) To study the cascaded CSTR
7) To draw C [t], E [t] and F [t] curve and to calculate the mean residence time {tm} variance { σ^2} and skew ness {S^3} for Annular reactor.
8) To study the kinetic in tubular flow reactor [coiled tube] for the given reaction.

REFERENCE:

1. Octave Levenspiel, Chemical reaction engineering, John Wiley and sons.
2. J.M. Smith, Chemical engineering kinetics, McGraw Hill
3. S.D. Dawande, Principles of reaction engineering, Central Techno publication, Nagpur.
4. H.Scott Fogler, Elements of chemical reaction engineering, Prentice Hall New Jersy
5. Lanny D. Schimdt , Chemical reaction engineering, Oxford University Press.

3. MASS TRANSFER-II

Teaching Scheme:
Lectures: 4 Hrs. / Week
Practical: 4 Hrs. / Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Practical: 50 Marks
Term Work: 25 Marks

UNIT- I :
Introduction to distillation process, Vapor liquid equilibrium, The methods of distillation (Binary mixture), The fractionating column, Condition for varying overflow in non- ideal system(Binary), Batch distillation, Multi component mixture, Azeotropic, extractive and steam distillation, Introduction to distillation equipments. (10 Hrs, 20 Marks)

UNIT- II :
Introduction to extraction process, Liquid equilibria, Material balances for stage wise contact methods, Extraction with reflux, Fractional extraction, Stage contact and continuous contact type extractors. (10 Hrs, 20 Marks)

UNIT- III:
Introduction to crystallization, Growth and properties of crystals, Effect of impurities in crystallization, Effect of temp. on solubility, Fractional crystallization, Caking & yield of crystals, Different type of crystallizes. (10 Hrs, 20 Marks)

UNIT- IV:
Introduction to adsorption operation, Type of adsorption operation, Nature of adsorbents, Adsorption equilibria, Adsorption of vapor, gas mixture and liquids, Material balances for stage wise for operation, Continues contact process for adsorption, Unsteady state fixed bed adsorbed, Principle of ion exchange operation, Equilibria for ion exchange operation, Rate of ion exchange operation, Application of ion exchange operation. (10 Hrs, 20 Marks)

UNIT- V:
Introduction to leaching operation, Mass Transfer in leaching operation, Calculation of of stages for diff. Processes, Graphical method for calculation of no. of stages counter current washing process, Equipments for leaching operation, Introduction to membrane separation process, Different Types of membrane separation process, (Ultrafiltreation , Reverse Osmosis, Dialysis, Electro Dialysis, Pervaporation), General membrane equation, Liquid membrane (10 Hrs, 20 Marks)

TERM WORK:
Any eight experiments based on the above syllabus.

1. Simple Distillation: To verify Rayleigh's equation for simple distillation
2. Ternary Diagram: To construct ternary diagram for acetic acid –water – benzene
3. Tie Lines
4. Liquid – Liquid Extraction: To study and determine the efficiency of cross current liquid- liquid extraction.

5. Leaching
6. Crystallization
7. Adsorption: To study adsorption of acidic acid on activated charcoal
8. Determination of HTU, HETP and NTU
9. Spray Column
10. Ion Exchange
11. Bubble Cap Distillation
12. Study Of Mass Transfer Equipments

REFERENCES:

1) Coulson and Richardson, Chemical Engineering (Vol. II), Pergamon Press
2) RE. Tryebal, Mass Transfer Operation, McGraw hill.
3) Christie J. Geankoplis ,Transport Processes and Unit Operations ,Prentice Hall inc
4) P. Chattopadhyay, Unit operations in Chemical Engg. Vol. I and II, Khanna Publication, New Delhi.

4. PROCESS EQUIPMENT DESIGN & DRAWING –II

Teaching Scheme:
Lectures: 4 Hrs./ Week
Term Work : 4 Hrs./ Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Term Work: 50 Marks

UNIT- I:

Process Design of Heat Exchanger: Introduction, Types Of Heat Exchanger, Process Design of Shell and Tube Heat Exchanger.

Process Design of Evaporator: Introduction, Types of Evaporators, Methods of Feeding of Evaporators, Design of Evaporator **(10 Hrs, 20 Marks)**

UNIT- II:

Process Design of Reaction Vessels: Introduction, Materials of Construction, Agitation, Classification of Reaction Vessels, Heating Systems, Design of Reaction Vessels.

Crystallizer Design: Introduction, Types of Crystallizers, Design of crystallizers. **(10 Hrs, 20 Marks)**

UNIT- III:

Process Design of Rotary Dryer: Introduction, Types Dryers, Design of Rotary Dryer.

Design of Tall Vessels :Introduction, The Axial Stresses Due To Dead Loads, The Axial Stresses Due To Pressure, Longitudinal Bending Stresses due to Dynamic Loads, Design Of Distillation (Tall) Column (Tower). **(10 Hrs, 20 Marks)**

UNIT- IV:

Design of Sieve Tray for Distillation Column

Design of Thick Walled High Pressure Vessel **(10 Hrs, 20 Marks)**

UNIT- V:

Design of Bubble Cap Tray For Distillation Operation

Agitators : Introduction, Types Of Agitators, Baffling, Power Requirements, Design Of Turbine Agitator. **(10 Hrs, 20 Marks)**

TERM WORK:

The Term Work shall consist of process design and drawing of equipments on at least five half imperial sized sheets. Based on the above syllabus.

REFERENCES:

1) B. C. Bhattacharya, Introduction to Chemical Equipment Design (Mechanical Aspects) CBS Publisher & Distributors, New Delhi.
2) M.V.Joshi, V.V. Mahajan, Process Equipment Design, 3rd Edition, Macmillan India Ltd.
3) Coulson & Richardson, Chemical Engineering (Vol VI), Pergamon Press.
4) R.E.Treybal, Mass Transfer Operations, McGraw Hill, New Delhi.
5) S.D. Dawande, Process Design of Equipments (Vol. 1& 2) Central Techno Publications, Nagpur.
6) G.K.Roy, Solved Problems In Chemical Engg., Khanna Publications, NewDelhi.
7) J.H.Perry, Chemical Engineer's Hand Book, McGrawhill, New Delhi.

5. MATHEMATICAL METHODS IN CHEMICAL ENGINEERING

Teaching Scheme: Examination Scheme:
Lectures: 4 Hrs./ Week Paper: 100 Marks (3 Hrs)

UNIT- I:
Root Finding Methods : Bisection Method, Regula-falsi Method, Newton-Raphson Method, Direct Integration Method, Muller's Method.
Solution Of Simultaneous Linear Equation: Gauss Elimination Method, Matrix Inversion Method, Gauss Jordan Method, Jacobi's Iteration Method, Gauss Seidal Method
(10 Hrs, 20 Marks)

UNIT- II:
Interpolation & Extrapolation: Newtons-Gregory Forward Interpolation Formula, Newtons-Gregory Backward Interpolation Formula, Stirling's Formula, Central Difference Interpolation Formula, Choice of an Interpolation Formula.
Linear Programming (L.P.) : Introduction To L.P., Formulation Of L.P. Problems (L.P.P)/L.P. Models. Solution Of L.P.P. by Analytical Method (containing two variables), Solution Of L.P.P. By Graphical Method (10 Hrs, 20 Marks)

UNIT- III :
Chemical Engineering Optimization-I : The Optimum Diameter To height ratio for Large Oil Storage Vessel for Cost Minimization, Optimization of diameter and length of heat exchanger, Optimization of dimensions of an open rectangular Tank, Optimum thickness of insulation, Optimization of outlet temperature for counter-current arrangement in heat exchanger (10 Hrs, 20 Marks)

UNIT- IV:
Solution of L.P.P. with application of simplex technique.
Chemical engineering optimization-II : Optimum (economical) pumping temperature for pumping of oil, Optimization of dimension of rotary dryer, Optimum dimensions and optimum outlet temperature of air preheater, Optimization of kinetics of consecutive reactions (10 Hrs, 20 Marks)

UNIT- V:
Chemical engineering optimization-III : Optimum residence time for maximum yield in ideal isothermal batch reactor, optimization in refinery blending operation, optimization to get max. yield with respect to reactor volume, optimization of dimensions of straight rectangular Fin, optimization of performance of batch reactor with two consecutive reactions (by considering optimum Steam flow rate), optimum temperature approach and optimum Velocity (by considering process heat transfer approach), optimum proportions of a pressure vessel, optimum size of pressure vessels. (10 Hrs, 20 Marks)

REFERENCE:

1. T.F.Edgar and B.M.Himellblau optimization of chemical processes, International Edn.1989 McGraw hill
2. B.S.Grewal, Higher engineering mathematic, Khanna Publisher,Newdelhi
3. P.K.Gupta and D.S.Hira, Operation research 1st edition reprint 1997, S.Chand& com. NewDelhi.
4. S.S.Sastry; Introduction To methods Of Numerical Analysis, Prentice Hall.
5. B.S. Grewal Numerical Methods In Engg. & Science, Khanna Publications; Delhi
6. G.K.Roy, Solved Problems In Chemical Engg., Khanna Publications, NewDelhi.

6. PRACTICAL TRAINING / MINI PROJECT / SPECIAL STUDY

Examination Scheme:
Term Work: 25 Marks

- Every student has to undergo industrial/practical training for a minimum period of two weeks during summer vacation between (S.E Second Term) fourth and (T.E. First Term) fifth term or during winter vacation between fifth and sixth term (T.E. First Term and Second Term).
- The industry in which practical training is taken should be a medium or large scale industry.
- The paper bound report on training must be submitted by every student in the beginning of (T.E. Second Term) sixth term along with a certificate from the company where the student took training.
- The report on training should be detailed one.
- Maximum number of students allowed to take training in company should be five. Every student should write the report separately.
- In case if a student is not able to undergo practical training , then such students should be asked to prepare special study report on a recent topic from reported literature

  Or

  a mini project related to the Chemical Engineering.
  1. Preparation of Chemical Compound and study of its properties.
  2. Kinetics of different types of reactions.
  3. Analysis of Natural Products, Chemical Products etc.

  Project report should be detail be detail of work, carried out by student.
- The practical training/special study/ mini project shall carry a term work of 25 marks. Every student shall be required to present a seminar in the respective class in the presence of two teachers. These teachers (fixed by the head of department in consultation with the Principal) shall award marks based on the following :

(a)	Report	10 marks
(b)	Seminar presentation	10 marks
(c)	Viva-voce at the time of Seminar presentation	05 marks

	Total	25 marks

==========XXXXX==========

NORTH MAHARASHTRA UNIVERSITY,

JALGAON (M.S.)

FINAL YEAR ENGINEERING (B.E.)

CHEMICAL ENGINEERING

TERM – I & II

W.E.F. 2008-2009

NORTH MAHARASHTRA UNIVERSITY, JALGAON

STRUCTURE OF TEACHING & EVALUATION

B.E. (CHEMICAL ENGINEERING) W.E.F.2008-2009

First Term

Sr. No.	Subject	Teaching Scheme Hours/Week		Examination Scheme				
		Lectures	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Process Dynamics & Control	04	02	03	100	25	--	25
2	Transport Phenomenon	04	--	03	100	--	--	--
3	Chemical Reaction Engineering-II	04	04	03	100	50	--	25
4	Elective –I	04	--	03	100	--	--	--
5	Energy Engineering	04	02	03	100	25	--	25
6	Project –I	--	02	--	--	25	--	25
7	Seminar	--	02	--	--	25	--	--
		20	12		500	150	--	100
	Grand Total	32			750			

Second Term

Sr. No.	Subject	Teaching Scheme Hours/Week		Examination Scheme				
		Lectures	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Computer Aided Process Equipment Design Modeling & Simulation	04	04	03	100	50	25	--
2	Process Engineering Economics & Costing	04	02	03	100	25	--	25
3	Chemical Plant Design & Project Engineering	04	04	03	100	25	--	25
4	Elective –II	04	--	03	100	--	--	--
6	Project –II	--	04	--	--	100	--	50
7	Industrial Visit / Case Study	--	--	--	--	25	--	--
		16	14		400	225	25	100
	Grand Total	30			750			

Subjects:

Elective-I
1. Biochemical Engineering
2. Polymer Engineering
3. Advance Catalysis

Elective-II
1. Industrial Pollution & Control
2. Advance Separation Techniques
3. Petrochemicals

1. PROCESS DYNAMICS & CONTROL

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 2 Hrs./ Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Oral : 25 Marks
Term Work: 25 Marks

UNIT- I

Characteristics of Chemical Process Control, Mathematical Modeling of Chemical Processes, State Variables and State Equation for Chemical Processes.

Input –Output Model, Linearization of non linear systems, Solution of Linear differential equation using Laplace Transform.

First order system and their transfer functions.

(10 Hrs, 20 Marks)

UNIT- II

Dynamic behavior of first order system , Pure capacity process, First order system with variable time constant and gain, Response of first order system in series :Interacting and Non-interacting.

Second order system and their transfer function.

(10 Hrs, 20 Marks)

UNIT- III

Dynamic behavior of second order system: under damped and over damped and critically damped systems, Transportation lag.

Higher order systems.

Introduction to feedback control, Controllers and final control elements.

Control action block diagram of chemical reactant control systems.

(10 Hrs, 20 Marks)

UNIT- IV

Dynamic behavior of feedback control processes: P, PD, PI, and PID.

Design of feedback controller: Performance criteria, selection of type of controller, Tuning of feedback controller.

Stability analysis by Routh criteria, Root Locus Diagram

(10 Hrs, 20 Marks)

UNIT-V

Frequency response analysis of linear processes: Bode's diagram, Nyquist plots.

Design of feedback control system using frequency response technique: Bode's stability criteria, gain and phase margin.

Ziegler – Nichols tuning technique. Nyquist stability criteria,

Control Systems with Multiple Loops: Feed forward control, Cascade control, Ratio control, selective control, split range control, Adaptive and Inferential control. Multi Variable Control

(10 Hrs, 20 Marks)

PRACTICAL and TERM WORK:

Practical and Term work shall consist of minimum eight experiments from list given below.

Dynamic behavior of first order system

1. Mercury Thermometer
2. Single tank system.
3. C.S.T.R.

Dynamic behavior of first order system in series

4. Two tank non-interacting system.

5. Two tank interacting system.

Dynamic behavior of second order system

6. Mercury Manometer

Dynamic behavior of final control Element

7. Pneumatic control valve.

Study of Pneumatic controllers.

8. Proportional Controller
9. Proportional Derivative Controller
10. Proportional Integral Controller
11. Proportional Integral Derivative Controller

Control Systems

12. Study of closed loop control system.

REFERENCES

1. George Stephanpolous, Chemical Process Control, Prentice Hall of India.
2. D.R. Coughnour, Process System Analysis and Control, McGraw-Hill.
3. R.P.Vyas, Process Control & Instrumentation {2nd edition}. Central Techno publication, Nagpur.
4. K. Krishnaswamy, Process Control, New age International.

2. TRANSPORT PHENOMENON

Teaching Scheme:
Lectures: 4 Hrs./ Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)

UNIT-I

Introduction. Transport phenomenon and Unit Operation.

Equilibrium and Rate Processes. Fundamental variables and Unit The role of Intermolecular forces.

Simple Balance: Material and Energy.

Molecular transport Mechanism:

The Analogy. The Case of Heat Transfer. The Case of Mass Transfer. The Case of Momentum Transfer. The Analogues forms. Heat, Mass, Momentum Diffusivities. Thermal Conductivity. Diffusion Coefficient. Viscosity.

(10 Hrs, 20 Marks)

UNIT-II

Viscosity and Mechanism of Momentum Transport.

Velocity Distribution in Laminar Flow.

(10 Hrs, 20 Marks)

UNIT-III

Thermal Conductivity and The Mechanism of Energy Transport.

Temperature Distribution in Solids and in laminar Flow.

(10 Hrs, 20 Marks)

UNIT-IV

Diffusivity and Mechanism of mass Transport.

Concentration Distribution in Solids and in Laminar Flow.

(10 Hrs, 20 Marks)

UNIT-V

The Equation of Change for Isothermal System.

The Equation of Change for Non-Isothermal System.

(10 Hrs, 20 Marks)

REFERENCES

1. R.B.Bird; W.E.stewart; E.N.Lightfoot, Transport Phenomenon, John Wiley & Sons1994; Singapore
2. R.S.Brodsky & H.C.Hershey, Transport Phenomenon ,McGraw-Hill{International edition}
3. C.O.Bennett & J.E.yers; Momentum, Heat & Mass Transfer; McGraw-Hill1982.
4. James R. Welly, Charles E. Wicks & Robert E.Wilson; Fundamentals of Momentum, Heat & Mass Transfer{3rd edition}. John Wiley & Sons; Singapore

3. CHEMICAL REACTION ENGINEERING – II

Teaching Scheme:
Lectures: 4 Hrs. / Week
Practical: 4 Hrs. / Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Oral : 25 Marks
Term Work: 50 Marks

UNIT-I

Introduction – Rate equations for heterogeneous systems , Contacting patterns in Two –Phase system ,Introduction to fluid particle reaction non-catalytic reactions, unreacted core model for Spherical particle of unchanging size, Rate of reaction for shrinking spherical particles , Determination of rate controlling step , Various contacting patterns in fluid solid reactors for fluid-particle non-catalytic reactions

(10 Hrs, 20 Marks)

UNIT-II

Introduction to fluid-fluid system (without catalyst), Rate equation for Instantaneous, Fast, Intermediate and slow reaction, Slurry Reaction kinetics, Rate equation for infinitely slow reaction Film conversion parameter , Reactors for gas-liquid reactions and their comparative evaluations on the basis of holdups .

Gas liquid reaction modeling on the basis of simultaneous absorption reaction model.

Aerobic fermentation, Tower for fast and slow reaction, Mixer settler and semi-batch contacting pattern .

Reactive distillation and extractive reaction.

(10 Hrs, 20 Marks)

UNIT-III

Introduction , Classification , Characteristics , Preparation and Deactivation of catalyst , Promoters and inhibitors , Determination of surface area and Pore volume of catalyst , Adsorption process and its classification , Types of adsorption isotherm .

(10 Hrs, 20 Marks)

UNIT-IV

Introduction to solid catalyzed reactor , Rate equation for adsorption , desorption and surface reaction, Diffusion and reaction in spherical catalyst pellets , Internal effectiveness factor, Over all effectiveness factor, Estimation of diffusion and reaction limited regimes, Mass transfer and reaction in a packed bed, The determination of limiting situation from reaction data, chemical vapor deposition reactors.

(10 Hrs, 20 Marks)

UNIT-V

Introduction to heterogeneous catalytic reactors,

Design, Mechanical construction and applications of: Moving bed reactors, Fluidized bed Reactors, Slurry bed reactors, Trickle bed reactors, Isothermal and Adiabatic fixed bed reactor.

(10 Hrs, 20 Marks)

REFERENCES

1. Octave Levenspiel , Chemical Reaction Engg" 3rd edition (1999)
2. H Scott Fogler, Elements of Chemical Reaction Engineering, Prentice Hall of India , 2nd edition (1997)
3. J M Smith, Chemical Engg Kinetics 3rd edition , New York , McGraw Hill (1981)
4. Lanny D Schmidt , The Engineering of Chemical Reactions ,Oxford University Press (1998)
5. Froment and Bischoff , Chemical Reactor Analysis and Design, Wiley Publications , New York (1979)
6. Hiroo Tominaga and Masakazu Tamaki, Chemical reactions & reactor design Ed Wiley and Maruzene Publications(1997)

PRACTICAL and TERM WORK:

Practical and Term work shall consist of eight experiments from list given below.

1. To study the reaction of solid liquid system for an instantaneous reaction for benzoic acid NaOH and calculate the enhancement factor.
2. To study the isothermal decomposition of ethyl alcohol in tubular reactor packed with activated alumina catalyst.
3. To improve the % purity of commercially used ethanol using reactive distillation.
4. To improve the % purity of commercially used ethanol using extractive distillation.
5. To carry out the catalytic reaction to convert the nitrobenzene to aniline in presence of iron filling/HCl catalyst in the reactor.
6. To study the reaction of liquid liquid system for butyl acetate NaOH and to calculate the enhancement factor.
7. Absorption – to study the reaction of liquid gas system for NaOH – CO_2 to determine rate of absorption.
8. Adsorption- to study the adsorption of Acetic acid on charcoal
9. Preparation of Butyl Acetate by Reactive Esterification

4. ELECTIVE – I
1. BIOCHEMICAL ENGINEERING

Teaching Scheme: Examination Scheme:
Lectures: 4 Hrs./ Week Paper: 100 Marks (3 Hrs)

UNIT-I:

Characteristics of Biological material. Types of microorganisms; general physical properties of cells and chemical composition of cells; requirement for growth of cells and formulation of media; reproduction cycles in microorganisms; changes in composition of cells with age and with growth rate; effect of substrate limiting growth on the composition of cells; strain breeding; Maintenance of pure cultures.

Material Balances in bioprocesses, Application of material balances to bioprocesses; material balance with recycle, by-pass and purge streams. Stoichiometry of growth and product formation. Thermodynamics of microbial growth. Energy balances in bioprocesses, Heat of reaction for processes with biomass production. Unsteady state energy and material balances in bioprocesses.

(10 Hrs, 20 Marks)

UNIT-II:

Enzymes. History. Enzyme nomenclature and classification. Properties of enzymes. Applications of enzymes. Enzyme substrate complex and enzyme action. Effect of Temperature and pH on enzyme activity.

Kinetics of enzyme catalyzed reaction; simple enzyme kinetics with one and two substrates; Michaelis Menten kinetics. Evaluation of parameters of Michaelis Menten equation. Kinetics of reversible enzyme catalyzed reaction. Enzyme inhibition. Types of enzyme inhibition. Kinetics of competitive, uncompetitive and noncompetitive enzyme inhibition. Substrate activation and inhibition. Multiple substrates reacting on a single enzyme. Immobilization of enzymes and their applications. Kinetics of immobilized enzyme system.

(10 Hrs, 20 Marks)

UNIT-III:

Microbial Kinetics: Monod's growth kinetics. Environmental effects on growth kinetics. Balanced growth kinetics, Transient growth kinetics, Unstructured batch growth model, Growth of filamentous organisms, Structured kinetic model, Product formation kinetics. Unstructured model. Chemically structured kinetic model, Product formation kinetics by filamentous organisms.

Reactor Cofigurations: Enzyme reactors, Batch growth of microorganisms, Continuous culture of microorganisms, Stirred tank reactor with recycle of biomass, Continuous stirred tank fermenters in series, plug flow fermenter, fed batch fermenter, CSTR cell reactors with recycle and wall growth, multiphase reactors such as packed bed reactors, bubble column reactors, fluidized bed reactors and trickle bed reactors.

(10 Hrs, 20 Marks)

UNIT-IV:

Sterilization: Importance of Sterilization. Batch Sterilization of liquids, continuous sterilization of liquids, filter sterilization of liquids, sterilization of air, thermal death kinetics of cells and sports.

Aeration and Agitation: Mass transfer and Microbial respiration, bubble aeration and mechanical agitation, correlation between oxygen transfer coefficient and operating variables, effect of temperature, organic substances, surface active agents, mycelium and types of sparger on oxygen transfer coefficient. Measurement of oxygen transfer coefficient, Scale up.

(10 Hrs, 20 Marks)

UNIT-V:

Recovery of fermentation products, principle of mechanical separation; hindered settling in gravitation and centrifugal fields, filtration, pretreatment of cells to alleviated filtration resistance; Disruption of cells, mechanical methods, ultrasonic vibrations, grinding and mechanical shear, shearing by pressure, induction by lysis(physical methods, lytic agents, dessication, increasing the fragility of cells, Extraction preliminary fractionation procedures(removal of nucleic acids precipitation),high resolution techniques(ultra filtration, Chromatography, counter current distribution methods and other means).

Instrumentation and Control: Introduction, methods of measuring process variables; temperature measurement and control, pressure measurement and control ,foam sensing and control, weight of fermenter and estimation of microbial biomass, dissolved oxygen measurement and control, inlet and exit gas analysis, pH measurement and control, online analysis of other chemical factors and computer applications in fermentation technology, bioprocess economics.

(10 Hrs, 20 Marks)

REFERENCES

1. Shuichi Aiba, Arthur E.H. & Nancy F.M.,Biochemical Engineering; University of Tokyo Press.

2. James E.Bailey & David F.Ollis, Biochemical Engineering. Fundamentals; McGraw Hill Publication.
3. P.F.Stanbury, A.Whitaker & S,J.Hall, Principles of Fermentation Technology; Aditya Books Ltd; New Delhi.
4. Doran Pauline M. Bioprocess Engineering Principles, Academic Press. An Imprint of Elsevier.
5. Shular Michael L.and Kargi Fikret. Bioprocess Engineering Basic Concepts, Prentice Hall of India.
6. Editors: J.F. Richardson, D.G. Peacock, Coulson's & Richardson's Chemical Engineering, (Vol-III) Asian Books Pvt. Ltd. New Delhi
7. J.H. Backhurst& J.H.Harker, Coulson's & Richardson's Chemical Engineering(Vol-V) Asian Books Pvt. Ltd. New Delhi

4. ELECTIVE – I
2. POLYMER ENGINEERING

Teaching Scheme: Examination Scheme:
Lectures: 4 Hrs./ Week Paper: 100 Marks (3 Hrs)

UNIT-I:
Introduction to polymer and their classification. Types of polymerization. Addition Polymerization and Condensation Polymerization. Mechanism of polymerization.
Bulk, solution, suspension and emulsion polymerization techniques; merits, demerits and applications of these techniques.

(10 Hrs, 20 Marks)

UNIT-II:
Kinetics of polymerization: Kinetics of free-radical chain polymerization via initiation; propagation and Termination. Degree of polymerization and chain transfer reactions. Kinetics of catalyzed and uncatalyzed polycondensation reactions. Molecular Weight distribution; extent of reaction and degree of polymerization of polycondensation reactions.

(10 Hrs, 20 Marks)

UNIT-III:
Introduction to average molecular weight and Molecular Weight distribution in polymers, measurements of number, average by cryoscopy; Ebwiometry ; membrane osmometry ; vapor pressure osmometry and end group analysis. Measurement of viscosity, average molecular weight by viscometry.

(10 Hrs, 20 Marks)

UNIT-IV:
Thermal analysis of polymer by differential scattering calorimeter; TGA, TMA and HDT. Mechanical properties like tensile strength, Young's Modulus, hardness, etc.

(10 Hrs, 20 Marks)

UNIT-V:
Properties, applications and manufacturing techniques of polyethylene, PVC, Phenol formaldehyde, Urea formaldehyde resins, styrene-butadiene rubber (SBR), Nylon6, cellulose fiber (Rayon Yarn), PET.

(10 Hrs, 20 Marks)

REFERENCES
1. V. R. Gowarikar, N. V. Vishwanathan, Polymer science; Wiley Eastern Publication, Delhi
2. B. K. Sharma, Polymer Science, Goel Publishing House; Meerut
3. Fried W. Billmeyar, Text book of polymer science, John Willey and Sons
4. M. Gopalarao, Dryden's Outlines of Chemical Technology; 3rd edn; East West Press.

4. ELECTIVE – I
3. ADVANCE CATALYSIS

Teaching Scheme:
Lectures: 4 Hrs./ Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)

UNIT-I:
Catalysis: Introduction, History.
Homogeneous Catalysis: Introduction, Characterization of solution Processes, Examples of solution catalysis: Acid – base catalysis, Organometallic Catalysis.
Heterogeneous Catalysis: Introduction, Characterization of Surface Processes, Properties of Solid Catalysts, Influence of Mass Transport on Catalyst Performance.
Catalyst Components: Catalytically active species, Supports, Binders, Promoters.
Catalyst treatment: Activation, Deactivation, Regeneration, Redispersion, Reclamation, Disposal and Toxicity
Catalysis by Metals, Metal Oxides and zeolites, Metal Sulphides.

(10 Hrs, 20 Marks)

UNIT-II:
Supported Catalysts: Introduction, Definition of Supported Catalysts.
Advantages of Supported Catalysts: Separability, Cost, Catalyst activity, Catalyst Selectivity.
Support Materials for the Catalyst, Composition, Size and Shape, Surface Area., Porosity and Pore size. Attrition Loss, Density, Cost and quality.
Design and Development of Supported Catalysts: Preparation and Manufacture, Catalyst Preparation Methods, Catalysts from Physical Mixtures, Impregnated Catalysts, Ion exchange Catalysts. Testing and evaluation of Supported Catalysts, Application of Supported Catalysts.

(10 Hrs, 20 Marks)

UNIT-III:
Regeneration of Catalysts
Fluid Catalytic Cracking Unit: Process Description, Heat Balance, Coke formation, Coke burning, CO Combustion, Environmental aspects. Regenerator Operating Parameters. Influence of Regenerator design on Catalyst Fluidization, Equipment/Unit Operation in Cracking Units.
Noble and Base Metal Catalysis: Noble Metal Catalysis, Deactivation, Regeneration, Regeneration Processes such as continuous Catalyst Regeneration, Fixed Bed Semi Regenerative Process, Cyclic or swing, Reactor regeneration.
Base Metal Catalysis: Process and Catalyst Description.

(10 Hrs, 20 Marks)

UNIT-IV:
Catalysis in Petroleum and Petrochemical Industries:
Applications of zeolites in Petrochemical Refining. Improving quality of Petroleum fuels through Catalysis. O-xylene isomerization over Nickel containg SAPO-5 molecular sieves. Pd-sulfonated Polysiloxane catalyst for etherification of FCC light gasoline. Oxidation of Ethylbenzene catalyzed

by Soluble Cobalt (III) complexes. Comparative evaluation of various catalysts used for removal of NOx from air streams.

(10 Hrs, 20 Marks)

UNIT-V:

Biocatalysts: Introduction and importance of biocatalysts. Type of biocatalysts.

Enzymes: Definition, Sources of Enzymes, production of Enzymes. Formation of enzyme substrate complex. Applications.

Simple enzyme kinetics. Derivation of Michaelis Menten equation. Evaluation of parameters of Michaelis Menten equation. Effect of Temperature and pH on enzyme Kinetics.

Microbial Cell: Classification of cells. Requirement for the growth of cells and growth Media. Microbial Kinetics. Monods Equation. Parameters affecting the growth kinetics of cells. Immobilization of enzymes and cells. Methods and Techniques of immobilization. Application of immobilized enzymes and cells.

(10 Hrs, 20 Marks)

REFERENCES

1. Kirk Othmer, Encyclopedia of Chemical Technology, 4th edition, Volume-V. John wiley and sons New York.
2. Editors: Bhattacharya KG and Talukdar A K, Catalysis in Petroleum and Petrochemical Industries. Narosa Publishing House, New Delhi.
3. Editors: Richardson J.F. and Peacock D.G.Richardson and Coulson's , Chemical Engineering , Volume-III, Asian Books Pvt. Ltd., New Delhi.
4. James E. Bailey and David F.Ollis, Biochemical Engineering. Fundamentals; McGraw Hill Publication.

5. ENERGY ENGINEERING

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 2 Hrs./ Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Oral : 25 Marks
Term Work: 25 Marks

UNIT-I:

Introduction to energy engineering. Energy resources and forms of energy. Energy demand. Changing energy consumption trends. National energy strategies. National energy plan. Energy power management and Energy planning in India. Energy Audit. Energy Conservation and recycling.

(10 Hrs, 20 Marks)

UNIT-II:

Conventional Energy Sources

Coal : Type of coal, classification of Indian coal. Important Properties of coal. Exploration, Storage and Transportation of coal. Coal gasification, coal liquefication. Carbonization of coal, Production of coke and coal gas, By-products.

Petroleum, Natural gas and Refinery Products: Introduction to Petroleum and Natural gas and Naphtha. Energy routs of petroleum. Exploration of petroleum. Production of crude oil and Natural gas. Transportation of crude oil and Natural gas. Refining of crude oil and Natural gas. Liquefaction of Natural gas. Petroleum and Natural gas in India.

(10 Hrs, 20 Marks)

UNIT-III:

Chemical Energy Sources:

Fuel cells: Introduction, Design and operation of a Fuel cell. Classification of fuel cells, Types of fuel cells, Advantages and disadvantages of fuel cells, Conversion efficiency of fuel cells, Work out put and EMF of fuel cell, Applications of fuel cells.

Hydrogen: Introduction, Applications of Hydrogen, Production of Hydrogen, Storage and transportation safety and management, Hydrogen technology development in India.

Methanol: Production of methanol, Applications of methanol as fuel.

Nuclear Energy: Nuclear energy and application compared with coal, Fuels for Nuclear Fission Reactor. Nuclear fuel cycle, Storage and Transportation. Energy from nuclear fission reaction. Uranium Enrichment Process. Nuclear Waste management.

(10 Hrs, 20 Marks)

UNIT-IV:

Solar Energy: Solar radiation and its measurement. Solar energy collectors, solar energy storage, Applications of Solar energy.

Wind energy: Basic Principles of wind energy conversion. Site Selection Considerations Classification of wind energy conversion system, Advantages and disadvantages of wind energy conversion systems, Storage and Applications of wind energy.

Geothermal Energy: Geothermal energy resources, utilization of geothermal energy, Applications of geothermal energy.

Tidal Energy: Tidal energy conversation, Tidal power, Tidal energy resources in India.

Bioenergy: Biomass energy resources, Biomass conversion processes, direct combustion of biomass, Thermo chemical conversion of biomass, Biochemical conversion, Ethanol from biomass, Applications.

(10 Hrs, 20 Marks)

UNIT-V:

Energy conversion technologies and Electrical power plants: Energy conversion processes and devices, Power plants with conventional energy sources, Coal fired steam thermal power plants, Hydro electric power plants, Nuclear fission reaction power plants, Gas-turbine power plants, Combined cycle power plants, Integrated coal gasification combined cycle power plants, Diesel electric power plants, Geothermal electrical power plants. Plant factors and reserves.

(10 Hrs, 20 Marks)

REFERENCES

1. S. Rao and Dr. B.B. Parulekar, “Energy Technology” Non Conventional, Renewable and Conventional, Khanna Publishers, Delhi.
2. G.D. Rai “Non conventional Energy Sources”, Khanna Publishers Delhi
3. S.B. Pandya, “Conventional Energy Technology” Fuels and Chemical Energy Tata McGraw-Hill Publishing Company Ltd, New Delhi
4. S.P. Sukhatme, “Solar Energy”, Principals of thermal collection and Storage. Tata McGraw-Hill Publishing Company Ltd, New Delhi

TERM WORK:

Term Work shall consist of any eight assignments given below.

1. Energy power management and Energy planning in India
2. Energy Audit, Energy Conservation and recycling.

3. Conventional Energy Sources: Coal
4. Petroleum, Natural gas and Refinery Products
5. Chemical Energy Sources
6. Nuclear Energy and Power plant
7. Solar Energy
8. Wind Energy, Geothermal Energy, Tidal Energy and Bioenergy
9. Energy conversion technologies and power plants

6. PROJECT-I

Teaching Scheme:
Practical: 2 Hrs./ Week

Examination Scheme:
Oral : 25 Marks
Term Work: 25 Marks

The project topic shall consists of either some investigation work or design problem or experimental set up of some development work or prototype equipment or dissertation related to field of chemical engineering.
Project shall be taken in the beginning of the seventh term in consultation with concerned guide and must be completed in eighth term. The project proposal must be submitted in the beginning of the seventh term by every student or a group of students (not more than five students in a group).
The students shall submit the report to the corresponding guide, present their work in due time based on following points,

- Introduction.
- Literature survey.
- Physical / chemical properties etc.
- Experimental setup and procedure.
- Extent of project completed.

Presentation can be performed with OHP slides / LCD.
The progress of the project shall be evaluated by a committee of internal teachers which shall include concerned guide also and shall award the term work marks.
The oral examination of the project shall be conducted by concerned guide and external examiner jointly.

7. SEMINAR

Teaching Scheme:
Practical: 2 Hrs./ Week

Examination Scheme:
Term Work: 25 Marks

During seventh term, every student individually will study a topic assigned to him and submit a report in a typed form and shall deliver a short lecture / seminar on the topic at the time of seminar oral examination .The topic assigned will be related to the field of chemical engineering.

The students shall deliver the seminar (10 to 15 minutes) and submit the seminar report to the staff member on different technical subjects during the semester. The assessment of the term-work shall be based on the: -

1. Attendance to the seminar
2. Performance of the seminar delivery
3. Seminar reports and
4. Viva voce during the seminar.

The staff member/members shall guide the students in:

1. Selecting the seminar topic.

2. Information retrieval (literature survey)
    a) Source of Information i.e. names of the journals, reports, books etc.
    b) Searching for the information i.e. referring to chemical abstracts etc.
3. Preparing the seminar report
4. Delivering the seminar

The oral examination shall be conducted by a committee of teachers internally which shall include the concerned guide also and shall award the oral marks (in the seventh term / at the end of seventh term).

1. COMPUTER AIDED PROCESS EQUIPMENT DESIGN MODELING & SIMULATION

Teaching Scheme:
Lectures: 4 Hrs. / Week
Practical: 4 Hrs. / Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Practical: 25 Marks
Term Work: 50 Marks

UNIT-I:
Computer Aided Design:
Shell and Tube Heat Exchanger.
Reactor

(10 Hrs, 20 Marks)

UNIT-II:
Computer Aided Design:
Single Effect Evaporator.
Distillation Column.

(10 Hrs, 20 Marks)

UNIT-III:
Computer Aided Design:
Absorption Column.
Rotary Dryer.

(10 Hrs, 20 Marks)

UNIT-IV:
Introduction to Lumped Parameter Model.
Comparison of Model with Real Situation.
Modeling of An Activated Sludge Process as a continuous Operation by Recycling Biological Sludge
Modeling Difficulties in C.S.T.R.
Modeling of Constant Hold up Three CSTR's in Series.
Modeling of Batch Reactor With First Order Consecutive Reaction Takes Place as Time Proceed for Study of Optimal Batch Time.
Modeling for Maximizing the Yield of the Intermediate (Desirable) Product.
Modeling for Evaluation of the Adiabatic Equilibrium Temperature.
Modeling for Catalyst Decay in a CSTR.
Modeling for Evaluation of Conversion with Catalyst Decay in Batch Reactor.

(10 Hrs, 20 Marks)

UNIT-V:
Introduction of the Chemical Engineering Simulation.
Simulation Language.
When to Use Simulation?
Steps of Simulation Process.
Chemical Engineering Application of Simulation Techniques.
Advantage and Limitation of Simulation Technique.
Simulation of Ammonia Production System.
Simulation of Catalyst Temperature by Newton-Raphson Method.
Simulation of CSTR By Euler's Method.

Simulation of CSTR with Second Order Irreversible Exothermic Reaction Using Runga-Kutta Method.

(10 Hrs, 20 Marks)

Practical and Term Work shall consist of following experiments.

1. Computer aided design of shell & tube heat exchanger.
2. Computer aided design of single effect evaporator.
3. Computer aided design of rotary dryer.
4. Simulation of ammonia production system.
5. Simulation of catalyst temperature by Newton Raphson method.
6. Simulation of Reactor Design.
7. Computer control heat exchanger.
8. Computer Aided Design of absorber.

REFERENCES

1. W. L. Luyben , Process Modeling Simulation and Control for Chemical Engineers; 1988 McGraw Hill.
2. B.C. Bhattacharya & C. M. Narayan, Computer Aided Design of Chemical Process Equipment : 1st Edition, 1992, NCBA, Calcutta

Note: Students Can Utilize FORTRAN -77 And / Or C And/Or C++ Programming Language for the Above Syllabus.

2. PROCESS ENGINEERING ECONOMICS & COSTING

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 2 Hrs./ Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Oral : 25 Marks
Term Work : 25 Marks

UNIT-I:

Scales of Production, Selection of Plant Capacity, Plant Location. Availability of Raw Materials, Energy Gestation Period. Expansion, Diversification and Obsolescence. Scope for Standardization in Design and Production .Economics of Research and Development .Indian Chemical Industry , Current Status and Trends .

(10 Hrs, 20 Marks)

UNIT-II:

Cost Estimation: Factors Affecting Investment and Production Cost .Capital Investment , Fixed Investment and Working Capital .Estimating Equipment Cost By 6 /10 Factor Rule .Method of Estimating Capital Investment .Different Costs Involved in Total Product Cost .Computer Automization in Costing.

(10 Hrs, 20 Marks)

UNIT-III:

Interest and Investment Cost , Simple and Compound Interest , Nominal and Effective Rates of Interest , Continuous Interest , Ordinary Annuity ,Perpetuities and Capital Costs . Taxes and Insurances: Types of Taxes and Tax Returns. Types of Insurance and Legal Responsibility.

(10 Hrs, 20 Marks)

UNIT-IV:
Depreciation: Types of Depreciation, Service Life, Salvage Value, Present Value. Methods of Determining Depreciation, Single Unit and Group Depreciation .Causes of Obsolescence and Inadequacy.

(10 Hrs, 20 Marks)

UNIT-V:
Profitability, Alternative Investment and Replacement, Mathematical Methods of Profitability Evaluation, Cash Flow Diagram. Break Even Analyses, Balance Sheet, Pricing Issue Method and Income Statement.

(10 Hrs, 20 Marks)

TERM WORK:
Term Work shall be based on the following.
1. Location of a chemical plant
2. Indian Chemical industry
3. Cost Estimation
4. Interest and Investment costs
5. Taxes and Insurance
6. Depreciation
7. Profitability and Replacement
8. Break Even Analysis

REFERENCES

1. Peter M.S. Timmerhaus K.D. Plant Design and Economics for Chemical Engineers. McGraw Hill.
2. Vilbrandt F.C. and C.E. Dryden , Chemical Plant Design. McGraw Hill
3. T.R. Banga and S.C.Sharma, Industrial Organization & Engineering Economics, Khanna Publications, New Delhi.
4. O.P.Khanna Industrial Engineering & Management, Dhanpat Rai Publications Pvt. Ltd. New Delhi.
5. Dewett & Varma, Elementary Economic Theory : S Chand & Company Ltd New Delhi

3. CHEMICAL PLANT DESIGN & PROJECT ENGINEERING

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 4 Hrs./ Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)
Oral : 25 Marks
Term Work: 25 Marks

UNIT-I:
Introduction to Chemical Engineering Plant Design and Project Engineering.
The role of Chemical Engineer in Chemical Plant Design. Chemical Engineering Design, need for Plant Design, Process Design.
Development of the project: Evaluation of a process, process research, research evaluation, process development, preliminary engineering studies, pilot plant, semi-commercial plant, commercial plant and commercial plant design factors.
Technical factors, economic factor, safety considerations, legal phases, sources of information.

(10 Hrs, 20 Marks)

UNIT-II:

Process Design: Choice of process continuous Vs. Batch processing.

Process Equipments and Materials: Selection of Materials, Plan for Selection of Materials. Selection of Process Equipments, Equipment selection procedures, standard Vs. special equipment. Scale up method, types of flow sheet, development of process flow sheet from process information.

(10 Hrs, 20 Marks)

UNIT-III:

Plant Layout : Introduction planning-layout, factors in planning-layout methods of layout planning area concept, two dimensional layouts, scale models, principles of plant layout, safety, utilities & material handling equipments , railroads and roads, etc.Plant layout for Benzene Hexachloride process.

Locating the Chemical Plant: Introduction, summary of factors in plant location.

Economics location, plant location factors, raw material supply, market and transportation, power and fuel, water supply , temperature, plant measures for conservation of water, legal restriction, federal pollution act, climate, labour, community and site characteristics and waste disposal.

(10 Hrs, 20 Marks)

UNIT-IV:

Site preparations and Structures : Introduction, Site Preparation, Surface Evaluation, Foundation and Shape of Foundation, Machinery and Equipment Foundations, Supports, Outdoor Plants, Selection Building types, Building design principles, Flooring , walls, Roof, safety and higher protection conditioning , heating and ventilation. Cost Consideration for Plant Sites and Structures New Development in Management techniques. (PERT & CPM).

(10 Hrs, 20 Marks)

UNIT-V:

Process Auxiliaries : Introduction, Piping, Explanation of CODES, Selection of Piping, Pipe strength, Wall thickness, Nominal Pipe Size (NPS), Criteria for Selection of Materials, Pipe sizing by ID, Choosing the final pipe size, Process steam piping, piping layout, piping insulation, methods of providing flexibility for piping.

(10 Hrs, 20 Marks)

TERM WORK:

Term Work shall consist of minimum 5 (five) half imperial size sheets based on above syllabus.

1. Process flow diagram of Manufacturing of Benzene Hexa Chloride (BHC)
2. Process flow diagram of Manufacturing of Nitric Acid
3. Plant Layout for Manufacturing of Benzene Hexa Chloride (BHC)
4. Plant Layout for Manufacturing of Nitric Acid
5. Piping diagram for Manufacturing of Nitric Acid
6. Piping diagram for Manufacturing of Benzene Hexa Chloride (BHC)
7. Network Analysis Numerical : PERT & CPM

REFERENCES

1. F.C. Vilbrandt and C.E. Dryden, Chemical Engineering Plant Design McGraw Hill, New Delhi.
2. Peter M. S. and K.D. Timmerhaus, Plant Design and Economics for Chemical Engineers. McGraw Hill.
3. Modes J. and Philips, Rheinhold, Project Engineering with CPM and PERT :
4. Perry’s Chemical Engineer’s handbook.

4. ELECTIVE – II
1. INDUSTRIAL POLLUTION & CONTROL

Teaching Scheme: Examination Scheme:
Lectures: 4 Hrs./ Week Paper: 100 Marks (3 Hrs)

UNIT-I:
Introduction: Types of Pollution. Introduction: Pollution control aspects. Environmental Legislation: Water (Prevention and Control of Pollution) Act,197, Air (Prevention and control of Pollution) Act, 1981. Industrial Waste Water Analysis. Industrial Gaseous Effluent Analysis. General Instrument for Gaseous Pollutants.

(10 Hrs, 20 Marks)

UNIT-II:
Removal of BOD. Introduction to removal of BOD Biological oxidation units: Activated Sludge Process; Trickling /Biological Filters; Waste Stabilisation Ponds. Anaerobic Treatment. Numerical Examples based on removal of BOD.
Removal of Chromium. Introduction to removal of Chromium. Control Methods, Reduction precipitation, Ion Exchange, Reverse Osmosis, Lime coagulation and adsorption.

(10 Hrs, 20 Marks)

UNIT-III:
Removal of Mercury: Introduction of removal of mercury, Measurement of Mercury, Ventron mercury removal process.
Removal of ammonia/urea: Introduction to removal of ammonia/urea, Methods for removal of nitrogen, Physico-chemical processes, Biological methods.

(10 Hrs, 20 Marks)

UNIT-IV:
Treatment of Phenolic Effluents: Introduction to Treatments of Phenolic Effluents, Sources of phenols.
Treatments/Removal Methods: Steam Gas Stripping. Adsorption/Ion Exchange; Extraction of phenols using Phenosolvants Biological Methods of Treatment.
Removal of particulate matter: Introduction to removal of particulate matter, Gravity settling chamber, solid traps, cyclone separators, fibre filters, fabric filters, liquid scrubbers and ESP.
Numerical Examples based on settling chamber, cyclone separators, fiber filter, liquids scrubber and ESP.

(10 Hrs, 20 Marks)

UNIT-V:
Pollution control in process industries:
Introduction to pollution control,
Pollution control aspects of fertilizer industry: Introduction to pollution control in fertilizer industry.
Removal of carbon in ammonia plant effluents by scrubbing with liquids using vacuum filtration,
Removal of oil in ammonia plant effluents, Removal of hydrogen sulphide in ammonia plant effluents
Pollution control in petroleum and petrochemical units: Introduction
Refinery Liquid based treatment methods: Oxidation pond treatment, disposal of sludges.
Treatment of liquid effluents from petrochemical industries, Removal of hydrogen sulphide gas from sour gas by stripping, Removal of ammonia from gases.
Alcohol industry: Treatment method by recovery of potash from distillery spent-wash.

(10 Hrs, 20 Marks)

REFERENCES
1. S. P. Mahajan, Pollution control in process industries, Tata McGraw-Hill Publication
2. M. N. Rao & A K. Datta, Waste Water Treatment: IBH Pub., Delhi

4. ELECTIVE – II
2. ADVANCE SEPARATION TECHNIQUES

Teaching Scheme: Examination Scheme:
Lectures: 4 Hrs./ Week Paper: 100 Marks (3 Hrs)

UNIT-I:
Separation Processes: Industrial Chemical Processes, Mechanism of Separation
Separation by phase addition or creation. Separation by barrier. Separation by solid agent. Separation by external field or gradient. Component Recoveries and product purities. Separation power. Selection of feasible separation processes.
Crystallization from the melt: Introduction.
Progressive freezing: component Separation by progressive freezing, Pertient variables in progressive freezing. Applications.
Zone melting: component separation by zone melting, pertient variables in zone melting, Application.
Melt crystallization from the bulk: Investigations, commercial equipment and application.
Falling-film crystallization: Principles of operation, commercial equipment and applications.

(10 Hrs, 20 Marks)

UNIT-II:
Enhanced distillation: Introduction. Azeotropism.
Azeotropic distillation: Introduction, exploitation of homogeneous azeotropes, exploitation of pressure sensitivity, exploitation of boundary curvature, Exploitation of azeotropy and liquid Extractive distillation: Introduction, solevent effect in extractive distillation, extractive distillation design and optimization, solvent screening and selection extractive distillation by salt effects. Reactive distillation: Introduction, simulation, modeling and design feasibility, Mechanical design and implementation issues, process applications.

(10 Hrs, 20 Marks)

UNIT-III:
Supercritical fluid separation processes: Introduction. Physical properties of pure supercritical fluids; thermodynamic properties and transport properties. Process concept in super critical fluid extraction. Phase equilibria: Liquid- Fluid equilibria, Solid- Fluid equilibria, Polymer- Fluid equilibria and the Glass Transition, Cosolvents and surfactants, phase equilibria models. Mass Transfer.
Applications: Food and Pharmaceutical applications, Temperature controlled residuum Oil super critical extraction [ROSE], Extraction from aqueous solution, Adsorption and desorption, Polymer de volatilization and fractionation, Drying and Aerogel formation, Clearing, Crystallization, Reactive separations.

(10 Hrs, 20 Marks)

UNIT-IV:
Membrane separation processes: Introduction. Advantages of membrane separations, Basic equations, Basic concept, Membrane types, Economics.
Electro dialysis: Process description, examples, membranes, membrane efficiency, process description and configuration, Energy requirements, Equipment and economics.
Reverse osmosis and Nano filterization: Processes description, examples Basic principles of operations, RO and NF membranes, process limitations and configuration. Economics.
Ultra filtration: Process description, UF membranes, membrane characterization, process limitations, process configurations, Energy requirements, Design and economics.
Microfiltrations: process description, Examples, MF membranes, membrane characterization , process limitations, Equipments configurations, process Applications and Economics.
Gas- Separations membranes: Process descriptions, examples, Basic principles of operations, selectivity and permeability, Gas- Separation membranes, membrane system design features, energy requirements and economics.
Pervaporization: Process description, definition, operational factors, vapor feed, examples, pervaporation membranes, modules.

(10 Hrs, 20 Marks)

UNIT-V:
Biochemical separation processes: Introduction.
Initial product harvest and concentration: centrifugation, Filtration, Selection of cell separation Unit operation, Cell disruption, protein refolding.
Initial purification: Precipitation, Extraction, Adsorption, Membrane processes.
Final Purification and product formulation.: Chromatography, Lyophilization and drying. Integration of fermentation and downstream processing operations.

(10 Hrs, 20 Marks)

REFERENCES

1. Perry Robert H. and Green Don W. Perry's chemical Engineers Handbook 7th edition. McGraw Hill Publication, New York.
2. Seader J. D. and Henley Ernest J, Separation Process Principles. John Wiley and Sons, Inc, New York
3. Ladisch Michael R., Bioseparations Engineering, Principles, Practice and Economics, Wiley Interscience, John Wiley and Sons, Inc. Publications New York
4. Long Robert B. Separation Process in Waste Minimization .Marcel Dekker, Inc, New York

4. ELECTIVE – II
3. PETROCHEMICALS

Teaching Scheme:
Lectures: 4 Hrs./ Week

Examination Scheme:
Paper: 100 Marks (3 Hrs)

UNIT-I
Petrochemical Industry in India. Feed stocks for petrochemicals, separation of aromatics
Chemicals from methane: Manufacture of methanol, formaldehyde, acetic acid, ethylene glycol, CS_2, liquid fuels from methanol, manufacture of ethanol.

(10 Hrs, 20 Marks)

UNIT-II
Chemicals from ethane- ethylene-Acetylene.
Ethane: Occurrence, halides of ethane, Nitroethane and oxidation of ethane.

Ethylene production, production of ethylene derivatives like vinyl acetate monomer, ethylene oxide, ethylene diamine, ethanol and acetaldehyde.
Chemicals from acetylene: acrylic acid, vinyl chloride, vinyl acetate and Acetonitrile.

(10 Hrs, 20 Marks)

UNIT-III

Chemicals from C_3, C_4 and higher carbon atoms:
Products from propane. Dehydrogenation of propane and higher paraffins.
Chemicals from propylene: Isopropyl alcohol, acetone, propylene glycol, acrylic acid and ester, Phenol.
Dehydrogenation of butanes. Production of Iso and n- butanol. Production of methyl –tert-butyl ether [MTBE], Adipic acid. Derivatives from hydrocarbons higher than butane.

(10 Hrs, 20 Marks)

UNIT-IV

Synthesis gas and chemicals:
Synthesis gas. Steam reforming of hydrocarbons. Production of synthesis gas. Chemicals from synthesis gas. Oxo synthesis, vinyl acetate, acetic acid.
Fischor- Tropsch synthesis: catalysts and the products.
LPG: sources, properties grades of LPG. Supply of LPG to consumers, the storage and use of LPG, LPG piping system, safety consideration and emerging action. Emergency controls and action.

(10 Hrs, 20 Marks)

UNIT-V

Petroleum aromatics: Production of BTX.
Benzene derivatives like Aniline, phenol, alkylation of benzene.
Products from toluene: Chloro toluenes, O- Cresols, Dinitro toluenes, Benzaldehyde, caprolactum, Terephthalic acid.
Chemicals from xylene: o-xylene, m-xylene, p-xylene, Naphthalene

(10 Hrs, 20 Marks)

REFERENCES

1. Bhaskararao B.K. “A Text on petrochemicals”, Khanna Publishers, New Delhi
2. Sarkar G.N. “Advanced Petrochemicals” Khanna Publishers, New Delhi
3. Maiti Sukumar [editor],”Introduction to Petrochemicals”, Oxford and IBH Publishing co. Pvt. Ltd. New Delhi

6. PROJECT-II

Teaching Scheme:
Practical: 4 Hrs./ Week

Examination Scheme:
Oral : 50 Marks
Term Work: 100 Marks

The students are required to carry out one of the following projects.
1. Process based Project: Manufacture of product.
2. Equipment based Project: Detailed design and fabrication of the equipment for a given capacity.
3. Experimental based Project: Experimental investigation of basic or applied research problem.
4. Industrial Problems: Any problem or project directly related to existing plants for modification of process or equipment or regarding pollution control and energy conservation under the guidance of a staff member and /or staff members and submit a typed report in duplicate.

The Project Work consists of collection of literature, study of the various processes selection of the process, computation of material and energy balances, process design of important equipments, detailed design of one of the main equipment, plant location and layout, cost Estimation,
economic analysis, details of experimental set up, analysis of data, pollution control, safety, marketing, conclusions and recommendations, bibliography, etc., as applicable to the individual problem.
The object of the project is to make use of the knowledge gained by the student at various stages of the degree course. This helps to judge the level of proficiency, originality and capacity for application of the knowledge attained by the student at the end of the course.
Each group should consist of maximum 5 students. For term-work (Internal) of 100 marks, the assessment should be by conducting frequent written tests, seminars during the year and an oral examination at the end of the year conducted by all the staff members of the department. The Head of the Department should see that the assessment procedure should be the same for all the students of the class. For external 50 marks, the project work shall be assessed by an oral examination by at least two examiners, one internal and one must by external at the end of the year.
The object of the VIVA VOCE examination (Internal and External Orals) is to determine whether the objectives of the project work have been met by the student as well as to assess the originality and initiative of the student as demonstrated in the project work.

7. INDUSTRIAL VISIT / CASE STUDY

Examination Scheme:
Term Work: 25 Marks

During seventh term, every student shall visit minimum three industries or organization pertaining to the Chemical Engineering arranged by College and accompanied by departmental teachers as per AICTE and University norms. The report of technical visit shall be submitted by every student at the end of eight term which shall be evaluated by the concerned teachers through internal Viva Voce.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

SE (COMPUTER ENGINEERING)
(w.e.f. 2006-07)

TERM – I

ANALOG ELECTRONICS

Teaching Scheme:
Lecturers: 4 Hrs / Week
Practical: 2 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term work: 25 Marks
Practical: 25 Marks

Unit – I

Basic Definition, ideal and practical voltage and current sources, dependent and independent voltage and current sources, network theorems (AC and DC), with numerical.
Loop Analysis, node analysis super position, Thevenin and Norton equivalent circuits, maximum power transfer theorem, principle of duality, RC, RL, RCL, driven and un-driven with initial conditions. (10 Hrs, 20 Marks)

Unit – II

Transistor at low frequencies: Analysis of single stage Transistor amplifier using hybrid- model (h-model), calculating A_{VS}, A_{IS}, R_{IN}, R_{OUT}, calculation of lower cut-off frequency of. Miller's theorem.
Transistor at high frequencies: Equivalent Π-model of transistor, analysis of transistor at high frequency using Π-model and calculating higher cut-of frequency. (10 Hrs, 20 Marks)

Unit – III

Multistage amplifier: Analysis of cascade amplifier CE-CE, CE-CB, CE-CC using h-model, Darlington amplifier, Bootstrapping circuit, Emitter coupled differential amplifier(calculating A_V and CMRR)
Large signal amplifier: Classification of amplifier, Distortion in amplifier, Step and Square wave response, Class-A, Transformer coupled amplifier, Push-Pull amplifier. (10 Hrs, 20 Marks)

Unit – IV

Field Effect Transistor: Biasing of JFET and MOSFET, low frequency analysis of JFET and MOSFET
Feedback amplifier: Concept of negative and positive feedback, Negative feedback topology, analysis of feedback amplifier (all topology)
Oscillator: Barkhausain criteria, Phase shift oscillator, Wein bridge oscillator, Collpits oscillator, Hartley oscillator, Clap and Crystal oscillator. (10 Hrs, 20 Marks)

Unit – V

Operation amplifier application: Comparator, Instrumentation amplifier, Zero crossing detector, Schmitt trigger, wave form generator, Multivibrator
Power supply:
Unregulated power supply: Half wave and full wave rectifier using diode (load and line regulation calculation)

Regulated power supply: Zener, series regulator, protection circuit (load and line regulation calculation), Block diagram and working of Switch Mode Power Supply, Uninterrupted power supply. (10 Hrs, 20 Marks)

Reference Books -

- R S Shedha " Electronic Devices and circuits ", S Chand Publications
- Salivahanan " Electronic Devices and circuits ", TMH
- Ramakant A. Gaikwad "Op-Amp and Linear Integrated circuits". 3rd" Edition PHI
- M.E.Van Valkenberg, "Network Analysis", PHI

List of experiments -

- Study of Maximum Power transfer theorem
- Square wave testing of an amplifier.
- To plot the frequency response of single stage CE amplifier.
- To measure mid-band voltage gain of CE from transistor stage followed by CC stage.
- Find CMRR of Emitter coupled differential amplifier.
- Push Pull class B power amplifier calculation of efficiency.
- To calculate the mid-band voltage gain of single stage FET amplifier.
- Study of phase shift RC Oscillator using transistor verification of theoretical and practical frequency.
- Study of zero crossing detectors using op-amp.
- Study of square / triangle wave generation using op-amp verification of theoretical and practical value of frequency and duty cycle.
- To find line regulation load regulation for full wave bridge rectifier
- Study of SMPS

Term work should be include minimum of 8 (eight) experiments

NORTH MAHARASHTRA UNIVERSITY, JALGAON

SE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2006-07)

TERM – I

DISCRETE STRUCTURE AND GRAPH THEORY

Teaching Scheme:
Lecturers: 4 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)

Unit - I

Sets, Logic and Proofs
Propositions, proposition and logical operations, Conditional Statements, Propositional Calculus, Quantifiers: universal and existential quantifiers, methods of proofs, Set Theory: Set, Combinations of Sets, Finite and Infinite sets, uncountably infinite sets, Mathematical Induction, Principle of inclusion and Exclusion.
Discrete Probability, Information and Mutual information (10 Hrs, 20 Marks)

Unit - II

Relations, functions, Recurrence Relations
Definitions, properties of Binary relations, Equivalence Relations and partitions, Partial ordering relations and lattice, chains and antichains, Transitive Closure and Warshall's Algorithm.
Functions Definitions, Pigeonhole principle.
Recurrence Relation, Linear Recurrence Relations with constant Coefficients, Homogeneous Solutions, Particular Solutions, total solutions, Solution by the method of generating functions.
(10 Hrs, 20 Marks)

Unit - III

Graphs
Basic terminology, multigraphs and weighted graph , paths and circuits , shortest path algorithms, Euler and Hamiltonian Paths and circuits , factors of a graph, Planer graph and Kuratowski theorem, graph coloring.
Trees
Trees, rooted trees, path length in rooted trees, prefix code, binary search trees, spanning trees and cut set, minimum spanning trees, kruskal's and prim's algorithms for minimum spanning tree.
(10 Hrs, 20 Marks)

Unit - IV

Analysis of Algorithm and Algebraic systems - Time Complexity of algorithms, shortest path algorithms, complexity of problems, tractable and intractable problem.
Algebraic system - Groups, subgroups, Isomorphisms and Automorphisms, Homomorphisms and Normal subgroup, Rings, Integral domains and fields. (10 Hrs, 20 Marks)

Unit - V

Boolean algebra - Lattice and Algebraic systems, Principle of duality, basic properties of lattice defined by lattices, distributive and complemented lattices, Boolean lattices and Boolean algebras, Boolean functions and Boolean Expressions.
Binary Number systems- binary, octal, hex conversion. Application of Boolean algebra.
(10 Hrs, 20 Marks)

Text and Reference Books

- C.L. Liu , " Elements of Discrete Mathematics", 2nd edition, Tata McGraw-Hill, 2002
- Kenneth H. Rosen, Discrete Mathematices and its Application, 5th edition, TMH
- Lipschutz, lipson, " Discrete Mathematics", 2nd edition, Tata McGraw- Hill, 1999.
- V. K. Balakrishnan, " Graph Theory", Tata McGraw- Hill
- B. Kolman , R. Busby and S. Ross, "Discrete Mathematical Structures" 4th edition, Pearson education,2002
- J. Treamblay , R. Manohar ," Discrete Mathematical structures with application to computer science" , Tata McGraw-Hill, 2002

NORTH MAHARASHTRA UNIVERSITY, JALGAON

SE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2006-07)

TERM – I

DIGITAL SYSTEMS AND MICROPROCESSOR

Teaching Scheme:
Lecturers: 4 Hrs / Week
Practical: 2 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term work: 50 Marks
Practical: 25 Marks

Unit – I

Review of fundamental concepts: Basic gates, universal gates & Exclusive gates. Digital Signal, Positive & Negative logic,
Boolean Algebra: Boolean postulate and Theorems, Examples of realization of Boolean functions using Boolean algebra.
Introduction to digital logic families: DTL, TTL & CMOS (10 Hrs, 20 Marks)

Unit – II

Combination logic design: Standard representation of logical function, K map representation of logical function, simplification of logical function using K map, for 2, 3 & 4 variables. K map with Don't care condition. Introduction to five and six variable K map with don't care condition. Design of half adder, full adder, half sub tractor, full sub tractor (10 Hrs, 20 Marks)

Unit – III

Combination logic design examples: Various Example of combinations logic circuit (truth table – K map – circuit diagram) with the help of K map and their implementation with the help of Basic/Universal gates.
Design of multiplexer & Demultiplexer: Design of comparator circuits using logic gates. Design of parity generator & checker circuit using logic gates
Introduction to sequential logic circuit: function of one bit memory cell, Truth table and excitation tables of S – R, JK, D & T Flip – Flop. (10 Hrs, 20 Marks)

Unit – IV

8085 Microprocessor
Introduction to 8085 Microprocessor - Architecture, functional pin diagram, register model , programming model , Bus architecture
Instruction Set of 8085 - Instruction cycle, fetch operation, execute operation machine timing diagram for op code fetch cycle, memory read, I/O read, memory write, I/O write, various addressing modes, various instruction set such as data transfer group, arithmetic group, logical group, branch group, stack, input, output and machine control group, instruction format, various addressing modes (10 Hrs, 20 Marks)

Unit – V

8085 assembly programming - Assembly Language, comparison of high level language and assembly language , role of assembler, Assembly language programming of 8085: addition and subtraction of 8 and 16 bit numbers, one's and two's complements of 8 and 16 bit numbers,

multiplication and division of 8 and 16 bit numbers, largest and smallest number using array, sorting of numbers using array, finding square from look up table, square root of number, program related to shift and masking operation of 8 and 16 bit numbers.

(10 Hrs, 20 Marks)

Reference Books

- Modern Digital Electronics by R.P. Jain, 3rd Edition, TMH.
- Digital Logic and Computer Design by M. Morris Mano, PHI.
- Fundamentals of Digital Circuits by A Anandkumar, PHI.
- Microprocessor and Interfacing , 2nd edition ,Douglas V Hall
- Advanced Microprocessors and Interfacing , B Ram, TMH
- Microprocessor architecture,programming and applications , 2nd ed , Ramesh Gaonkar
- Introduction to Switching Theory and Logic Design, Hill and Peterson , John Wiley and Sons.
- Digital system, James E Palmer, David E Parlman, McGraw Hill.

Laboratory Assignment

Group A

- Verity the truth table of logic gates and verification of DeMorgance theorem.
- Construction on of basic gates using universal gate (NAND / NOR)
- Construction of half adder & full adder circuit. Also implement full adder with the help of two half adder circuit & one OR gate.
- Construction of Half subtractor & full subtractor Circuit.
- Gray to Binary and Binary to gray code converter.
- Verification of truth table of multiplexes & flip flops.

Group B

- Addition and subtraction of 8 and 16 bit numbers
- Determining maximum and minimum elements in array
- Look up table for BCD to 7 Segment conversions
- HEX To BCD and BCD to HEX conversion
- Arranging the numbers in ascending and descending order
- Shift and mask off operation of 8 bit number

The term work should include minimum of four experiments from Group A and minimum of four experiments from Group B.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

SE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2006-07)

TERM – I

INDUSTRIAL MANAGEMENT AND ECONOMICS

Teaching Scheme:
Lecturers: 4 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)

Unit - I

History of Management, Scientific Management, & its Principles, Administration Management, Neo – Classical Theory, Gilberth's contribution, Modern management Theories, Relation between Administration and organization, Levels of managements, Function of Management.

(10 Hrs, 20 Marks)

Unit – II

Organizational structures: Line, functional, Line staff forms of Business ownerships: Proprietorship, partnership Joint stock Co - Pvt. Ltd. Co., public Ltd Co., Co-operative organizations, public sector, joint ventures, Their meanings, formation, Advantage, Limitations & Applications.

(10 Hrs, 20 Marks)

Unit – III

Engineering Economics. Wants, Utility, Demand, Supply, Elasticity of demand & supply. Capital: Fixed, Working capital, sources of finance Credit, shares, Debentures, ploughing Back, Loans from banks, Trade Public Deposits, financial Institution, foreign capital. Cost Estimating, Cost Accounting, Fixed costs, veriable costs selling price. (No Numericals)

(10 Hrs, 20 Marks)

Unit – IV

Manpower planning, factors affecting manpower planning sources of Recruitment, Need, objectives & benefits of Training, Method of Training workers, supervisors and Executives. Job Evaluation & Merit rating (Concept Only) Selling & Marketing Concept, Sales promotion, Advertising.

(10 Hrs, 20 Marks)

Unit – V

Quality (International Standard Organization of standards) ISO certificate Intellectual property rights (IPR), patents, Trademarks, copyrights, Management information system (MIS), Definition, Need & objectives of MIS, MIS & Computer, Designing of MIS, Application of MIS.

(10 Hrs, 20 Marks)

Reference Books –

- Industrial Engineering & Production Management by M. Mahajan.
- Industrial Organization and Management by O.P. Khanna, TMH
- Management Information system by Jawdekar, THM

NORTH MAHARASHTRA UNIVERSITY, JALGAON

SE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2006-07)

TERM – I

ENGINEERING MATHEMATICS - III

Teaching Scheme:
Lecturers: 4 Hrs / Week
Tutorial: 1 Hr / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term work: 25 Marks

Unit – I

Linear Differential Equation – Linear differential equation of order n, solution of LDE with constant coefficient, method of variation of parameters, equation reducible to linear form with constant coefficients, Cauchy's linear equation, Legendre's linear equation, Solution of simultaneous and symmetric simultaneous differential equation, applications to electric circuits.

(10 Hrs, 20 Marks)

Unit – II

Fourier and Z-transforms –
Fourier Transform (FT) – Fourier integral theorem, sine and cosine integrals, Fourier transform, Fourier cosine transform, Fourier sine transform and their inverses, Problems on wave equation.
Z-Transform – definitions, standard properties (without proofs), ZT of standard sequences and inverse, Solution of simple differential equations, Applications of Z-transform to discrete system analysis.

(10 Hrs, 20 Marks)

Unit – III

Laplace Transform (LT) – definition of LT, inverse LT, properties and theorems, LT of standard functions, LT of some special functions, (1^{st} order Bessel's periodic, unit step, unit impulses and ramp), Problems on finding LT and inverse LT, initial and final value theorems, applications of LT for network analysis.

(10 Hrs, 20 Marks)

Unit – IV

Vector integration – Line integral, surface and volume integrals, Guass's Stocke's and Green's theorem (without proofs), applications to problems in electromagnetic fields.

(10 Hrs, 20 Marks)

Unit – V

Number theory – Congruence's and Residue classes, Euler's Phi function, Theorems on Fermat, Euler and Lagrange, Quadratic residues – Quadratic residuosity, Legendre-Jacobi symbols.
Square root modulo Integer – Computing square root modula prime, computing square root modula composite.
Blum Integers.

(10 Hrs, 20 Marks)

Text Books –

- Advanced Engineering Mathematics – Erwin Kreyszig (Wiley Eastern Ltd)
- Advanced Engineering Mathematics – H K Dass (S Chand)
- Modern Cryptography – Theorems and Practice – Wenbo Mao – Pearson Education (low price edition)

Reference Books –

- Advanced Engineering Mathematics – Wylie C R and Barrett, McGraw Hill
- Higher Engineering Mathematics – B S Grewal, Kanna Publication
- Engineering Mathematics – B V Raman, Tata McGraw Hill
- Applied Mathematics Vol 1 and 2 – P N Wartikar and J N Wartikar (Pune Vidharthi Griha Prakashan Pune)
- Advanced Engineering Mathematics with MatLab, 2^{nd} Edition – Thomas L Harman, James Dabney and Norman Richert , Thomson Learning
- Engineering Mathematics – III – Dr. Gokhale, Dr. Chaudhary and Dr. Singh

NORTH MAHARASHTRA UNIVERSITY, JALGAON

SE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2006-07)

TERM – I

PROGRAMMING LABORATORY - I

Teaching Scheme:
Lecturers: 3 Hrs / Week
Practical: 4 Hrs / Week

Examination Scheme:
Term work: 50 Marks
Practical: 50 Marks

Unit –I

Introduction to C - C Fundamentals, data types , constants , variables, Statements, operators, expressional, control statements.
Arrays - Representation and declaration of array one dimensional array, two dimensional array, multidimensional array.
Strings - Representation, array of string, operation on sitting.
Pointers - Fundaments, declaration, advantage, pointers to different data types , array and pointers, array to pointers, operations on pointers
Functions - Need function definition, prototype, function, parameter, recursion, scope of Variables in the function, library functions, passing array to function, pointer to function

Unit – II

Structure - Definition, declaration, array to structures, structures within structures, structures, and function, structures and pointers, self referential structures user defined data types – typedef .
Union - Need definition, operation, bit fields, difference between structure and union.
File Handling - Structure of file, file types, file operations
Macros - Substitution, File inclusion, complier, controlled directives.

Unit – III

Inter-conversion – Inter-conversion of Number system: decimal, binary, octal, hexadecimal.
System of liner equation - Gauss Elimination, Gauss Jordan, Jacobi or Gauss Siedel.
System of differential Equation - Taylor, Heun's method, Euler's modified method.

Unit – IV

Root of equations, Methods - Newton-Raphson, Raquel, faisi, Bolzano.
Interpolation - Newton backward, forward difference, table, divided difference.
Integration - Trapezoidal, Simpson's 1/3, 3/8 rule.

Unit – V

Permutation, Combination, powerset, Sorting - Insertion, Quick, Merge, Bubble, study of algorithms and implementation, analysis of sorting methods.
Searching - Linear search, binary search.

Reference Books -

- M.K.Jain lyanger “Numerical Method of Scientific and Engineering Computer” 3rd edition, New age publications.
- E. Balaguruswami “ programming in ANSI C” Tata McGraw Hill.
- H. Schildt, “ C The complete Reference” Tata McGraw Hill
- Venugopal, K.R. and Prasad Sudeep R, “Programming With C” Tata McGraw Hill.
- V. Rajaraman “ Computer Oriented Numerical Methods” 3rd Edition Prentice Hall of India, Eastern Economy Edition.
- E. Balaguruswami, “Object Oriented Programming with C++” Tata McGraw Hill.
- Shah Y.L. & M.H.Thaker , “Programming in C++ ISTE Learning Material Center.
- Venugopal K.R. Ravishankar T.& Raj Kumar “Mastering C++, Tata McGraw Hill.
- Steven Chapra “Numerical Methods for Engineers” Tata McGraw Hill.
- Ellis Horowitz and Sahani “ Fundamentals of Data Structure” Tata McGraw Hill.
- Kanetkar Y, “Let us C” BPB Publications.

List of Laboratory Assignments -

- Matrix Operation (Addition, Multiplication, Inverse)
- Swapping of numbers using single pointer.
- Processing student records using structure.
- File manipulation opening closing, input and output operation files.
- Program for macros.
- Nesting of macro.
- Macro with arguments
- Inter conversion of number system.
- To find value of unknown using Guass Elimination.
- To find value of unknown using Guass Siedal.
- To find root of equation using Newton Raphson.
- To find root of equation using Regula-Falsi.
- Find interpolating values using interpolation methods.
- Find integral values using Simpson’s 1/3, 3/8 rules.
- Generation of Permutation for given list.
- Generation of Combination for given list.
- Generation of Power set.
- String Operations.
- Sorting using Bubble Sort.
- Sorting using Quick Sort
- Searching of given element using Linear search.
- Searching of given element using Binary search.

The term work should include minimum of 15 experiments from the above list.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

SE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2006-07)

TERM – II

MICROPROCESSOR - I

Teaching Scheme:
Lecturers: 4 Hrs / Week
Practical: 2 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term work: 25 Marks

Practical: 25 Marks

Unit – I

8086/ 8088 CPU architecture programming model Segmentation, Addressing modes, Instruction sets, Assembly language programming BIOS and DOS interrupts. (10 Hrs, 20 Marks)

Unit - II

BIOS AND DOS Interrupts:, Introduction to DOS, Assembly language Programming in MSDOS using BIOS and DOS Interrupts, programming Technique, Time delay loop, produce and macros.
(10 Hrs, 20 Marks)

Unit – III

8086 Configuration:, Basic 8086 configuration, maximum and minimum modes, System bus timing, Interrupt priority management, programmable interrupt controller (PIC) 8259A 8089 (IOP)
(10 Hrs, 20 Marks)

Unit – IV

Main memory design: 8086 CPU Read/ Write timing SRAM and ROM interfacing requirement, address decoding technique full partial block PROM, Troubleshooting the memory module. DMA: Basic DMA operation, 8237 DMA Controller
(10 Hrs, 20 Marks)

Unit – V

Multiprocessor Configuration: Queue status and block facility 8086 based multiprocessor system, co-processor configuration, closely coupled configuration Overview of loosely coupled configuration, 8087 NDP, 8087 Data types and processor architecture, 8087 programming.
(10 Hrs, 20 Marks)

Reference Book:

- John E. Uffenteck , "The 8086/ 8088 Family: Design, Programming and Interfacing, " Prentice- Hall of India.
- S.P. Dandomudi," Introduction to Assembly Language Programming – From 8086 to Pentium Processor" Springer.
- Yu – Cheng Liu and Gleen A Gibson, "Microcomputer systems; The 8086 / 8088 Family Architecture, Programming and Design" 2nd Edition, Practice Hall of India.
- Allen Wyatt, "Assembly Language Programming" QUE.
- Peter Abel, "IBM PC Assembly Language and Programming" Practice – Hall Of India.
- Douglas V. Hall "Microprocessor and Interfacing" Programming and Hardware" Prentice Hall of India.
- Barre B Brey "The Intel Microprocessor: 8085/ 8088, 80186/ 80286, 80386, 80186, Pentium, and Pentium Pro Processor- Architecture Programming and Interfacing" 4th Edition, Prentice Hall of India.
- A.K.Rai and K.M.Bhurchandi, "Advance Microprocessors and Principles- Architecture Programming and Interfacing" Tata McGraw Hill.
- B.Ram "Advanced Microprocessors and Interfacing", Tata McGraw Hill.

Laboratory Assignments -

Assembly language programming of 8086:

- Study of BIOS and DOS interrupts
- Study of MASM directives
- Program for string manipulation
- Program for password
- HEX- BCD conversion
- BCD- HEX conversion
- BCD Addition
- Program using MACRO
- Program using NEAR procedure
- Program using FAR procedure
- Program to display Date and Time
- Program using structures
- Program using 8087 instruction set
- Program using 8087 instruction set

The term work should include a minimum of 12 experiments. Program based on 8087 are compulsory.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

SE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2006-07)

TERM – II

DATA STRUCTURES AND FILES

Teaching Scheme:
Lecturers: 4 Hrs / Week
Practical: 4 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term work: 50 Marks
Practical: 50 Marks

Unit – I

Introduction: Concept of data, data types, data objects, structure, abstract data type, (ADT) and study .Implementation of data structure.
Stack and Queues:- Fundamental of stacks and queues, Data Structure of stack and queues, Basic operations on stacks and queues, Disadvantages and applications of stacks and queues, Concept of circular queues, basic operation on stacks and queues, Multi-stack and queues, priority queues.
Applications of Stacks:- Polish notation (infix, postfix, prefix) Evaluation of prefix and postfix expression , inter conversion of infix, prefix and postfix expression. Use of stack by function call and recursive function call, Multi-stack machines, Parenthesis matching, Towers of Hanoi, Queue application. (10 Hrs, 20 Marks)

Unit – II

Linked list: Concept of Linked list, Basic Operations on a single linked list (Creation, insertion, deletion, traversing, concatenating, inverting and length finding) Linked stack and Queues, circular linked list, advantages of circular linked list, erasing circular linked list, Double linked list with basic operations like copy, storing polynomial using linked list, polynomial addition, and

Generalized list, operations like copy, and equal depth on generalized list, Data representation for strings, pattern matching in string.
Storage Pool :- Initializing Storage Pool, allocating and (GETNODE) and deal locating (RET) a node Dynamic storage Management Procedure for allocation and freeing of blocks, First Fit, Best fit and Worst fit memory allocation Strategies. (10 Hrs, 20 Marks)

Unit – III

Binary Tree: Basic terminology, Data structure and representation of binary tree, Binary tree traversal, and recursive and non recursive procedure for tree traversal, basic operations on binary tree, (Creation, insertion, deletion, printing, copy, equal and depth finding) Threaded binary tree, insertion in order threaded binary tree, In order traversal of in order threaded binary tree, Concept of binary search tree, Static tree labels, Huffman, Algorithms, Constructions, of optimal binary search tree, Dynamic tree tables, Basic Operation on it-insertion, deletion, height balanced binary tree, LL, LR, RL, RR Rotations (10 Hrs, 20 Marks)

Unit – IV

Sorting and Searching - Searching strategies:- liner and binary search algorithm, Algorithm for bubble sort, Insertion sort, Quick sort, selection sort, shell sort, merge sort, Heap sort, Radix sort, Radix exchange sort, Best average and worst case time complexity of each of the sorting and searching Algorithm
Hashing: Hashing function, overflow handling, collision, linear probing deletion, clustering re-hashing bucket and chaining selection of good hash function (10 Hrs, 20 Marks)

Unit – V

File Handing - Sequential and Relative Files: Description and organization, primitive operations on sequential and relative file.
Direct access file - Description and organization, primitive operations on direct access files
Indexed Sequential files and Indexes:-Description and organization, primitive operations on indexed sequential files, Indexed concept, linear indexes, tree indexes, algorithm for B-tree.
Multi Indexed files:- Description and organization of Inverted files, Multi list files, and algorithms for addition and deletion of records from the files. (10 Hrs, 20 Marks)

Reference Books -

- Ellis Horowitz and Sahani, “Fundamentals of data Structure” Galgotra.
- Thomas R. Harborn, “ File system and Algorithms”, Prentice- Hall International
- Seymour Lipschutz, “ Theory and Problems of data Structures” Schum’s Outline Series, McGraw Hill.
- Trembaly and Sorenson “An Introduction to Data structures with Applications” Tata McGraw Hill.
- Tannenbaum, “Data Structure C and C++ Prentice Hall of India.
- Sahani, “Data Structures, Algorithms and Applications in C++ McGraw Hill.

Laboratory Assignments -

List of programming assignments to be developed in C/C++ with emphasis on developing debugging abilities

- Implementation of stack using array or linked list
- Implementation of Queue using array or linked list
- Implementation of circular Queue using array or linked list
- Conversion of Infix expression to postfix expression
- Conversion of postfix expression to infix expression

- Addition of two single variable polynomial using linked list
- Implementation of double linked list and perform insertion, deletion and searching
- Creation of binary tree and perform all non-recursive traversals.
- Creation of binary search tree and perform insertion, deletion printing and in a tree shape.
- Implementation of pattern matching in starting using linked listed.
- Create a hash table and handle the collisions using liner probing with or without replacement.
- Implementation of simple index file.
- Insertion and deletion of a record from a direct access file using changing with and without replacement.
- Insertion and deletion of a record from a sequential file.
- Insertion and deletion of a record from a relative file
- Insertion and deletion of a record from a multi list file

Term work should be minimum of 12 experiments from the above list.

NORTH MAHARASHTRA UNIVERSITY, JALGAON
SE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2006-07)
TERM – II

COMPUTER ORGANIZATION

Teaching Scheme:
Lecturers: 4 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)

Unit – I

Introduction to system concepts: Functional Units, Basic operational concepts, instruction formats for machines, fixed and expanding opcodes, zero, two and three address schemes, concept of stack processor. General Addressing Modes.
Processor Organization: Instruction set design. 68000 architecture – Register structure and addressing modes, normal and exceptional processing. Bus structures. (10 Hrs, 20 Marks)

Unit – II

Information representation, Big-endian and little-endian, data types, fixed and floating point representation, IEEE format for floating point and decimal algorithm, Booths algorithm, bit pairing methods, Restoring and non-restoring division algorithm. Floating point operations, guard bits and rounding (10 Hrs, 20 Marks)

Unit – III

Control unit design, design levels, one / two / three bus CPU, hardwired control design methods and implementations, Microprogrammed control unit concepts and control unit design considerations, Wilkes design, Nano programmed computers, bit-slice architecture, 2900 family CPU designs, emulation. (10 Hrs, 20 Marks)

Unit – IV

Memory Organization: Memory hierarchies, memory interleaving, cache memories organization, virtual memory and organization, performance considerations, content addressable memories, memory management in 68000 family and cache designs, Introduction to SRAM, DRAM, RDRAM, Flash memory. (10 Hrs, 20 Marks)

Unit – V

System Organization: Buses, interconnection system bus, CPU and IO bus-bus operation, UNIBUS, multibus and IEEE 488 I/O addressing, data transfer, synchronization, serial and parallel ports, I/O interfaces, I/O channel, PCI bus, SCSI bus, Universal Serial Bus. RISC architecture, concepts, CISC versus RISC, advantages of RISC (10 Hrs, 20 Marks)

Reference Books –

- Hamacher, Vransic, Zaky, "Computer Organization", 5th Ed., McGraw Hill international.
- J. P. Hayes, "Computer Architecture and Organization", 3rd Ed. McGraw Hill international.
- Tanenbaum, "Structured Computer Organization", PHI.
- William Stallings, "Computer Organization And Architecture", 6th ed., PHI.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

SE (COMPUTER ENGINEERING)
(w.e.f. 2006-07)

TERM – II

DIGITAL SYSTSEM DESIGN

Teaching Scheme:
Lecturers: 4 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)

Unit – I

Combinational Logic Design: Using MSI circuits, BCD Adder, BCD subtractor, BCD to 7 segment decoder . Adder / Subtractor using IC 7483.
Design of code Converter circuits: BCD to Binary, Binary to BCD, BCD to Gray, Gray to BCD, BCD to Ex-3, Etc.
Design of counter and shift register using IC 7493 & IC 7495. (10 Hrs, 20 Marks)

Unit – II

Design of ROM, PLA, PAL: Basic structure of ROM, size of Rom, Design of ROM, Structure of PLA, PAL, and their designs. Introductions to complex programmable Logic devices (CPLDs) & Field – Programmable Gate Array, (FPGA) (10 Hrs, 20 Marks)

Unit – III

Sequential Logic Design:- Review of excitation table of S-R, J-K, D & T flip flops. Analysis of clocked sequential circuit state table, state diagram, next stat equations, state reduction, state assignment. Design of register, shift resistor ripple counter, synchronous counters, sequence generator & detector. (10 Hrs, 20 Marks)

Unit – IV

Asynchronous sequential circuit : Asynchronous verses Synchronous sequential circuit, Application of Asynchronous sequential circuit.
Asynchronous sequential Machine modes, Analysis of Asynchronous sequential Machine, Design of Asynchronous Sequential circuit (10 Hrs, 20 Marks)

Unit – V

Algorithmic state Machines.
ASM chart, definition, standard symbols for ASM chart Method of implementation ASM chart by 'D' Flip Flop, Mux – Controller, Rom Controller, One hot controller.
Generation of ASM chart for different waveforms, Miscellaneous problem of ASM chart, e.g. Traffic light, Washing machine, Wending machine etc.
Introduction to VHDL : Entity, Architecture, configuration Declaration Generic, Data objects example of VHDL codes. (10 Hrs, 20 Marks)

Reference Books –

- "Modern Digital Electronics" by R.P. Jain, 3rd Edition, TMH.
- "Digital Logic and Microprocessor" by F.J. Hill, John Willy & sons.
- "Digital Electronic circuit and system" by V.K.Puri, TMH.
- "Digital Design" by M. Morris Mano, PHI.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

SE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2006-07)

TERM – II

DATA COMMUNICATION

Teaching Scheme:
Lecturers: 4 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)

Unit – I

Introduction to data communication and networks –
Data communication – Components, data representation, direction of flow
Networks – network criteria, network hardware, network software, protocol hierarchy, design issues for the layer, ISO OSI reference model
Signals – Analog signals, digital signal, analog verses digital signal, data rate limits, transmission impairment, throughput, propagation speed, propagation time, wavelength etc.
(10 Hrs, 20 Marks)

Unit – II

Digital transmission and analog transmission –
Digital transmission – line coding, characteristics, schemes. Block coding, transformation and common block codes. Sampling – PAM, PCM, Nyquist's theorem, bit rate, transmission modes.

Analog transmission – Analog modulation, AM, FM, PM. Digital modulation, ASK, FSK, PSK, QAM. Bit/baud comparison.
Telephone modems – Modem standards, traditional modems, 56K modems etc.

(10 Hrs, 20 Marks)

Unit – III

Multiplexing – FDM – Multiplexing process, de-multiplexing process, applications of FDM, WDM, TDM – Time slots, frames, interleaving, synchronization, bit padding, DSS, T-Lines, inverse TDM, Applications of TDM.
Transmission media – Guided media, twisted pair, coaxial cable, fiber optics, unguided media, radio waves, microwaves, infrared.
Switching – Circuit switching, packet switching and message switching. Telephone networks – components, LATAs, making conections, analog services and digital services.

(10 Hrs, 20 Marks)

Unit – IV

Error detection and correction –
Types of errors, single bit burst errors. Detections – redundancy, parity, CRC, checksum. Error correction – Correction by retransmission, FEC, Burst error correction.
Flow control and error control – stop and wait ARQ, Go-back-N ARQ, selective repeat ARQ.

(10 Hrs, 20 Marks)

Unit – V

Ethernet – Traditional Ethernet, fast Ethernet, gigabit Ethernet.
Multiple access – random access, MA, CSMA, CSMA/CD, CSMA/CA, control access, FDMA, TDMA, and CDMA.
IEEE 802.3, 802.4, 802.5, X.21, X.25, SDLC/HDLC protocol standards.
Introduction to network connecting devices – repeater, bridge, router, gateway, hub etc.

(10 Hrs, 20 Marks)

Reference Books –

- "Computer Networks" A S Tanenbaum 4th edition PHI
- "Data Communication and Networking" B Forouzan, 3nd edition, TMH
- "Data Communication and Networking" Achyut Godbole, TMH

NORTH MAHARASHTRA UNIVERSITY, JALGAON

SE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2006-07)

TERM – II

PROGRAMMING LABORATORY - II

Teaching Scheme:
Lecturers: 2 Hrs / Week
Practical: 4 Hrs / Week

Examination Scheme:
Term work: 50 Marks
Practical: 50 Marks

Unit – I

Introduction to Object Oriented Programming - Need of Object Oriented Programming: A look at Procedure Oriented Programming, Object Oriented Programming Paradigm Basic Concept of OOP - Objects, classes, Data Abstraction, Encapsulation, Inheritance, Polymorphism, Data hiding ,Message Passing. Benefits of OOP, Application of OOP

Beginning with C++ : What is C++, Structure of C++ Program, A simple C++ program, comments, output using Cout, input using Cin, declaration of variables, Reference variables, Token, Keywords, Identifier, Constant, Basic data types, Derived data types.

Unit – II

Control structures , Classes and Objects - Control Structures: If statement, switch statement, Do while statement, while statement and For statement.
Classes and objects: Specifying a Class, Defining Member function, A C++ program with class, Nesting of member function, Private member function, Array within a class, memory allocation for objects, Static Data member, Static member function, Array of Objects, Objects as function argument, Friendly function, Returning objects.
Constructor and destructor - Constructor Parameterized Constructor ,Multiple Constructor in a class, Constructor with default argument, Dynamic Initialization of Objects,
Copy Constructor, Destructor

Unit – III

Functions and Operator overloading - Function in C++: The main function, Function prototype, Call by value, Call by reference, Return by reference, Inline Function, Default Argument, Function Overloading,
Operator - Operator in C++, Scope Resolution Operator, Operator Precedence
Operator Overloading - Defining Operator overloading, Overloading Unary Operator, Overloading Binary operator, Overloading binary operator using friend, Rules for operator overloading
Type conversion

Unit – IV

Inheritance and Pointer, Virtual function and Polymorphism, Inheritance: Introduction, Defining Derived classes, Single inheritance, Making a Private member inheritable, Multilevel Inheritance, Multiple Inheritance, Hierarchical Inheritance, Hybrid inheritance, Virtual base classes, Abstract classes, Constructor in derived class.
Pointer, Virtual Function and Polymorphism: Introduction, Pointer to Object, this pointer, Pointer to Derived classes, Virtual function.

Unit – V

Managing Console I/O operation and File Operation - Managing Console I/O operation: C++ Stream, C++ Stream Classes, Unformatted I/O Operation, Formatted Console I/O operation, Managing Output with manipulators
Working with files: Classes for File Stream Operations, Opening and Closing a File, Detecting End Of File ,More about Open() : File Modes, File Pointer and their manipulator, Sequential Input and Output Operations, Updating a File: Random Access. Error handling during file operation,
Template: Function template, Class Template

Reference Books –

- E. Balgurusamy ," Object Oriented Programming with C++ ", III Edition TATA McGraw – Hill Publication

- Kanetkar Y. , " Let Us C++" , BPB Publication
- Schildt , " C++ The Complete Reference " ,Tata McGraw Hill Publication.

Laboratory Assignment: -

- One Simple C++ Program
- C++ Simple Program using Control Structure.
- Program to create array of Object.
- Program that illustrate use of various types of constructor
- Program for String Manipulation
- Program for Unary Operator Overloading.
- Program for Binary Operator Overloading
- Program for Function Overloading
- Program for Multilevel inheritance
- Program for Run time polymorphism using Virtual Function
- Program to format output using manipulator
- Program for File Handling
- Program using Template
- Mini project in C++ (e.g. Banking system, Railway reservation system etc.)
- Program for stack operations using class
- Program for Queue operations using class

Term work should be minimum of 12 experiments from the above list.

North Maharashtra University, Jalgaon
New Syllabus with effect from Year 2006-07
TE Computer Term I

Sr. No	Subject	Teaching Scheme per Week			Examination Scheme				
		L	T	P	Paper Hr.	Paper	TW	PR	OR
1	Microprocessor II	4	-	2	3	100	25	25	-
2	Theory of Computer Science *	4	-	-	3	100	-	-	-
3	Computer Network *	4	-	2	3	100	25	-	25
4	Computer Graphics *	4	-	2	3	100	25	-	-
5	Systems Programming *	4	-	2	3	100	50	-	25
6	Advanced Development Tools Laboratory *	-	-	4	-	-	50	-	-
	Total	20	0	12		500	175	25	50
	Grand Total	**32**			**750**				

TE Computer Term II

Sr. No	Subject	Teaching Scheme per Week			Examination Scheme				
		L	T	P	Paper Hr.	Paper	TW	PR	OR
1	Microprocessor III	4	-	2	3	100	25	-	-
2	Operating Systems *	4	-	2	3	100	25	-	25
3	Software Engineering *	4	-	2	3	100	25	-	50
4	Database Management System *	4	-	2	3	100	25	25	-
5	Analysis and Design of Algorithms	4	-	2	3	100	25	-	-
6	Practical Training/Mini Project/Special Study		-		-	-	25	-	-
	Total	20	0	10		500	150	25	75
	Grand Total	**30**			**750**				

* Common subject with TE IT

NORTH MAHARASHTRA UNIVERSITY, JALGAON

TE (COMPUTER ENGINEERING)
(w.e.f. 2007-08)

TERM – I

MICROPROCESSOR II

Teaching Scheme:
Lectures: 4 Hrs / Week
Practical: 2 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term work: 25 Marks
Practical: 25 Marks

Unit – I
Dos: File System, boot record, FAT, Device Drivers, Installable device drivers. Structure of device drivers, .com and .exe files.
Basic I/O Interface: Introduction. I/O Port Address decoding, 8255: Programmable Peripheral Interface.8254: Programmable Interval Timer.

(10 Hrs, 20 Marks)

Unit – II
Basic I/O Interface: 8251: Programmable Communication Interface. The Parallel Printer Interface (LPT). Interfacing 7-segment display, Stepper motor interfacing, Interfacing ADC & DAC. Disk Reading Method- FM,MFM. Introduction to CD recording. TSR programs: Concepts and implementation.

(10 Hrs, 20 Marks)

Unit – III
Hardware Organization of PC: Motherboard Component Logic.I/O Channels. Memory Map. Interrupts. DMA Channels. Reset Logic, CPU nucleus logic,DMA logic, NMI logic, RAM,ROM logic. RTC ,PC cards. Keyboard Interface block diagram.
CRT Controller 8275, PC Display Adapters-CGA.EGA.VGA.SVGA. Principles of AGP

(10 Hrs, 20 Marks)

Unit – IV
Bus Interface: The ISA Bus, the Extended ISA(EISA) and VESA Local Buses. The Peripheral Component Interconnect (PCI) bus, the Universal Serial Bus(USB). Floppy Disk Controller 8272,FDC system Interface, Overall operation of Floppy disk Subsystem. Overview of Hard Disk Controller Organization.HDC Commands.

(10 Hrs, 20 Marks)

Unit – V
Microcontrollers: Different Types of microcontrollers. 8051 microcontroller Architecture. 8051 hardware Feature. Input/output pins. Ports and Circuits.External memory. Counters and Timers. Serial dada I/O.Interrupts . 8051 programming.Addressing Modes.

(10 Hrs, 20 Marks)

Reference Books -

1. B.Govindarajalu, "IBM PC and Clones" Tata McGrawHill
2. Mazidi," The 8051 Microcontroller & Embedded Systems , " Pearson LPE
3. Jeff Duntemann,"Assembly Language Progg. For IBM PC Family, 3rd edition,Dreamtech (Wiley India)
4. Antonakos, " An Introduction to the Intel Family of Microprocessors," – Pearson LPE

5. Douglas Hall, "Microprocessor and Interfacing", Tata McGrawHill, revised 2nd Ed.
6. Ray Duncan. "Advanced MS-DOS" BPB.
7. Peter Abel, Niyaz Nizamuddin, "IBM PC Assembly language and Programming", Pearson
8. Ray and Bhurchandi. "Advanced Microprocessors and Peripherals" Tata McGraw Hill, 2nd Ed.
9. Barry B Bray. "The Intel Microprocessors-Architecture.Programming and Interfacing". Pearson LPE/PHI, 7th Ed.
10. Kenneth J.Ayala. "8051 Microcontroller"Penram Internationals", Penram International, 2nd Ed
11. Manoharan, Kannan, "Microcontroller based System Design", Scitech
12. Badri Ram."Advanced Microprocessors and interfacing".Tata McGraw Hill.
13. Myke Predko."Programming and Customizing 8051 Micocontroller" Tata McGraw Hill
14. Korneev n kiselev,"ModernMicroprocessors",3rdedition,Dreamtech Press(WileyIndia)

List of experiments -

Group A:

1. Interfacing ADC with 8086.
2. Interfacing DAC with 8086.
3. Centronics parallel Printer interface.
4. PC to PC Communication using serial port in 8086.
5. Write a Device Driver Program.
6. Interfacing Stepper motor with 8086.
7. Reading partition table from Hard Disk.

Group B:

1. Read/Write/Format sector/Track of floppy.
2. Mouse Interfacing.
3. TSR Routine.
4. Program for Rolling Display using 8051.
5. Design of graphic editor.
6. Waveform generation using 8051.
7. Program for Generating Speaker tones by using PC.

The term work should include minimum of 10 Assignment.(5 from each group).Assignment no.5 from group A is compulsory.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

TE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2007-08)

TERM – I

Theory of Computer Science

Teaching Scheme:
Lectures: 4 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)

Unit – I

Mathematical Preliminaries: Alphabets, Strings, Languages, States, Graphs and trees, Concept of basic machine.

Finite State Machines: State tables, Transition graph, Adjacency matrix, Moore and Mealy FSM's, Deterministic and Non-deterministic FSM's, Equivalence of DFA and NFA, FSM with Epsilon moves, Minimization of FSM

(10 Hrs, 20 Marks)

Unit – II

Regular Expressions: Definition, Building RE, Converting DFA's to RE, Conversion of RE to NFA. Properties of Regular Sets: Pumping lemma for regular sets, Applications of Pumping lemma, Closure properties of Regular sets, and Decision algorithms for regular sets.

(10 Hrs, 20 Marks)

Unit – III

Grammars: Definition, Production rules, Formalization, Derivation trees, Ambiguous grammar, Removal of ambiguity, Reduced form grammar – Removal of unit productions, Epsilon productions, Useless symbols, Chomsky hierarchy.
Context Free Grammars: Definition, Simplification of CFG, Regular Grammar – Definition, Left linear and right linear regular grammar, Inter-conversion between left linear and right linear grammar, Reduced Forms – CNF and GNF, Reduction to CNF and GNF, Construction of regular grammar from DFA, Construction of FA from regular grammar.
Context Free Languages: Definition, Properties, Pumping lemma for CFL's, Decision algorithms for CFL's, CYK algorithm

(10 Hrs, 20 Marks)

Unit – IV

Pushdown Stack Memory Machines: Definition, PDM examples, Power of PDM, Deterministic and Non-deterministic PDM, PDA and CFL, Construction of PDA from CFG, Construction of CFG from PDA.
Production Systems: Definition, Post canonical system, PMT systems, Acceptors and Generators, Markov algorithm

(10 Hrs, 20 Marks)

Unit – V

Turing Machine: Definition, Notations, Transition diagram, Power of TM over FSM, PDM and PM, Design of TM, Universal TM, Church's Turing Hypothesis, Multi-stack TMs, TM limitations, Halting problem, Undecidability, Tractable and intractable problems

(10 Hrs, 20 Marks)

Reference Books -

1. E V Krishnamurthy, 'Theory of Computer Science', EWP.
2. Hopcroft, Ullman, 'Introduction to Automata Theory' Narosa.
3. K.L.P.Mishra, 'Theory of Computer Science', PHI.
4. Daniel Cohen, 'Introduction to computer Theory', Wiley India
5. John Martin, 'Introduction to Language and Theory of Computations', TMH.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

TE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2007-08)

TERM – I

Computer Network

Teaching Scheme:
Lectures: 4 Hrs / Week
Practical: 2 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term Work: 25

Oral: 25

Unit – I

Review of Data Communication and Introduction to computer networks.

Data Link layer: Data Link layer design issues, Elementary data link layer protocols, Sliding window protocols, Data Link Layer switching, Bridges 802.x to 802.y, Local inter-networking, Spanning tree and remote bridges.

Review of network connecting devices and multiple access protocols.

(10 Hrs, 20 Marks)

Unit – II

Network Layer: Logical Addressing - IPv4 addresses- Address space, notations, Classful addressing, Classless Addressing, Network Address Translation.IPv6 addresses- Structure and address space

Internet Protocols: Internetworking- Need of network layer, datagram network, connectionless network

IPv4- Datagram, Fragmentation, Checksum, Options

IPv6- Advantages, packet formats, extension headers

Transition from IPv4 to IPv6: Dual stack, Tunneling, Header Translation

(10 Hrs, 20 Marks)

Unit – III

Network Layer: Address Mapping - ARP, RARP, BOOTP and DHCP

ICMP: Types of messages, message formats, error reporting, query, debugging tools

IGMP: Group Management, messages, message format, IGMP operations, Encapsulation, Netstart utility.

ICMPv6: Error reporting and queries

Delivery: Direct versus Indirect delivery

Forwarding: Techniques, process, routing tables

(10 Hrs, 20 Marks)

Unit – IV

Unicast Routing Protocols: Optimization, Intra and Inter domain routing, distance vector routing, link state routing, path vector routing

Multicast Routing Protocols: Unicast, Multicast and Broadcast, applications, routing protocols

Transport Layer: Process to process delivery, UDP

(10 Hrs, 20 Marks)

Unit – V

TCP/IP Protocol Suite: Addressing

TCP: Services, features, segments, connections, flow control, error control, congestion control

Congestion control: Data Traffic, open- loop, closed- loop congestion control, congestion control in TCP and frame relay

Quality of Service: Flow characteristics and classes, techniques to improve QOS such as Scheduling, Traffic shaping, resource reservation, admission control

Integrated Services: Signaling, flow specification, admission, Service Classes, RSVP, problems with Integrated Services

(10 Hrs, 20 Marks)

Reference Books -

1. Andrew S. Tanenbaum, “Computer Networks”, 4th edition, Pearson LPE /PHI.
2. Behrouz Forouzan, “Data Communications and Networking”, TMH, 4th Ed.
3. Irvine,”Data Communication and Networks:An Engg. Approach” Wiley India
4. S. Keshav, “An Engineering Approach to Computer Networking”, Pearson Education, 5th Ed
5. Irvine Olifer,”Computer Networks:Principles,Technologies and Protocols” Wiley India

List of experiments -

1. Study of network resources and various components.
2. TCP/IP Socket Programming.
3. Implementation of Data link layer protocol.
4. Implementation of Network routing algorithm.

5. Implementation of data compression and decompression algorithm (Huffman Algorithm).
6. Implementation of Network security algorithm (Encryption and Decryption Algorithm).
7. Program using FTP to exchange files between computers,
8. Study of proxy server/DNS Server/mail server/NFS server.

1 to 6 assignments are compulsory.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

TE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2007-08)

TERM – I

Computer Graphics

Teaching Scheme:
Lectures: 4 Hrs / Week
Practical: 2 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term Work: 25

Unit – I

Basic Concepts: Introduction to computer graphics, Types of Computer Graphics, Application of Computer Graphics, Graphics Standards, Graphics file formats such as BMP, TIFF, PCX and GIF

Interactive Computer Graphics: Working of Interactive Computer Graphics, Graphics Hardware, CRT, display and controller, Interlaced and non interlaced display, Vector and raster scan display, Random scan display, Frame buffers, Display adapters, VGA, SVGA, Bios video support, Various input devices, Graphics device drivers, Graphics software, Co-ordinates representations, Graphical functions, Plotters, Scanners, Digitizers and Light Pen.

Linear and Circle Generation: Line generation – DDA and Bresenhams /algorithm Thick line generation, Antialiasing, Circle Generation – DDA and Bresenham's Algorithm, Character Generation – Stroke principal, Starburst principle, Bitmap method.

(10 Hrs, 20 Marks)

Unit – II

Polygons: Types, representations, entering polygon, Polygon filling: Fance fill, Edge flag, Seed fill, Edge fill, Scan conversion algorithm. Scan conversion algorithm. Scan conversion: Real time scan conversion, Solid area scan conversion, Run length encoding, Cell encoding.
Segments: Concepts, Segment table, Segment creation, Deletion, Renaming, Image Transformation.

(10 Hrs, 20 Marks)

Unit – III

2D & 3D Geometry: 2D transformation primitives and concepts Translation, Rotation, Rotation about an arbitrary point, Scaling and Shearing, 3 D transformations, Rotation about an arbitrary axis, 3D viewing transformation , Concept of parallel perspective projections, Viewing parameters.
Clipping Fundamentals, Types of clipping.

(10 Hrs, 20 Marks)

Unit – IV

Windowing and Clipping: Viewing transformation, 2 D clipping and 3D clipping, Sutherland Cohen line clipping algorithm, Mid-point subdivision algorithm, Generalized clipping, Cyrus-Beck Algorithm, Interior and Exterior clipping, Polygon Clipping, Sutherland-Hodgman algorithm.
Hidden Surfaces and Lines: Back face removal algorithm, Hidden line methods, Z-buffer, Warnock and Painter algorithm, Floating horizon.

(10 Hrs, 20 Marks)

Unit – V

Light, Color and Shading: Diffused Illumination, Point source illumination, Shading algorithm, Color Models – RGB, HVS, CYM etc Elimination back faces, Transparency, polygons, B-Splines and corner, Bezier Curves, Fractals, Fractal Surfaces and lines

Graphical User Interface: Concepts of X-Windows, Concept of client/server model, Protocols, Message passing (only GUI related) Motif – widget, gadget structure (Only GUI concept) Concept of MS Windows, Open GL, Why 3D? Why Open GL? OpenGL and Animation

Graphics Standard: Introduction to graphics kernel system with basic primitives

Graphics Applications: Scientific and engineering applications, Business applications, Application concept in Animation and concept in Animation and Simulation

(10 Hrs, 20 Marks)

Reference Books -

1. David F. Rogers, "Procedural Elements for Computer Graphics:, Tata McGraw Hill, 2nd Ed
2. Steven Harringtom, "Computer graphics A Programming Approach", MGH
3. Hill, "Computer Graphics using OpenGL", Pearson LPE/PHI, 2nd Ed
4. Foley, Vandam, Feiner, Hughes, "Computer Graphics Pricipals & Practice", Pearson, 2nd Ed
5. Donald Hearn and Pauline Baker," Computer Graphics", Pearson LPE, 2nd Ed
6. Rao and Prasad," Graphics user interface with X windows and MOTIF", New Age
7. ISRD, "Computer Graphics", Tata McGraw Hill
8. Mukherjee, "Fundamentals of Computer Graphics and Multimedia", PHI

List of experiments -

1. Study of various Graphics Commands
2. Line generation using DDA
3. Different Line Style using Bresenhams Algorithm
4. Circle Generation using Bresenhams Algorithm
5. Program for Polygon Filling
6. Program for 2D Transformations (Translation, Rotation and Scaling)
7. Program for Segmentation
8. Program for line clipping
9. Program for Polygon clipping
10. Program for 3D rotation
11. Program for Parallel Projections
12. Program for Perspective Projection
13. Program for Animation
14. Program for Bezier Curve
15. Mini Project: Developing some Graphics application
16. Study assignment on any latest GUI application or mini-project.

The term work should include a minimum of ten assignments.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

TE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2007-08)

TERM – I

Systems Programming

Teaching Scheme:
Lectures: 4 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)

Practical: 2 Hrs / Week

Term Work: 50
Oral: 25

Unit – I

Introduction: Introduction to system programming, Types of s/w and application software, System programming and system programs, Need of system software, Assemblers, Loaders, Compilers, Interpreters, Macros, Operating system and formula system, Translators and its types.

Assemblers: Structure of assembler, Basic function, Machine dependent and machine independent features of assembler, Types of assemblers – single pass, multi-pass, cross assembler, General design procedure of assembler, Design of Pass-I and Pass-II assembler (with reference to 8086 assembler), Single pass assembler for IBM PC, Implementation examples – MASM example.

(10 Hrs, 20 Marks)

Unit – II

Macros and Macro Processors: Definition and function of Macro Processor, Features of macro facility, Macro expansion, Nested macros, Design of macro processor – single pass and two pass macro processor, Detailed design of two pass macro processor.

Loaders and Linkage Editors: Basic loader functions, Relocation and linking concepts, Various loader schemes with their advantages and disadvantages, Other loader schemes – binders, Linking loaders, Overlays, Dynamic binders, Design of direct linking loaders, Specification of problem, Specification of data structures, Format of databases.

(10 Hrs, 20 Marks)

Unit – III

Design of a linker, A linker for MS DOS, Linking for overlays
Grammar and scanner, Overview of compilation process, Programming language grammar, Derivation, Reduction and syntax tree, Ambiguity, Regular grammar and regular expression, Basic functions of complier, Machine dependent and machine independent features of compiler, Types of compilers – single pass, multi-pass, cross compiler and pseudo code compiler, Phases of compiler

(10 Hrs, 20 Marks)

Unit – IV

Design of lexical analyser, Software tools for program development YACC and LEX.

Functions of parser, Parsing techniques, Top-down and Bottom-up parsing, Limitations of top-down parsing, Shift reduce and recursive descent parser, Operator precedence parser, Predictive parser, L-R parser, Syntax directed translation (design of parser not expected)

(10 Hrs, 20 Marks)

Unit – V

Symbol table organization and memory allocation, Elementary symbol table organization, Hash tables, Linked list and tree structure symbol tables, Memory allocation – static and dynamic memory allocation.

Dynamic linking in Windows (only introduction and concepts only) – concept of clipboard, OLE terminology and technology, Dynamic Data Exchange, Dynamic Link Libraries (DLL)

(10 Hrs, 20 Marks)

Reference Books -

1. John J. Donovan “System Programming”, TMH
2. Dhamdhere “System Programming & Operating System”, TMH, 2nd Ed
3. L. Beck “System Software”, Pearson, 3rd Ed
4. Aho, Ulman “Compiler Construction” – Pearson LPE
5. J P Bennett, “Compiling Techniques”, TMH
6. Dick Grune,”Modern Compiler Design” Wiley India.

7. David Galles,"Starting out with Modern Compiler Design" Dreamtech Press(Wiley India)

List of experiments -

1. Develop an application to simulate first pass of 2-pass assembler
2. Develop an application to simulate second pass of 2-pass assembler
3. Design a simple loader
4. Develop an application to create a simple text editor
5. Develop an application for simulating Lexical phase of Compiler
6. Develop an application for simulating Syntax Analysis phase of Compiler

The term work should include a minimum of five assignments.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

TE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2007-08)

TERM – I

Advanced Development Tools Laboratory

Teaching Scheme:
Practical: 4 Hrs / Week

Examination Scheme:
Term Work: 50

Part I: Windows Programming
Basic Windows SDK programming, Programming involving Dialog Boxes, Menus and standard GUI components, Writing of Windows Help file using "HC", Writing DLLs and VXDs (Win 95/98/2k)

Part II: Front-End Tools
Assignments based on packages like C# / .NET / VC++ / VB / Java. Assignments should cover basic GUI components, Database Access, ActiveX technology, Network applications.

Part III: Internet Programming Tools
HTML programming, Java Scripts or VB Scripts programming, Internet programming using Java / C# / .NET, (Assignments should cover dynamic page creation) database connectivity (e.g. search engine), online communication (e.g. chatting, email-editor)

Reference Books -

1. Charles Petzold "Programming Windows", Microsoft Press, 5th Ed
2. Andrew Troelson,"C# and .Net Platform, A Press (Wiley India)
3. Herbert Schildt, "Programming Windows 2000 – Ground Up", Tata McGraw Hill
4. Schurman and Pardi, "Dynamic HTML in Action", Microsoft Press, 2nd Ed
5. Sells, "Windows Forms Programming in Visual Basic .NET", Pearson
6. Deitel, "C# How to program", Pearson LPE
7. Steven Hozner," Java 2(Jdk 5) Progg. Black Book" Dreamtech Press(Wiley India)
8. Ivor Horton,"Beginning VC++" Wrox Press(Wiley India)
9. Steven Hozner ," VB.Net Progg. Black Book" Dreamtech Press(Wiley India)
10. Bakharia, "Microsoft C# fast and easy web development", PHI
11. Steven Hozner ,"HTML Black Book" Dreamtech Press(Wiley India)
12. Eric Brown,"Windows Forms in Action" Manning Press(Wiley India)

Term work -

Term work should include at least four assignments from each part.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

TE (COMPUTER ENGINEERING)
(w.e.f. 2007-08)

TERM – II

Microprocessor III

Teaching Scheme:
Lectures: 4 Hrs / Week
Practical: 2 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term Work: 25

Unit – I
Architecture of the 80386: Functional DIP, Support for pipelining, Dynamic bus sizing, 80386 SX/DX differences, Programming model of 80386, Register model, Data types and addressing modes, New instructions of 80386, Bus cycles with 16 & 32 bit, Data bus with timing state diagram, INTA, HOLD, HALT and reset cycles.

(10 Hrs, 20 Marks)

Unit – II
Operating Modes and Memory Management: Segmentation, Paging, (Real, Protected and VM86 mode), Debugging support.

(10 Hrs, 20 Marks)

Unit – III
Privilege Levels: Privilege level protection (Call gates, Conforming code segments) in protected and VM86 mode.
Multitasking: TSS, Moving between tasks, Task scheduling, Busy bit, NT bit, Back link field, TS bit, Extension to TSS, I/O permission bit map, Changing privilege levels within a task, Changing LDTs.

(10 Hrs, 20 Marks)

Unit – IV
Faults and Interrupts: Exception processing in Real, Protected and VM86 Mode.

80387 NDP: Register set, Number system, Instruction Set, Programming.
Processor to co-processor interface, Difference among 80387, 80287, 8087

(10 Hrs, 20 Marks)

Unit – V
Study of 80386 and 80486 motherboard (block diagram treatment only), Overview of Intel Chipset, Pentium motherboards – PI to PIV (block diagram treatment only)

Pentium Microprocessor: Introduction, Salient features, System architecture, MMX architecture
Introduction to Pentium II, III, IV (block diagram treatment only)

(10 Hrs, 20 Marks)

Reference Books -

1. James Turley “Advanced 80386 Programming techniques”, Tata McGraw Hill
2. Triebel, “Advanced 80386”, Tata McGraw Hill
3. Uffenbeck, “ the 80x86 Family: Design, Prog & Interfacing, 3/e”- Pearson LPE

4. Brey/Sarma, “The Intel Microprocessors-Architecture, Programming and Interfacing”, Pearson LPE
5. Douglas Hall, “Microprocessors and Interfacing”, Tata McGraw Hill
6. Badri Ram, “Advanced Microprocessors and Interfacing”, Tata McGraw Hill
7. Nelson, “The 80386 Book”, Microsoft Press
8. Hans Peter, “The Indispensable Pentium”, Pearson LPE
9. Murray Pappas, “The 80386 Programming Reference Manual”
10. B Govindarajalu, “IBM PC Clones”, Tata McGraw Hill, 2nd Ed.
11. James Antonakos, “The Pentium Microprocessor”, Pearson
12. Korneev n kiselev,”ModernMicroprocessors”,3rd edition,Dreamtech Press(WileyIndia)
13. Jeff Duntemann,”Assembly Language Progg. For IBM PC Family, 3rd edition,Dreamtech (Wiley India)

List of experiments -

Assembly language programming for 80386/80387

1. Generation of sine/cosine wave
2. Switching from real mode to protected mode and back
3. Solving arithmetic expression
4. 64 bit Arithmetic operations
5. Program using NDP

Study of 386, 486, Pentium motherboards

1. Layout of motherboard and minimum peripherals
2. Study of CMOS setup
3. Installation of peripherals
4. PC diagnostics using diagnostic tools
5. Study assignment on any latest GUI application or mini-project.

The term work should include a minimum of Six assignments.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

TE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2007-08)

TERM – II

Operating Systems

Teaching Scheme:
Lectures: 4 Hrs / Week
Practical: 2 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term Work: 25
Oral: 25

Unit – I

Introduction: Need of OS, Evolution of OS, Types of OS like Batch, Timesharing, Multiprogramming, Multitasking, Real-time and Personal OS.
OS Views and Concepts: Shell command language, system calls, user view, OS components, OS structure like monolithic, layered, kernel based, micro-kernel based, virtual machine.
Process and Process management: Process concepts, interleaved CPU and IO operations, CPU burst, Process states, OS services for process management, threading.

(10 Hrs, 20 Marks)

Unit – II

Scheduling: Process scheduling, schedulers – long term, middle term and short term. Scheduling algorithms and performance evaluation.

Inter-process communication and synchronization needs: Mutual exclusion, semaphores, critical regions and monitor. Classical problems in concurrent programming.

(10 Hrs, 20 Marks)

Unit – III

Deadlock: Principles, detection, prevention, avoidance and recovery with Bankers algorithm.

Process management in UNIX: Structure of process, process control, process system calls – fork, join, exec, system boot (No algorithms).

Memory Management: Types, contiguous and non-contiguous, segmentation and paging concepts.

(10 Hrs, 20 Marks)

Unit – IV

Virtual memory management: Concepts, implementation, allocation, fetch and replacement.

Memory management in Unix: Policies, swapping and demand paging

File management: Organization, concepts, files and directories, hierarchical structures, space allocation, free space management

Security and protection: Overview, goals of security and protection, security and attacks, formal and practical aspects of security, authentication and password security.

(10 Hrs, 20 Marks)

Unit – V

File management in Unix: Internal representation of files, inodes

File structure in Unix: Structure of file and directories, super block, inode assignment to a new file. Allocation of disk blocks, file creation, and pipes. (No algorithms)

Mass storage structures, disk scheduling, disk management and swap space management.

Distributed OS: Concepts, design issues and system models.

(10 Hrs, 20 Marks)

Reference Books -

1. Silberschatz, Galvin, Gagne, “Operating System Concepts”, 7th Ed,Wiley India
2. D.M. Dhamdhere, “Operating Systems”, Tata McGraw Hill, 2nd Ed.
3. Milenkovic, “Operating Systems Concepts and Design”, Tata McGrawHill
4. M.J. Bach, “The design of Unix Operating System”, Pearson LPE
5. Tenenbaum, “Modern Operating Systems”, Pearson, 2nd Ed
6. William Stallings, “Operating systems-Internals and design principles”, Pearson LPE/PHI, 5th Ed.
7. Deitel, “Operating systems”, Pearson, 2nd Ed
8. Paul Love, “ Beginning Unix”, Wrox Press, (Wiley India)

List of experiments -

1. Study of Unix / Linux commands.
2. Implementation of command interpreter using system calls
3. Simulation of windows explorer
4. Implantation of CPU scheduling algorithm
5. Implementation of Memory Management algorithms – best fit, first fit, worst fit
6. Simulation of page replacement algorithm
7. Implementation of Bankers algorithm
8. Implementation of Inter process communication
9. Implementation of threading
10. Installation of Unix/Linux/Windows server installation with configuration of web-mail and proxy server systems

The term work should include a minimum of six assignments.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

TE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2007-08)

TERM – II

Software Engineering

Teaching Scheme:
Lectures: 4 Hrs / Week
Practical: 2 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term Work: 25
Oral: 50

Unit – I
Introduction: What is and why software engineering? Product: Evolving role of software, Software Characteristics, Components, Applications, Software crisis and Myths, Software Engineering Process, Software development phases and Software Process Models, Prototyping and RAD Model, Water fall, Incremental Model, Spiral Model,4 GT Model, CASE tools.

(10 Hrs, 20 Marks)

Unit – II
Planning and Managing Software projects:

People, Problem and Process, Measures, Metrics and Indicators, Metrics for software quality, Scoping, Software Project Estimation, Make by decision, Software Acquisition Software risks - Identification, Projection, Assessment, Monitoring Project Scheduling and tracking tasks/Work break down structures, Time line charts, Project plan, CASE tools.

System Engineering: Computer based system, System engineering hierarchy.

Information engineering: Information strategy, Planning Enterprise modelling, Business area analysis, Information flow modelling, Product engineering, System analysis, Feasibility study, Economic and Technical feasibility analysis, Modelling system architecture diagram, CASE tools.

(10 Hrs, 20 Marks)

Unit – III
Requirement Analysis: Communication Techniques, FAST, Quality deployment, Analysis Principals: Modelling, partitioning, Prototyping, Specification,

SRS and SRS review analysis models: Data modelling, Functional modelling, Information flow, Data flow Diagrams, Extension to real time systems, Behavioural models, Mechanism of structural analysis, E-R diagrams, controlled modelling, Data dictionary, CASE tools.

(10 Hrs, 20 Marks)

Unit – IV
Design Fundamentals: Software Design and software design process, principals and concepts, Abstractions, Refinement and modularity, Software architecture, Control hierarchy, Partitioning, Data structure, Information hiding, Effective modular design,

Cohesion, coupling, Design Model, Design documents, CASE tools

Design Methods: Architectural design and design process, transform and transaction flow, design steps, interface design, procedural design, graphical and tabular design notations.

(10 Hrs, 20 Marks)

Unit – V

Software Testing Techniques and Strategies: Software testing fundamentals, Test case design, White box testing, Black box testing, Control structure testing, Strategic approach to testing, Strategic issues, Unit testing, Integration testing, Validation testing, System testing, CASE Tools

Introduction to OOSE.
Introduction Unified Modeling Language (UML)

(10 Hrs, 20 Marks)

Reference Books -

1. Pfleeger," Software Engineering : Theory & Practice",6th Edition-Pearson LPE
2. Pressman, "Software Engineering", McGraw Hill, 6th Ed
3. Peters," Software Engineering" Wiley India
4. Ghezzi, Jazayeri, Mandrioli, "Fundamentals of Software Engineering", Pearson/PHI, 2nd Ed
5. Sommervile, "Software Engineering", Pearson, 7th Ed
6. Rajib Mall, "Fundamentals of Software Engineering", PHI, 2nd Ed
7. Javadekar, "Software Engineering" Tata McGraw Hill
8. Thayer ,"Software Engineering Project Management "2nd edition, Wiley India
9. Tian ,"Software Quality Engineering" 2nd Edition, Wiley India

Term Work-

The term work should include a minimum of four software mini projects covering problem definition, analysis, design and documentation for each.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

TE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2007-08)

TERM – I

Database Management System

Teaching Scheme:
Lectures: 4 Hrs / Week
Practical: 2 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term Work: 25
Practical: 25

Unit – I

Introduction to DBMS: Basic concepts, advantages of a DBMS over file processing system, Data abstraction, Data models and data independence, components of a DBMS and overall structure. Database terminology

Database administration issues: DBA role, indexes. Data dictionary, security, backups, Replication, SQL support for DBA, commercial RDBMS selection

Data modeling: Basic concepts, types of data models, E-R data model and Object oriented data model, relational, network and hierarchical data models and their comparison, E-R and ERR diagramming.

(10 Hrs, 20 Marks)

Unit – II

Relational Model: Basic concepts, attributes and domains, interaction and extensions of a relation, concept of integrity and referential constraints. Relational query languages (relational algebra, relational calculus), concepts of view and trigger

(10 Hrs, 20 Marks)

Unit – III

SQL: Structure of a SQL query, DDL and DML, SQL queries, set operations. Predicates and join membership, tuple variables, set comparison, ordering of tuples, aggregate functions, nested query. Database modification using SQL, Dynamic and embedded SQL and concepts of stored procedure, Query optimization

(10 Hrs, 20 Marks)

Unit – IV

Relational database design: Need of normalization, Notation of a normalized relation, Normalization using functional dependency, Multi-valued dependencies and join dependency, 1NF, 2NF, 3NF, BCNF, 4NF.

Transaction Management: Basic concepts of transaction, components of transaction management (concurrency control, Recovery system), Different concurrency control protocols such as Time stamps and locking, different crash recovery such as log based recovery and shadow paging, concepts of cascaded abort, Multi-version concurrency control methods.

(10 Hrs, 20 Marks)

Unit – V

Object oriented DBMS: Review of object oriented concepts: Objects, Classes, attributes, Messages, Inheritance, and Polymorphism etc. Object schemas, Class subclass relationships, inter-object relationships, features of object oriented DBMS and ORDBMS, concepts of OID, persistence of objects in OODBMS, Physical organization, object-oriented queries, schemas modifications, Temporal databases, Active databases.

(10 Hrs, 20 Marks)

Reference Books -

1. Singh," Database Systems: Concepts,Design & Apllication"- Pearson LPE
2. Kahate, " Introduction to Database Management Systems"- Pearson LPE
3. Henry F. Korth, Abraham silberschatz, "Database system concepts", 5th Ed.Mc Graw Hill Inc.
4. Date, "Introduction to Database Management Systems", 8/e Pearson LPE.
5. Rajesh Narang, "Database Management System", PHI
6. Elmasri, Navathe, Somayajulu, Gupta, "Fundamantals of Database Systems", Pearson
7. ISRD, "Introduction to Database Management System", Tata McGraw Hill
8. Connolly, " Database Systems" – Pearson LPE.
9. Bipin Desai, "Introduction to database management systems", Galgotia.
10. Renu Vig, "Fundamentals of database management systems", ISTE learning materials centre
11. Phillip Pratt, "Concepts of DBMS", Thomson Learning, 3rd Ed.
12. Phillip Pratt, "A Guide to SQL", Thomson Learning, 5th Ed.
13. V.K.Jain, " Database Management System" Dreamtech Press (Wiley India)
14. Oracle Sql,Pl/Sql for 9i and 10 g, Dreamtech Press(Wiley India)

15. Andy Oppel, " Rational Databases-Principles and Fundamentals, Dreamtech Press(Wiley India)
16. Paul Wilton," Beginning SQL" Wrox Press, (Wiley India)

List of experiments -

1. Creating a sample database application using conventional file processing mechanism and "C" language. The program should provide facilities for retrieving, adding, deleting and modifying records
2. Prepare an E-R diagram for the given problem definition. Prepare and verify a relational database design using concepts of normalization techniques in appropriate normal form.
3. Creating a sample database file and indexes (for the design made in experiment No. 2) using any client server RDBMS (oracle/Sybase) package using SQL DDL queries. This will include constraints (key reference etc.) to be used while creating tables.
4. SQL DML queries: Use of SQL DML queries to retrieve, insert, delete and update the database created in experiment No. 3. The queries should involve all SQL features such as aggregate functions, group by, having, order by, sub queries and various SQL operators.
5. PL/SQL: Fundamentals of cursors, stored procedures, stored functions.
6. Screen design and Report generation: Sample forms and reports should be generated using Developer 2000 (in case of Oracle) or through Power builder or Visual basic front end tools or any prototyping software engineering tool.
7. Prototype of OODBMS/ Active database/ Temporal Database in C++

The term work should include a minimum of six assignments.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

TE (COMPUTER ENGINEERING)
(w.e.f. 2007-08)

TERM – II

Analysis and Design of Algorithms

Teaching Scheme:
Lectures: 4 Hrs / Week
Practical: 2 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term Work: 25

Unit – I
Introduction: Role of algorithms in computing, algorithm analysis, complexity issues, designing algorithms, algorithm strategies, methods for designing algorithms

(10 Hrs, 20 Marks)

Unit – II
Divide and Conquer method: Binary search, merge sort, quick sort, Starssen's matrix multiplication.
Probabilistic analysis and randomised algorithms: The hiring problem, indicator random variables, randomised algorithms, probabilistic analysis.

(10 Hrs, 20 Marks)

Unit – III
Back tracking: Eight Queens Problem, graph coloring, Hamilton cycles, Knapsack problem, Maze Problem.
Branch and Bound: Traveling salesman's problem, lower bound theory-comparison trees for sorting/searching, lower bound on parallel computation.

(10 Hrs, 20 Marks)

Unit – IV

Advanced Design And Analysis Techniques: Dynamic Programming: Elements of dynamic programming, multistage graph, optimal binary search tree(OBST), 0/1 knapsack problem, Traveling salesman problem

Greedy Algorithms: Elements of greedy algorithms, Theoretical foundation of greedy methods, Job sequencing optimal merge patterns

(10 Hrs, 20 Marks)

Unit – V

NP hard and NP complete Problem: Algorithm complexity, Intractability, Non-deterministic Polynomial times(NP),Decision problems, Cook's theorem.

NP-Complete Problems: Satisfiability Problem, vertex cover problem.

NP-Hard problems: code generation Problems, Simplified NP hard problems, approximation algorithm for NP-hard problems.

(10 Hrs, 20 Marks)

Reference Books -

1. Aho , "Design & Analysis of Computer Algorithms"- Pearson LPE
2. Russ Miller ," Algorithms: Sequencial and Parallel" Dreamtech Press(Wiley India)
3. Goodrich ," Algorithm Design: Foundation and Analysis, Wiley India.
4. Grama , "An Intro to Prarallel Computing : Design & Analysis of Algorithms, 2/e, "- Pearson LPE
5. Baase , " Computer Algorithms: Intro to Design & Analysis, 3/e,"- Pearson LPE
6. Thomas H. Cormen and charles E.L. Leiserson, " Introduction to Algorithm", PHI, 2nd Ed
7. Horowitz/Sahani, "Fundamentals of Computer Algorithm", Galgotia, Reprint 1994
8. A.V. Aho and J.D. Ullman, "Design and Analysis of Algorithms", Pearson LPE.
9. Bressard, Bratly, " Fundamentals of Algorithm", Pearson LPE/PHI
10. Simon Harris, " Beginning Algorithms" Wrox Press (Wiley India)

Term Work -

The term work should consist of minimum six lab assignments covering the above syllabus.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

TE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2007-08)

TERM – I

Practical Training/Mini Project/Special Study

Examination Scheme:
Term Work: 25

Every student needs to complete following requirements for term work of Practical Training / Special Study / Mini Project.

Practical training in any industry for a period of minimum two weeks and submit training report certified by personnel manager or works manager or any other higher authority of that industry.

OR

Special study on a recent topic from reported literature and submit a report on it

OR

One mini Theoretical or development project and submit a report on it.

Notes:

1. Practical training is to be undergone in summer vacation after SE and / or in winter vacation after first term of TE.
2. Report should be typed on A4 size paper and two copies paper bounded are to be prepared, one copy for the candidate, and one for the library.

North Maharashtra University, Jalgaon
New Syllabus with effect from Year 2008-09
BE Computer
Term I

Sr. No	Subject	Teaching Scheme per Week			Examination Scheme				
		L	T	P	Paper Hr.	Paper	TW	PR	OR
1	Elective I	4	-	2	3	100	25	-	25
2	Artificial Intelligence	4	-	-	3	100	25	-	-
3	Advanced Unix Programming *	4	-	2	3	100	25	25	-
4	Object Oriented Modeling and Design *	4	-	2	3	100	25	-	25
5	Advanced Computer Network	4	-	-	3	100	-	-	-
6	Seminar	-	-	2	-	-	25	-	-
7	Project I			2	-	-	25	-	25
	Total	20	0	10		500	150	25	75
	Grand Total	**30**			**750**				

Elective I
Operation Research *
Embedded Systems *
Image Processing *

Term II

Sr. No	Subject	Teaching Scheme per Week			Examination Scheme				
		L	T	P	Paper Hr.	Paper	TW	PR	OR
1	Elective II	4	-	2	3	100	25	-	25
2	Data Warehousing and Mining *	4	-	2	3	100	25	-	25
3	Software Metrics and Quality Assurance *	4	-	2	3	100	25	-	25
4	Advanced Computer Architecture	4	-	2	3	100	25	-	-
5	Industrial Visit / Case Study		-				25	-	-
6	Project II		-	6	-		100	-	50
	Total	16	0	14		400	225	0	125
	Grand Total	**30**			**750**				

Elective II
Fuzzy Logic and Neural Networks
Mobile Network*
Compiler Construction

* Common subject with BE IT

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (COMPUTER ENGINEERING / IT)
(w.e.f. 2008-09)

TERM – I

Elective – I
Operation Research

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 2 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25
Oral: 25

Unit – I **(10 Hrs. 20 Marks)**

Introduction to Operation Research – Modeling in operation research, principles of modeling, Main phases of operation research, scope, role of operation research in decision making, linear programming, model formulation, graphical method, simplex method, advantages of Linear Programming.

Unit – II **(10 Hrs. 20 Marks)**

Dynamic Programming - Introduction, Basic concepts and applications, characteristics of dynamic programming approach, special techniques of Linear programming, Transportation problems, North – West corner rule, Least cost method, Vogel's approximation method, Balanced and unbalanced problems, Assignment problems, Hungarian method, balanced and unbalanced problems, traveling sales man problem.

Unit – III **(10 Hrs. 20 Marks)**

Project Planning Using PERT/CPM : Phases of project management, construction of network or arrow diagrams, time estimates, earliest expected time, latest allowable time and slack, critical path computations for PERT, calculations on CPM networks various floats for activities, critical path, Difference between CPM and PERT , Project time Vs project cost, use of CPM/PERT in project management.

Unit – IV **(10 Hrs. 20 Marks)**

Replacement Model – Deterministic and probabilistic considerations, Replacement of old equipment by the most efficient by the sudden failure items, failure trees, examples of failure trees, sequencing model Terminology and notations, Principles assumptions, Solution of sequencing problems, Processing of n jobs through two machines, Processing n jobs through three machines, Two jobs through m machines, Processing n jobs through m machines .

Unit – V **(10 Hrs. 20 Marks)**

Decision theory and game theory: Decision trees, classes of decision model, decision under certainty, uncertainty and risk.

Game Theory: Theory concept characteristics, maximum and minimum principles saddle points, dominance, basic concept, terminology of two persons zero sum game, MXZ and ZX games subgames methods, graphical method.

Reference Books:

1. N. D. Vohra, Quantitative Techniques in Management, TMH
2. Taha H. A., Operation Research – An Introduction PHI
3. S. D. Sharma, Operation Research, Kedarnath Ramnath Compay
4. N. G. Nair, Operation Research, Dhanpat Rai
5. Prem kumar Gupta, D. S. Hira, Operation Research, S. Chand & Company
6. L. S. Srinath, PERT and CPM Principles & Applications, EWP

Term work:

Assignment based on:

1. Implementation of Linear Programming Model
2. Implementation of Simplex Method
3. Implementation of Dynamic Programming
4. Implementation of transportation model
5. Implementation of assignment model
6. Implementation of Traveling Sales man problem
7. Implementation of sequencing model
8. Implementation for replacement model
9. Game playing with min / max search
10. Program for decision tree

Any Five Lab Assignment should be framed by concern staff member based on above list.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (COMPUTER ENGINEERING / IT)
(w.e.f. 2008-09)

TERM – I

Elective – I
Embedded Systems

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 2 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25
Oral: 25

Unit – I **(10 Hrs. 20 Marks)**

Embedded system Introduction

Introduction to Embedded System, History, Design challenges, optimizing design metrics, time to market, applications of embedded systems and recent trends in embedded systems, embedded design concepts and definitions, memory management, hardware and software design and testing, communication protocols like SPI, SCI, I2C, CAN etc

Unit – II **(10 Hrs. 20 Marks)**

System Architecture

Introduction to ARM core architecture, ARM extension family, instruction set, thumb Instruction set, Pipeline, memory management, Bus architecture, study of on-chip peripherals like I/O ports, timers, counters, interrupts, on-chip ADC, DAC, RTC modules, WDT, PLL, PWM, USB etc.

Unit – III **(10 Hrs. 20 Marks)**

Interfacing and Programming

Basic embedded C programs for on-chip peripherals studied in system architecture. Need of interfacing, interfacing techniques, interfacing of different displays including Graphic LCD (320X240), interfacing of input devices including touch screen etc, interfacing of output devices like thermal printer etc., embedded communication using CAN and Ethernet, RF modules, GSM modem for AT command study etc.

Unit – IV **(10 Hrs. 20 Marks)**

Real time Operating System Concept

Architecture of kernel, task scheduler, ISR, Semaphores, mailbox, message queues, pipes, events, timers, memory management, RTOS services in contrast with traditional OS. Introduction to uCOSII RTOS, study of kernel structure of uCOSII, synchronization in uCOSII, Inter-task communication in uCOSII, memory management in uCOSII, porting of RTOS.

Unit – V **(10 Hrs. 20 Marks)**

Embedded Linux
Introduction to the Linux kernel, Configuring and booting the kernel, the root file system, Root file directories, /bin, /lib etc., Linux file systems, Types of file system: Disk, RAM, Flash, And Network. Some debug techniques- Syslog and strace, GDB, TCP/IP Networking- Network configuration, Device control from user space- Accessing hardware directly, Multi processing on Linux and Inter Process Communication- Linux process model and IPCs, Multithreading using pThreads - Threads vs. Processes and pThreads, Linux and Real-Time- Standard kernel problems and patches.

Reference Books:

1. Rajkamal, “Embedded Sytems “, TMH.
2. David Simon, “Embedded systems software primer”, Pearson
3. Steve Furber, “ARM System-on-Chip Architecture”, Pearson
4. DR.K.V.K.K. Prasad, “Embedded /real time system”, Dreamtech
5. Iyer,Gupta, “Embedded real systems Programming“, TMH

Laboratory exercise

- Integrated Development Environment Overview (Project creation, down load & debug)
- Study of JTAG Debugger/on-board debugger-emulator.
- ARM Instructions execution (Barrel Shifter, LDR/STR, SMT/LDM)

Term Work:

Group - A
1) Writing basic C-programs for I/O operations
2) C-Program to explore timers/counter
3) C-programs for interrupts
4) Program to demonstrate UART operation

Group - B
5) Program to demonstrate I2C Protocol.
6) Program to demonstrate CAN Protocol.

Group - C
7) Program to interface LCD
8) Program to interface Keyboard and display key pressed on LCD
9) Program to interface stepper motor

Group - D
10) Program to demonstrate RF communication
11) Program to implement AT commands and interface of GSM modem
12) Implementation of USB protocol and transferring data to PC.
13) Implementation of algorithm /program for the microcontroller for low power modes.
uCOSII /Embedded Linux RTOS Examples

Group - E
14) Interfacing 4 x 4 matrix keyboards and 16 x 2 character LCD display to microcontroller / microprocessor and writing a program using RTOS for displaying a pressed key.
15) Writing a scheduler / working with using RTOS for 4 tasks with priority. The tasks may be keyboard, LCD, LED etc. and porting it on microcontroller/ microprocessor.

Group - F
16) Implement a semaphore for any given task switching using RTOS on microcontroller board.
17) Create two tasks, which will print some characters on the serial port, Start the scheduler and observe the behavior.

Group – G
18) RTOS based interrupt handling using Embedded Real Time Linux.

19) Program for exploration of (Process creation, Thread creation) using Embedded Real Time Linux.

Group – H

20) Program for exploring Message Queues using Embedded Real Time Linux.
21) Ethernet Based Socket Programming using Embedded Real Time Linux.

Note: 1) At least one practical should be performed from each group.
2) Two practicals should be performed using the JTAG debugger/on-board Debugger-emulator.

Term work will be based on above list.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (COMPUTER ENGINEERING / IT)
(w.e.f. 2008-09)

TERM – I

Elective – I
Image Processing

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 2 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25
Oral: 25

Unit – I **(10 Hrs. 20 Marks)**

Introduction - What is digital image processing?, Fundamental steps in digital image processing, A simple Image formation model, Image sampling and quantization , Representing Digital Images, Basic relationship between pixels,

Image Enhancement in the spatial domain: Basic Gray level transformations, Histogram Processing(Equalization, Matching), Basics of spatial filtering, Smoothing spatial filters, Sharpening spatial filters.

Unit – II **(10 Hrs. 20 Marks)**

Image Enhancement in the frequency domain: Fourier Transform and Frequency domain, Filtering in the frequency domain, Basics of filtering in the frequency domain, Basic filters and their properties, Smoothing Frequency domain filters, Sharpening Frequency domain filters, Homomorphic Filtering
Properties of 2 D Fourier Transform, The Convolution and Correlation Theorems

Unit – III **(10 Hrs. 20 Marks)**

Image Restoration: Model Of Image Restoration/ Degradation Process, Noise Models, Restoration in the presence of Noise- Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Filtering Techniques to restore image.

Image Compression- Compression models- Lossy Compression- Lossless Compression.

Unit – IV **(10 Hrs. 20 Marks)**

Color Image Processing : Color Fundamentals, Color Models, Converting Colors from different color models, Gray Level to Color Transformations, Color Transformations, Color Slicing, Color Image Smoothing.

Morphological Image Processing
Basic Concepts, Dilation, Erosion, Thinning, Thickening, Pruning, Gray level Morphology

Unit – V **(10 Hrs. 20 Marks)**

Segmentaion- Edge linking and Boundary detection, Thresholding, Region Based Segmentation, Histogram Analysis,

Application of Image Processing,
Introduction to Content Based Image Retrieval.

Reference Books:

1. R.C. Gonzalez, R.R. Woods, Digital Image Processing Person Education, Pearson Education
2. B. Chanda, D.Datta Mujumdar, "Digital Image Processing And Analysis", PHI ,
3. William Pratt, "Digital Image Processing", John Willey & Sons
4. Anil Jain, "Fundamentals Of Digital Image Processing", PHI

Term work:

1. Develop C/C++ code to create a simple image and save the same as bitmap image in .bmp file.
2. Develop C/C++ code to implement basic gray level transformations(Any One)
3. Develop C/C++ code to perform basic image enhancement operations
4. Develop C/C++ code to implement image histogram processing (Equalization or Matching)
5. Develop C/C++ code to find basic relationship between pixels.(Any One)
6. Develop C/C++ code to implement image compression (any one algorithm)
7. Implement gray scale thresholding to blur an image.
8. Implement C/C++ code to implement an algorithm for edge detection.
9. Implement C/C++ code to implement image morphological operations.(Any One)

The term work will be based on any 5 assignments from above list.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (COMPUTER ENGINEERING)
(w.e.f. 2008-09)

TERM – I

Artificial Intelligence

Teaching Scheme:
Lectures: 4 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25

Unit – I **(10 Hrs. 20 Marks)**

Introduction to Artificial Intelligence: Definition, AI Problems, physical symbol system and hypothesis, AI Technique, Turing test, Problem as a state space search, production system, Problem characteristics, breadth first search, depth first search, AI representation, Properties of internal Representation, Heuristic search techniques, Best files search, A* and AO* Algorithms, Mean and ends analysis

Unit – II **(10 Hrs. 20 Marks)**

Knowledge Representation using Predicate Logic: Predicate calculus, Predicates and Arguments, ISA hierarchy, Frame notation, Resolution, Natural deduction.

Knowledge Representation using Non-monotonic Logic: TMS (Truth Maintenance System), Statistical and probabilistic reasoning, Fuzzy Logic, Knowledge representation, Semantic Net, Frames, Script, Conceptual dependency.

Unit – III **(10 Hrs. 20 Marks)**

Planning: Types of planning, Block world, strips, Implementation using goal stack, Nonlinear planning with goal stacks, Hierarchical planning, List commitment strategy.

Perception: Action, Robot architecture, Vision, Texture and images, Representing and recognizing scenes, Walzs algorithm, Constraint determination, Trihedral and Nontrihedral figures labeling.

Unit – IV **(10 Hrs. 20 Marks)**

Learning: By training neural networks, Introduction to neural networks, Neural net architecture and

applications.
Natural Language Processing and understanding, Pragmatic, Syntactic, and Semantic analysis, Finite State Machine, ATN, Understanding sentences.

Unit – V **(10 Hrs. 20 Marks)**

Expert System: Utilization and functionality, architectures of Expert system, Knowledge representation, Two case studies on expert systems.
Game Playing: Minimize search procedure, Alpha-beta cutoffs, Waiting for Quiescence, Secondary search.

Reference Books:

1. Elaine Rich, Kerin Knight, "Artificial Intelligence". TMH
2. B. Yegnanarayana, “Artificial Neural Network”, PHI
3. Dan W. Patterson, “Introduction to artificial intelligence and expert system”, PHI
4. Timothy J Ross, “Fuzzy Logic with Engineering Application”, TMH

Term Work:

Assignments based on:

1. Implementation of single perceptron training algorithm.
2. Implementation of fuzzy membership function.
3. Implementation of Unification Algorithm.
4. Hill Climbing Algorithm.
5. Game playing with Min/Max Search.
6. Implementation of Dynamic database.
7. Parsing method implementation.
8. Development of Mini Expert System using Prolog.
9. Application development using Neural Network.
10. Development of Intelligent Perception System.

Any six lab assignments should be framed by concern staff member based on above list.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (COMPUTER ENGINEERING / IT)
(w.e.f. 2008-09)

TERM – I

Advanced Unix Programming*

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 2 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25
Practical: 25

Unit – I **(10 Hrs. 20 Marks)**

UNIX System Overview – Introduction, UNIX Architecture, Logging In, Files and Directories, Input and Output, Programs and Processes, Error Handling, User Identification, Signals, Time Values, System Calls and Library Functions.

File I/O – Introduction, File Descriptors, open Function, creat Function, close Function, lseek Function, read Function, write Function, I/O Efficiency, File Sharing, Atomic Operations, dup and dup2 Functions, sync, fsync, and fdatasync Functions, fcntl Function, ioctl Function, /dev/fd.

Files and Directories – Introduction, stat, fstat, and lstat Functions, File Types, Set-User-ID and Set-

Group-ID, File Access Per missions, Ownership of New Files and Directories, access Function, umask Function, chmod and fchmod Functions, Sticky Bit, chown, fchown, and lchown Functions, File Size, File Truncation, File Systems, link, unlink, remove, and rename Functions, Symbolic Links, symlinkand readlink Functions, File Times, utime Function, mkdirand rmdir Functions, Reading Directories, chdir, fchdir, and getcwd Functions, Device Special Files, Summary of File Access Per mission Bits.

Unit – II **(10 Hrs. 20 Marks)**

System Data Files and Information – Introduction, Password File, Shadow Passwords, Group File, Supplementary Group Ids, Implementation Differences, Other Data Files, Login Accounting, System Identification, Time and Date Routines.

Process Environment – Introduction, main Function, Process Termination, Command-Line Arguments, Environment List, Memory Layout of a C Program, Shared Libraries, Memory Allocation, Environment Variables, setjmp and longjmp Functions, getrlimit and setrlimit Functions.

Process Control – Introduction, Process Identifiers, fork Function, vfork Function, exit Functions, wait and waitpid Functions, waitid Function, wait3 and wait4Functions, Race Conditions, exec Functions, Changing User IDs and Group IDs, Interpreter Files, system Function, Process Accounting, User Identification, Process Times.

Unit – III **(10 Hrs. 20 Marks)**

Signals – Introduction, Signal Concepts, signal Function, Unreliable Signals, Interrupted System Calls, Reentrant Functions, SIGCLD Semantics, Reliable-Signal Terminology and Semantics, kill and raise Functions, alarm and pause Functions, Signal Sets, sigprocmask Function, sigpending Function, sigaction Function, sigsetjmp and siglongjmp Functions, sigsuspend Function, abort Function, system Function, sleep Function, Job-Control Signals, Additional Features.

Advanced I/O – Introduction, Nonblocking I/O, Record Locking, STREAMS, I/O Multiplexing, 2 poll Function, Asynchronous I/O, readv and writev Functions, readn and written Functions, Memory-Mapped I/O.

Unit – IV **(10 Hrs. 20 Marks)**

Threads – Introduction, Thread Concepts, Thread Identification, Thread Creation, Thread Termination, Thread Synchronization.

Thread Control – Introduction, Thread Limits, hread Attributes, Synchronization Attributes, Reentrancy, Thread-Specific Data, Cancel Options, Threads and Signals, Threads and fork, Threads and I/O.

Daemon Processes – Introduction, Daemon Characteristics, Coding Rules, Error Logging, Single-Instance Daemons, Daemon Conventions, Client-Server Model.

Unit – V **(10 Hrs. 20 Marks)**

Interprocess Communication – Introduction, Pipes, popen and pclose Functions, Coprocesses, FIFOs, XSI IPC, Message Queues, Semaphores, Shared Memory, Client-Server Properties.

Network IPC: Sockets – Introduction, Socket Descriptors, Addressing, Connection Establishment, Data Transfer, Socket Options, Out-of-Band Data, Nonblocking and Asynchronous I/O.

Advanced IPC – Introduction, STREAMS-Based Pipes, Unique Connections, Passing File Descriptors, An Open Server, Version 1, An Open Server, Version 2.

Reference Books:

1. W. Richard Stevens and Stephen A. Rago, Advanced Programming in the UNIX Environment, 2/E, Pearson Education
2.W. Richard Stevens, Unix Network Programming - Interprocess Communications, Volume 2, 2/E, Pearson Education

Term Work:

Concerned staff members should suitably frame the term work (at least 6) based on above syllabus and implementation of Unix commands using library functions as well as implementation of shell scripts.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (COMPUTER ENGINEERING / IT)
(w.e.f. 2008-09)

TERM – I

Object Oriented Modeling and Design

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practicals: 2 Hrs./Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25 Marks
Oral: 25 Marks

Unit – I **(10 Hrs. 20 Marks)**

Review of Object Modeling, New Paradigms, Object Oriented Thinking, UML Concepts: Overview of UML.
UML 2.0 New Features.
Rational Unified Process emphasizing Inception, Elaboration, Construction, Transition Phases. 4+1 View architecture, Architectural approaches: Use case Centric, Architecture driven, Iterative approach, OO Concepts Review.

Unit – II **(10 Hrs. 20 Marks)**

Introduction to UML. UML MetaModel. Extensibility mechanisms like stereotypes, tagged values, constraints and profiles. OCL. Overview of all diagrams in UML 2.0.

Unit – III **(10 Hrs. 20 Marks)**

Object diagrams, CRC method, Review of OO concepts. Class diagrams, Classes and Relationships, Interfaces and ports, Templates, Active Objects, Advanced relationships generalization, association, aggregation, dependencies. Composite structure diagrams including composite structures, collaborations.

Unit – IV **(10 Hrs. 20 Marks)**

Interaction diagrams. Interaction Overview diagrams including interactions, signals, exceptions, regions, partitions, Sequence diagrams, Communication diagrams.
State Machine diagrams, States, encapsulation of states, transitions, submachine, state generalization. Timing diagrams, Activity diagrams, Activities, sub activities, signals, exceptions, partitions, regions.

Unit – V **(10 Hrs. 20 Marks)**

Support for modeling Architecture in UML. Package diagrams, Component diagrams, Deployment diagrams. Applications of UML in embedded systems, Web applications, commercial applications.

Reference Books:

1. Grady Booch, James Rumbaugh, Ivar Jacobson “Unified Modeling Language User Guide”, Addison-Wesley
2. Joseph Schmuller “SAMS Teach yourself UML in 24 Hours”, Third edition.
3. Martin Fowler, “UML Distilled: A Brief Guide to the Standard Object Modeling Language”, Third Edition (Paperback) ,Addision Wesley
4. Dan Pilone, Neil Pitman “UML 2.0 in a Nutshell”, O'Reilly
5. Rambaugh, “Object Oriented Modeling and Designing”. PHI

6. Bouch. “Object Oriented Analysis and Design with Applications”. Addison Wesley.
7. Schah, “Introduction to OOAD with UML and Unified Process”, TMH

Term Work:
Concerned staff members should suitably frame the term work at least 5 assignments based on above syllabus. Each assignment must consider definition, analysis, design and modeling of a project.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (COMPUTER ENGINEERING)
(w.e.f. 2008-09)

TERM – I

Advanced Computer Network

Teaching Scheme:
Lectures: 4 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)

Unit – I **(10 Hrs. 20 Marks)**

Introduction to wireless Networking: Why Wireless? What makes Wireless Network different? A Network by Any other name.
Overview of 802.11 Networks: IEEE 802 Network Technology Family tree, 802.11 Nomenclature and design, 802.11 Network Operation, Mobility Support.

802.11 MAC Fundamentals: Challenges for the MAC,MAC Access Modes and Timing, Contention-Based Access Using the DCF, Fragmentation and Reassembly, Frame Format, Encapsulation of Higher-Layer Protocols Within 802.11,Contention-Based Data Service, Frame Processing and Bridging.

802.11 Framing in Detail: Data Frames, Control Frames, Management Frames, Frame Transmission and Association and Authentication States

Unit – II **(10 Hrs. 20 Marks)**

Management Operations: Management Architecture, Scanning, Authentication, Pre-authentication, Association, Power Conservation, Timer Synchronization, Spectrum Management

Contention-Free Service with the PCF: Contention-Free Access Using the PCF, Detailed PCF Framing, Power Management and the PCF

Physical Layer Overview: Physical-Layer Architecture , The Radio Link , RF Propagation with 802.11, RF Engineering for 802.11

Unit – III **(10 Hrs. 20 Marks)**

The Frequency-Hopping (FH) PHY: Frequency-Hopping Transmission ,Gaussian Frequency Shift Keying (GFSK) FH PHY Convergence Procedure (PLCP), Frequency-Hopping PMD Sublayer, Characteristics of the FH PHY

The Direct Sequence PHYs: DSSS and HR/DSSS (802.11b): Direct Sequence Transmission, Differential Phase Shift Keying (DPSK), The "Original" Direct Sequence PHY, Complementary Code Keying, High Rate Direct Sequence PHY
802.11a and 802.11j: 5-GHz OFDM PHY: Orthogonal Frequency Division Multiplexing (OFDM), OFDM as Applied by 802.11a, OFDM PLCP, OFDM PMD Characteristics of the OFDM PHY

Unit – IV **(10 Hrs. 20 Marks)**

Wired Equivalent Privacy (WEP): Cryptographic Background to WEP, WEP Cryptographic Operations, Problems with WEP, Dynamic WEP

User Authentication with 802.1X: The Extensible Authentication Protocol, EAP Methods, 802.1X: Network Port, Authentication, 802.1X on Wireless LANs
802.11i: Robust Security Networks, TKIP, and CCMP: The Temporal Key Integrity Protocol (TKIP), Counter Mode with CBC-MAC (CCMP), Robust Security Network (RSN) Operations

Unit – V **(10 Hrs. 20 Marks)**

Ad Hoc Wireless Networks: Introduction, Issues in Ad Hoc Wireless Networks, Ad Hoc Wireless Internet
Routing Protocols for Ad Hoc Wireless Networks: Introduction, Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks, Classifications of Routing Protocols, Table-Driven Routing Protocols, On Demand Routing Protocols, Hybrid Routing Protocols, Routing Protocols with Efficient Flooding Mechanisms, Hierarchical Routing Protocols, Power-Aware Routing Protocols
Wireless Sensor Networks: Introduction, Sensor Networks Architecture, Data Dissemination, Data Gathering, MAC Protocols for Sensor Networks, Location Discovery, Quality of a Sensor Network.

Reference Books:

1. Matthew Gast, 802.11 Wireless Networks: The Definitive Guide, Second Edition, O'Reilly
2. C.Siva Ram Murthy, B.S. Manoj, Ad Hoc Wireless Networks: Architectures and Protocols, Pearson

---

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (COMPUTER ENGINEERING / IT)
(w.e.f. 2008-09)

TERM – I

Seminar

Teaching Scheme:
Practical: 2 Hrs./ Week

Examination Scheme:
Term Work: 25 Marks

1. For seminar every student will individually study a topic assigned to him / her and submit a report and shall deliver a short lecture / Seminar on the topic at the end of term.
2. Selection of topic should be done by students in consultation with concerned guide
    a. Topic should be related to branch but it should be extended part of the branch (latest and advance topic).
    b. The topic should be such that the student can gain latest knowledge. Student should preferably refer at least one research paper
3. Seminar topic should not be repeated in the department and registration of the same should be done on first come first served basis
4. Seminar report should be submitted in paper bound copy prepared with computer typing
    a. Size of report depends on advancement of topic.
    b. Student should preferably refer minimum 5 reference books / magazines.
    c. Format of content
        i. Introduction.
        ii. Literature survey.
        iii. Theory
            1. Implementation
            2. Methodology
            3. Application
            4. Advantages, Disadvantages.
        iv. Future scope.
        v. Conclusion.
5. ASSESSMENT OF SEMINAR for TERM WORK

Title of seminar : _____
Name of guide : _____

Sr. No.	Exam Seat No.	Name of Student	Assessment by examiners					Grand Total
			Topic Selection 5	Literature Survey 5	Report Writing 5	Depth of understanding 5	Presentation 5	25

6. Assessment of Literature survey will be based on
    a. collection of material regarding history of the topic,
    b. implementation,
    c. recent applications.

7. Assessment of Depth of understanding will be based on
    a. Questioning by examiners.
    b. Questioning by students.
    c. What the student understands i.e. conclusion regarding seminar.

8. Assessment of presentation will be based on;
    a. Presentation time (10 minutes)
    b. Presentation covered (full or partial)
    c. Way of presentation
    d. Questioning and answering (5 minutes)
9. Examiners should be a panel of two one of them must be guide. Examiner must have experience at least 3 years. Examiners will be appointed by HOD in consultation with Principal.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (COMPUTER ENGINEERING)
(w.e.f. 2008-09)

TERM – I

Project - I

Teaching Scheme:
Practical: 2 Hrs./ Week

Examination Scheme:
Term Work: 25
Oral: 25

1. Every student individually or in a group (group size is of 3 students. However, if project complexity demands a maximum group size of 4 students, the committee should be convinced about such complexity and scope of the work) shall take a project in the beginning of the (B.E. first Term) seventh term in consultation with the guide and the project must be completed in the (B.E. Second Term) eighth term.

2. The project proposal must be submitted in the institute in the beginning of the (B.E. first Term) seventh term. While submitting project proposal care is to be taken that project will be completed within the available time of two term i.e 2 Hrs per week for (B.E. first Term) seventh term and 4 Hrs per week for (B.E. Second Term) eighth semester (total time become 12*2 + 12*4 = 72 Hrs per project partner). The final title of

the project work should be submitted at the beginning of the (B.E. Second Term) eighth semester. .

3. Project title should be precise and clear. Selection and approval of topic:
   Topic should be related to real life or commercial application in the field of Computer Engineering

OR

Investigation of the latest development in a specific field of Computer Engineering

OR

Commercial and Interdisciplinary projects should be encouraged. The examination will be conducted independently in respective departments.

4. The group should maintain a logbook of activities. It should have entries related to the work done, problems faced, solution evolved etc., duly signed by guide.
5. The group is expected to complete details system/problem definition, analysis, design, etc. in (B.E. first Term) seventh term, as a part of term work in the form of a joint report. Project report must be submitted in the prescribed format only. No variation in the format will be accepted.
6. One guide will be assigned at the most three project groups.
7. The guides should regularly monitor the progress of the project work.
8. Assessment of the project for award of term work marks shall be done by the guide and a departmental committee (consisting of minimum two teachers with experience more than three years) as per the guidelines given in the following table.

A) ASSESSMENT OF PROJECT I TERMWORK B.E. FIRST TERM

NAME OF THE PROJECT: _____
NAME OF THE GUIDE: _____

Sr No	Exam Seat No	Name Of Student Marks	Assessment by guide (70%)					Assessment by Departmental committee (30%)			Grand Total	Out of 25 Marks
			Literature survey	Topic Selection	Docum-entation	Attendance	Total	Evaluation (10%)	Pres-ntaion (20%)	Total		
			10	05	15	05	35	05	10	15	50	25

Sign of Guide Sign. of Committee Members Sign. of H. O. D.

9. The guide should be internal examiner for oral examination (If experience is greater than three years).
10. The external examiner should be from the related area of the concerned project. He should have minimum of five years of experience at degree level / industry.
11. The evaluations at final oral examination should be done jointly by the internal and external examiners.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (COMPUTER ENGINEERING)
(w.e.f. 2008-09)

TERM – II

Elective – II
Fuzzy Logic and Neural Networks

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 2 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25
Oral: 25

Unit – I **(10 Hrs. 20 Marks)**

Introduction to Biological Neurons: Neurons, Axon, Synaptic links, Dendrites, Working,
Artificial Neuron Model: McCulloch-Pitts Neuron Model, Neuron Modeling for Artificial Neural Systems, Activation Functions.
Models of Artificial Neural Networks: Feed forward Network, Feedback Network, Neural Processing, Learning and Adaptation, Supervised and Unsupervised Learning.

Unit – II **(10 Hrs. 20 Marks)**

Neural Network Learning Rules: Hebbian Learning, Perceptron Learning, Delta Learning, Widrow-Hoff Learning, Correlation Learning, Winner-Take-All Learning, Single Layer Perceptron Classifier: Classification Model, Features, Decision Regions, Discriminants Functions, Linear Machine and Minimum Distance Classification, Nonparametric Training Concept.

Unit – III **(10 Hrs. 20 Marks)**

Training and Classification using Discrete Perceptron, Single Layer Continuous Perceptron Networks for Linearly Separable Classifications, Multi-category Single Perceptron Networks.
Multilayer Feedforward Networks: Linearly Nonseparable Pattern Classification, Delta Learning Rule for Multiperceptron Layer, Generalized Delta Learning Rule.

Unit – IV **(10 Hrs. 20 Marks)**

Feed Forward Recall and Error Back Propagation Training, Learning Factors, Single Layer Feedback Networks, Basic Concepts, Hopfield Networks, Boltzmann Machine, Kohonens self organizing maps.
Applications of Neural Networks: Pattern Recognition, Classification and clustering.

Unit – V **(10 Hrs. 20 Marks)**

Fundamentals of 'Fuzzy System, Crisp Sets, Membership Functions, Fuzzy Sets, Fuzzy Set Properties and Manipulation, Linguistic Variables, Fuzzy System Architecture, Fuzzy System Design and implementation.
Fuzzy Neural Networks: Introduction to Neuro – Fuzzy Systems, Types of Fuzzy-Neural Nets, Nero-Fuzzy Systems Design and implementation.

Reference Books:

1. Robert J. Schalkoff, "Artificial Neural Networks", McGraw – Hill
2. B. Yegnarayan, " Artificial Neural Networks", PHI
3. Timoty J Ross, "Fuzy Logic with Engineering Applications", McGraw-Hill
4. Satish Kumar, "Neural Network:A Classroom Approach", TMH
5. J. M. Zurada, "Introduction to Artificial Neural Networks", Jaico Publishing House.

Term Work:

1. Implementation of basic learning rules using single neuron
2. Implementation of Single layer discrete perceptron

3. Implementation of Single layer continues perceptron
4. Implementation of operations of fuzzy sets
5. Design and Implementation of fuzzy sets and its membership functions
6. Mini application development using fuzzy sets
7. Mini application development using neural network

Any six-lab assignments should be frame by the concern staff based on above list.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (COMPUTER ENGINEERING/IT)
(w.e.f. 2008-09)

TERM – II

Elective – II
Mobile Network

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 2 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25
Oral: 25

Unit – I **(10 Hrs. 20 Marks)**

Introduction – PCS Architecture, Cellular Telephony, Cordless Telephony and Low-tier PCS, Third Generation wireless system

Mobility Management – Handoff, Inter - BS handoff, Intersystem handoff, Roaming management, Roaming management under SS7 and Roaming management for CT2.

Handoff Management – Detection and Assignments, Handoff detection, Strategies for handoff detection, Mobile controlled handoff, Network controlled handoff, Mobile assisted handoff, Handoff failure, Channel assignment, Non- prioritized scheme and Reserved channel scheme, Queuing priority scheme, Sub rating scheme, Implementation issues, Hard handoff – MCHO link transfer, MAHO/NCHO link transfer, Sub rating MCHO link transfer, Soft handoff – adding new BS, dropping a BS.

Unit – II **(10 Hrs. 20 Marks)**

GSM Overview – GSM Architecture, location tracking and call setup, Security, Data Services – HSCSD, GPRS, Unstructured supplementary service data.
GSM Network Signaling – GSM MAP service frame work, MAP protocol machine, MAP dialogue.
GSM Mobility management – GSM location update, Mobility databases, Failure restoration, VLR Identification algorithm, VLR Overflow control.

Unit – III **(10 Hrs. 20 Marks)**

GSM short message service – SMS architecture, SMS protocol hierarchy, Mobile originated messaging, Mobile terminated Messaging.
International Roaming for GSM – International GSM call setup, Reducing the International call delivery cost
GSM Operations, Administration, and Maintenance – Call recording functions, Performance Measurement and Management, Subscriber and Service data Management.
Mobile number portability – Fixed network number portability, Number portability for Mobile networks, Mobile number portability mechanism.

Unit – IV **(10 Hrs. 20 Marks)**

VoIP Service for mobile networks – GSM on the Net, iGSM wireless VoIP solution, iGSM procedures and Message flows.

General Packet Radio Services – Architecture, Network nodes, Interfaces, Procedures, Billing, Evolving from GSM to GPRS.

Unit – V **(10 Hrs. 20 Marks)**

Wireless Application Protocol – WAP Model, WAP Gateway, WAP Protocol – WDP, WTLS, WTP, WSP, WAE, Mobile station Application execution environment.

Third Generation Mobile Services – Paradigm shifts in 3G Systems, W-CDMA, cdma 2000, Improvements on core network, Quality of service in 3G, Wireless Operating System for 3G Handset.

Paging Systems – Paging Network Architecture, User Access Interface – Telocator Alphanumeric Input Protocol (TAP), Telocator Message Entry Protocol (TME), Intersystem Interface.

Wireless Local Loop – WLL Architecture, WLL technologies.

Reference Books:

1. Yi-Bing Lin and Imrich Chlamtac "Wireless and Mobile Network Architecture", Wiley Publication.
2. Kasera Sumit, Narang Nishit, "3G Networks: Architecture, Protocols and Procedures", TMH

Term Work:

1. Setting up wireless network with and without infrastructure support.
2. Configuring Access Point with bridging mode (Point to Point and Point to Multi Point).
3. Configuring Routing between wired and wireless Networks.
4. Configuring Security in wireless network with and without infrastructure support.
5. At least 3 lab assignments based on above syllabus using any network simulator such as NS2, OPNET, OMNET etc.

Concerned staff members should suitably frame the term work (at least 6) based on above syllabus. Oral will be conducted based on the above syllabus and the term work submitted in the form of journal.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (COMPUTER ENGINEERING)
(w.e.f. 2008-09)

TERM – II

Elective – II
Compiler Construction

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 2 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25
Oral: 25

Unit – I **(10 Hrs. 20 Marks)**

Introduction to Compiling: System software's introduction: Assembler, Loader, Linker. The phases of compiler, preprocessors, overview of simple one pass compiler.

Lexical Analysis: Role of lexical analyzer, input buffering, token specification, token recognition, language for lexical analysis specification, Finite Automata, NFA to DFA, RE to NFA, RE to DFA, state minimization of DFA. LEX tools

Unit – II **(10 Hrs. 20 Marks)**

Syntax Analysis: The role of the parser, context free grammar, ambiguity in grammar and it's elimination, Top down parsing: recursive descent, predictive, LL(1) parsers. Construction of predictive parsing tables, FIRST and FOLLOW, LL(1) grammar, Error recovery in Predictive parsing . Bottom up parsing: Handle pruning, stack implementation and conflicts of shift reduce parsing, LR parsers: LR parsing algorithm, constructing SLR, canonical LR, LALR parsing tables. Error recovery in LR parsing, YACC tools.

Unit – III **(10 Hrs. 20 Marks)**

Syntax Directed Translation: Syntax directed definition, inherited attributes, construction of syntax tree, directed acyclic graphs for expressions, Bottom up evaluation of S-attributed definitions, L-attributed definitions, top down translation, bottom up evaluation of inherited attributes.

Intermediate Code Generation: Intermediate language, various intermediate forms, TAC, syntax directed translation into TAC, Declaration, Assignment statements, Boolean expressions, case statements, Back patching, Procedure calls.

Unit – IV **(10 Hrs. 20 Marks)**

Code generation: Design issues of code generation, the target machine, run time storage management, basic blocks and flow graphs, a simple code generator, the DAG representation of basic blocks, Peephole optimization, Generating code for DAGs.

Code Optimization: Criteria for code improving transformation, code optimization sources: Local and global common sub-expression elimination, dead code elimination, Induction variable reduction, loop invariant computation, Optimization of basic blocks, loops in flow graph, reducible flow graph, code improving transformations.

Unit – V **(10 Hrs. 20 Marks)**

Run time environments: activation trees, control stacks, storage organization, subdivision of run time memory, activation records, storage allocation strategies: static allocation, stack allocation, heap allocation, symbol table management: hash tables, dynamic storage allocation techniques, explicit allocation of fixed size and variable size blocks.

Reference Books:

1. Aho, Sethi, Ulman, “Compilers Principles, Techniques and Tools”, Addision Wesley
2. Dhamdhere, “Compiler Construction- Principles and Practices”, MacMillan India.
3. Andrew Appel, “Modern Compiler Implementation in C”, Cambridge University Press
4. J.P.Bennett, “Introduction to Compiling Techniques”, TMH
5. Holub A.J., “Complier Design In ‘C’”, Prentice Hall

Term Work:

1. Study of LEX and YACC.
2. Calculator (text or graphics) using LEX and YACC.
3. Lexical analyzer for a subset of a C using LEX.
4. Design of a Predictive parser.
5. Implementation of code generator
6. Implementation of code optimization for
   Common sub-expression elimination, Loop invariant code movement.

Any 5 laboratory assignments should be framed by concern staff member based on above list.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (COMPUTER ENGINEERING/IT)
(w.e.f. 2008-09)

TERM – II

Data Warehousing and Mining

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 2 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25

Oral: 25

Unit – I **(10 Hrs. 20 Marks)**

Evolution of database technology, What is data mining?, Data Mining Applications, Steps in Knowledge Discovery, Architecture of typical data mining System, Data mining- On What kind of data, Data mining Functionalities, Classification of data mining systems, Major Issues in Data Mining.

What is Data Warehouse? Difference between Operational Database systems and Data Warehouse (OLTP and OLAP), Why Separate Data Warehouse?

A Multidimensional Data Model, Schemas for Multidimensional Databases: Stars, Snowflakes, and Fact Constellations. Measures, Concept Hierarchies, OLAP Operations in the Multidimensional Data Model.

Unit – II **(10 Hrs. 20 Marks)**

Data Warehouse Architecture, Process of Data Warehouse design, A Three tier Data Warehouse Architecture., Types Of OLAP servers.

Data Preprocessing: Why Preprocess Data? Data Cleaning Techniques, Data Integration and Transformation, Data Reduction Techniques, Discretization and Concept Hierarchy Generation for numeric and categorical data.

Data mining Primitives, A Data Mining Query Language.

Unit – III **(10 Hrs. 20 Marks)**

Concept Description: What is Concept Description? Data Generalization and Summarization-Based Characterization, Attribute Oriented Induction, Analytical Characterization: Attribute Relevance Analysis, Methods, Mining Descriptive Statistical Measures in Large Databases.

Mining Association Rules: Association Rule Mining, Market Basket Analysis, Association Rule classification, Mining Single-Dimensional Boolean Association Rules from Transactional Databases, The Apriori Algorithm, Mining Multilevel Association Rules, Constraint-Based Association Mining.

Unit – IV **(10 Hrs. 20 Marks)**

Classification and Prediction: What is Classification and Prediction? Data Classification Process, Issues Regarding Classification and Prediction., Classification by Decision Tree Induction, Bayesian Classification, , Classification by Back propagation, A Multilayer Feed Forward Neural Network, Classification Based on Association Rule Mining, Other Classification Methods

Cluster Analysis: What is Cluster Analysis? Types of Data in Cluster Analysis, A Categorization of Clustering Methods, Partitioning Methods, Hierarchical Methods, Density Based Methods, Grid Based Methods, Model Based Clustering Methods.

Unit – V **(10 Hrs. 20 Marks)**

Cluster Analysis: What is Cluster Analysis? Types of Data in Cluster Analysis, A Categorization of Clustering Methods, Partitioning Methods, Hierarchical Methods, Density Based Methods, Grid Based Methods, Model Based Clustering Methods

Mining Complex Types Of Data: Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Mining Multimedia Databases, Mining Text Databases, Mining the World Wide Web.

Reference Books:

1. Han and Kamber, “Data Mining: Concepts and Techniques”, Morgan Kaufmann Publishers
2. Alex and Berson, “Data warehousing, Data Mining and OLAP”, TATA McGraw Hill

Term Work:

1. Develop a application to construct a multidimensional data model (Star, Snowflake or Fact constellations)
2. Develop a application to perform OLAP operations.
3. Develop a application to implement data preprocessing techniques.
4. Develop a application to implement data integration techniques.
5. Develop a application to implement data generalization and summarization techniques
6. Develop a application to extract association mining rules.
7. Develop a application for classification of data.
8. Develop a application for implementing one of the clustering technique.
9. Study of commercial data mining tools.

Any 6 laboratory assignments should be framed by concern staff member based on above list.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (COMPUTER ENGINEERING / IT)
(w.e.f. 2008-09)

TERM – II

Software Metrics and Quality Assurance

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 2 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25
Oral: 25

Unit – I **(10 Hrs. 20 Marks)**

Software Measurements: Measurement in Software Engineering, Scope of Software Matrices, The representational theory of measurements, Measurement and Models, Measurements Scales and scale types, Meaningfulness in measurement, Classifying software measures, Applying the framework, Software measurement validation.

Unit – II **(10 Hrs. 20 Marks)**

Measuring internal product attributes: Size- Aspects of software size, Length, Reuse, Functionality, Complexity.

Measuring internal product attributes: Structure- Types of structural measures, Control-flow structure, Modularity and information flow attributes, Data structure, Difficulties with general "complexity" measures.

Measuring internal product attributes: Modeling software quality, Measuring aspects of quality.

Unit – III **(10 Hrs. 20 Marks)**

Software Reliability: Basics of reliability theory, software reliability problem, parametric reliability growth models, predictive accuracy, importance of operational environment.

Good estimates, cost estimation: problems and approaches, models of effort and cost, problem with existing modeling methods, dealing with problems of current estimation methods, implication for process predictions.

Unit – IV **(10 Hrs. 20 Marks)**

Software documentation, Standards, Practices, Conventions and metrics, The software inspection process, The walkthrough process, Audit process, Document verification, The ISO 9000 Quality Standards, Comparison of the ISO 9000 model with SEI's CMM.

Unit – V **(10 Hrs. 20 Marks)**

Cleanroom Software Engineering: The cleanroom approach, Functional Specification, Cleanroom design, Cleanroom testing.

Reengineering: Business process reengineering, Software reengineering, Reverse reengineering, Reconstructing, Forward engineering, The economics of reengineering.

Reference Books:

1. Flanton, Pfleeger, "Software Metrics- A Rigorous and Practical Approach", Thompson Learning
2. Mordechai Ben-menachem/Garry S.Marliss, "Software Quality", Thompson Learning
3. Roger S. Pressman, "Software Engineering- A Practitioner's Approach", TMH
4. Swapna Kishore and Rajesh Naik, "ISO 9001:2000 for Software Organizations", TMH

Term Work:

Concerned staff members should suitably frame the term work at least 5 assignments based on above

syllabus.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (COMPUTER ENGINEERING)
(w.e.f. 2008-09)
TERM – II

Advanced Computer Architecture

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 2 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25

Unit – I **(10 Hrs. 20 Marks)**

Introduction to Parallel Processing: Evolution of computer Systems, Parallelism in uni-processor Systems, Parallel Computer Structure, Architectural Classification Schemes, Clock rate and CPI, performance factors, system Attributes MIPS rate ,Throughput rate, Implicit parallelism, Explicit parallelism, Parallel processing applications.
Program and Network Properties: Condition of Parallelism, Program partitioning and Scheduling, Program flow mechanism, system Interconnect architectures.

Unit – II **(10 Hrs. 20 Marks)**

Processor and Memory Hierarchy: Design space of processors, Instruction set architectures, CISC scalar processors, RISC scalar Processors, Super scalar and Vector Processors.
Inclusion, coherence and Locality, memory capacity planning. Bus, cache and shared memory.
Back, plane Bus System: Back plane bus specification, addressing and timing protocol, Arbitration and Interrupt, shared memory organization: Interleaved memory organization, Bandwidth and fault tolerance, memory allocation schemes.
Principles of Pipelining: Principles of Linear pipelining, classification of pipeline processor, General pipelines and Reservation tables.

Unit – III **(10 Hrs. 20 Marks)**

Pipelining and Super scalar Techniques: Linear pipeline processors, nonlinear pipeline processors, Instruction pipeline design, Arithmetic pipeline design, Super scalar and Super pipeline design.
Array Processors: SIMD Array processors: SIMD Computer Organization, Masking and data Routing Mechanism, Inter-PE Communications SIMD Interconnection networks.
Parallel Algorithms for array processor: SIMD Matrix Multiplication, Parallel sorting.
Associated array processing: Associative search Algorithms.

Unit – IV **(10 Hrs. 20 Marks)**

Multiprocessor Architecture: Loosely Coupled Multiprocessors, Tightly Coupled multiprocessors, Processor characteristics for multiprocessing.
Parallel Algorithms for Multiprocessing: Classification of parallel Algorithms, Synchronized and Asynchronous parallel Algorithms, Multiprocessor OS.
Vector Processing: Vector processing principles , vector access memory schemes, characteristics of vector processing.

Unit – V **(10 Hrs. 20 Marks)**

Data Flow Computers: Data driven computing and languages, data flow computer architectures.
Principles of Multithreading: Issues and solution, multiple context processor, Multidimensional Architectures, Multithreading.
Parallel Programming Modules: Shared-variable model, message- passing model, data- parallel model, object- oriented model, Functional and logic models.
Parallel languages: languages features for parallelism, parallel language construction.

Reference Books:

1. Kai Hwang, "Advance Computer Architecture, Parallelism, Scalability, Programmability", Mc-Graw Hill Publication
2. Kai Hwang and Faye A Briggs, "Computer Architecture and Parallel Processing"

Term Work:

Any five lab assignments should be framed by concern staff member based on above syllabus.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (COMPUTER ENGINEERING)
(w.e.f. 2008-09)

TERM – II

Industrial Visit / Case Study

Teaching Scheme:

Examination Scheme:
Term Work: 25

EDUCATION TOUR / TECHNICAL VISITS / CASE STUDY AND ITS EVALUATION

1. During (B.E. First Term / Second Term) seventh and / or eighth terms or during vacation between (B.E. First Term / Second Term) seventh and eighth terms, every student; shall visit minimum two industries, factories arranged by colleges and accompanied by teachers. There shall be at least one teacher for a group of 20 students and at least one non-teaching staff accompanied with the students.

2. The colleges should obtain appropriate certificates of visit from the concerned organizations just after the visits.

3. Students should submit written report about the visits individually at the end of (B.E. Second Term) eighth term.

4. The report should contain information about the following points:

   (a) The organization - activities of organization and administrative setup technical personnel and their main duties.
   (b) The project / industry brief description with sketches and salient technical information.
   (c) The work / processes observed with specification of materials, products, equipments etc. and role of engineers in that organization.
   (d) Suggestions (if any) for improvement in the working of those organizations.

5. The evaluation of the report of technical visits will be made by panel of two teachers appointed by principal based on following points:

   (a) Coverage aspect: All above points should be covered.
   (b) Detailed observations: System / Process / Product explained with data, diagram specifications.
   (c) Quality of presentation: Report should be very objective and should consist of clear

and systematic organization of topics and information.

(d) Viva - voce: A viva -voce shall be conducted on the technical visit report by the teachers to assess the specific knowledge gained by the students for technical applications.

6. The case study should include the study problem in Computer Engineering branch.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (COMPUTER ENGINEERING)
(w.e.f. 2008-09)

TERM – II

Project - II

Teaching Scheme:
Practical: 6 Hrs./ Week

Examination Scheme:
Term Work: 100
Oral: 50

1. The Project group in (B.E. first Term) seventh term will continue the project work in (B.E. Second Term) eighth term and complete project.
2. The group should maintain a logbook of activities. It should have entries related to the work done, problems faced, solution evolved etc., duly signed by guide.
3. The guides should regularly monitor the progress of the project work.
4. The project work along with project report should be submitted as part of term work in (B.E. Second Term) eighth term on or before the last day of the (B.E. Second Term) eighth term.
5. Project report must be submitted in the prescribed format only. No variation in the format will be accepted.
6. Assessment of the project for award of TW marks shall be done by the guide and a departmental committee (consisting of minimum two teachers with experience more than three years) as per the guidelines given in the following table.

B) ASSESSMENT OF PROJECT II TERMWORK (B.E. SECOND TERM)

NAME OF THE PROJECT: _____
NAME OF THE GUIDE: _____

Sr. No	Exam. Seat No	Name Of Students	Assessment by guide (70%)						Assessment by department (30%)			Grand Total
			Fabrication /software / actual work	Execution of project	Project report	Scope/ Cost / Utility	Attende-nece	Total	Evaluation (10%)	Prese-ntaion (20%)	Total	
		Marks	20	10	20	10	10	70	10	20	30	100

Sign of Guide Sign. of Committee Members Sign. of H. O. D.

7. The guide should be internal examiner for oral examination (If experience is greater than three years).
8. The external examiner should be from the related area of the concerned project. He should have minimum of five years of experience at degree level / industry.
9. The evaluation at final oral examination should be done jointly by the internal and external examiners.
10. The Project work should be kept in department for one academic year after University Examination.

NORTH MAHARASHTRA UNIVERSITY
JALGAON

SAYLLABUS FOR SECOND YEAR ENGINEERING DEGREE COURSE

IN

ELECTRICAL ENGINEERING

(w.e.f. July. 2006-07)

NORTH MAHARASHTRA UNIVERSITY JALGAON
S.E. (ELCTRICAL) W.E.F 2006 -2007
TERM - I
ENGINEERING MATHEMATICS – III

Teaching Scheme:	Examination Scheme:
Lectures : 4 Hrs/Week	Theory Paper : 100 Marks (3 Hours)
Tutorials : 1 Hr/Week	Term Work : 25 Marks

Unit – I : Linear Differential Equations

Linear Differential equation of order n, Solution of LDE with constant coefficient, method of variation of parameters, equations reducible to linear form with constant coefficients, Cauchy's linear equation, Legendre's linear equation.Solution of Simultaneous and Symmetric Simultaneous Differential equation Applications to electrical circuts. Lectures-10, Marks -20

Unit – II : Complex Variables

Functions of complex variables, Analytic functions, C-R equations, Conformal mapping, Billinear transformation, Residue theorem, Cauchy's Integral theorem and Cauchy's Integral formula (without proof). . Lectures-10, Marks -20

Unit – III : Fourier and Z – Transforms

Fourier Transform (FT): Fourier Intergral theorem. Sine and Cosine Integrals. Fourier ,Transform, Fourier Cosine Transform, Fourier Sine Transform and their inverses.,Problems on Wave equation.

Z Transform (ZT): Definition, standard properties (without proof), ZT of standard sequences and Inverse. Solution of simple difference equations, Applications of Z Transform to discrete system analysis.

. Lectures-10, Marks -20

Unit –IV: Laplace Transform (LT)

Definition of LT, Inverse LT. Properties and theorems. LT of standard functions. LT of some special functions viz, error, 1st order Bessel's Periodic, Unit Step, Unit Impulse and Ramp. Problems on finding LT and Inverse LT. Initial and final value theorems.Applications of LT for Network Analysis.

Lectures-10, Marks -20

Unit – V Vector Integration.

a) Applications of partial differential equations to :

1. Vibration of strings or wave equations:

$$\frac{\partial^2 y}{\partial t^2} = a^2 \frac{\partial^2 y}{\partial x^2}$$

2. One dimensional heat flow equation.

$$\frac{\partial u}{\partial t} = a^2 \frac{\partial^2 u}{\partial x^2}$$

3. Laplace equation Two dimensional heat flow equation.

$$\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$$

by separating variables only.

b) Line Integral, Surface and Volume integrals, Gauss's, Stoke's and Green's Theorems (without proof). Applications to problems in Electromagnetic Fields. Lectures-10, Marks -20

REFERENCE BOOKS:

1. Erwin Kreyszig :Advanced Engineering Mathematics , John Wiley and sons
2. H.K. Dass : Advanced Engineering Mathematics , S. Chand
3. Wylie C.R. and Barrett : Advanced Engineering Mathematics , Mc Graw Hill
4. B.S. Grewal : Higher Engineering Mathematics , Khanna Publication, Delhi.
5. B.V. Raman : Engineering Mathematics , Tata Mc- Graw – Hill.
6. P.N. Wartikar and J.N. Wartikar : Applied Mathematics (Volume I and II), Pune Vidhyarthi Griha Prakashan, Pune
7. Thomas L. Harman James Dabney and Norman Richer : Advance Engineering Mathematics with MATLAB, Books/Cole, Thomson Learning 2/e
8. Dr. Gokhale, Dr. Chaudhari and Dr. Singh :Engineering Mathematics – III

SEM–III

Electrical Engineering Materials

Teaching Scheme:	Examination Scheme:
Lectures:- 3 Hrs/week	Theory paper :-100
Practical :- 2 Hrs/week	ICA : 25 marks
	ESE:25marks

Unit:-I

Introduction :- Classfication of electrical engineering materials based on atomic structure, hydrogen atom,energy levels, bond and arrangement in solid, quantum numbers and Pauli's exclusion principle. Crystal structure and defects. Semi-conducting materials: Bonds in silicon and Germanium ,their electrical properties. Hall effect,. High resistence materials; Nickel-Chromium alloys, Constantan, Kanthal, tungsten, Molybdenum.

(08 Hrs, 20 Marks)

Unit II

Conducting Materials:Free electrons theory , resistivity of metals,relaxation,collosion time and mean free path. Heat develop in current carring conductor ,Thermal conductivity, wiedmann frenz law, super conductivity,cryotons and other modern application of super conductivity, thermal bimetal,thermocouple materials.

(08 Hrs, 20 Marks)

Unit III

Dielectric properties of insulating material in static field:- static dielectric field, polarisationand dielectric constant ,types of polarization , deravation of expression for orientational polarization, internal field and clausius-mossotti relation, ferroelectricity, spontaneous polarization,piezoelectricity.

(08 Hrs, 20 Marks)

Unit IV

Dielectric properties of insulating material in alternating field: Dependence of polarizability on frequency and temperature. Dielectric by circuit equivalent. Breakdown of insulating material, principles of electric breakdown and factor influencing the breakdown strength. Different type of insulating material used for electric machines,transformer, power cable,capacitors and electronic equipment. Testing of insulating material as per i.s. specification.

(08 Hrs, 20 Marks)

Unit V

Magenetic material:- review of magnetic circuit. Magnetic dipole moment, magnetization, induced dipole moment, classification of the maganetic material , domeain structure, spontaneous magnetization and curie wiesse law ,ferromagnetic and ferrites ,electric sheet steel, hot rolled and cold rolled steel, , permanent magnet material, properties and application of amorphous magnetic material.

(08 Hrs, 20 Marks)

Reference Books

1. A.J.Dekker,Electrical Engineering Materials.
2. S.P.Seth and P.V.Gupta, A course in Electrical Engineering Materials.
3. C.S.Indulkar and S.Thiruvengadam, Electrical Engineering Materials.
4. S.P.Chhaiotra and B.K.Bhat, Electrical Engineering Materials.
5. Electrical Engineering Materials: T.T.T.I Chennai ,TMH.

List of Experiments:-

1.Testing of insulating oil as per I.S.
2.Testing of solid insulating materials as per IS
3. Testing of power capacitors as per IS
4. Measurements of resistivity of conducting materials.
5.Measurements of resistivity of resistive material.
6 .Use of spark gap for measurements of high voltage.
7.To study Seeback and Peltier effects.
8. Study of hysterisis loop of ferromagnetic materials.
9 .Study of various insulating materials.

The term work should include a minimum of eight experiment from the above list.

TERM - I
APPLIED THEMODYNAMICS

Teaching scheme	Examination scheme
Lectures:4 Hrs/week	Theory:100 Marks 3 Hrs
Practicals:2 Hrs/week	Termwork : 25 marks

Unit I

Steam generators. Classification, constructional features of process and power boilers, Boiler mountings and accessories, Equivalent evaporation, boiler efficiency ,energy balance ,

rankine cycle , work power out put, steam consumption ,rankine efficiency ,method to improve efficiency steam turbine classification ,construction and necessity of compounding of steam turbine (10hrs,20 Marks)

Unit II

Internal combustion engine: classification otto and diesel cycles , construction and working of 2 stoke and 4stoke engines, calculations of IP,BP,FP,BSFC,MEP and a efficiencies, heat balance sheet . engine trial and performance. Study of fuel feeding ignition, starting ,governing ,cooling ,lubrication, exhaust and power Take off

(10hrs,20 Marks)

Unit III

Air compressor : uses of compressed air , classification, construction and working of air compressor, power input , concept of clearance volume , swept volume ,single and multi stage compression ,volumetric and isothermal efficiencies and factors affecting these efficiencies. Necessity of cooling of compressor and compressed air , FAD, air motor ,its use, construction and working (10hrs,20 Marks)

Unit IV

Introduction to heat transfer: various models of heat transfer, fundamental laws of conduction , convection and radiation. Concept of thermal conductivity , heat transfer coefficient and emmisivity, concept of black, gray , white body, use of fins on electrical appliances

(10hrs,20 Marks)

Unit V

Refrigeration and air conditioning: Refrigeration effect and its uses. Vapour compression cycle, calculations of vapour compression, Refrigeration system, coefficient of performance, TR capacity. Common refrigerants and their desirable properties. air conditioner and its requirement. Properties of moist air psychometric chart and its use. Psychometric processes such as sensible heating and cooling, humidification and dehumidification. Study of central air conditioning plant. Refrigeration controls and industrial air conditioning . vapour absorption system. (10hrs,20 Marks)

Reference Books

1. P.K.Nag, engineering thermodynamics,.
2. R.K.Rajput., thermal engineering,
3. Gupta and Prakash,. heat transfer,
4. V.Ganeshan, Internal combustion engine,
5. T.Roy chowdhary. Basic thermodynamics,

List of experiments

Group A

1. Study of steam power plant.
2. Study of boiler mountings and accessories.
3. Study of fuel feeding system of an I.C. engine
4. Study of ignition system of an I.C. engine

Group B

5. Study and trial on petrol engine at one load.
6. Study and trial on reciprocating air compressor.
7. Study and trial on refrigeration system.
8. Study and visit of central air conditioning plant.
9. Determination of thermal conductivity of metal rod
10. Determination of Stefan Boltzmann's constant
11. Calculation of fin efficiency in natural and forced convection.
12. Study and trial on diesel engine at one load.

The termwork should include minimum eight experiments, two from group A and six from group B.

Term-I
AC CIRCUITS AND TRANSFORMERS

Teaching scheme	Exam. Scheme
Lectures-4 hrs/week	Theory paper-100marks (3 hrs)
Practicals-4 hrs/week	Term work-25marks
	Practical-50marks

Unit-I

Polyphase systems-Concepts of Polyphase systems, power in balanced and unbalanced three phase circuits, measurment of power in three phase, three wire and four wire systems, two wattmeter method for balanced and unbalanced three phase, three wire system ,balanced three phase loads,modification of two wattmeter method by using a single wattmeter, use of wattmeter readings for determining power factor of the load and its nature (lagging, unity or leading),effect of load power factor on wattmeter readings, measurements of reactive volt-amperes.

Solution of balanced and unbalanced three phase circuits, star-delta and delta-star conversion of impedances , Millmans theorem and its application for solving unbalanced, star connected circuits. (10hrs, 20 Marks)

Unit-II

Single phase Transformers-constructional details ,arrangements of core and coils in shell type and core type transformer, material used for magnetic cores and windings, EMF equation, voltage and current ratios, concept of leakage flux and its effect, resistance leakage reactance and leakage impedances of transformer windings and their effect on the transformer performance, Exact and approximate equipments circuitr referred to either side, general phasor digrams on load and no load, various losses in transformer,their variation with load ,efficiency, maximum efficiency, transformer rating ,voltage regulation, its determination by direct loading and from equivalent circuits, kapps regulation leakage reactance and impedances. (10hrs, 20 Marks)

Unit III

Polyphase Transformers-connecting a bank of three identical single phase transformer for three phase transformation, construction of shell type and core type three phase transformers, comparison between a bank of three identical single phase transformers and a single three phase transformer .

Standard connections for three phase transformers, their voltage phasor diagrams, phasor groups,sutability of particular connection for suppling unbalanced loads, floating neutral. Parallel operation of three phase transformers, three winding transformers, tertiary winding ,use of tertiary windings in three phase transformers, moving coil voltage regulator ,construction and operation. (10hrs, 20 Marks)

Unit IV

Descriptive treatment of non-sinusoidal waveform of the magnetizing currents of a transformer with sinusoidal applied voltage, sketching this waveform and that of the sinusoidal flux from the B-H curve of the magnetic core , concepts of harmonics and the presence of third harmonics in the magnetizing current of a transformer ,autotransformer and dimmerstat their rating and use., comparision between auto transformer and two winding transformer ,connecting two winding transformer use as an auto transformer,its voltage, current and kva rating as an auto transformer.

Parallel operation of single transformers ,conditions to be satisfied, equivalent circuits and phasor diagrams. Load sharing under various conditions . (10hrs, 20 Marks)

Unit V

Special transformer connections- V and T connection of two single phase transformer for three phase to three phase transformation, their phasor diagrams, applications, scott connection for three phase to two phase transformation and vice-versa ,voltage ratios of the transformers , phasor diagrams of voltage and currents of the input and output sides for balanced and unbalanced loads, application.(4hrs)

Testing of transformers- concept of polarity of transformer windings, standard practice of marking transformer winding terminals ,polarity test using ac supply and voltmeter, polarity test using a battery, tap key and dc galvanometer.

Open circuit and short circuit tests, methods of carrying out the tests and information obtained from these , sumpners test, IS Specifications of transformers, concepts of routing type test, testing of transformers as per IS specifiacations. (10hrs, 20 Marks)

Referance Books

1. M. G. Say , The performance and design of AC machines
2. A. S. Langsdrof , "Theory of AC machinery, second edition", Tata mcgraw hill.
3. Kerchner and Corcoran , AC Circuits, Wiley eastern.
4. Edward Haughes. ,Electrical tech., 6th edition .
5. V.N.Mittle , Basic elect. Engg., Tata mcgraw hill.

List of Experiments

1. Open circuit and short circuit test on a single phase transformer.
2. Polarity test on single phase and three phase transformer 1)using an ac supply and voltmeter 2)using battery, tap key and dc galvanometer.
3. Sumpners test on two identical single phase transformers.
4. Parallel operation of two single phase transformer.
5. Study of connections for three phase transformers.
6. V connection of two single phase transformers on no load and at balanced load.
7. T connection of two single phase transformer on no load and at balanced load.
8. Scott connection of two single phase transformers on no load and at balanced load.
9. a) Study of two wattmeter method for balanced & unbalanced 3-phase loads.
   b) Effect of load p.f. on wattmeter reading in case of balanced laod.
10) Measurement of reactive voltamperers in 3-phase balanced loads.
11) Verification of millmans theorem
12) Study the no-load current waveform of 1-phase transformer on a CRO.

The term work should include a minimum 10 experiments from the above list.

Term-I

Electrical Measurement-I

Teaching scheme:	**Examination Scheme:**
Lectures: 4 Hrs/week	**Theory paper 100 Marks. (3 Hrs)**
Practicals : 2 Hrs/week	**Term work : 25 Marks**

Practical :50 Marks

Unit I

International system of units, dimension of Electrical quantities, Absolute measurements of current and resistance.

Magnetic measurements: Fluxmeter, B-H curve of a ring specimen, hystersis loop, permeameters, Iron loss test at power frequency, effect of voltage, frequency and form factor iron loss, separation of iron losses.

(10 Hrs, 20 Marks)

Unit II

Measurements of resistance : Classification, Ohm meter, ratio-meter, D.C. potentiometer, Kelvin's double bridge, measurements of high restistance, measurment of earth resistance and resistivity, bridge megger and ductor megger, measurement of insulation resistance.

(10 Hrs, 20 Marks)

Unit III

Measuring instruments (General theory) : Static and Dynamic Characteristic of an instrument, accuracy, linearity, reproductivity, sensitivity, resolution, speed of response.

Galvanometer : Construction, deflection, controlling, damping, balancing systems, D'Arsonval, Ballistic and vibration galvanometers.

(10 Hrs, 20 Marks)

Unit IV

Ammeters and Voltmeters : Construction, Principle of operations, torque equations and errors of PMMC, Moving iron and Electro-static instruments. Extension of ranges using short and multipliers.

Instrument transformers : Theory, expression for ratio and phase angle errors. Design consideration and testing. Precautions in using the instruments transformers.

(10 Hrs, 20 Marks)

Unit V

Wattmeters and Energymeters : Construction and principle of operation of electrodynamic and condution type wattmeter. Construction and working of low P. F. wattmeters, Errors and their compensation. Construction and principle of operation and torque equation for the induction type of energymeter. Error and adjustments.

(10 Hrs, 20 Marks)

Reference Books:

1. E. W. Golding. , Electrical Measurements and Measuring instruments.
2. C. T. Baldwin. , Fundamentals of electrical Measurements.
3. Cooper and Derfllick , Electronic instrumentation and measurements Techniques, 3rd edition, Prentice-Hall of India.

List of Experiments :

1. Barlow method of measurements of power using two CT's
2. Barlow method of measurement of power using P.T.
3. Measurement of the power in 3-phase 4-wire circuit.
4. Calibration of single phase energy meter at different P.F.'s
5. Calibration of three phase two elements energy meter at different P.F.'s
6. Use D.C. potentiometer for calibration of ammeter and voltmeter.
7. Kelvin's double bridge.
8. Anderson's bridge.
9. Epstein square.
10. Measurements of phase angle error and ration error of C.T.
11. Measurements of phase angle error and ration error of P.T.
12. Measurement of earth resistance.

The term work should include a minimum ten experiments from the above list.

Term - II

Analog and Digital Electronics

Teaching Scheme:
Lecture: 4 Hrs./week
Practical: 2 Hrs./week

Examination Scheme:
Theory: 100 Marks(3Hours)
Term work: 25 Marks

Practical: 25 Marks

UNIT –I

Introduction, BJT amplifier with reference to operational analysis of CE and CC configuration, FET amplifier , Multistage amplifier, differential amplifier . Operational amplifier, basic configuration differential, inverting ,non inverting, summer and substractor . Op-amp parameters (concept only) CMRR,slew rate , frequency response and gain limitations. (10 hrs,20 Marks)

UNIT- II

Op-amp applications: Integrator , differential , comparator , Schmitt trigger, instrumentation amplifier , precision rectifiers, zero crossing detectors.

Waveform generation using Op-amp – sine, square , saw tooth, and triangular. IC 555 modes of operation-astable, monostable, clock generation. (10 hrs,20 Marks)

UNIT-III

Feedback type of series voltage regulator , protection circuits , fixed and variable voltage regulators using Ics Viz 78xx,79xx,LM723, LM317, study of VCO and PLL.
ADC-sar,dual slope type
DAC-binary weighted ladder type (10 hrs,20 Marks)

UNIT-IV

Flip flop- RS latches, D-latches, edge triggered, D flip flop, edge triggered JK flip flop, JK flip flop, JKmaster slave flip flop opto coupler , opto isolator, opto decoder, opto encoder (10 hrs,20 Marks)

UNIT-V

Buffer register,shift register controlled shift register, ripple counter, synchronous counter, twisted ring counter,N module counter, down counter, up – down counter, three stage registers. (10 hrs,20 Marks)

Reference Books:-

1.Gaikwad R,Operational amplifier, PHI New Delhi
2.K.R.Botkar,Integrated circuit , Khanna Publication,New Delhi

Lab experiments:-

1) Op-amp as square & sine wave generator
2) Op-amp as comparator & Schmitt trigger
3) Instrumentation amplifier using 3 Op-amps
4) IC 555 application – astable, monostable,square wave generator, square counter
5) IC 565/4046 application ,calculation of lock range and capture range
6) Study of JK flip flop
7) A to D & D to A converter using ADC 0808 and DAC 0808
8) Study of up down counter & N-modulo counter
9) Study of IC 723 as low / high voltage regulator
10) IC 7805 used as fixed voltage regulator, elevated voltage and current, constant current source

Term-II

Digital Computational Techniques & Programing.

Teaching scheme:
Lectures: 4 Hrs./ week.
Practical: 2 Hrs./ week.

Examination Scheme:
Theory Paper:100 marks((3 Hrs)
Term work: 25 Marks.

Unit I

Number systems & errors in digital computations; Transcendental & polynomial equations; concept of roots of an equation & methods to find the same. Bisection method, Secant method, Newton- Raphson method, Muller methods, Regula-Falsi method. Method of matrix Inversion(Shipley inversion method)

(10Hrs, 20 marks)

Unit II

Linear algebraic simultaneous equations: Cramer's rule,Gauss method, Substitution method (Forward & Backward substitution), Gauss Elimination, Gauss Jordan, Jacobi Iteration, Triangular Factorization (L-U Factorization),Gauss Seidal method.
Non Linear algebraic simultaneous equations: Newton- Raphson method.

(10Hrs, 20 marks)

Unit III

Interpolation: Lagrange & Newton interpolations; finite difference operators, interpolating polynomials using finite differences, Least squares approximation.

(10Hrs, 20 marks)

Unit IV

Differentiation & Integration: Numerical differentiation methods based on interpolation, finite differences, undetermined coefficients. Integration using Simpson's & Trapezoidal rule.

(10Hrs, 20 marks)

Unit V

Ordinary differential equations: Euler's method, Taylor series method, Runge-Kutta methods, and predictor-corrector methods.

(10Hrs, 20 marks)

Reference Books:

1) Jain & Iyengar , Numerical Methods for Scientific & Engineering Computation, 3rd edition, , New Age international.
2) S.K. Gupta , Numerical methods for Engineers, New Age international.
3) Anita, Numerical methods for scientists & Engineers, Tata McGraw Hill.
4) S.S. Shashtry, Introductory methods of Numericals, Tata McGraw Hill.
5) Rajaraman,Numerical methods & computations, Tata McGraw Hill.
6) Yashwant Kanitkar., Let us C.

List of Programs: (To be written in 'C' language.)

1) Program to evaluate truncation error in a series.
2) To find roots of polynomial using any iterative method.
3) Solution of simultaneous linear algebraic equations.
4) Evaluation of interpolating polynomial.
5) Differentiation using numerical differentiation.
6) Integration using numerical integration.
7) Solution of differential equations.

The term work should include six programs from above list, executed on the computer.
Note: In theory paper, questions may be asked on numerical methods or algorithms/programs used for solving on the computer.

Term-II

Network Analysis

Teaching Scheme:
Lecturer: 04 Hrs/Week
Practical: 02 Hrs/Week
Tutorial: 01 Hr./Week

Examination Scheme:
Paper: 100 Marks(03 Hrs.)
Term Work : 25 Marks
Practical: 25 Marks

Unit I:

Network Defination , lumped, distributed, linear and non linear, bilateral and unilateral and time variant and time invariant, space variant and space invariant networks, mesh and node circuit analysis concept of supper node and supper mesh, concept of voltage and current divider mutual inductance, dot convention for coupled circuits , concept of duality and dual networks

Topological description of network: Graph oriented graph, Branches, nodes, planner and non planner graph, sub graph, trees and chords.

Network equations: Number of network equations, source transformations, formulation of network equations, loop variable analysis, node variable analysis, determines- minor and gauss elimination method, state variable analysis

Initial conditions in network: Initial conditions in elements, procedure for evaluating initial conditions, initial state of network (10 Hrs,20 Marks)

Unit II

Second order differential equation- internal excitation, solution and initial conditions, network excited by external energy source, solution and initial conditions.

Laplace Transformation: Transforms of linear combinations, transforms of derivatives, transforms of integrals, solution of problem with laplace transformation, partial fraction expansion, Heavisides expansion theorem, Example of solution by laplace transmission, laplace transforms of standard functions, shifted waveforms – unit step, ramp and impulse, initial and final value of f(t) from f(s). (10 Hrs,20 Marks)

Unit III

Impedance functions and network theorems: Concepts of complex frequency, transform impedance and transform circuits, series and parallel combinations of elements, super position and reciprocity theorem, Thevenin's and Norton's theorem and Milliman's and Tellegn's theorem and maximum power transfer theorem.

Network functions, poles and zeros : terminal pairs of ports, network functions for one port and two port network, impedance (or admittance) function, voltage transfer function, transfer impedance, transfer admittance, calculation of network function, lader network, bridge T , parallel T and Lattice networks, poles and zeros of network functions, restrictions on poles and zero location of driving point function- transfer function, time domain behaviour from pole zero plot. (10Hrs,20 Marks)

Unit IV

Two-port parameters : z parameter , y parameter, h parameters, transmission (abcd) parameter, relation between various parameters, inter connection of two port network,

cascade connection of two port network, parallel connection of two port network, series connection and series parallel connection of two port network.
Fourier series and signal spectra: Fourier series, evaluation of Fourier coefficients, waveform symmetries as related to Fourier coefficients, exponential form of Fourier series. (10Hrs,20 Marks)

Unit V
Sinusoidal steady –state analysis : Sinusoidal steady state , sinusoid and e+,solusition using e+jwt, phasor diagram, analysis of series resonating and parallel resonating R-L-C circuit, Q factor resonance frequence and band width of the series resonating and parallel resonating R-L-C circuit, power, power transfer and insertion loss : energy and power, average and complex power, optimizing power insertion loss, (10 Hrs,20 Marks)

Reference Books :

1. M.E. Van Valkenberg ,Network Analysis , third edition, Printice Hall of India.
2. William Hayt, Jack Kemmerly,Engineering circuits analysis, fifth editions, McGraw Hill International edition.
3. D. Roy Choudhary,Networks and systems, New Age International.
4. Franklin Koo, Network analysis and Synthesis, New Age International
5. Shyam Mohan and sudhakar, Network Analysis, TMH Publications.

List of Experiments:

1. Verifications of Thevenin's Theorem for two port network.
2. Verification of Norton's Theorem for two port network.
3. Verification of Superposition Theorem for two port network.
4. Pole and Zero plot of one port network.
5. Measurement of Z parameter of two port network.
6. Measurement of Y parameter of two port network.
7. Measurement of ABCD parameter of two port network.
8. Two plot frequency response of series RLC circuit.
9. Two plot frequency response of parallel RLC circuit.
10. To study power transfer and insertion loss.

The termwork should include minimum eight experiment from the above list.

Term -II

Electrical Machines-I

Teaching scheme:
Lectures:4Hrs/week
Practical: 25 marks

Examination scheme:
Theory Paper:100 marks(3hrs)
Practical:2Hrs/week
Term work: 25 marks

Unit -I

D.C .Machines: Construction of field system, flux distribution and fringing, magnetic leakage, magnetization curve, construction of armature and its main parts, commutator,
Brush rockers and brush gears, type of armature windings type of enclosures

D.C.generator: Basic principles of working e.m.f. Equation, types, characteristics and applications of different types of d.c.generator. building up of e.mf .in d.c. shunt generator and causes of failures, remedies (10 Hrs, 20 Marks)

Unit-II

D.C.Motors:-Basic principles of working,significance of back e.m.f. torque equation,types,characteristics and applications of different types of d.c. motors,starting,
Reversing and speed control by armature voltage and field control.and starers. Armature reaction in d.c. machines,effect on field with and without brush lead,
Effect of saturation ,demagnetising and crossmagnetising mmfs and their estimation,remedies to overcome armature reaction (10 Hrs, 20 Marks)

Unit –III

Process of commutation, types of commutation, reactance voltage, straight line commutation,with variable current density,under and over commutation ,causes of bad commutation and remedies. Interpoles,compensating windings

Losses and efficiency of d.c.machines, condition of maxium efficiency and maximum power output,effect of saturation and armature reaction on losses

Testing of d.c.machines: insulation resistance test ,break test,Swinburne's test,regenerative test on series and shunt motors,separation of various losses,retaration test,heat run and temperature rise test , commutation test,armature faults,types of routine tests according to I.S.I.specification. (10 Hrs, 20 Marks)

Unit-IV

Poly phase induction machines:-construction ,production of rotating magnet fields,
Principles of working,induction motor as grneralised transformer,simplified theory with constant flux,slip,rotor e.m.f.,current,.power,torque relations,torque slip characteristics,condition for maximum torque ,exact and approximate equivalent circuit,circle diagram computation,experimrntal test for ploting circle diagram

(10 Hrs, 20 Marks)

Unit-V

Methods of starting of slipring and cage rotor induction motor,varies types of starters,high starting torque squirrel cage motors,double squirrel cage motors,industrial applications of different types of motors,cogging,crawling and noice production in induction motor

Speed and power factor control of motors: -Rheostatic speed control,phase advancers,speed adjustment by pole changing,speed control by change of frequency,cascading.
Induction voltage regulators,induction generator.test as per I.S.I.specification.

(10 Hrs, 20 Marks)

Reference Books: -

1) E.W.Clayton.Design and performance of d.c.machines-
2) M.G.Say. Design and performance of a.c.machines-
3) Langsdorf A.C.machines,TMH.
4) P.C.Sen. D.C.machines- - Langsdorf,TMH.
5) Nagrath and Kothari Electric machine –TMH

Lists of experiments.

Group A

1) Determination of magnetization ,external and internal characteristics of d.c. shunt generator.
2) Determination of magnetization ,external and internal characteristics of d.c. series generator.
3) Determination of external characteristics of d.c. compound generator.as 1) differtial compound ii) cumulative compound generator.
4) Speed control of D.C shunt motor by armature and field control
5) A) Study of 3 and 4 point starters B) Reversal of motor rotation.
6) Load test on d.c.shunt motor.

Group B

7) Load test on induction motor
8) Determination of performance of induction motor from circle diagram.
9) Study of induction motor starters.
10) Speed control of slip ring induction motors using rotor resistance method.
11) Determination of equivalent circuit from no load and blocked rotor test On induction motor.

The term work should include minimum eight experiments (four from each group A and B)

Term-II
POWER SYSTEM -I

TEACHING SCHEME: Examination scheme:
Lectures:4 Hrs/week Paper: 100 Marks(3Hrs)
Term work: 25Marks

UNIT I:

Generation: types of generating plants, basic requirements, site selection, principle of working ,main components and auxiliary components ,schematic block diagram and role played by each block for Hydro ,thermal, nuclear plants using conventional fuels.

(10 hrs,20 Marks)

UNIT II:

Non-conventional sources of energy: like solar, tidal, MHD, fuel cells, geo-thermal energy, principle of working, main components and auxiliary components, schematic block diagram and role played by each block

(10 hrs,20 Marks)

UNIT III:

Power plant terminology: load, demand. Classification of power plants as Base load Peak load & Intermediate load plants. Hydrograph, Flow duration curve. Load curves, Load duration curve , Load factors , Demand factor , Diversity factor, Plant capacity factor, Plant use factor.

(10 hrs,20 Marks)

UNIT IV

Major electrical equipments in power plants: descriptive treatment of ratings, special features, field of use of equipments like alternators, transformers, busbars, exciters, and excitation systems, control panels, metering and control room equipments in generating stations.

(10 hrs, 20 Marks)

UNIT V

Transmission : Importance of 3 phase overhead transmission lines in power systems & factors to be considered while planning their layout. Resistance, skin effect, Inductance and its estimation for two-wire-single-phase, 3-wire-3-phase, single and double circuit lines, with and without transposition, equal/unequal and horizontal spacing. Circuit representation of lines: Classification of lines based on length as short, medium & long transmission lines. Representation of transmission line as tee & pie ckts using r-l-c parameter, voltage and current relation of short & medium transmission line (10 hrs,20 Marks)

Reference Books: -

1. B.R.GUPTA, Generation of electrical energy, S Chand publication
2. William Stevenson ,Elements of Power System Analysis M-H international addition
3. OllE Elgerd, Electrical energy system theory second edition, TMH.
4. J.B.Gupta A course in electrical power system, Dhanpat Rai and sons' Publication.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

SE (ELECTRICAL) REVISED SYLLABUS TERM-II
(WITH EFFECT FROM JULY 2006)

ELECTRICAL WORKSHOP

Teaching scheme:	Examination Scheme:
Practical: 2 Hours/week	Term Work: 50 Marks

1) **Study of different wires** – size of wires, standard wires, TRC and CTS wires, weather proof wires, Flexible wires.
2) **Study of wiring accessories**- Types of switches, types of lamp holders, ceiling rose, mounting blocks, socket outlets plugs, wooden boards, main switches (ICDP/ICTP), Junction boxes, Distribution boxes, Fuse boards, fuses.
3) **Lamp circuits**- Simple circuit, series parallel circuit, Motor switches circuit.
4) **Underground Cable**- Fiber optic cable, Cable insulation, Types of three Phase cable, Cable joining, Coaxial cable, Twisted pair cable, Flat ribbon cable.
5) **Study and use of DC / AC voltmeter**- Study and use of DC/AC ammeter.
6) **Study and use** of Analog multi-meter to measure electrical quantities. Study and use of Digital multi-meter to measure electrical quantities.
7) **Study and use** of Megger.
8) **Electrical Shocks and safety precautions**.
9) **Industrial Visit**- Electrical substation, electrical workshop, electrical process industries (minimum two visits) and its reports.

Reference Books-

1) S L Uppal ,Electrical wiring, Estimation and Costing
2) Surjit Singh, Electrical wiring, Estimation and Costing
3) S K Bhattacharya, Electrical wiring, Estimation and Costing
4) B R Gupta, Electrical wiring, Estimation and Costing

Faculty of Engineering & Technology

।।अंतरी पेटवू ज्ञानज्योत।।

NORTH MAHARASHTRA UNIVERSITY, JALGAON.

Syllabus For

THIRD YEAR ENGINEERING (T.E.)

ELECTRICAL ENGINEERING

TERM- I & II

(W.E.F.2007-2008)

NORTH MAHARASHTRA UNIVERSITY, JALGAON
STRUCTURE OF TEACHING AND EVALUATION
T.E.(*ELECTRICAL ENGINEERING*)
FIRST TERM
W.E.F. 2007-08

Sr. No	Subject	Teaching Scheme Hours/week			Examination Scheme				
		Lectures	Tutorial	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Electrical Installation, Estimation and Distribution	4	--	2	3	100	25	--	--
2	*Electromagnetic Engineering	4	1	--	3	100	25	--	--
3	Power System-II	4	--	2	3	100	25	25	--
4	Electrical Machines-II	4	--	2	3	100	25	25	--
5	Microprocessor and Micro controller	4	--	2	3	100	25	25	--
6	Software Applications	--	--	2	--	--	50	--	--
	Total	**20**	**1**	**10**	**--**	**500**	**175**	**75**	**--**
	Grand Total	**31**			**750**				

SECOND TERM

Sr. No	Subject	Teaching Scheme Hours/week			Examination Scheme				
		Lectures	Tutorial	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Power Electronics	4	--	2	3	100	25	--	--
2	Electrical Measurement-II	4	--	2	3	100	25	25	--
3	Control System-I	4	--	2	3	100	25	25	--
4	Electrical Machine Design-I	4	--	4	3	100	50	--	25
5	Industrial Organization and Management	4	1	--	3	100	25	--	--
6	Practical Training / Mini Project / Special Study	--	--	2	--	--	25	--	--
	Total	**20**	**1**	**12**	**--**	**500**	**175**	**50**	**25**
	Grand Total	**33**			**750**				

* Common with TE (Electronics, Electronics and Communication, Electronics and Telecommunication).

NORTH MAHARASHTRA UNIVERSITY JALGAON
T.E. (ELECTRICAL)
W.E.F : 2007- 08
TERM – I

Electrical Installation , Estimation and Distribution

Teaching Scheme	**Examination scheme :**
Lectures : 4 Hrs/ week	**Paper :** 100 marks (3Hrs)
Drawing : 2 Hrs / week	**Term work :** 25 marks

Unit I

Supply Systems : typical transmission and distribution system from generation to utilization (overall layout). A.C. transmission , d.c. transmission and comparison between them .

Types of transmission : overhead transmission , underground transmission and comparison between them.

Various systems of transmission: dc systems –two wire dc, two wire dc with midpoint earthed, dc three wire system; single –phase systems – single –phase two wire , -single phase two wire with midpoint earthed , single phase three wire system; two –phase ac systems ; two phase three wire system, two phase four wire system ; three phase a.c. system- three phase three wire system, three- phase four wire system.

Cost of conductors in overhead and underground systems.

Different types of tariffs. **(10 Hrs. : 20 marks)**

Unit II

Overhead transmit line components : The support –poles , towers , and their types ; cross arm and clamps ; guys and stays. Conductors-characteristics of conductor material , types of conductor- solid conductor , bundle conductor, concentrically standard conductor (AAC, ACAR conductor). Insulators – types (pin , strain, shackle and suspension insulator), comparison between them, requirement of material, failure of insulators, testing and protection od insulators..

Fuses –types and operation .

Underground cables ; classification , construction of cable, requirements of insulating materials , insulation resistance , capacitance dielectric stress in single-core/multi-core/ sheathed /armored cables. Grading cables – capacitance grading and inter sheath grading.

Causes of failure of underground cables, cable faults and location of faults.

(10 Hrs. : 20 marks)

Unit III

Earthing : Neutral Earthing methods-solid ,resistance ,reactance, voltage transformer, zig-zag transformer .

Design of distribution system : A.C. distribution – service mains design , design of radical and ring distributors for concentrated , distributed loads and combination of both types of loads, feeder design based on Kelvin's law Lamp Flickers-types and design, Application of capacitors to distribution system. **(10 Hrs. : 20 marks)**

Unit IV

Alarm and timer circuits ; basic alarm circuits for audible and visible signals, types of timers, time sequence charts for reset and sequential timers, time delay relay circuits, thermal time delay and electronic time delay relays, contactors.

Control panel : Introduction , advantages , symbols used on control panels, types of control panel, control panel components , toggle switches , controllers, timers, relays, protection circuits; introduction to SCADA and PLC panels ,distribution automation

(10 Hrs. : 20 marks)

Unit V

Illumination : nature of light , definitions –plane angle , luminous flux luminous intensity , illuminance and their units, luminous efficiency ; laws of illumination – inverse square law and Lambert's cosine law , polar curves.

Requirements of good lighting scheme: Polar curves, direct, indirect , semi direct , semi-indirect lighting.

Design of lighting scheme : factors to be considered , working plane space to height ratio, absorption factor, maintenance factor , depreciation factor , coefficient of utilization ; design of illumination schemes for industrial workshops assembly halls, street lighting.

Design of flood lighting schemes: factors like reflection factor , waste light factor and beam factor and design of such schemes for typical installation.

Design and Estimation : design and estimation of installation of domestic , commercial , industrial heads as peer IE rules and IS 732 ; design and estimation of town or village electrification schemes as per IE rules and IS 732 **(10 Hrs. : 20 marks)**

Drawing sheets;

1. Transmission line components : Five insulators –one piece pin, three piece pin type , suspension insulator (one disc) string insulator (one disc), shackle insulator; towers for single circuit and double circuit lines; lightening arrestor, stays, clamps, pin; typical pole including service mains, HT, LT lines supporting pole , 'H' type pole.
2. Distribution substation; Two views (front view and side view) of distribution substation layout ; single line diagram, pipe earthing , plate earthing.
3. Wiring diagrams and symbols**:** minimum 25 symbols as per IS standards.
   Any four circuit diagram out of the following: 1 Rotor resistance starter, 2. Scooter /motor cycle electric wiring diagram,
4. Lift (passenger /goods) or crane, 4. Automatic star /delta starter, 5. Auto synchronous motor starter, 6. Battery charging circuit, 7. Maximum demand indicator.
5. Project on illumination design of laboratory / workshop or small scale industrial establishment along with estimation.
6. Project on electrification of given area showing distributors , feeders and substations along with estimation.

The term work should include five drawing sheets and reports based on the above topics.

References

Author	Name	Publisher
1. J.B.Gupta	Transmission and Distribution	S.K.Kataria and Sons, New Delhi.
2. S.L.Uppal	Electrical Wiring , Estimation and costing	Khanna Publishers, New Delhi.
3. W.N.Alerich	Electric motor control	D.B.Taraportwala and Sons, Mumbai
4. S.L.Uppal	Electric Power	Khanna publishers, New Delhi.
5. H.Pratap	Art and Science of Electrical Utilization	Dhanpat Rai and Sons, New Delhi.
6. B.D.Arora	Electric Wiring, Estimating and Costing	New Heights, New Delhi

7. I.E.Rules.
8. Practical Relay Circuits, Frank J.Oliver, D.B. Taraporewala and Sons , Mumbai -1

NORTH MAHARASHTRA UNIVERSITY JALGAON
T.E. (ELECTRONICS, ELECTRONICS and COMMUNICATION, ELECTRONICS and TELECOMMUNICATION,ELECTRICAL)
W.E.F : 2007- 08
TERM – I

ELECTROMAGNETIC ENGINEERING

Teaching scheme:
Lectures : 4 hrs/week
Tutorial : 1 hrs/week

Examination scheme:
Theory Paper : 100 Marks (3 Hrs).
Term Work : 25 Marks

UNIT – I

Electrostatics:- Coulomb's law, Electric field due to line charge, Sheet charge and volume charge densities,
Electric flux density, Gauss's law and Divergence theorem. Energy, Potential and Work-done, Potential
gradient. Dipole and its electric field, Dipole movement. Energy density in electrostatic field.
Lectures-10, Marks -20

UNIT-II

Conductor, Dielectrics and Capacitance:- Current and current density. Current continuity equation, Properties of conductors, Boundary conditions (C.D.I. and D.D.I.). Energy stored in capacitors, Poisson's and Laplace's equation's, Capacitance between parallel plates and co-axial cable using Laplace's equation. **Lectures-10, Marks -20**

UNIT-III

Magnetostatics:- Biot-Sarverts law and its vectorial form, Magnetic field due to infinitely long current carrying conductor ,Ampere's Circuital law. Application to co-axial cable. Curl operator, Magnetic flux density, Stoke's theorem. Scalar and Vector magnetic potential. Lorentz's Force equation. Energy stored in magnetic field. **Lectures-10, Marks -20**

UNIT-IV

Time Varying Fields:- Faradays law , Maxwell's equations (Differential , Integral and Phasor forms). Uniform plane waves. Representation of wave motion in free space, perfect dielectrics and Lossy dielectrics (Wave equations). Pointing Theorem and Power density. Propagation in good conductor and Skin effect. Reflection of Uniform plane waves. VSWR.
Impedance matching ,Single stub and Double stub transmission line. Introduction to Smith Chart. **Lectures-10, Marks -20**

UNIT-V

Radiation and antennas: - Radiation resistance. Radiation pattern. Calculation of Radiation resistance for short dipole, Short monopole, Half-wave dipole and Quarter-wave monopole antennas. Directivity, Reciprocity between Transmitting and Receiving antennas, Hertzian dipole, Vector retarded potential.
Types of Antennas: - Folded dipole, Yagi-uda, Horn antenna, Parabolic and Cassegrain feed antenna. Broadside, End fire, Binomial, Tchebysheff antenna arrays. Principle pattern multiplication, General pattern of two isotropic radiators,. **Lectures-10, Marks -20**

REFERENCES:

1) **"Engineering Electromagnetic" by W. Hayt, TMH. (5^{th} or 7^{th} edition).**
2) **"Antenna and Wave Propagation" by K. D. Prasad , Satya Prakashan.**

Topics	Reference No / Name and Author	Lectures
Unit-I	**1(Hayt)**	**10 Lectures**
Unit-II	**1(Hayt)**	**10 Lectures**
Unit-III	**1(Hayt)**	**10 Lectures**
Unit-IV	**1 and 2 (Hayt) and K. D. Prasad**	**10 Lectures**
Unit-V	**1(Hayt) K. D. Prasad**	**10 Lectures**

Termwork:- Assignment for the termwork will be based on the problems on each unit (min.FIVE Assignment).

NORTH MAHARASHTRA UNIVERSITY JALGAON
T.E. (ELECTRICAL)
W.E.F : 2007- 08
TERM – I
POWER SYSTEM-II

Teaching scheme:	**Examination scheme:**
Lectures-4 hrs/week	**Theory scheme**: 100 marks (3hrs)
Practical: 2 hrs/week	**Term work**: 25 marks
	Practicle: 25 marks

Unit-I

Introduction: - Growth of national and international power system, constituents of power systemand role, role of digital computers in operation control and analysis of power system, different aspect of power system analysis and necessity ,relationship, and use of both under normal and abnormal condition .

Complex power: Real, reactive , complex power component, load on system and it's composition, nature and variation, load voltage frequency ,real power load frequency, real power load voltage frequency, reactive power load voltage dependency and method of voltage control. **(10 hrs, 20 marks)**

Unit-II

Long transmission line: V/I relation, hyperbolic equation, ABCD constants, propagation constant, surge impedance and loading, incident and reflected voltage/ current efficiency and regulation on load, equivalent " T " and " π " models, Ferranti effect.

Power system model: Single line impedance and reactance diagrams and their use, PU system, relation, selection of base, reduction of common base and advantages, application of impedance diagrams, representation and modeling of 3 winding transformer,

(10 hrs, 20 marks)

Unit-III

Symmetrical Fault analysis:- 3 phase s.c. analysis of unloaded alternator – subtransient, transient and steady state current , impedances , dc offset ,effect of instant s.c. on the waveforms ,estimation of fault currents with and with-out pre fault current for simple power system ,selection of circuit breakers and current limiting reactors.

Unit-IV

Unsymmetrical Fault analysis: method of Symmetrical components, relationship, advantages, representation of power system by positive, negative, zero sequence diagrams with p.u. values, nature of sequence impedances, L-L, L-G, L-L-G Fault analysis of unloaded , pre-loaded , alternators and simple power system with and with –out Fault impedances.

(10 hrs, 20 marks)

Unit-V

Load flow analysis: Development of mathematical model of simple system by network reduction, nodal voltage/mesh current forms, concept of Z and Y matrices and their ,relation Concept of Load flow analysis, formulation of power flow equations (PFE's) consideration of constraints, bus classification in adopting final strategy solution of power flow equations, outline of Gauss, Gauss seidal and N-R method to solve non linear equations in the form of power flow equations. **(10 hrs, 20 marks)**

References:-

1. W.D. Stevenson – Elements of Power System Analysis, Tata McGrawHill
2. Olle I. Elgard, Introduction to electrical energy system theory, Tata McGraw- hill.
3. I. J. Nagernath, D. P.Kothari, Modern power system Analysis,Tata McGraw hill.
4. B. R. Gupta , Power system analysis and Design,

List of Experiments;

1. Measurements of ABCD constants of long transmission line and plotting of circle diagram to estimate performance parameters.
2. The effect of VAR compensation on receiving and voltage profile of transmission line using capacitor bank.
3. Determination of steady state power limit of a transmission line.
4. Measurement of sub-transient reactance of salient pole synchronous machine by static/Dalton- Cameron method.
5. Study of load flow on a three-bus power system using A.C. network analyses or by actual simulation.
6. Measurement of sequence reactance of a synchronous machine.
7. Fault analysis for symmetrical 3 phase fault by simulation or by ac dc analyzer
8. Unsymmetrical fault analysis for LL,LG, LLG FAULT ON A.C / D.C network analyzer.
9. Computer- added solution of a 3 bus load flow problem using gauss seidal method
10. Formulation of " Y bus " matrix using computer program.

The term works should include a minimum eight experiment from the above list.

NORTH MAHARASHTRA UNIVERSITY JALGAON
T.E. (ELECTRICAL)
W.E.F : 2007- 08
TERM – I
Electrical Machines-II

Teaching Scheme:	**Examination:**
Lectures: 4Hrs./Week	Paper:100 marks
Practical: 2Hrs./Week	Termwork:25 marks
	Practical: 25 marks

Unit-I

Synchronous machines:- Principle of generator action and motor action ; construction – rotating field type ; rotating armature type ,salient pole type , Arrangement of armature winding, E.M.F. equation , winding factors.

3 Ø Synchronous generator :- Alternator on- load ,no load condition; effect of armature current ; armature reaction ;resistance drop; Concept leakage flux; and leakage reactance; armature reactions rotating m.m.f.;production of electromagnetic torque; concept of synchronous reactance and synchronous impedance.

Unit-II

Voltage regulation –definition; regulation by direct load testing, short circuit ratio. Regulation of non salient pole alternator by synchronous impedance method; (e.m.f. method); m.m.f. method; potier triangle; and A.S.A.method.

Two reaction theory for salient pole machines, direct axis and quadrature axis reactance; their determination by slip test; phasor diagram of salient pole alternator and calculation of regulation.

Power: - power angle relation for non salient pole machines and salient pole (steady state power angle charct.) losses in alternator and efficiency.

Unit-III

Parallel operation of alternator: alternators working single and alternator working with infinite bus bar Parallel operation of alternator; load sharing between 2 parallel alternators.

Parallel generator theorem- synchronizing –lamp method and use of synchroscope, synchronizing torque; operating chart of alternator working with infinite bus bar.

Time period oscillation. an alternator connected to infinite bus bar working as motor ,if prime mover is failed. Representation of syn. M/c in a power system network

Unit-IV

Synchronous motors:- motor action , phasor diagram on the basis of synchronous impedance, expression for gross mechanical power develop; power flow. Operatation with const. Load and variable excitation : locus of tip of current phasor under the above condition and v curve

Operatation with const. exciation and variable load : locus of tip of current phasor circle phasor. Starting method, hunting and it causes and remedies.

Unit-V

Harmonics- Concept of time and space harmonicsand their generation, effect of harmonics on performance of synchronous machines, remedies.

1 Ø Induction motors- construction, rotating field theory, equivalent circuitand T-N characteristics, test to determine equivalent circuit parameters.

Types, constructions, connections, T-N characteristics, comparison with 3 Ø I.M.;

Special purpose machines:- universal motor, repulsion motor, reluctance motor, hystresis motor, printed circuit motor, linear induction motor,.

REFERENCES

Author	**Name**	**Publisher**
M.G.Say	Performance and design of A.C.machine	ELBS.
A.S.Langsdort	Theory of alternating current machinery , Second edition	Tata McGraw - Hill
Nagrath and Kothari	Theory and Problems of Electrical machines	Tata McGraw – Hill
E.D.Taylor	Performance and Design of A.C.Commutator	ELBS
S.K.Bhattacharya	Electrical machines Second Edition	Tata McGraw – Hill

List of Experiments:

1. Direct loading test on three phase alternator.
2. O.C. and S.C. test on alternator: determination of its regulation by e.m.f. method and m.m.f. method.
3. Zero power factor test on alternator: regulation by Potier method and A.S.A. method.
4. Slip test on salient pole synchronous machine: determination of direct and quadrature-axis synchronous reactance and hence regulation by two reaction theory.
5. Synchronizing alternators: lamp methods and use of synchroscope.

Group B :

6. V- Curves of synchronous motor at constant load.
7. Load test on synchronous induction motor or synchronous motor at constant excitation.
8. Study of various types of single-phase induction motors.
9. No load and blocked rotor tests on capacitor – start single –phase induction motor and determination of parameters of equivalent circuit.
10. Load test on single phase induction motor.

The term work should include a minimum of eight experiments four each from groups A and B of the above list. The term work marks will be based on performance in theory and practicals having a weightage of 40 % and 60 % respectively.

MICROPROCCER &MICROCONTROLLER

Teaching scheme:
Lectures-4 hrs/week
Practical: 2 hrs/week

Examination scheme:
Theory scheme: 100 marks (3hrs.duration)
Term work: 25 marks
ORAL: 25 marks

Unit-I

8085 Intel microproccer: Organization, architecture, Generation of control signal,Addressing mode, Instruction format , Instruction set, classification of instructions, interrupt.- interrupt structure , Assembler , types of Assembler.

(10 Hour, 20 marks)

Unit-II

stack , subroytine, types of subroutine , Programming in assembly language, Programms on 8085, data transfer technique, -synchronous & asynchronous, interrupt driven data transfer, and polling data transfer, parallel data transfer ,memory organization & interfacing, chip capacity, memory module, address space,. Memory specification, Types of memory- ROM, RAM, PROM, EPROM, EEPR0OM, static & dynamic.

(10 Hour, 20 marks)

Unit-III

Study of common peripheral devices, their architecture & different modes of operation- 8255 PPI, mode 0, 1, BSR mode, ; 8279 keyboard display interface, , 8155, static RAM, I/O ports, timers. DMA controller 8257 **(10 Hour, 20 marks)**

Unit-IV

8086 Microproccesor- architecture, memory segmemtation,parrelel processing, addressing modes,reviw of instruction set of 8086.
D to A – types, Ladder, R-2R
A to D converters, SAR type, dual slope. **(10 Hour, 20 marks)**

Unit-V

Microcontroller-

Signal description of 8051, register set of /8051, timmer & modes i/o port strucher.
Microproccer Applications in –b power system, measurement of voltage, frequency, power factor, Electrical drives- stepper motor control, D.C. motor speed control,

(10 Hour, 20 marks)

REFERENCE:

1. Microproccer Architecture, programming, & Applications with 8085, third edition, R.S.Gaonkar.
2. 8085 Assembly languages programming Leventhal, McGraw hill
3. Microproccer & digital system second edition, Douglas V. Hall McGraw hill
4. Fundamental of Microproccer & Microcomputers B, Ram, Dhanpat Rai & co.
5. Microprosser & interfacing programming& hardware.D.V.hall McGraw hill

List of Experiments-

1. Study of Architecture of 8085. Microproccer & write program of 8 bit addition & subtraction.
2. Instruction set of 8085. & write program of 16 bit addition & subtraction.
3. write program for asending/ desending/comparision of given number.
4. study of different memories & write program of block transfer.
5. Study of 8255 PPI
6. Study of 8253 PIT
7. Study of D/A & A/D converter.
8. Study of 8259 interrupter controller.
9. Study of Architecture of 8086.
10. Applications in power measurement
11. Applications in Electrical drives speed control
12. Study of micro controller based system.

The term work should contain minimum 8 experiments from above lists

NORTH MAHARASHTRA UNIVERSITY JALGAON
T.E. (ELECTRICAL) W.E.F 2007--2008
TERM - I
SOFTWARE APPLICATION – I

Teaching scheme: **Examination scheme:**
Practical : 2 hrs/week **Term Work : 50 Marks**

Objectives:
To make the students aware of:
1. Programming practice in C for numerical methods .
2. Use of application specific software tools in the design development simulation and testing of electronic circuits .
3. Use of mathematical software packages for understanding and modeling electrical signals and linear systems .

Section- A : **Numerical computational techniques**:
Instruction of following techniques assited by C programme/ function implimentation of at least THREE of them is expected .
Solution of transcendental &polynomial equation, bisection method,Newton Raphson ,secant, successive methods, solution of linear equations using Gauss elimination .Gauss-Jordan methods Newton's forward and backward difference equations, interpolation, numerical integration and differentiation: trapezoidal rule Simpson's 1/3 and 3/8 rule, Euler's Method.

List of suggested assignments:
1: Program to solve numerical methods : bisection method, Newton Raphson method using users defined functions. Functions should incorporate parameter passing techniques.
2. Program using Functions to solve differential equations by Euler's modified method.
3. Program using Function to find integration by Simpson's 1/3 and 3/8 method.

Section B: Simulation of typical circuits using circuit simulation tools
(1) Two stage amplifiers.
(2) Series regulatator.
(3) Combinational Logic
(4) Timer Circuit

REFERENCES:
W H Hayt / J E Kemmerly / S M Durbin : Engineering circuit Analysis, TMH 6/e

Note: Term work should be based on minimum **FIVE** assignments, **THREE** from section **A** and TWO from section **B .**

NORTH MAHARASHTRA UNIVERSITY JALGAON
T.E. (ELECTRICAL)
W.E.F : 2007- 08
TERM – II
POWER ELECTRONICS

Teaching scheme:
Lectures-4 hrs/week
Practical: 2hrs/week

Examination scheme:
Theory scheme: 100 marks (3hrs.)
Term work: 25 marks

Unit-1

Modern Power Semi-conducting Devices: Introduction, Basic Structure, ON-OFF Control and Operational Charact. and Applications. Viz;
Gate Assisted Turn-off Thyristors (GATT), Bi-directional Diode Thyristors (DIAC), Bi-directional Triode Thyristors (TRIAC), Silicon Unilateral Switch (SUS), Silicon Controlled Switch (SCS), Insulated Gate Bipolar Transistor (IGBT), Metal- Oxide Field Effect Transistor (MOSFET), Programmable Unijunction Transistor (PUT), Light Activated Silicon Controlled Rectifiers (LASCRs), Gate Turn Off Thyristors (GTO), Static Induction Thyristors (SITH), Field Controlled Thyristors (FCT), MOS Controlled Thyristors (MCT). **(10 Hours, 20 marks)**

Unit-2

Thyristors: Principle of Operation, Operating Charact. of SCR, Turn on Methods, di / dt , dv/dt Protection,
Commutation: Forced and Natural, Classification of Forced Commutation- Class A, Class B, Class C, Class D, Class E, Class F. Gate Triggering Circuits- R, RC, UJT Triggering.
Internal Power Dissipation and Temp. rise, Multi-Connections of SCRs. Series, Parallel connection, String Efficiency, SPICE Thyristor model.

(10 Hours, 20 marks)

Unit-3

Full Wave controlled Rectifiers: M-2 and M-6 Connections, Bridge Circuits, Single Phase B-2 Connection, Three Phase B-2 Connection, Analysis of Bridge Circuits, Half Controlled Bridge Circuits, Single Phaseand Three Phase, Analysis of Line Commutated Control rectifiers, Input-Output Charact. Effect Source Impedance and Load Impedance, Effect of Overlap angle, Inter-Phase Reactor Connection.
Power Factor Improvement: Phase Angle, Symmetrical Angle, PWM.

(10 Hours, 20 marks).

Unit-4

Inverters: classification, Series inverter, Parallel inverter, Single Phase and Three Phase Current Source Inverters (CSI), Voltage Source Inverters, Bridge Inverters With Conduction modes, Inverter Fed Induction Motor with V/ F Control.
Dual Converters : Principle of Operation Ideal and Non-ideal, Dual Converters With and Without circulating current Schemes.
Cycloconveters: Principles, Single Phase Cycloconveters, Control Circuit.

(10 Hours, 20 marks

Unit-5

Dc Choppers: Basic Principle of Operation, Step Up / Step Down Chopper, Chopper Configuration, Class A, Class B, Class C, Class D, Class E, Multi-purpose Choppers.
Ac Choppers: Single Phase and Three Phase with R, RL Load.
Frequency Changer, Doubler, Tripler, High Frequency Conversion.
AC Regulators: Single Phase Half and Full wave R,RL load, Three Phase AC regulators.
Solid State Speed Control of Dc motors: Chopper fed Separately Excited DC motors.

(10 Hours, 20 marks)

References:

1) M. Rashid, Power Electronics, PHI Pub.
2) M.D. Singh and Khanchandani, Power Electronics, TMH Pub.
3) M. Rammamurty, An Introduction to Thyristors and its Applications, East-West Press.
4) Shingare, Industrial and Power Electronics, Electo-Tech. Pub.

List of practical

1) Triggering Circuit of SCR
2) Characteristics of SCR,MOSFET,
3) Commutation circuit class C, class D
4) Single phase full wave controlled rectifiers R, R-L characters tics
5) Single phase semi-converter
6) Three phase full wave controlled rectifiers
7) Step up chopper
8) Step down chopper
9) Series and parallel inverter
10) Three phase inverter

Minimum eight experiments out of ten are to be conducted.

NORTH MAHARASHTRA UNIVERSITY JALGAON
T.E. (ELECTRICAL)
W.E.F : 2007- 08
TERM – II

ELECTRICAL MEASUREMENT-II

Teaching scheme:
Lectures-4 hrs/week
Practical: 2 hrs/week

Examination scheme:
Theory scheme: 100 marks (3hrs.)
Term work: 25 marks
Practical: 25 marks

Unit-I

A .C. Bridges : classification, Maxwell, Anderson ,hay, Schering, Campbell,and wein bridge ,accessories and errors ,Special measuring instruments- construction and principles of 1 Ø and 3 Ø p.f.meters ,frequency meters ,synchronoscope, trivector meter , max. Demand indicators, multimeter, C.R.O. **(10 hours, 20 marks)**

Unit-II

Introduction to instrumentation: definition, purpose, measurement – definitions, types and classification of instruments, generalized measurement system, standards, and calibrations.
Instrument Response - Instrument Response to step, ramp, sinusoidal i/p up to second order system. Errors – types – gross, systematic, random, limiting, sources of errors, techniques to minimize them. **(10 hours, 20 marks)**

Unit-III

Introduction to transducers - definition, classification, selection of transducer.
Measurement of temperature - using R T D, thermocouple, bimetallic thermocouple. Pressure thermometers, pyrometers.
Pressure Measurement- Bourdon Tubes, bellows, diaphragms.
Vacuum Measurement- McLeod gauge, pirani gauge. **(10 hours, 20 marks)**

Unit-IV

Flow measurement- Rota meter, electromagnetic flow meter, hot wire anemometer, ultrasonic flow meter.
Level measurement – mechanical, pneumatic methods , electrical methods- capacitance level gauge, hot wire / carbon resistance method nucleonic level gauge, ultrasonic method.
Displacement measurement – LVDT, strain gauge, -types, working principles, measurement circuitry, temperature compensation, and application. **(10 hours, 20 marks)**

Unit-V

Recorders- necessity, construction, working, types- strip chart, circular chart, self balance potentiometric, X-Y recorder, ultraviolet recorder.
Electronic technique – for measurement of voltage, current, power, energy, phase angleand rms values. **(10 hours, 20 marks)**

Reference:-

1) Golding, widding, Y.P.Chopra ,Electrical Measurement and measuring Instruments – 5th edition, (A.H.Wheelerand co.Ltd.)
2) C.T.Baldwin ,Fundamental electrical measurement- 2 nd edition, lyall book depot.,
3) E.B.Deoblin,Measurement system- Application and design, 4 th Edition , Mcgrawhill.
4) B.C.Nakva,Instrumentation, measurement and analysis- TAta McGraw hill.
5) A.K.Sawhne.A course in electrical and electronic measurement and Instrumentation, 11 th Edition, Dhanpat Ray and co.
6) H.S.kalsi ,Electronics Instrumentation TAta McGraw hill.

List of Experiments-

1. Measurement of inductance by Andersons Bridge.
2. Measurement of capacitance and loss angle of capacitor by Schering bridge.
3. Measurement of frequency / mutual inductance by campbell's bridge.
4. Strain Measurement using strain gauge .
5. Study of LVDT.
6. Measurement of temperature by RTD/Thermocouple.
7. Study of pressure transducers.
8. Study of recorders.
9. Measurement of speed by magnetic pick-up / photo electric method.
10. Study of CRO of it's different types and Applications.
11. Step response of meters.
12. Measurement of systematic errors of wattmeter..

The term works should include a minimum eight experiment from the above list.

NORTH MAHARASHTRA UNIVERSITY JALGAON
T.E. (ELECTRICAL)
W.E.F : 2007- 08
TERM – II

CONTROL SYSTEM-I

Teaching scheme:
Lectures-4 hrs/week
Practical: 2 hrs/week

Examination scheme:
Theory scheme: 100 marks (3hrs.)
Term work: 25 marks
Practical: 25 marks

UINT I

Introduction to atomic control: open loop and close loop system, servomechanisms, mathematical modeling of physical system, transfer function- definitions assumptions, transfer function of simple electrical and mechanical system, block diagram-constructions of block diagram for system equations, block diagram reduction techniques, single flow graphs, and mason's gain formula. Effect of feed back on sensitivity to parameter variation and reduction of noise. **(10 Hrs. 20 Marks)**

UNIT II

Control system components: electrical/ electromechanical components such as ac/ dc. servo motors ,stepper motors potentiometer, techogenerators, there functional analysis and operating characteristics and there applications, pneumatic controls devices

(10 Hrs. 20 Marks)

UNIT III

Time response analysis: time responses of first and second order systems to standard inputs. Transient response specifications, types of system, error analysis, error coefficient, steady state errors, dynamic errors series. Approximate methods for higher order system proportional, derivative and integral control **(10 Hrs. 20 Marks)**

UNIT IV

Stability: Stability of control systems, characteristics equations, impulse response, Routh Hurwitz stability criterion, relative stability. Root locus: construction of root locus, determination of roots from root locus, condition of variable parameters for stability effect of addition of poles and stability. Stability of control systems, characteristic equation, impulse response, Routh Hurwitz stability criterion, relative stability

(10 Hrs. 20 Marks)

UNIT V

Frequency Response of linear system

Specification of polar plots of various systems, Nyquist criteria / Nyquist plots and stability analysis, bode plots from open loop transfer functions for various systems, gain margin and phase margin, stability analysis from Bode plots, Estimation of approximate transfer functions from the frequency response. **(10 Hrs. 20 Marks)**

Reference books:

1) Nagrath I.J ,Control system engg. –.- Wilay Eastem
2) Ogate K.Modern control system: -prentice hall of India
3) Kuo B.C ,Linear control system -.- khanna publications.

List of experiments:

1) Study of potentiometer as on
   a) Error detector
   b) Determination of sensitivity
   c) Determination of input and output characteristics.
2) Study of
   a) synchro characteristics.
   b) Electrical zeroing of syncro.
   c) Synchronous as error detector.
   d) synchros on position control system
3) To determine the transfer functions of armature and field controlled dc generator.
   40to determine transfer function of dc generator.
5) To study performance characteristic of dc motor angular position control system.
6) To plot the torque speed characteristic of two phase ac servomotor.
7) Frequency response plot of second order system.
8) To determine transfer function of AC servomotor...
9) Operation of stepper motor in single step and multistep.
10) Study of P, PI, and PID controller.

The term work should include a minimum of 8 experiments from the above list.

NORTH MAHARASHTRA UNIVERSITY JALGAON
T.E. (ELECTRICAL)
W.E.F : 2007- 08
TERM – II

ELECTRICAL MACHINE DESIGN-I

Teaching scheme:
Lectures-4 hrs/week
Practical: 4 hrs/week

Examination scheme:
Theory scheme: 100 marks (3hrs.)
Term work: 50 marks
Oral-25 marks

Unit-I

Introduction- principles of design and design factors, rating, specifications, standards, performances, brief study of magnetic, electric, dielectric and other material.

Design of Induction Motors-1 phase and 3 phase.

(10 hours,20 marks)

Unit-II

Design of electric Apparatus and devices:- detailed design of heating coils, rotor resistance starters, regulators, field coils, choke coils, and Introduction to design of lifting magnets.

(10 hours,20 marks)

Unit –III

Design of Transformer- Design of distribution and power Transformer,-types, classifications, specifications, design of main dimension, core, yoke, winding, tank, cooling tubes, radiators, estimation of leakage reactance for equal height of H.V. and L.V. winding, resistance of winding, calculation of losses, determination of voltage regulation and efficiency, calculation of mechanical forces develop during short circuit, their estimation and remedies.

(10 hours,20 marks)

Unit- IV

D.C.Machine Windings- types of d.c. Windings, choice and design of simplex and duplex lap and wave Windings, equalizer connections, dummy coils, concept of multiplex Windings , reason for choosing them. **(10 hours,20 marks)**

Unit- V

A.C. Machine Windings- single and double layer, single phase ac Windings with integral and fraction slots, three phase Windings. **(10 hours,20 marks)**

Reference:-

1. A. K .Sawhney, Electric machine design tenth edition, Danpat ray and sons.
2. A. E .clayton, Performance and design of DC machine, third edition, ELBS, Isaac pitman sons.
3. A. E. clayton Performance and design of AC machine, third edition, ELBS, Isaac pitman sons.
4. N. Vinogradov, Electric machine winder, MIR publication.
5. N. PerelmuterRepair of Windings and insulation of Electric machine, N.Perelmuter.
6. Say and Taylor, D.C. Electric machine, Say and Taylor, ELBS, pitman sons.
7. Feinberg,Macmillan,Modern power Transformer design practices.first edition, Feinberg,Macmillan,
8. Transformers BHEL.

Drawing Sheets-

1. **one of electric devices From following:**
   a) Rotor resistance starter for slip ring I.M.
   b) DC series/shunt generator field regulator.
   c) DC series/shunt generator field regulator for speed control.
   d) Lifting Magnet.
2. Details and assembly of three phase Transformer.
3. Details and Layout of DC Windings.
4. Details and Layout of AC Windings.

The term work should include four drawing sheets and reports based on actual design of the above topics.

NORTH MAHARASHTRA UNIVERSITY JALGAON
T.E. (ELECTRICAL)
W.E.F: 2007- 08
TERM – II
INDUSTRIAL ORGANISATION and MANAGEMENT

Teaching scheme:
Lectures-4 hrs/week

Examination scheme:
Theory scheme: 100 marks (3hrs.)
Term work: 25 marks

UNIT-I

Basic management-meaning and definition of management, administration, organization concept, contributors to management science, whether management is science, art or profession. MBO, characteristics of MBO , objective benefits, limitations

Forms of business organization - different forms of business organization, organization structure in industry. **(10 hours 20 marks)**

Unit-II

Elementary economics- Basic economics concept, law of demand and supply, law of diminishing utility, elasticity of demand and supply, money- it's evaluation, different, cost and types of cost elasticity of demand, price elasticity, types, MMF of elasticity, demand forcasting **(10 hours 20 marks)**

Unit – III

Plant location and layout- factors affecting Plant location, different types of Plant layout. CPM PERT , quality control manufacturing system

Work study- techniques of Work study-method study, work measurement, therbligs, different charts, diagrams used in method study. **(10 hours 20 marks)**

Unit-IV

Personnel management – manpower planning, recruitment, selection and training of employees, wages, different methods of wage payment, administration, job evaluation,

Merit rating, incentives, essential of good incentive plan.

Financial management – capital, types of capital, source of capital, financial institutes, elements of costs, depreciation, stores and inventory control, money market, capital market, role OF SEBI. **(10 hours 20 marks)**

Unit- V

Marketing management –marketing and selling concept, market survey and research, management productivity, advertising-media of advertising market forcasting

Industrial Laws- The factories Act, minimum wages act, pollution control act, works man compensation act, industrial safety- Causes of accidents, prevention of accidents, legal provisions. Domestic and international market, brand, trademarks, strategies, pricing, distribution channel **(10 hours 20 marks)**

References-

1. O.P.Khanna. Industrial Engineering management-
2. Banga and Sharma, Industrial. Organization and Engineering economics
3. Dutta, Sundaram. Elementary economics,
4. S.A. Sherlekar. Modern business organization and management
5. Philip Kotler, Marketing management.
6. C.B. Mamoria, Personnel management-.

NORTH MAHARASHTRA UNIVERSITY JALGAON
T.E. (ELECTRICAL)
W.E.F: 2007- 08
TERM – II
PRACTICAL TRAINING / MINI PROJECT / SPECIAL STUDY

Teaching scheme: Examination scheme:
Practical : 2 hrs/week Term Work : 25 Marks

- Every student has to undergo industrial / practical training for a minimum period of two weeks during summer vacation between (S.E. Second Term) fourth and (T.E. First Term) fifth term or during winter vacation between fifth and sixth term (T.E. First Term and Second Term).
- The industry in which practical training is taken should be a medium or large scale industry
- The paper bound report on training must be submitted by every student in the beginning of (T.E. Second Term) sixth term along with a certificate from the company where the student took training.
- The report on training should be a detailed one.
- Maximum number of students allowed to take training in a company should be five. Every student should write the report separately.
- In case if a student is not able to undergo practical training, then such students should be asked to

prepare special study report on a recent topic from reported literature .

or

a mini project related to the Electrical branch of engineering.

1. The circuit for mini project must be designed by a student.
2. The circuit should be simulated using any of the standard simulation software available.
3. Result verification for paper design and simulation should be carried out and discrepancies should be discussed.
4. Verified circuit should be assembled and tested on general purpose PCB/ Protoboard for actual working and practical results.
5. Layout of circuit using standard Layout tool (Orcad / Protel / CADstar / Pads / Ultiboard) should be designed and PCB making process should be carried out.
6. Assemble and test the circuit on PCB. Prepare bill of materials.
7. Project report should be detail of work, carried out by student, including layouts, circuits, bill of materials and relevant details

- The practical training / special study / mini project shall carry a term work of 25 marks. Every student shall be required to present a seminar in the respective class in the presence of two teachers. These teachers (fixed by the head of department in consultation with the Principal) shall award marks based on the following:

(a) Report **10 marks.**
(b) Seminar presentation **10 marks.**
(c) Viva -voce at the time of Seminar presentation **05 marks.**

Total 25 marks.

========XXX=======

NORTH MAHARASHTRA UNIVERSITY, JALGAON
STRUCTURE OF TEACHING AND EVALUATION
B.E. (ELECTRICAL ENGINEERING)

FIRST TERM

W.E.F. 2008-09

Sr. No.	Subject	Teaching Scheme Hours/week			Examination Scheme				
		Lectures	Tutorial	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Power System operation and Control	4	--	--	3	100	25	--	--
2	Industrial Electrical Engineering	4	--	2	3	100	25	25	--
3	Energy Audit and Conservation	4	--	--	3	100	25	--	--
4	High Voltage Engineering	4	--	2	3	100	25	--	25
5	Elective-I	4	--	--	3	100	25	--	--
6	Seminar	--	--	2	--	--	25	--	--
7	Project – I	--	--	4	--	--	25	--	25
	Total	**20**	**--**	**10**	**--**	**500**	**175**	**25**	**50**
	Grand Total	**30**			**750**				

SECOND TERM

Sr. No.	Subject	Teaching Scheme Hours/week			Examination Scheme				
		Lectures	Tutorial	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Switchgear and Protection	4	--	2	3	100	25	--	25
2	Power System Stability	4	--	2	3	100	25	--	25
3	Industrial Drive and Control	4	--	2	3	100	25	--	25
4	Elective-II	4	2	--	3	100	25	--	--
5	Project – II	--	--	4	--	--	100	--	50
6	Industrial Visit / Case Study	--	--	--	--	--	25	--	--
7	Entrepreneurship Development Skills	--	--	2	--	--	--	--	--
	Total	**16**	**02**	**12**	**--**	**400**	**225**	**--**	**125**
	Grand Total	**30**			**750**				

Elective-I
1. Control System-II
2. Computer Methods on Power System
3. Electromechanical Energy Conservation
4. Optimization Techniques
5. Power System Dynamics

Elective-II
1. Flexible AC Transmission
2. Power System Design Practice
3. Electric Traction Engineering
4. Generation Planning and Load Dispatch
5. Extra High Voltage Transmission

NORTH MAHARASHTRA UNIVERSITY, JALGAON
B.E. (ELECTRICAL) W.E.F : 2008- 09
Term I

1) Power System Operation & Control

Teaching Scheme
Lectures : 4 hrs/week

Examination Scheme
Paper : 100 marks
Duration: 3 Hrs.
Term work:25 Marks

UNIT I: ECONOMIC LOAD DISPATCH & OPTIMAL OPERATION OF POWER SYSTEM

Input Output characteristics, Heat-rate characteristics, Incremental fuel rate and cost, Incremental production cost, , optimum scheduling of generation between different units. (Neglecting transmission losses), Transmission loss as a function of plant generation (A simple system connection two generating plants to load) and incremental transmission loss for optimum economy, Calculation of loss coefficients (Two plants system), Optimum scheduling of generation between different plants considering transmission loss concept and significance of penalty factor, Automatic load dispatch, function and applications

(10 Hrs., 20 Marks)

UNIT II: GENERATOR VOLTAGE CONTROL

Automatic voltage control, generator controllers, Cross coupling between P–f and Q–V control channel, automatic voltage regulator, types of exciters and excitation systems, exciter modeling, transfer function modeling for control static performance and dynamic response of AVR loops.

(10 Hrs., 20 Marks)

UNIT III: LOAD FREQUECNY CONTROL

Automatic load frequency control, speed governing system and hydraulic valve actuator for individual generator, Turbine modeling, generator and load modeling transfer function representation of power control mechanism of generator.

(10 Hrs., 20 Marks)

UNIT IV: ELECTRIC POWER CONTROL

Concept of control area, division of power system into control areas, Load frequency of single areas, two area and multi area (control) power system with and without integral controls. Advantage of pool operation, tie line bias control area exchange.

(10 Hrs., 20 Marks)

UNIT V: VOLTAGE STABILITY AND COMPENSATION

Power system security, Operating stage (State transition diagram), Voltage stability, Comparison of angle and voltage stability, Reactive power flow and voltage collapse, voltage stability analysis and prevention of voltage collapse.

Compensation in power system: Load compensation, load ability of compensated and uncompensated over head transmission line, compensation of transmission line (Shunt& Series). Introduction of FACTS

(10 Hrs., 20 Marks)

Reference:

1) Electrical Energy system theory & Introduction Olle L. Elgerd, TMH.
2) Modern Power system analysis : I. J. Nagrath & D. P. Kothari, TMH.
3) Elements of Power system analysis : Willium D. Stevenson Jr., TMH.
4) Electric Power control : Dr. C.S. Indulkar.
5) Economic Control of power system : L.K. Kirchmayer
6) Electrical Power System Analysis : C L Wadhwa, New Age International Publication

NORTH MAHARASHTRA UNIVERSITY, JALGAON

B.E. (ELECTRICAL) W.E.F : 2008- 09

TERM I

2) Industrial Electrical Engineering

Teaching Scheme
Lectures: 4Hrs/week
Practical: 2Hrs/week

Examination scheme
Paper :100 Marks
Duration : 3 Hrs.
Term work : 25 Marks
Practical : 25 Marks

UNIT I :- ELECTRIC DRIVES

Industrial group and collective drives, types of motors, their running characteristics , characteristics of load, starting , speed control and reversing of d.c. and 3 phase induction motors, electric braking, plugging, rheostatic braking, regenerative braking. Types of Enclosures.

(10 Hrs., 20 Marks)

UNIT II: - TYPES OF DUTIES

Continuous, intermittent and short time rating , temperature rise and rating calculations for these duties mechanical features , features of load diagram construction, load equalization & use of flywheel.

(10 Hrs., 20 Marks)

UNIT III:- TRACTION SYSTEMS

Requirements of ideal traction system, Systems of track electrification and their comparison, speed time curve, energy consumption calculation, calculation of tractive effort.

(10 Hrs., 20 Marks)

UNIT IV: - TRACTION MOTORS:

General features and types, characteristic and control of locomotive motor coaches, series parallel control .Electric breaking including regenerative breaking, overhead equipment control gear for overhead equipment.

(10 Hrs., 20 Marks)

UNIT V: - NATURE OF LIGHT

Units, luminous efficiency, glare production of light Types & applications of electric lamps polar curves, control of light by reflection , refraction and diffusion, Design of factory lighting, flood lighting, street lighting .

Methods of electric heating & its advantages, transfer of heat, resistance oven, induction heating electric welding.

(10 Hrs., 20 Marks)

Reference Books:

1) J.B.Gupta -- A course in Electrical power
2) S.K. Bhattacharya - Electrical Machines (2nd edition) - Tata Mc Graw Hill
3) V.V.L.Rao - Utilization of electrical energy -TMH
4) O.E.Taylor - Utilization of electrical energy -TMH
5) S.K.Pillai - A course in electrical energy TMH
6) H. Partab - Art & Science of Utilization of electrical energy.

List of experiments:-

1) To perform load test on single phase induction motor &plot its performance characteristics.
2) To perform load test on DC series motor& plot its performance characteristics.
3) Speed control of DC series motor.
4) Rheostatic breaking of three phase induction motor.
5) To perform load test on three phase induction motor & plot its performance characteristics.
6) Rheostatic breaking of DC shunt motor.
7) Speed control of three-phase slip ring induction motor by rotor resistance method.
8) To perform the load test on DC shunt motors and plots its performance characteristics.
9) Study of illumination system.
10) Study of induction heating &Welding.
11) Study of different types of enclosures.

The term work should include a minimum **eight** experiments from above list.

3) Energy Audit and Conservation

Teaching Scheme
Lectures: 4 Hrs/Week

Examination Scheme
Paper : 100 Marks
Duration : 3 Hrs.
Term Work : 25 Marks .

UNIT I: - ENERGY AUDIT

Energy audit, pre-requisite of energy conservation, principles of energy audit, preliminary energy audit and detailed energy audit, procedures of carrying out energy audit. Energy production relationship, specific energy consumption, least square methods consume technique, data energy flow diagram, sankey diagram. Instruments used for energy audit. Policy of government to promote renewable energy.

(10 Hrs., 20 Marks)

UNIT II: - ECONOMICS OF ENERGY CONSERVATION:

Simple payback period analysis, advantages &limitations of payback period, time value of money, net present value method, internal rate of return method, and profitability index for benefit cost ratio. Study and selection of proper tariff for particular application, fixed &variable components in tariff, impact of tariff on energy management.

(10 Hrs., 20 Marks)

UNIT III: - ENERGY MANAGEMENT:

concept of energy management –energy inputs in industrial ,residential, commercial, agricultural and public sector-comparison of different energy inputs on the basis of availability , storage feasibility, cost (per unit output)etc. electrical energy management-energy accounting and management of power factor, voltage profile, current energy requirement ,power demand monitoring target setting etc.

Concept of supply side management and demand side management (DSM), load management, voltage profile management from receiving end .methods of implementing DSM. Advantages of DSM to consumers, utility and society.

(10 Hrs., 20 Marks)

UNIT IV: - ENERGY CONSERVATION

Objectives of energy conservation, planning for energy conservation

i) Motive power: potential for saving electrical energy in motors - oversizing or under loading, speed, improving, efficiency of an existing motor, energy efficient motors, use of soft starters, variable or adjustable speed drives for energy conservation selection of cost effective drive.
ii) Lighting: level of illumination for different areas. Use of right source of lamp for different applications, energy efficient lamps, fixtures and types of illumination controllers.
iii) Heating processes: most efficient space, furnace water heating and welding processes.
iv) Cooling systems: energy saving in air coolers air conditioners, ventilating systems and refrigeration.

(10 Hrs., 20 Marks)

UNIT V: - SCOPE OF CONSERVATION

Energy conservation in industrial, agricultural, commercial, domestic and municipal sectors.

i) Energy conservation in generation, Co-generation, Tri-generation, transmission and distribution, effective measures to reduce the T and D losses.
ii) Energy Efficient motors:- Features of energy efficient motors, high efficiency motor design, European agreement on low voltage electric motor efficiency, NEMA, high efficiency motors,
iii) Determination of cost effectiveness, implementation of motor management program.

(10 Hrs., 20 Marks)

Reference books

1. S. C. Tripathy-Electrical Energy Utilization and conservation – THM Publication.
2. S.Rao-Energy Technology-Khanna Pub.
3. Dr. S.P. Sukhtme-Solar energy.
4. Preceding of the Seminar on " Energy Audit & Demand Side Management" held at Govt. College of Engineering, Pune-5 organized by M.S.E.B.(SEA) ON 16.09.1998
5. Hand Book on energy efficient motors , International Cooper proposition council , B.E. Kushare.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

B.E. (ELECTRICAL) W.E.F: 2008- 09

TERM I

4) High Voltage Enggineering

Teaching Scheme
Lectures: 4Hrs/week
Practical: 2Hrs/week

Examination scheme
Paper : 100 Marks
Duration : 3 Hrs.
Term work : 25 Marks
Oral : 25 Marks

UNIT I: - BREAKDOWN IN GASES, LIQUIDS & SOLIDS

Classification of insulating material, gases as insulating media, Ionization and decay process, breakdown in gases, Townsend's law. The streamer mechanism of spark, Paschen's law, corona discharge, electronegative gases. Breakdown in pure and commercial liquids, solid dielectric and composite dielectric, high voltage bushing guarding, shielding and field plotting.

(10 Hrs., 20 Marks)

UNIT II: - LIGHTING AND SWITCHING OVER VOLTAGE PROTECTION

Lighting strokes to lines and towers mechanism & characteristics. Protection of transmission lines from lighting, lighting arrestors, insulation co-ordination of HV and EHV power system and substation.

(10 Hrs., 20 Marks)

UNIT III: - GENERATION OF HIGH VOLTAGE & CURRENTS

Generations of high dc, ac and impulse voltages, standard impulse wave shapes, generation of weitching surges and high impulse generator

HVDC Power transmission

Kinds of dc links, limitations and advantages of ac & dc transmission. Principle application of dc, ground return advantages & application.

(10 Hrs., 20 Marks)

UNIT IV: - MEASUREMENT OF HIGH VOLTAGE AND CURRENTS

Methods of measurement of peak voltage, impulse voltage and high direct current, non destructive measurement and testing, high voltage dielectric loss and capacitance measurements, ratio frequency & partial discharge measurements.

(10 Hrs., 20 Marks)

UNIT V :-TTESTING AND EHV LINE INSULATION

Basic technology , testing of insulators bushing , cables , transformer, surge diverters & threshold current , capacitance of long objects, Electromagnetic interference, E.H.V line insulation design based upon transient over voltages.

(10 Hrs., 20 Marks)

Reference Books:-

1) M.S. Naidu & V.Kamaraju - High voltage Engg - Tata McGraw Hill
2) E.Kuffel and W.S Zaenglo -High voltage Engg - PERgamon Press
3) EHV, Rakash Das - Begamudre
4) C.L. Wadhawa - H.V Engg Wley Eastern
5) K.R. Padiyar; HDVC power transmission systems technology & system interaction -New Age International
6) H.V. Engg - R.S.Jha

List of Experiments:-

1) Measurement of insulation resistance of 600/250 V.P.T by megger.
2) Power frequency withstand test on 11KV, 10/5 amp CT
3) Study of corona discharge
4) Determination of insulating break-down strength of solid, liquid and gaseous dielectric media.
5) Power frequency high voltage withstand test on cable
6) Study of impulse generator.
7) Dry & Wet power frequency withstand test in insulator
8) Flash over test on insulator.
9) Double voltage double frequency withstand test on insulator.
10) Study of calibration of sphere gap.
11) Study of 100KV high voltage testing set.

The term work should include a minimum **eight** experiments, from the above list.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

B.E. (ELECTRICAL) W.E.F : 2008- 09

TERM I

5) Elective-I

I) CONTROL SYSTEM – II

Teaching Scheme	**Examination scheme**
Lectures: 4Hrs/week	**Paper : 100 Marks**
	Duration : 3 Hrs.
	Term work : 25 Marks

UNIT I: - **STATE SPACE TECHNIQUES**

State, state space and state variables. States variable models of SISO/MIMO linear systems, from differential equations, transfer function and block diagrams, state diagram (Signal flow graphs)

Decomposition of transfer functions in phase variable forms, canonical forms, Jordan canonical form, transfer function from the state model, transfer matrix.

Solutions of state equations, state transition matrix (STM) various methods to obtain STM, Resolvent matrix time response of SISO system.

Controllability and observability of linear systems. Gilibert's method and kalman's test to test the controllability and observability of SISO/MIMO system.

System design using pole placement technique for close loop system via state variable feedback for SISO controllable system.

(10 Hrs., 20 Marks)

UNIT II: - **SAMPLE DATA CONTROL SYSTEM**

Representation of sample data (Discrete system) review of Z transforms, sample and hold zero order hold. Sampling theorem Z-transform analysis of sampling data control system. (Open loop and closed loop), Z transfer function of systems. Solutions of different equation by Z transfer methods. Response of discrete system.

Pulse transfer functions of open loop and closed loop system with different sample locations.

Digital controller and its transfer functions. Stability analysis, relation between S and Z domain, stability by Jury's test and bi-linear transformation and root locus method.

(10 Hrs., 20 Marks)

UNIT III: - **NON LINEAR SYSTEM ANALYSIS I**

Behavior of non linear system, various general non linear ties and their characteristics.

Stability analysis by describing function method. Existence and stability of limit cycles.

Limitation of describing function method.

(10 Hrs., 20 Marks)

UNIT IV: - NON LINEAR ANALYSIS II

Liberalization in a small region operating point. Singular point and their nature. Phase plane method of analysis of nonlinear system, construction of phase trajectories by isoclines method. Limit cycle behavior stability analysis, limitation of phase plane method.

(10 Hrs., 20 Marks)

UNIT V: - STABILITY ANALYSIS BY LIAPUNOV METHOD

Concept of stability, asymptotic stability in the large, instability, the sense of a Lipunov, Positive of a scale function, quadratic forms. Second method of Lipnov, stability theorems, Lipunov fuctions stability of linear time invariant systems, Lipunov equations.

Krasowakii's method for time examining the stability of non-linear time invariant system.

(10 Hrs., 20 Marks)

Reference Books :

1) Nagrath & Gopal : Control system engineering - Wiley Eastern
2) OgataK : Modern controll theory - Prentice Hall Of India
3) Naresh Sinha - control system - Wiley Eastern
4) Kuo B.C: Automatic control system - Prentice Hall Of India.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

B.E. (ELECTRICAL) W.E.F: 2008- 09

TERM I

5) Elective-I

II) COMPUTER METHODS ON POWER SYSTEM

Teaching Scheme
Lectures: 4Hrs/week

Examination scheme
Paper : 100 Marks
Duration : 3 Hrs.
Term work : 25 Marks

UNIT – I NETWORK TOPOLOGY

Topology of Electric power system-Network Graphs, Incidence matrices, fundamental loop and cutset matrix, primitive impedance and admittance matrix, singular transformation of network matrix.

(10 Hrs., 20 Marks)

UNIT – II INCIDENCE MATRIX

Formation of bus impedance and admittance matrices by algorithm – Modification of bus impedance and admittance matrix to account for change in networks. Derivation of loop impedance matrix.
Algorithm for formulation of 3- phase bus impedance matrix.

(10 Hrs., 20 Marks)

UNIT – III SHORT CIRCUIT STUDIES

Three phase network, Symmetrical components. Thevenin's theorem and short circuit analysis of multimode power system using bus impedance matrix. Short circuit calculations for balanced and unbalanced short circuit bus impedance and loop impedance matrices.

(10 Hrs., 20 Marks)

UNIT – IV LOAD FLOW STUDIES

: Slack bus, loop buses, voltage control buses, Load flow equations, power flow model using bus admittance matrix, Power flow solution through Gauss-Seidal and N-R methods sensitivity analysis, Second order N-R method, fast decoupled load flow method, Sparsity of matrix.

(10 Hrs., 20 Marks)

UNIT – V FAULT ANALYSIS

Simultaneous faults, Simultaneous Faults by two port network Theory (Z, Y and H-type Faults), Simultaneous faults by matrix Transformations, Analytical simplifications of series and shunt fault.

(10 Hrs., 20 Marks)

References:-

1. J. J. Gringer/W.D. Stevenson, power System Analysis, McGraw Hill. 1994
2. G.W.Stagg and A.H.EI-biad,Computer Methods in Power System Analysis, Mc Graw Hill, 1968.
3. I.J.Nagrath and D.P.Kothari, Modern Power System Analysis, Tata McGraw Hill,1980.
4. G.L.Kusic, Computer Aided Power System Analysis, Prentice Hall, 1986.
5. Hadi Sadaf, Power System Analysis, Tata McGraw Hill.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

B.E. (ELECTRICAL) W.E.F: 2008- 09

TERM I

5) Elective-I

III) Electromechanical Energy Conservation

Teaching Scheme	**Examination scheme**
Lectures: 4Hrs/week	**Paper : 100 Marks**
	Duration : 3 Hrs.
	Term work : 25 Marks

UNIT I: - MAGNETICALLY COUPLED CIRCUITS AND TRANSFORMER:

Self and mutual flux linkages and inductances. Voltage
Equation of coupled circuits. Coefficients of coupling and leakage coefficient.
Two winding transformers:
Steady state and transient analysis using mutual and self inductances. Variable frequency transformers.
Energy flow considerations.

(10 Hrs., 20 Marks)

UNIT II: - ELECTROCHEMICAL ENERGY CONVERSION PRINCIPLES:

Electrochemical System, Energy process in electromagnetic systems.
Law of conversation of energy as applied to electromechanical system. Linear and non-linear, singly and doubly excited magnetic systems;
Energy and co-energy, various expressions for forces and torques; Energy, forces and torque in a system of rigid currents. Application to various magnetic field transducers.

(10 Hrs., 20 Marks)

UINT III: -ELECTRIC FIELD AND TRANSDUCERS

Quasi-static electric fields as coupling medium, Energy forces and torques in a system of charged conductors, Application of electric field transducers. Incremental motion transducers (detailed analysis of few cases).

(10 Hrs., 20 Marks)

UNIT IV: - BASIC ROTATING MACHINES:

Common structural features of rotating machines. Machine windings and their basic properties.
Distributed bindings as current sheets.
Equivalence between concentrated and distributed windings M.M.F. and flux distributation and various windings. Rotating magnetic field.

(10 Hrs., 20 Marks)

UNIT V: - TYPES OF ROTATING MACHINES:

Commutator, Synchronous and asynchronous machines
Induced e.m.f.s and electromagnetic torque in non salient pole machines**.**

(10 Hrs., 20 Marks)

Reference Books:

1. Rakosh Das, Begamudre- Electromachinical Energy Conversion- Wiley Eastern Publication.
2. Gourishankar- Electromechnical Energy Conversion.
3. Fitzgerald, Kingsley & Kusko- Eletric Machinary- McGraw Hill Kogo Kusha Ltd.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

B.E. (ELECTRICAL) W.E.F: 2008- 09

TERM I

5) Elective-I

IV) OPTIMIZATION TECHNIQUES

Teaching Scheme
Lectures: 4Hrs/week

Examination scheme
Paper : 100 Marks
Duration : 3 Hrs.
Term work : 25 Marks

UNIT I:- LINEAR PROGRAMMING

Linear Programming, Simplex Method, Revised Simplex Method, Duality, Sensitivity Analysis.

(10 Hrs., 20 Marks)

UNIT II:-NON LINEAR PROGRAMMING

Non Linear Programming, One-Dimensional Minimization, Elimination Methods. Fibonacci Method, Golden Method, Interpolation method, Qadratic and Cubic Interpolation methods.

(10 Hrs., 20 Marks)

UNIT III:-UNCONSTRAINED OPTIMIZATION METHODS

Unconstrained Optimization Methods, Univariate and Pattern Search Methods, Rosenbrock's Method of Coordinates,

(10 Hrs., 20 Marks)

UNIT IV:-OPTIMIZATION METHODS

Simplex method. Descent Methods, Steepest descent Method, Conjugate Gradient Method Reevs Method, Davidon, Fletcher-Powell Method.

(10 Hrs., 20 Marks)

UNIT V:-CONSTRAINED OPTIMIZATION

Constrained Optimization, Complex method, Cutting Plane Method, Method of Feasible Directions. Integer Programming, Dynamic programming.

(10 Hrs., 20 Marks)

References,

1. S.S.Rao, Optimization Theory and Applications, Willey Eastern Limited.
2. H.A.Taha, Optimization Research.
3. R.L.Fox, Optimization methods for engineering design.
4. Hummel Blau, Non-linear Programming.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

B.E. (ELECTRICAL) W.E.F: 2008- 09

TERM I

5) Elective-I

V) POWER SYSTEM DYNAMICS

Teaching Scheme
Lectures: 4Hrs/week

Examination scheme
Paper : 100 Marks
Duration : 3 Hrs.
Term work : 25 Marks

UNIT I: - INTRODUCTION

Reliable electrical power services, Stability of Synchronous machine, Tie-line oscillation, Method of simulation.

Synchronous machine:

Review of synchronous machine equations, parameters, Equation in a-b-c phase co-ordinates and Park's co-ordinates, Representation of external system Phasor diagram p.u. reactances.

(10 Hrs., 20 Marks)

UNIT II: - SYSTEM RESPONSE TO LARGE DISTURBANCES

System of one machine against infinite bus, Classical model, Mechanical and electrical torques, Critical clearing angle and time, Automatic reclosing, Precalculated swing curves and their use.

(10 Hrs., 20 Marks)

UNIT III: - SYSTEM RESPONSE TO SMALL DISTURBANCES

Two machine system with negligible losses, Clarke diagram for two machine series reactance system, Extension of Clarke diagram to cover any reactance network, Equation for steady state stability limit, Two Machine system with losses, Effect of inertia, Effect of governor action, Conservative Criterion for stability, Effect of saliency, saturation and short circuit ratio on steady state power limits.

(10 Hrs., 20 Marks)

UNIT IV: - REGULATED SYNCHRONOUS MACHINES

Demagnetizing effect of armature reaction and effect of small speed changes, Modes of oscillations of unregulated multimachine system, Voltage regulator and governor coach with delay Distribution of power impacts.

(10 Hrs., 20 Marks)

UNIT V: - EFFECT OF EXCITATION ON STABILITY

Effect of excitation on generator power limits, transient and dynamic stability, Examination of dynamic stability by Routh's criterion, Root locus analysis of a regulated machine connected to an infinite bus. Approximate System representation, Supplementary Stabilizing Signals, Linear analysis of stabilized generator.

(10 Hrs., 20 Marks)

REFERENCES:-

1. Synchronous Machines by C.Concordia, John Wiley& Sons.
2. Power System Stability by E.w..Kimbark,Vol.-3,John Wiley & Sons, New York.
3. Power System Control & Stability by P.A. Anderson, Galgotia Publ.
4. Power System Stability by S.B.Crary, John Wiley&Sons.

NORTH MAHARASHTRA UNIVERSITY, JALGAON
B.E. (ELECTRICAL) W.E.F: 2008- 09
TERM I
SEMINAR

Teaching scheme **Examination scheme**
Practical: 2 hrs/ week **Term Work :25** .

1. For seminar every student will individually study a topic in depth assigned to him / her and submit a report and shall deliver Seminar on the topic at the end of term.
2. Selection of topic should be done by students in consultation with concerned guide
    a. Topic should be related to branch but it should be extended part of the branch (latest and advance topic), preferably outside the syllabus.
    b. The topic should be such that the student can gain latest knowledge. Student should preferably refer at least one research paper
3. Seminar topic should not be repeated in the department and registration of the same should be done on first come first served basis
4. Seminar report should be submitted in paper bound copy prepared with computer typing
    a. Size of report depends on advancement of topic.
    b. Student should preferably refer minimum 5 reference books / magazines / proceedings / journals.
    c. Format of content
        i. Introduction.
        ii. Literature survey.
        iii. Theory 1) Implementation 2) Methodology
        3) Application 4) Advantages, Disadvantages.
        iv. Future scope.
        v. Conclusion.

5 FORMAT FOR ASSESSMENT OF SEMINAR for TERM WORK
Title of seminar: _____
Name of guide : _____

Sr. No.	Exam Seat No.	Name of Student	Assessment by examiners					Grand Total
			Topic Selection 5	Literature Survey 5	Report Writing 5	Depth of understanding 5	Presentation 5	25

6 . Assessment of Literature survey will be based on
    a. Collection of material regarding history of the topic.
    b. Implementation.
    c. Recent applications.

7. Assessment of Depth of understanding will be based on
    a. Questioning by examiners.
    b. Questioning by students.
    c. What the student understands i.e. conclusion regarding seminar.

8. Assessment of presentation will be based on;
    a. Presentation time (15 minutes)
    b. Presentation covered (full or partial)
    c. Way of presentation
    d. Questioning and answering (5 minutes)

9. Examiners should be a panel of two one of them must be guide. Examiner must have experience at least 3 years.
   Examiners will be appointed by HOD in consultation with Principal.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

B.E. (ELECTRICAL) W.E.F: 2008- 09

TERM I

PROJECT-I

Teaching Scheme	**Examination Scheme**
PRACTICAL:	**Term Work: 25(Term I)**
4Hrs. /Week (For Term-I)	**Oral : 25 Marks (Term I)**

1. Every student individually or in a group (of appropriate group size) shall take a project in the beginning of the B.E. First Term in consultation with the guide or sponsored by the industry and the project must be completed in the B.E. Second Term.
2. The project proposal must be submitted in the institute in the beginning of the B.E. first Term. While submitting project proposal care is to be taken that project will be completed within the available time of two terms. The final title of the project work should be submitted at the beginning of the B.E. Second Term.
3. Project title should be precise and clear.
4. Selection and approval of topic:
   Topic should be related to real life application in the field of electrical engineering.
   .OR Manufacturing / Fabrication of a prototype unit include selection, concept, design, material manufacturing of the component, testing and performance evaluation.
   OR Computer aided design and analysis of system/electrical equipments.
   OR Problems related to material handling system.
   OR Energy audit of organization / use of renewable energy source.
   OR Low cost automation, electric / microprocessor control of electrical machines, control system, power systems etc.
   OR Software development for solution of problems in control / power systems.
   Interdisciplinary projects should be encouraged. The examination will be conducted independently in respective departments.
5. The group should maintain a logbook of activities. It should have entries related to the work done, problems faced, solutions evolved etc., duly signed by guide.
6. The group is expected to complete detailed system design, layout etc. in B.E. first Term as a part of term work in the form of a joint report. Project report must be submitted in the prescribed format only.
7. The guides should regularly monitor the progress of the project work.
8. Assessment of the project for award of TW marks shall be done by the guide and a departmental committee (consisting of minimum two teachers with experience more than three years) as per the guidelines given in the following table.

A) ASSESSMENT OF PROJECT- I TERMWORK at B.E. FIRST TERM

NAME OF THE PROJECT _____

NAME OF THE GUIDE: _____

Sr No	Exam Seat No	Name Of Student Marks	Assessment by guide (70%)					Assessment by Departmental committee (30%)			Grand Total	Out of 25 Marks
			Liter-ature survey	Topic Se le-tion	Docu m-Entati on	Atte-nden-ce	To-tal	Eval-uation (10%)	Pres-ntaion (20 %)	Total		
			10	05	15	05	35	05	10	15	50	25

Sign of Guide Sign. of Committee Members Sign. of H. O. D.

9. The guide should be internal examiner for oral examination .

10. The external examiner should be from the related area of the concerned project. He should have minimum of five years of experience at degree level / industry.

11. The evaluation at final oral examination should be done jointly by the internal and external examiners.

NORTH MAHARASHTRA UNIVERSITY, JALGAON
B.E. (ELECTRICAL) W.E.F: 2008- 09
TERM - II

1) SWITCH GEAR & PROTECTION

Teaching Scheme
Lectures: 4Hrs /Week
Practical: 2Hrs/Week

Examination Scheme
Paper : 100 Marks
Duration : 3 Hrs.
Term work : 25 Marks
Oral : 25 Marks

UNIT – I:- ARC PHENOMEN AND INTERRUPTION

Arc phenomenon, maintenance of arc, properties of arc, interruption theories, transient recovery Voltage, transient analysis, RRRV, Interruption of capacitive current, CB rating, current chopping, construction & Operation of air blast & bulk oil CB.

(10 Hrs., 20 Marks)

UNIT – II:-CIRCUIT BREAKERS AND FUSES

Construction & Operation minimum oil C.B, SF6 & vacuum Ckt. C.B., Earth leakage & moulded case C.B, Testing installation & maintenance Of CBs Rewirable Fuses , HRC fuses Characteristics & application.

(10 Hrs., 20 Marks)

UNIT – III:-PRINCIPLES OF RELAYING

Basic Principle of relaying essential features & characteristics , relaying schemes, terminology ,CT's & PTs, electromagnetic relays constructional features, principle of operation , characteristics and application of attraction type and induction type over current, directional distance and differential relays**.**

(10 Hrs., 20 Marks)

UNIT –IV: PROTECTION SCHEMES

Protection of transmission lines, Relaying practice using over current, earth fault, directional distance and differential relays, parallel feeders and ring mains,

Protection of electrical equipments and machines like transformer, motors, generators and buses. Static relaying basic concepts, equipments and protection schemes.

(10 Hrs., 20 Marks)

UNIT –V:-MICROPROCESSOR AND MICROCONTROLLER BASED PROTECTION

Evolution of microprocessor, advantages of digital, use of microprocessor & microcontroller in protection, configuration of microprocessor based control for overcurrent, overvoltage, undervoltage, overfrequency, under frequency, DSP & it's use in power system.

(10 Hrs., 20 Marks)

Reference Books :-

1) T.S. Madharao - Power system protection (static rElay), Tata MacGraw Hill
2) C.R.Mason - The art and science of protective relaying.
3) B.Ram &Vishwakarma D.N - Power system protection & switch gear -TMH
4) Sunil S.Rao - Switchgear & Protection - Khurana Pun
5) Geosonoviz - High voltage circuit beakers
6) B.Ravindranath & M. Chandar, Power system protection & switch gear, New age International.
7) A.R.Warrington-Protective relay.
8) A.G. Phadke & Thorpe- Power system protection their theory & practice Chapman & Hall.

List of experiments:

1) Study of relaying components and control circuit developments.
2) To plot operating characteristics of Inverse time over current relay
3) To study the through fault stability of differential relay.
4) Study of MHO distance relay to plot.
    a) R- X diagram
    b) Relay voltage Vs Admittance characteristic
5) Study of combined over current & earth fault protection scheme of alternator.
6) Protection 3 phase transformer using differential relay (Merz- Price protection scheme)
7) To plot the characteristic of rewirable fuses and MCB
8) Study oil Arc extinction phenomenon.
9)Demonstration of microprocessor base protection of 3 phase IM using MM-30 L & T k make
10)Study of different types fuses.

The term should include a minimum of eight experiments from the above list.

NORTH MAHARASHTRA UNIVERSITY, JALGAON
B.E. (ELECTRICAL) W.E.F: 2008- 09
TERM - II

2) Power System Stability

Teaching Scheme	Examination scheme
Lectures: 4Hrs/week	Paper : 100 Marks
Practical: 2Hrs/week	Duration : 3 Hrs.
	Term work : 25 Marks
	Oral : 25 Marks

UNIT I: - BASIC CONCEPT

Meaning of stability, steady state transient & dynamic stability limits, Park's transformation equations, Analysis of transient and subtransient state operation of salient and non salient pole machines, phasor diagrams, voltage behind the transient and subtransient impedances, time constants. Determination of parameters and time constants.

(10 Hrs., 20 Marks)

UNIT II: - STEADY STATE STABILITY

SSSL of short transmission lines, Analytical and graphical methods of solutions, loosy lines effect of inertia conservative criterion, synchronizing co efficient multi machine system.

(10 Hrs., 20 Marks)

UNIT III: - FACTORS AFFECTING STEADY STATE STABILITY

Effect of saturation, saturated reactance, equivalent reactance, graphical method to find equivalent effect of short circuit ration effect of governor action, effect of automatic voltage regulator.

(10 Hrs., 20 Marks)

UNIT IV: - TRANSIENT STATE STABILITY

Review of basic concept, TTS and equal area criterion, swing equation, point by point solution, critical cleaning angle and critical angle and critical clearing time.

(10 Hrs., 20 Marks)

UNIT V: - FACTORS AFFECTING TRANSIENT STATE STABILITY

Effects of types of fault, effect of grounding, effect of high speed reclosing Precalculated swing curves and their use, effects of fault clearing time, effects of excitation and governing action, Methods of improving stability, multi-machine problem .

(10 Hrs., 20 Marks)

Reference Books:

1) E .W. Kimbark - Power system stability, Vol- 1 & 3 - John Wiley
2) S. B.Cray - Power system stability vol- 1 & 2 - John Wiley
3) Nagrath & Kothari - Modern power system analysi -TMH

List of Experiment:

1) Parameters and time constants of synchronous machines
2) Synchronous machine of infinite bus
3) Effect of saturation and & determination of equivalent reactance's of synchronous machines.
4) Retardation test on synchronous machines to find moment of inertia of rotating part and angular momentum.
5) To obtain power angle characteristics of lossy & lossless lines.
6) To study steady state stability by point by point method.
7) To determine the steady state stability limit of short transmission line.
8) To determine SSSL of long transmission line.
9) Study of clerk's diagram.
10) Study of different types of automatic voltage regulator.

The term work should include a minimum **eight** experiments, from the above list.

NORTH MAHARASHTRA UNIVERSITY, JALGAON
B.E. (ELECTRICAL) W.E.F: 2008- 09
TERM - II
3) INDUSTRIAL DRIVES AND CONTROL

Teaching Scheme	**Examination scheme**
Lectures: 4Hrs/week	**Paper : 100 Marks**
Practical: 2Hrs/week	**Duration : 3 Hrs.**
	Term work : 25 Marks
	Oral : 25 Marks

Unit – I: - ELECTRICAL DRIVES

Concept, classification, advantages, parts of drives, choice of electric drives, fundamental torque equation, types of practical mechanical loads, dynamics of electrical drive- stability of an electrical drive, constant torque drive, constant power drive, selection of a D.C and A.C drive, modes of operation.

(10 Hrs., 20 Marks)

Unit - II: - SPEED-TORQUE CHARACTERISTICS AND CONTROL OF ELECTRICAL DRIVES

Characteristics and equivalent circuits; Dc motor; separately excited, series, shunt, compound.
Induction motors, Synchronous motors.
Basic principles of Speed control; closed loop control, current & speed sensing, Phase locked loop, closed loop position control.

(10 Hrs., 20 Marks)

Unit – III: - SOLID STATE CONTROLLERS:

Dc motor: Using thyristors, Phase control, chopper fed, Dual converters.
Single phase Induction motor: Using triac, Inverter circuit, Using cycloconverters, Speed control of universal motor.
Three phase induction motor: Basic schemes using chopper.
Synchronous motor: Self commutation circuits for three phase Synchronous motor.

(10 Hrs., 20 Marks)

Unit – IV: - AC DRIVES AND SYNCHRONOUS MOTOR CONTROL

Stator voltage control using Ac voltage controller, Inverter fed induction motor (VSI / CSI fed), chopper control in rotor circuit. Slip Energy recovery scheme,
CLC for Induction motor.
open loop control, Self Control Strategy, variable frequency operation, margin angle control.

(10 Hrs., 20 Marks)

Unit – V:- DC DRIVES

Single phase DC Drives for separately & self excited Dc motor (continuous & Discontinuous armature current operation), CLC & TRC Controller, chopper fed Dc Drives. Three phase drives for Dc motors, Full converter & semi- converter operation of Series connected converter.

Micro-processor based control for Drives: Micro-processor based chopper fed Dc motor, Micro-computer based control of Dc drives, using dual converter, Micro-processor based speed control of three phase Induction motor, Synchronous motor control.

(10 Hrs., 20 Marks)

Reference Books :

1) Thyristerised control of Electric Drives – V. Subramanyam, Tata McGraw Hill, New Dehli.
2) Thyristor Power Control- Dubey, Joshi, Sinha, Willey Eastern Publication.
3) Power Electronics Circuit Devices & Applications –M. Rashid, Prentice Hall of India.
4) Fundamentals of Electrical Drives – G. K. Dubey , Narosa Publishing House.
5) Fundamentals of Electrical Drives - Mohammad A. EL-sarkawi, vikas Publishing House.

List of experiments:-

1) Control of d.c motor using single phase half controlled rectifier.
2) Control of d.c motor using single phase fully controlled rectifier.
3) One quadrant chopper control of d.c motor.
4) Two quadrant chopper control of d.c motor.
5) Speed control of single phase induction motor using ac voltage regulator
6) Study of stepper motor drive circuit.
7) Speed control of universal motor.
8) Study of Micro-computer based control of Dc drives,
9) Study of vector control method for induction motor.
10) Study of reversible drives

The term work should include a minimum of eight experiments from above list.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

B.E. (ELECTRICAL) W.E.F: 2008- 09

TERM - II

ELECTIVE-II

I) FLEXIBLE A.C.TRANSMISSION

Teaching Scheme	**Examination scheme**
Lectures: 4Hrs/Week	**Paper : 100 Marks**
Tutorial : 2Hrs/Week	**Duration : 3 Hrs.**
	Term work : 25Marks

UNIT I:- DEVICES AND CONVERTERS

Advanced Power Semiconductor Devices, Voltage Source Converter, Single Phase Full Wave Bridge Converter Operation. Three Phase, Full Wave Bridge Converter. Three Level Voltage source Converter, PWM Converter. Generalized technique of harmonic elimination and voltage control, current sourced converter, and current source verses voltage sourced converters.

(10 Hrs., 20 Marks)

UNIT II:-FACTS CONCEPTS

FACTS Concepts, Flow of Powers in AC System, Dynamic stability consideration of transmission interconnection. Relative importance of controllable parameters, facts controllers.

(10 Hrs., 20 Marks)

UNIT III:-SHUNT COMPENSATORS

STATIC Shunt Compensator, Methods of Controllable VAR Generation, Static VAR Compensators, Static VAR System.

(10 Hrs., 20 Marks)

UNIT IV:-SERIES COMPENSATORS

STATIC Series, compensator, Variable Impedance Type Series Compensators, Switching Converter, Types and Compensators, External Control for series Reactive Compensators.

(10 Hrs., 20 Marks)

UNIT V:-COMBINED COMPENSATORS

Combined Compensator, Unified Power Flow Controller, Interline Power Flow Controller, Generalized Multifunctional FACTS Controllers.

(10 Hrs., 20 Marks)

References,

1. N.G.Hingorani,' Understandig FACTS', IEEE Press, 1999
2. Yang hue Song,'Flexible AC Transmission Systems (FACTS), IEEE Press, 1999

NORTH MAHARASHTRA UNIVERSITY, JALGAON

B.E. (ELECTRICAL) W.E.F: 2008- 09

TERM - II

ELECTIVE-II

II) POWER SYSTEM DESIGN PRACTICE

Teaching Scheme	**Examination scheme**
Lectures: 4Hrs/Week	**Paper : 100 Marks**
Tutorial : 2Hrs/Week	**Duration : 3 Hrs.**
	Term work : 25Marks

UNIT I:- DESIGN FUNDAMENTALS

Electrical & mechanical design of transmission line. Design of EHV transmission lines.

(10 Hrs., 20 Marks)

UNIT II: - DESIGN OF DISTRIBUTION SYSTEMS

Improvement and expansion of power system. Bus bar arrangements, isolating switches.

(10 Hrs., 20 Marks)

UNIT III:- CIRCUIT BREAKERS

Circuit breakers: operating mechanism, rating and selection, operating under special conditions, specification and technical details for deranged tender preparations.

(10 Hrs., 20 Marks)

UNIT IV: - LIGHTING ARRESTORS

Rating characteristics, testing technical defects, standards followed for details insulation co ordination. Power transformers different types, tapping , fittings, cooling, drying rating, cost comparison, testing technical details for ordering and tender preparations.

(10 Hrs., 20 Marks)

UNIT V: - SHUNT CAPACITORS

Need, construction, location, connections, protection, analysis, special types, testing, technical details. Earthing: Earthing systems, step potential, touch potential and transfer potential.

(10 Hrs., 20 Marks)

REFERANCES:-

1) Pratapsingh Satnam & P.V. Gupta. – Substation Designed equipments, Dhanpat Rai & Sons.
2) M. V. Deshpande: - Electrical Power system Design.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

B.E. (ELECTRICAL) W.E.F: 2008- 09

TERM - II

ELECTIVE-II

III) ELECTRIC TRACTION ENGG.

Teaching Scheme	**Examination scheme**
Lectures: 4Hrs/Week	**Paper : 100 Marks**
Tutorial : 2Hrs/Week	**Duration : 3 Hrs.**
	Term work : 25Marks

UNIT I: - TRAIN MOVEMENT AND PERFORMANCE

Speed time curve, its analysis and construction, schedule speed and factors affecting it, train resistance and its components. Tractive effort calculations, average acceleration and speed, energy output and consumption.

(10 Hrs., 20 Marks)

UNIT II: - POWER TRANSMISSION AND WEIGHT TRANSFERENCE

Methods of transmission of power from motor to wheels .Idea about riding quantities of an electric loco motive, grouping of motor and weight transference, adhesive weight factors affecting slip.

(10 Hrs., 20 Marks)

UNIT III: - TRACTION MOTORS

Performance of (i) d.c. motors (ii) a.c. single phase series motors at low frequencies and at commercial frequency and (iii) poly phase induction motors, under traction service conditions, specific problems and method of overcoming them, special features of construction effect of differences in driving wheel diameters and speed time curves on division of load, traction motor ratings, speed factor, track and overhead equipments.

(10 Hrs., 20 Marks)

UNIT IV: - POWER SUPPLY FOR TRACTION

Overhead and conductor rail system, third rail construction, Bonding of conductor and track rails, overhead construction for trolley, buses and railways, quaternary's construction, temperature effects, current collectors, out times of feeding and distributing system for d.c low frequency, a.c and commercial frequency, a.c. traction voltage drop control, Electrolytic and inductive coordination, power loading curves, Positions of substations and load - sharing .

(10 Hrs., 20 Marks)

UNIT V :- BRAKING ON ELECTRIFIED RAILWAYS

Mechanical versus electric breaking, rheostatic braking, Regenerative braking, method and energy saved in the process, Magnetic track brakes.

Traction control: Duty cycle, Methods of traction motor control, series-Parallel and other types of controllers, use of interlocks, run back prevented, multiple unit control, Master controllers, Reverses, Dead man's handle, use of Metadyne and Megavolt.

(10 Hrs., 20 Marks)

Reference Books:-

H. Partab: Modern Electric traction, Dhanpat Rai & sons.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

B.E. (ELECTRICAL) W.E.F: 2008- 09

TERM - II

ELECTIVE-II

IV) GENERATION PLANNING AND LOAD DISPATCH

Teaching Scheme	**Examination scheme**
Lectures: 4Hrs/Week	**Paper : 100 Marks**
Tutorial : 2Hrs/Week	**Duration : 3 Hrs.**
	Term work : 25Marks

UNIT-I: - GENERATION

Hydropower, fossil fuels nuclear power generation system. Chronological Load curves, power duration curve, integrated duration curve hydrography, flow duration curve, mass duration curve or hydro power generation stations.

Co-ordination of steam, hydro & nuclear power stations. Optimum generation allocation- line losses neglected & including the effect of transmission losses for thermal power generations.

Low range& short range hydro thermal scheduling of generation the short term and long term hydro thermal scheduling of generation.

(10 Hrs., 20 Marks)

UNIT-II:-PLANNING

Objectives of generation system planning, long term and short term planning. Stages in planning. Policy studies.

(10 Hrs., 20 Marks)

UNIT-III:- LOAD ENERGY FORECASTING

Classification of loads, load forecasting methodology.

peak demand forecasting- non whether sensitive forecast- weather sensitive forecast-total forecast- annual and monthly peak demand forecast.

(10 Hrs., 20 Marks)

UNIT-IV: - GENERATION SYSTEM COST ANALYSIS

Capacity cost, production cost, tuning of addition production analysis- production analysis involving nuclear unit production analysis involving hydro unit. Fuel inventories, energy transition off peak energy utilization.

(10 Hrs., 20 Marks)

UNIT-V:-GENERATION SYSTEM RELIABILITY ANALYSIS

Probabilistic generation unit- model &load model effective load- reliability analysis for isolated system- interconnected system- reliability of interconnected system.

(10 Hrs., 20 Marks)

Reference Books:-

1) Generation of Electric Energy – B.R. Gupta,
   Euresia Publishing House Pvt. Ltd., New Dehli.
2) Power System Planning – R.L.Sullivan, McGraw Hill.
3) Economic Control of Interconnected System – Kirchmayers L.K.,
   John Wiley & Sons, New York.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

B.E. (ELECTRICAL) W.E.F: 2008- 09

TERM - II

ELECTIVE-II

V) EXTRA HIGH VOLTAGE TRANSMISSION

Teaching Scheme	**Examination scheme**
Lectures: 4Hrs/Week	**Paper : 100 Marks**
Tutorial : 2Hrs/Week	**Duration : 3 Hrs.**
	Term work : 25Marks

UNIT I:-AC POWER TRANSMISSION

Basic aspects of A.C. Power transmission, power-handling capacity and line loss, surface voltage and conductors, electrostatic field of EHV lines. Measurement of electrostatic fields. Electromagnetic interference. Traveling waves and standing waves, Line energization with trapped-charge voltage. Reflection and refraction traveling waves. Transient response of system with series and shunt lumped parameters. Principles of traveling protection.

(10 Hrs., 20 Marks)

UNIT II:-LIGHTNING AND PROTECTION

Lightning & lightning Protection, Insulation coordination based lightning.

(10 Hrs., 20 Marks)

UNIT III:-OVERVOLTAGES IN EHV SYSTEM

Over Voltage in EHV system caused by switching operation, Origin of over voltage and their types caused by interruption of inductive and capacitive currents, Ferro-response over voltage, calculation surges, Power frequency voltage control and over voltages, Power circle diagram.

(10 Hrs., 20 Marks)

UNIT IV:-STABILITY CONSIDERATIONS

Reactive power flow and stability in power systems. Steady-state static real power and reactive power stability, transient stability. Basic principles of system voltage control. Effects of transformer tap changing in the post disturbance effect of generator excitation adjustment, Voltage collapse in EHV lines, reactive power requirement for voltage in long line. Voltage stability

(10 Hrs., 20 Marks)

UNIT V:-MAXIMUM POWER TRANSFER AND STABILITY LIMIT

Power Transfer at voltage stability limit of EHV lines, Magnitude of receiving end voltage, Voltage Magnitude of receiving end voltage during maximum power transfer. Magnitude of Maximum power and stability limit. Optimal reactive power at voltage stability limit

(10 Hrs., 20 Marks)

References,

1. A.Chakrabarti, D.P.Kothari, A.K. Mukhopdadhyay, Performance, operational & control of EHV power system, Wheeler publications.
2. Rakosh Das Begamudre,'Extra high-voltage A.C. transmission Engineering' New Age International.
3. S.Rao, EHVAC & HVDC transmission Engineering & practice' - Khanna publications.

NORTH MAHARASHTRA UNIVERSITY, JALGAON
B.E. (ELECTRICAL) W.E.F: 2008- 09
TERM - II

PROJECT -II

Teaching Scheme	**Examination Scheme**
PRACTICAL:	
4Hrs. /Week (For Term-II)	**Term Work: 100(Term II)**
	Oral : 50 Marks (Term II)

1. The Project group in, BE. first Term will continue the project work in B.E. Second Term, and complete project in all respect (assembly, testing, fabrication, tabulation, test result etc.)
2. The group should maintain a logbook of activities. It should have entries related to the work done, problems faced, solution evolved etc., duly signed by guide.
3. The guides should regularly monitor the progress of the project work.
4. The project work along with project report should be submitted as part of term work in B.E. Second Term on or before the last day of the term
5. Project report must be submitted in the prescribed format only..

Submission of project report:

The student shall submit a detailed report base on his/her project work to his/her institutional guide. It shall include relevant circuit diagrams, graphs, photographs, specification sheets etc.

Format for the project report shall be as follows:

a) The report shall be neatly typed on white paper .The typing shall be of normal spacing and only on one side of the "A4 "size paper.

b) The report shall be submitted with front and back cover card paper, neatly cut and bound together.

c) Front cover shall have the following details in block capitals in the following sequence.

Title at the top, followed by the name of the candidate with roll no and exam seat no in the next line. Name of the guide with designation below the details of the candidate. The name of the institute and year of submission on separate lines at the end.

d) Project work approval sheet in the form of a certificate duly signed, shall be included.

e) The format of the text of the project report:

The synopsis shall be followed by literature survey. The report of analytical or experimental work done, if any shall then follow. The discussion and conclusion shall form the next part of the text. It shall be followed by nomenclature and symbols used and then acknowledgement .The bibliography shall form the last section.

The total number of typed pages, excluding cover, shall be about 50 to100.All the pages shall be serially numbered.

Number of copies of the project report submitted to the department shall be equal to number of students in a group plus three.The oral examination will be base on the project report.

6. Assessment of the project for award of TW marks shall be done by the guide and a departmental committee (consisting of minimum two teachers with experience more than three years) as per the guidelines given in the following table.

B) ASSESSMENT OF PROJECT II TERMWORK (B.E. SECOND TERM)

NAME OF THE PROJECT: _____

NAME OF THE GUIDE: _____

Sr. No	Exam. Seat No	Name Of Students	Assessment by guide (70%)						Assessment by department (30%)			Grand Total
			Fabrication /software / actual work	Execution of project	Project report	Scope/ Cost / Utility	Attende-nece	Total	Evaluation (10%)	Prese-ntaion (20%)	Total	
		Marks	20	10	20	10	10	70	10	20	30	100

Sign of Guide. Sign of Committee Members Sign. of H. O. D.

7. The guide should be internal examiner for oral examination .

8. The external examiner should be from the related area of the concerned project. He should have minimum of five
years of experience at degree level / industry.

9. The evaluation at final oral examination should be done jointly by the internal and external examiners.

NORTH MAHARASHTRA UNIVERSITY, JALGAON
B.E. (ELECTRICAL) W.E.F: 2008- 09
TERM - II
INDUSTRIAL VISIT

Term work:25 Marks.

EDUCATION TOUR / TECHNICAL VISITS / CASE STUDY AND ITS EVALUATION

1. During B.E. First Term / Second Term or during vacation between B.E. First Term / Second Term every student; shall visit minimum two industries, factories arranged by colleges and accompanied by teachers. There shall be at least one teacher for a group of 20 students and at least one non-teaching staff accompanied with the students.

2. The colleges should obtain appropriate certificates of visit from the concerned organizations just after the visits.

3. Students should submit written report about the visits individually at the end of B.E. Second Term .

4. The report should contain information about the following points:

   (a) The organization - activities of organization and administrative setup technical personnel and their main duties.
   (b) The project *I* industry brief description with sketches and salient technical information.
   (c) The work *I* processes observed with specification of materials, products, equipments etc. and role of engineers in that organization.
   (d) Suggestions (if any) for improvement in the working of those organizations.

5. The evaluation of the report of technical visits will be made by panel of two teachers appointed by principal based on following points:

   (a) Coverage aspect: All above points should be covered.
   (b) Detailed observations: System *I* Process / Product explained with data, diagram specifications.
   (c) Quality of presentation: Report should be very objective and should consist of clear and systematic organization of topics and information.
   (d) Viva - voce: A viva -voce shall be conducted on the technical visit report by the teachers to assess the specific knowledge gained by the students for technical applications.

.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

B.E. (ELECTRICAL) W.E.F: 2008- 09

TERM - II

ENTREPRENEURSHIP DEVELOPMENT SKILLS

Practical: 2 hours/week.

1. Entrepreneurship:

Aim alternative to seeking jobs- promote self- employment end accelerate industrialization. Entrepreneurship development program in India and Maharashtra an overview. Institutions promoting entrepreneurship, their objectives and mode of functioning.

2. Motivation, requirement and constraints:

Affiliation, power, achievement, GOAL SETTING, FINCIAL AND CARRER RISK AND Rewards. Sources of information- "where to go and for what?" Entrepreneurial personality, creavity and qualities.

3 Selecting the right entrepreneurship field

Search and scanning: Small scale/ medium scale industries/ manufacturing/ transporting/ consultancy. Criteria for selecting product for elopements/ manufacturing.

4 feasibility report: Market survey, selecting right infrastructure, location and government subsidies, sources of technology, recruiting right people, identifying customers, finding out competitors, preparation of feasibility report, project report.

5 Organizational set-ups: advantages and limitations of proprietorship, partnership, co- operatives, private limited and public limited

COLLEGE OF ENGINEERING AND TECHNOLOGY,
BAMBHORI POST BOX NO. 94, JALGAON – 425001. (M.S.)

NBA Accredited

Website : www.sscoetjalgaon.ac.in Email : sscoetjal@gmail.com

Mandatory Disclosure

Part-III

January 2013

Shram Sadhana Bombay Trust's
COLLEGE OF ENGINEERING AND TECHNOLOGY,
BAMBHORI POST BOX NO. 94, JALGAON – 425001. (M.S.)
Included under section 2 (f) & 12 (B) of the UGC Act, 1956
with NBA Accredited courses & ISO 9001 : 2008 certified
ISO 9001:2008

Website- www.sscoetjalgaon.ac.in
Email: sscoetjal@gmail.com
Phone No. (0257) 2258393.
Fax No. (0257) 2258392.
Principal: Dr. K.S.Wani
M. Tech, DBM, Ph.D.

Ref. No. COET/AICTE/MD/ / 13 **Date:**

C E R T I F I C A T E

Certified that all enclosures contained in PART-I , PART-II & PART-III bearing page no. **01** to page no. **1207** are pertaining to our institution which are being submitted in two separate above mentioned bound booklets/box file of Mandatory Disclosure. All xerox copies may be treated as original.

PRINCIPAL

NORTH MAHARASHTRA UNIVERSITY, JALGAON
STRUCTURE OF TEACHING AND EVALUATION
S.E.(ELECTRONICS & Communication / electronics & Telecommunication / electronics)

First term

W.E.F. 2006-07

Sr. No.	Subject	Teaching Scheme Hours/week			Examination Scheme				
		Lectures	Tutorial	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Electronics Materials and Components	4	--	--	3	100	25	--	--
2	Electronics Instrumentation	4	--	2	3	100	25	25	--
3	Digital Circuits and Logic Design	4	--	2	3	100	25	25	--
4	Electrical Circuits and Machines	4	--	2	3	100	25	--	--
5	Semiconductor Devices and Circuits	4	--	4	3	100	25	50	--
6	Electronics Workshop	--	--	2	--	--	25	--	--
	Total	**20**	**--**	**12**	**--**	**500**	**150**	**100**	**--**
	Grand Total	**32**			**750**				

SECOND TERM

Sr. No.	Subject	Teaching Scheme Hours/week			Examination Scheme				
		Lectures	Tutorial	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Management Science	4	--	--	3	100	--	--	--
2	Electronic Circuits and Applications	4	--	4	3	100	25	50	--
3	Engineering Mathematics-III	4	1	--	3	100	25	--	--
4	Network and Lines	4	1	2	3	100	25	25	--
5	Analog Communication	4	--	2	3	100	25	50	--
6	Software Application-I	--	--	2	--	--	25	--	--
	Total	**20**	**2**	**10**	**--**	**500**	**125**	**125**	**--**
	Grand Total	**32**			**750**				

NORTH MAHARASHTRA UNIVERSITY JALGAON
S.E. (ELECTRONICS, ELECTRONICS & COMMUNICATION, ELECTRONICS & TELECOMMUNICATION)
W.E.F 2006 -2007
TERM - I
ELECTRONICS MATERIALS AND COMPONENTS

Teaching scheme:
Lectures : 4 hrs/week

Examination scheme:
Theory Paper : 100 Marks (3 Hours).
Term Work : 25 Marks

UNIT – I

Electrical conducting materials, Copper, Aluminum, Tungsten, Carbon and Graphite, Nickel, Lead, Tin-Alloys, properties and applications; Insulating materials, Mica, porcelain, Marble and Slate, Polythene, Bakelite, Polyvinyl chloride, Asbestos, Rubber, Cotton and Silk, Glass, Paper and Boards, Wood, Enamel covering, Semiconductor materials-Classification of semiconductors;-Elemental semiconductors-Antimony, Arsenic .Selenium. Gallium Silicon and Germanium, Compound Semiconductors -GaAs. Amorphous semiconductor:-Ge, Si, Se, Te, properties and applications; Magnetic materials:-Soft magnetic materials, Electrical steels, Hard magnetic materials, Magnetic recording, magnetic memories. Metallic glasses. Dielectric materials:-Capacitor structure, Multi layer capacitor dielectric . Lead Zirconate Titanate (LZT), PLZT system.

Lectures-10, Marks -20

UNIT – II

Passive components: Resistors: - Fixed type, carbon composition, carbon film, metal film: construction and characteristics; Variable resistors, carbon potentiometer, and wire-bound potentiometer: construction and characteristics. Tolerance of various resistors. Capacitors: - fixed type, electrolytic, aluminium type, tantalum type, ceramic capacitors, polystyrene, polyester capacitors, mica capacitor and paper capacitor, variable capacitor: construction and properties of each type. Inductors: - fixed type, air-core, ferrite-core inductors and variable inductors: construction and characteristics. Transformers:-Construction, Operation and types- power transformer, IF, AF and RF. Losses in transformers-Core losses, Eddy current Losses, Residual Losses Applications.

Lectures-10, Marks -20

UNIT - III

Discrete devices: Fabrication of discrete and monolithic devices, Semiconductor processing:-Zone refining Mono crystallization, Floating Zone method, vaferization. Diodes:- alloy junction, Crystals, Grown junctions, Solid diffusion, and Gaseous diffusion. Epitaxial diodes. Point contact diode, Schottky barrier diode, Zener diodes, power diodes, Tunnel diodes. Light emitting diodes. BJT Fabrication:-Alloy junction, Point contact, Diffusion, Power transistors,. junction, Diffused junction and Epitaxial techniques, JFET; Fabrication:-MOSFET Fabrication, Depletion MOSFET- Enhancement – MOSFET, C-MOS. V-MOS. Alloy junction, Diffused junction and Epitaxial techniques .UJT Fabrication, Pellet type SCR, Annular SCR, DIAC Fabrication,

Lectures-10, Marks -20

UNIT –IV

Fabrication of Optoelectronic Devices: LDR Phototransistor, LASCR, SUS, LCD, Seven segment displays.
Integrated circuits: Monolithic integrated circuits, chip and component size, photolithographic masking, fabrication: IC resistors, capacitors, diodes and transistors; fabrication of epitaxial- diffused integrated circuits. Thermo-compressic bonding of lead and packaging of ICs.

Lectures-10, Marks -20

UNIT –V

Printed Circuit Boards: Base and conducting materials, artwork, copper clad laminates: properties and types, Design rules for analog circuit PCBs, Design rules for PCBs in power electronics application, Design rules for PCBs in microwave application, photographic etching techniques, mass-soldering techniques, mounting of components, final protection, multilayered flexible PCB.

Lectures-10, Marks -20

REFERENCES:

1. C.S. Indulkar, S.Thiruvengadam: An Introduction to Electrical Engineering Materials, S Chand & Company. 3/e
2. Salivahanan, Suresh Kumar, Vallavaraj : Electronic Devices and Circuits, TMH publication.
3. Allison: Electronic Engineering Materials and Devices, TMH publication.
4. W. Bosshart : Printed Circuit Boards: Design and Fabrication, TMH publication.
5. S.M. Dhir: Electronic components & materials

Note: The term work should include minimum FIVE assignments based on above syllabus, ONE from each unit.

NORTH MAHARASHTRA UNIVERSITY JALGAON
S.E. (ELECTRONICS, ELECTRONICS & COMMUNICATION, ELECTRONICS & TELECOMMUNICATION)
W.E.F 2006 -2007
TERM - I
ELECTRONICS INSTRUMENTATION

Teaching scheme:
Lectures : 4 hrs/week
Practicals : 2 hrs/week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)
Term Work : 25 Marks
Practical : 25 Marks

UNIT – I

Measurement and error : Definitions, instruments, accuracy, precision, sensitivity , resolution error, accuracy and precision , significant figures, types of error , gross error, systematic error, random error, statistical analysis, arithmetic mean, average deviation, standard deviation, probable error and limiting errors.

Units of measurement: Fundamental and derived units, systems of unit - CGS, MKS and SI. Standards of measurement: Classification of standards, international standards, primary standard, secondary standard, working standard, IEEE standards.

Calibration – Primary calibration , Secondary Calibration, Indirect Calibration, Routine Calibration, Fundamentals elements of Measurement System.

Lectures-10, Marks -20

UNIT – II

Electromechanical Indicating Instruments : Permanent magnet moving coil mechanism (PMMC) , D'Arsonal movement , multirange DC ammeter , multirange DC volt meter sensitivity , loading effect , voltmeter - ammeter methods of measuring resistance , series type ohm meter, shunt type ohm meter, multimeter, calibration of DC instruments , AC indicating instruments , electrodynamometer , rectifier type instruments , typical multimeter circuits, electrodynamometer in power measurements, single phase watt meter , watt –hour-meter, power factor meter. Lectures-10, Marks -20

UNIT – III

Bridges and their applications : Wheatstone bridge, measurement errors, sensitivity, Kelvin bridge, guarded wheatstone bridge, Mega ohm bridge, AC bridge, conditions for bridge balance, inductance comparison bridge, capacitance comparison bridge, maxwell bridge, Hay bridge, Schering bridge, Wein bridge, Wagner ground connections. Lectures-10, Marks -20

UNIT – IV

Electronic instruments: Electronic dc and ac voltmeter, electronics multimeter, digital voltmeter - ramp type, Integration continuous balance and successive approximation type.

Recorders : Galvanometric, servo potentiometer, magnetic and digital data recording, printers.

Lectures-10, Marks -20

UNIT – V

Transducers and application: characteristic and applications of Strain gauges, capacitive transducer, Inductive transducer, linear variable differential transformer (LVDT), potentiometric transducer, thermister, thermocouple, thermostat ,Acoustical transducers - microphone, speakers., Instrumentation amplifier, RTD, pressure transducer, flow transducer, pyrometer, luxmeter. Lectures-10, Marks -20

REFERENCES:

1) Cooper & Helfric : Electronics Instrumentation & measurement technique, Pearson LPE
2) H.S. Kalsi : Electronics Instrumentation, TMH 2/e
3) A.K.Sawhney: Electrical and Electronics measurement and Instrumentation, Dhanpat Rai and compony.

LIST OF EXPERIMENTS:-

Group A

1) (a) Study of single phase wattmeter.
   (b) Study of single phase watt hour meter.
2) Study of Wheat stone bridge
3) Study of Kelvin bridge
4) Study of Maxwell bridge
5) Study of Hay bridge
6) Study of Schering bridge

Group B

7) Study of Wein bridge
8) Study of digital voltmeter
9) Study of Recorder
10) Study of Instrumentation amplifier
11) Study of Linear variable differential transformer
12) Application of thermistor for temperature control

The term work should include a minimum EIGHT experiments. FOUR from group A and FOUR from group B .

NORTH MAHARASHTRA UNIVERSITY JALGAON
S.E. (ELECTRONICS, ELECTRONICS & COMMUNICATION, ELECTRONICS & TELECOMMUNICATION)
W.E.F 2006 -2007
TERM - I
DIGITAL CIRCUITS AND LOGIC DESIGN

Teaching scheme:
Lectures : 4 hrs/week
Practicals : 2 hrs/week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)
Term Work : 25 Marks
Practical : 25 Marks

UNIT – I

Characteristics of digital IC's , TTL, Schottkey TTL , ECL, Interfacing ECL and TTL, MOS Logic, CMOS Logic, Interfacing of CMOS and TTL.
Loading rules for logic families, switching times, digital signals, positive and negative logic

Lectures-10, Marks -20

UNIT – II

Binary arithmetic, Signed binary numbers, Binary codes : Exess-3, Gray, BCD, ASCII , parity bit, hamming code .Boolean algebra, Demorgan's theorems , Minimization of logic functions using K-map, Canonical forms, min terms, max terms, don't care conditions, variable entered mapping (VEM) , code converters Lectures-10, Marks -20

UNIT – III

Combinational Logic Circuits Design: Arithmetic circuits, half and full adder, half and full subtractor, binary parallel adder, 7483, BCD adder, BCD subtractor, Excess-3 adder, digital comparator, Multiplexers, Demultiplexers, decoders, Arithmetic logic unit (ALU – 74181), Carry look ahead generator.

Lectures-10, Marks -20

UNIT – IV

Sequential logic circuits : Flip flops (SR, JK, MSJK, D, T), excitation table, design of ripple counter using flip flop and IC's, 4- bit Up / Down ripple counter, shift register, universal register and application

Lectures-10, Marks -20

UNIT – V

Synchronous Sequential Machine: Synchronous counters, Mod- N counter, synchronous counters using 74191, design of Sequential generator. Moore Mealy machines, state diagram, state table, application to sequential generator, Introduction to array

Lectures-10, Marks -20

REFERENCES:

1. R.P. Jain : Modern digital electronics , TMH 3/e
2. Morris Mano : Digital logic and computer design, Pearson LPE
3 Macrovitz : Introduction to logic design . TMH 2/e
4 Taub and Schilling : Digital integrated electronics, Mc Graw Hill
5 Gothman : Digital electronics : An Introduction to Theory & Practice, PHI 2/e
6. William Fletcher : Engineering approach to Digital design, PHI
7. Givone : Digital principles and Design , TMH
8. Malvino , Leach : Digital principle and Applications

LIST OF EXPERIMENTS

GROUP - A

1. Design and implement circuit using NAND or NOR gate to perform the Boolean expression
2. Design and implement BCD to Exess-3 code converter
3. Design and implement 4- bit binary to Gray code converter
4. Implement 4-bit binary adder using IC 7482 and IC 7483
5. Implement BCD to 7- segment decoder using IC 7447/7448
6. Implement BCD adder using 7483
7. Implement 4 – bit comparator using IC 7485
8. Implement arithmetic logic unit using IC 74181

GROUP – B

1. Verify the truth table of multiplexer and demultiplexer ICs
2. Implement the logical expression using multiplexer IC and gates
3. Implement the logical expression using demultiplexer IC and gates
4. Implement and verify S-R, J-K,D, and T flip flop using ICs
5. Implement 4- bit ripple counter using IC 7493
6. Design and Implement Mod -6 synchronous counter
7. Implement decade up- down counter using ICs
8. Implement shift register using 7495.

The term work should include a minimum EIGHT experiments. FOUR from group A and FOUR from group B.

NORTH MAHARASHTRA UNIVERSITY JALGAON
S.E. (ELECTRONICS, ELECTRONICS & COMMUNICATION, ELECTRONICS & TELECOMMUNICATION)
W.E.F 2006 -2007
TERM - I
ELECTRICAL CIRCUITS AND MACHINES

Teaching scheme:
Lectures : 4 hrs/week
Practicals : 2 hrs/week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)
Term Work : 25 Marks

UNIT – I

DC circuits: circuit definitions, sources of energy, source conversion, mesh analysis, nodal analysis, Thevinin`s theorems, Norton`s theorem, superposition theorem, maximum power transfer theorem,

Three phase circuits : Three phase supply, phase sequence , star and delta connection of three phase winding, line and phase voltages and currents in star and delta connections, power in three phase circuit with balance load for star and delta connections, measurement of three phase power by three watt meter method, two Watt meter method , single watt meter method, calculation of active and reactive power. Lectures-10, Marks -20

UNIT – II

DC Machines : construction ,types ,generator action, emf equation motor action , significance of back emf , torque and speed equations , characteristics of shunt , series , compound motors, speed controll methods , starters , theoretical treatment of losses and power flow diagram of dc machines, applications of dc machines. Lectures-10, Marks -20

UNIT – III

Transformers : Single phase transformer construction , emf equation , transformer on no load , transformer on load , phasor diagram, equivalent circuit, efficiency and regulation, open circuit and short circuit tests,

Three – phase transformers : star / star, delta / delta, star / delta, delta / star connections, V-V and scott connections, Autotransformer, C.T. and P.T. Lectures-10, Marks -20

UNIT – IV

Synchronous Machines : Alternators – principle of operation , constructional features, emf equation, winding factors, voltage regulation by synchronous impedance method.

Synchronous Motors: principle of operation, rotating magnetic field, on no load ,on load , phasor diagrams, 'V' curves, hunting, method of starting . Lectures-10, Marks -20

UNIT –V

Induction Motors: Three phase motors - principle of operation, construction, slip, torque equation , torque slip characteristics, relation between slip and rotor copper loss and rotor input, equivalent circuit, different types of starters, applications induction motors.

Single phase Induction motors - principle of operation, types, and applications.

Special purpose machines: Principle, working and application of stepper motor, servo motor, universal motors. Lectures-10, Marks -20

REFERENCES:

1. Edward Hughes : Electrical technology, ELBS.6/e
2. V. N. Mittal : Basic electrical engineering, TMH. 2/e
3. Nagarath and Kothari : Electrical machine, TMH.2/e
4. S.K. Bhattacharya : Electrical machine, TMH. 2/e
5. V. Del Toro : Electrical machines and power systems, Pearson.

LIST OF EXPERIMENTS:-

1. Two Wattmeter method of power measurement in three phase balanced load.
2. Speed control of D.C. shunt motor by armature voltage and flux control method,.
3. Load test on D.C. shunt motor
4. Load test on D.C. series motor.
5. O.C. and S.C. test of single phase transformer to determine regulation and efficiency.
6. Scott connection to convert three phase supply to two phase supply.
7. Regulation of alternator by synchronous impedance method.
8. Regulation of alternator by direct loading method.
9. To plot 'V' curve and P.F. curve for synchronous motor.
10. Load test on three phase induction motor.
11. Study of various single phase motors.
12. Study of three point starter.

The term work should include minimum EIGHT experiments , from the list..

NORTH MAHARASHTRA UNIVERSITY JALGAON
S.E. (ELECTRONICS, ELECTRONICS & COMMUNICATION, ELECTRONICS & TELECOMMUNICATION)
W.E.F 2006 -2007
TERM - I
SEMICONDUCTOR DEVICES AND CIRCUITS

Teaching scheme:
Lectures : 4 hrs/week
Practicals : 4 hrs/week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)
Term Work : 25 Marks
Practical : 50 Marks

UNIT - I

Semiconductor physics and semiconductor diodes: Conduction mechanism in extrinsic semiconductors, carrier concentrations, mobility, drift and diffusion current densities, mass action law, Einstein's relation and charge density relation. Piecewise linear diode model, V - I characteristics equation, static and dynamic resistances of diode, small signal and large signal model of diode.

Diode applications and special types of diodes: FWR, capacitor filter, power, shottkey and PIN diode, diode switching times and junction capacitance. Lectures-10, Marks -20

UNIT - II

BJT biasing and small signal models: Need for biasing BJT circuit, voltage divider biasing , stability factors, thermal runaway and compensation circuits. Low frequency h - parameter analysis , derivations for CE configuration for A_i, R_i, R_o, A_{vs}, A_{is} (exact / approx. analysis) in terms of h - parameters, Miller theorem and its dual, CE – CC and CE – CB parameter conversion, comparison of performance parameters with CB and CC configurations in tabular form. Need for multistage amplifiers. Cascade analysis of CE – CE, CE – CC and CE – CB. Darlington configuration, boot strapping.

. Lectures-10, Marks -20

UNIT - III

Field effect transistors : An overview of different types of FET's viz JFET , MOSFET, MESFET, JFET : JFET construction, symbol, basic operation , V - I characteristics, transfer characteristics, cut-off and pinch off voltages, trans conductance , Input resistance and capacitance, Drain to source resistance, Universal JFET bias curve. Biasing arrangements for JFET , biasing against device variation , biasing for zero current drift, d.c.analysis using graphical approach. JFET as voltage controlled source JFET amplifiers :CS, CD, CG amplifiers, their analysis using small signal JFET model.

Lectures-10, Marks -20

UNIT - IV

MOSFET's: An overview of following MOSFET's types – DMOSFET, EMOSFET, Power MOSFET nMOSFET, pMOSFET and CMOS devices .handling precautions for CMOS devices, D and E MOSFET characteristics and parameters, non ideal voltage current characteristics finite output resistance , body effect subthreshold conductions , break down effects and temperature effects , MOSFET biasing ,introduction to MOSFET as VLSI device.

MOSFET in VLSI: V - I characteristic equation in W / L ratio , MOSFET capacitances , CMOS inverter static characteristic , noise margin, threshold voltage

Lectures-10, Marks -20

UNIT - V

Frequency responses for BJT and FET: Concept of frequency response , human ear response to audio frequencies ,significance of octaves and decades .The decibel unit ,square wave testing of amplifiers. Effect of coupling, by pass, junction and stray capacitances on frequency response for BJT and FET amplifiers. Concept of dominant pole, N stage cascade amplifier, band pass of cascaded stages, concept of gain band width product.

Lectures-10, Marks -20

REFERENCES:

1) Thomas L Floyd : Electonics devices , Pearson 6/e
2) Millman Halkias: Integrated electronics ,TMH publications
3) Boylested Nashelsky: Electronics devices and circuits, ,Pearson LPE 8/e
4) Donald A, Neamen : Semiconductor physics and Devices – Basic Principles, TMH. 3/e
5) Cathey and Singh : Electronics Devices and circuits , TMH 3/e
6) D.R.Cheraku , B.T.Krshina : Electronics Devices and circuits, Pearson
7) R.S.Sedha : Applied Electronics , S Chand Publication.

LIST OF EXPERIMENTS:-

1) For a half wave rectifier with capacitor filter find line and load regulation and ripple factor.
2) For a bridge rectifier with capacitor filter find line and load regulation and ripple factor.
3) For full wave rectifier with capacitor filter find line and load regulation and ripple factor.
4) Determine h-parameters for CE configuration.
5) Determine I/P and O/P impedances and voltage gain of a CE stage followed by CC.
6) Measurement of I/P and O/P impedances and voltage gain of Darlington circuit without and with bootstrapping.
7) Plot characteristics of CSFET. Determine amplification factor, transconductance and dynamic resistance.
8) Determine I/P and O/P impedances and voltage gain and current gain for CSFET.
9) Plot characteristics of CSDMOSFET.
10) Plot characteristics of CSEMOSFET.
11) Square wave testing of an amplifier used to find lower and higher cut off frequency.
12) For two cascaded CE-CE stages, find voltage gain and bandwidth.
13) For cascode amplifier determine voltage gain and bandwidth.
14) Study frequency response of CSFET.
15) Study the effect of bypass capacitor on frequency response of single stage CE amplifier

The term work should include a minimum TWELVE experiments from the list.

NORTH MAHARASHTRA UNIVERSITY JALGAON
S.E.(ELECTRONICS, ELECTRONICS & COMMUNICATION, ELECTRONICS & TELECOMMUNICATION)
W.E.F 2006 –2007
TERM - I

ELECTRONICS WORKSHOP

Teaching scheme:
Practical : 2 hrs/week

Examination scheme:
Term Work : 25 Marks

.

I.] Multimeters and Power supply

(a) Study of Analog and Digital Multimeter (DMM)

1) To study AC / DC voltage and current ranges, different ranges for resistance and other functions.
2) Comparison of DMM and True RMS meters.
3) Difference in V_{rms}, V_{dc} and $V_{average}$ voltages.
4) Importance of $3_{1/2}$ digit and $4_{1/2}$ digit multimeters.
5) Study of different types of fuses used for multimeter.
6) Different types of batteries used in multimeters, voltage and current ratings.

(b) Study of Power Supply

1) Single Power Supply
2) Dual Power Supply
3) Dual Tracking Power Supply
4) Variable AC Power Supply

Measurement of voltage and current levels at different ranges

II.] Study of Cathode Ray Oscilloscope (C.R.O.)

a) Function of front panel knobs, different types of screens used for C.R.O.and probes.
b) Measurement of various parameters e.g. AC,DC voltages , currents, time , frequency measurement lissageous pattern and by phase shift method
c) Study of different types of C.R.O.

III.] Study of signal generator.

a) Study of front panel of signal generator.
b) Adjusting different signals (sine, square, triangular) along with voltages and frequencies
c) Significance of source resistance, offset voltage

IV.] Study of passive components

a) Resistors
   1) Different types:- MFR, MFR precision, CFR, Wire-wound, Variable resistors, potentiometers, trimpots of different wattages e.g. 1/8, ¼, ½ ,1 watt.
   2) 3, 4, 5 band resistors and colour codes of resistors.
   3) Fixed resistors
   4) Importance of zero ohm resistance
   5) E-series alpha numeric resistance like E6, E12, E24 resistors.
b) Capacitors

   Different types of capacitors (Fixed and Variables)

   1) Fixed : - ceramic, tantalum, aluminium, polysterene, mica, metalised poly paper, electrolytic etc.
   2) Variables: - air-dielectric, trimmer, ganged capacitors. Voltage and capacitance ratings
   3) Calculation of capacitance like 101, 102, 103,104 etc on ceramic capacitors.

4) Identification polarities of electrolytic capacitors.
5) Testing of polarized capacitors using analog meters [≥ 1μf].
6) Checking of capacitors on meters and identification of open / short of capacitance.
7) Colour coding of capacitors.

c) Inductors: -
Different types : ferrite core, iron core, RF coil, power transformer (step-down) , pulse transformer.
Study of quality factor.

V.] Study of hardware components

a) Wires and cables: different types like single strand, multi strand, ribbon cable, co-axial cable (75 ohm), TV antenna cable (300 ohm).
b) Switches: SPDT, DPDT, Toggle, Rotary, Micro, Membranes, Sliding.
c) Relays: general purpose, reed, pcb mounting, body mounting.
d) Wire connectors: relimate, power connector, D - type, FRC

VI.] Study of Active components
Diodes, Transistors, FET / MOSFET

a) Study of different types of diodes: rectifier, switching, power diode, number identification using datasheets.
Frequency operation of switching diodes, zener diodes, LED, LCD.
Testing of diodes (by multimeters).
b) Transistors: (BJT / FET)
Study of different types of transistors e.g. Audio, semi-power, power with their numbers, company names, Xerox of data sheet.
Identification of the types of transistors (NPN, PNP)
Different packages of transistors.
Testing of BJT (Using DMM).
Testing of FET (Using DMM).

VII.] a) Build and test any basic electronic circuit on bread board .
b) Preparation of artwork and layout of above circuit . Preparation of its PCB and testing the circuit.

REFERENCES:

1. James and M. Krickpatrick : Electronic Drafting and PCB Design , Thomson publications.
2. W. C. Bosshart : Printed Circuit Boards Design And Technology, TMH
3. Motorola power data book

Note: The term work is based on above syllabus with minimum EIGHT experiments and experiment from part VII is compulsory

NORTH MAHARASHTRA UNIVERSITY JALGAON
S.E.(ELECTRONICS, ELECTRONICS & COMMUNICATION, ELECTRONICS & TELECOMMUNICATION)
W.E.F 2006 –2007
TERM - II
MANAGEMENT SCIENCE

Teaching scheme:
Lectures : 4 hrs/week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)

UNIT - I

History of management, Scientific management and its principles, Administration management, Neo-Classical theory

Therbligs, Modern Management theories, Relation between Administration, Management and Organization, Levels of Management

Functions of Management

Lectures-10, Marks -20

UNIT - II

Organizational structures- Line, Functional, Line and staff, Forms of Business Ownership-Proprietorship, Partnership, Joint Stock company-Private limited. company, Public limited. company , Co-operative organizations, Public sector, Joint Ventures their meanings ,formation, advantages, limitations and applications.

Lectures-10, Marks -20

UNIT - III

Engineering Economics, Wants,Utility,Demand,Supply, Elasticity of demand and supply, Capital-Fixed capital, Working Capital

Sources of finance-Shares, Debentures, Ploughing Back of Capital, Loans from Banks, Trade Credit, Public Deposits, Financial- Institutions, Foreign Capital

Cost Estimating, Cost Accounting, Fixed Costs, Variable Costs, Selling Price (No Numerical)

Lectures-10, Marks -20

UNIT - IV

Manpower Planning, Factors affecting Manpower Planning, Sources of Recruitment, Need, Objectives and Benefits of Training Methods of training Workers, Supervisors and Executives Job Evaluation and Merit Rating (concept only)

Selling and Marketing Concept, Sales Promotion, Advertising

Lectures-10, Marks -20

UNIT - V

Industrial Acts:

Factories Act, Industrial Accidents, Industrial Safety, Quality Concepts, Total Quality Management, ISO 9001-2000, Intellectual Property Rights - Patents, Trademarks, Copy Rights

Lectures-10, Marks -20

REFERENCES:

1. M.Mahajan : Industrial Organization and Production Management, Dhanpat Rai and compony
2. O.P Khanna : Industrial Engineering and Management, Dhanpat Rai and compony
3. Koontz :Essentials of Management, TMH 6/e.

S.E. (ELECTRONICS, ELECTRONICS & COMMUNICATION, ELECTRONICS & TELECOMMUNICATION)
W.E.F 2006 -2007

TERM - II

ELECTRONICS CIRCUITS AND APPLICATIONS

Teaching scheme:
Lectures : 4 hrs/week
Practicals : 4 hrs/week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)
Term Work : 25 Marks
Practical : 50 Marks

UNIT - I

Diode Application:Voltage Multiplier Circuits: Working and comparison of voltage doubler, tripler and voltage quardrupler configuration. Limitations of voltage multiplier circuits. **Clipping and Clamping circuits:** Series and parallel form of clipping circuits, biased clipper, their operation and transfer characteristics, clamping circuits.

Differential Amplifiers: Emitter coupled differential amplifier, FET differential amplifier.D.C. Analysis of BJT and FET differential amplifier, Common Mode Rejection Ratio methods used to improve CMRR. Schmitt Trigger circuit.

Lectures-10, Marks -20

UNIT - II

High Frequency, small signal BJT amplifiers: Behaviour of transistor at higher frequency, high frequency hybrid "π" CE amplifier model. CE short circuits current gain for π models. Definitions and derivations for f_α, f_β and f_γ.Technique to improve bandwidth; cascode amplifiers.

Single tuned, doubled tuned and staggered tuned amplifiers, calculation of unloaded and loaded Q, effect of staggering on bandwidth [No derivations], neutralization

Lectures-10, Marks -20

UNIT - III

Large Signal AF BJT Amplifiers: Classes of power amplifiers: Class A, Class B, Class AB. An overview and applications of Class C and Class D amplifiers. Class A with resistive load, transformer coupled Class A amplifier, Class B push-pull, Class AB, complimentary symmetry, and quasi complimentary configuration.

Efficiency analysis for Class A transformed coupled and Class B push pull amplifiers. Comparison of efficiency of other configuration, distortion in amplifiers, concept of total harmonic distortion.

Lectures-10, Marks -20

UNIT IV

Feedback Amplifiers and Oscillators: Concept of feedback, negative and positive feedback, classification of feedback amplifiers based on feedback topology [voltage, current, transconductance and transresistance amplifiers]. Advantages and Disadvantages of negative feedback. Effect of feedback on input and output impedances and bandwidth of an amplifiers. Analysis of circuit for each feedback topology.

Oscillators: Barkhausen Criterion, study of following oscillators circuits (using BJT / FET) .LC Oscillators : General form of LC Oscillators, Hartley Oscillator, Colpitts Oscillators, Clapp Oscillators, Crystal Oscillators.

Lectures-10, Marks -20

UNIT - V

Linear Voltage Regulators and Voltage References:

Block diagram of regulated power supply, series regulator, line and load regulation, output resistance

Analysis of emitter follower regulator and controlled feedback type regulator. I.C. voltage regulator [IC 723]. Method for boosting output current using external series pass transistor.Protection circuits for regulator, over current protection, simple and fold back current limiting. Three terminals floating, dual and adjustable regulators. Current Boosting (LM 340, LM 320, 78XX, 74XX series) SMPS, UPS [Block Diagram and working only].

Lectures-10, Marks -20

REFERENCES:

1) Salivahanan, Kumar and Vallavraj : Electronics Device & circuits , TMH
2) Millman and Halkias: Integrated Electronics ,TMH
3) Allen Mottershead : Electronics Devices and Circuits Introduction , PHI
4) Boylestad Nashelsky : Electronics Devices and circuits, Pearson 9/e
5) Malvino : Electronics Principles , TMH

LIST OF EXPERIMENTS:

1. Emitter Coupled Differential Amplifiers Calculation of CMRR using emitter resistance.
2. In experiment 1 , emitter resistance is replace by (Constant current source) find CMRR
3. Plot frequency response of single tuned amplifiers.
4. Measure the response of Schmitt trigger circuit for a sine wave input observe Hysteresis characteristics, calculation of UTP, LTP.
5. Line and Load regulation of a series regulator.
6. Plot frequency response of voltage series feedback amplifiers calculation of bandwidth.
7. Class A transformer coupled efficiency calculation.
8. Class B push pull amplifiers efficiency calculation.
9. Oscillators circuits L C Oscillators, Hartley, Clapp/Colpitts.
10. Determination of frequency and output voltage of crystal oscillator..
11. Effect of feedback on Ri, Ro and Av for voltage series feedback amplifier.
12. Plot frequency response of stagger tuned amplifiers.
13. Complementary symmetry power amplifier, calculation of efficiency.
14. To observe & elimination of crossover distortion in complimentary symmetry class B amplifier.
15. IC LM317 for fixed out put, adjustable output ¤t regulation.
16. Low and High voltage measurement and regulation characteristics using LM723.
17. Regulation characteristics of voltage doubler circuit
18. Q point, Ad, Ac &CMRR measurement for BJT differential amplifier

The term work should include a minimum TWELVE experiments from the list.

NORTH MAHARASHTRA UNIVERSITY JALGAON

S.E. (ELECTRONICS, ELECTRONICS & COMMUNICATION, ELECTRONICS & TELECOMMUNICATION)

W.E.F 2006 -2007

TERM - II

ENGINEERING MATHEMATICS – III

Teaching Scheme:	Examination Scheme:
Lectures : 4 Hrs/Week	Theory Paper : 100 Marks (3 Hours)
Tutorials : 1 Hr/Week	Term Work : 25 Marks

Unit – I : Linear Differential Equations

Linear Differential equation of order n, Solution of LDE with constant coefficient, method of variation of parameters, equations reducible to linear form with constant co-efficients, Cauchy's linear equation, Legendre's linear equation. Solution of Simultaneous and Symmetric Simultaneous Differential equation Applications to electrical circuts. Lectures-10, Marks -20

Unit – II : Complex Variables

Functions of complex variables, Analytic functions, C-R equations, Conformal mapping, Billinear transformation, Residue theorem, Cauchy's Integral theorem and Cauchy's Integral formula (without proof). . Lectures-10, Marks -20

Unit – III : Fourier and Z – Transforms

Fourier Transform (FT): Fourier Intergral theorem. Sine and Cosine Integrals. Fourier ,Transform, Fourier Cosine Transform, Fourier Sine Transform and their inverses.,Problems on Wave equation.

Z Transform (ZT): Definition, standard properties (without proof), ZT of standard sequences and Inverse. Solution of simple difference equations, Applications of Z Transform to discrete system analysis.

. Lectures-10, Marks -20

Unit –IV: Laplace Transform (LT)

Definition of LT, Inverse LT. Properties and theorems. LT of standard functions. LT of some special functions viz, error, 1st order Bessel's Periodic, Unit Step, Unit Impulse and Ramp. Problems on finding LT and Inverse LT. Initial and final value theorems.Applications of LT for Network Analysis.

Lectures-10, Marks -20

Unit – V Vector Integration.

a) Applications of partial differential equations to :

1. Vibration of strings or wave equations:

$$\frac{\partial^2 y}{\partial t^2} = a^2 \frac{\partial^2 y}{\partial x^2}$$

2. One dimensional heat flow equation.

$$\frac{\partial u}{\partial t} = a^2 \frac{\partial^2 u}{\partial x^2}$$

3. Laplace equation Two dimensional heat flow equation.

$$\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$$

by separating variables only.

b) Line Integral, Surface and Volume integrals, Gauss's, Stoke's and Green's Theorems (without proof). Applications to problems in Electromagnetic Fields. Lectures-10, Marks -20

REFERENCES:

1. Erwin Kreyszig :Advanced Engineering Mathematics , John Wiley and sons
2. H.K. Dass : Advanced Engineering Mathematics , S. Chand
3. Wylie C.R. and Barrett : Advanced Engineering Mathematics , Mc Graw Hill
4. B.S. Grewal : Higher Engineering Mathematics , Khanna Publication, Delhi.
5. B.V. Raman : Engineering Mathematics , Tata Mc- Graw – Hill.
6. P.N. Wartikar and J.N. Wartikar : Applied Mathematics (Volume I & II), Pune Vidhyarthi Griha Prakashan, Pune
7. Thomas L. Harman James Dabney and Norman Richer : Advance Engineering Mathematics with MATLAB, Books/Cole, Thomson Learning 2/e
8. Dr. Gokhale, Dr. Chaudhari and Dr. Singh :Engineering Mathematics – III

S.E. (ELECTRONICS, ELECTRONICS & COMMUNICATION, ELECTRONICS & TELECOMMUNICATION)
W.E.F 2006 -2007
TERM - II
NETWORKS AND LINES

Teaching scheme:	Examination scheme:
Lectures : 4 hrs/week	Theory Paper : 100 Marks (3 Hours)
Tutorial : 1 hrs/week	Term Work : 25 Marks
Practical : 2 hrs/week	Practical : 25 Marks

UNIT – I

A.C. circuits and theorems – Mesh and nodal analysis, Thevenins , Nortons, Millmans, Reciprocity, and Maximum power transfer theorem.(A.C. analysis)

Graph theory and network equations – Introduction, graph, tree, co-tree and loops. Incidence matrix, cutset matrix, tieset matrix and loop currents, number of possible trees of a graph, analysis of networks, network equilibrium equations. duality general network transformation.

Lectures-10, Marks -20

UNIT – II

Resonance – Introduction , Q- factor, series resonance, selectivity and bandwidth, selectivity with variable capacitance and variable inductance, Parallel resonance, selectivity and bandwidth, Maximum impedance condition with C, L and f variable, current in antiresonance, General case resonance.

Transfer and mutual inductance, Coupling coefficient, properties of ideal transformer, impedance matching with transformer, “L” and “T” circuit impedance matching.

Lectures-10, Marks -20

UNIT – III

Four Terminal Network and Transmission Line- Two port network classification, characteristic impedance and propagation constant for symmetrical network , image and iterative impedance for asymmetrical network, Terminal impedances, reduction of complicated network into its equivalent T and π networks.

Transmission line as two port network, cascaded sections, characteristic impedance and propagation constant. Transmission line general solution, infinite line, wavelength and velocity of propagation. Line without distortion, reflection on transmission line reflection coefficient and SWR.

Lectures-10, Marks -20

UNIT – IV

Filters and attenuators – Filter fundamentals, constant k type low pass and high pass filter, m derived filter , low pass and high pass m - derived filters, Band pass and band stop filters, half section , terminating half section, composite filter.

Attenuators - symmetrical T and π attenuators, ladder type attenuators, asymmetrical T and π attenuators.

Lectures-10, Marks -20

UNIT – V

Transient response – Standard input signals, first order transients, zero input response, step response, pulse response, switched dc transients, switched ac transients, second order natural response, second order circuit equations, over damped, under damped and critically damped response, second order transients, initial conditions.

Lectures-10, Marks -20

REFERENCES:-

1) D Roy Choudhary : Networks and Systems, New Age International
2) Carlson : Circuits, Thomson publications,
3) John D. Ryder : Network Lines and Fields, Prentice Hall of India, 2/e
4) M. E. Van-Valkenburg : Network Analysis, Prentice Hall of India.

LIST OF EXPERIMENTS:-

1) Verification of Thevenins and Nortons theorem for a two port reactive network.
2) Maximum Power Transfer theorem.
3) Series and parallel resonance- BW and Q factor
4) Frequency response of constant k filters and find out cut of frequency.
5) Frequency response of m derived filters and find out cut of frequency.
6) Frequency response of band pass filter
7) Design build and test symmetrical T or Π attenuator(plot attenuation Vs RL)
8) Measurement of Zo and γ for a transmission line.
9) To study the transient response of second order circuit
10) Measurement of VSWR and effect of terminating impedance on VSWR for a transmission line and evaluation of reflection coefficient.

The term work should include a minimum EIGHT experiments from the list including at least one experiment from each unit.

NORTH MAHARASHTRA UNIVERSITY JALGAON
S.E. (ELECTRONICS, ELECTRONICS & COMMUNICATION, ELECTRONICS & TELECOMMUNICATION)
W.E.F 2006 –2007
TERM - II

ANALOG COMMUNICATION

Teaching scheme:
Lectures : 4 hrs/week
Practicals : 2 hrs/week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)
Term Work : 25 Marks
Practical : 50 Marks

UNIT – I

Introduction and importance of communication system: Modulation, Need for modulation, types of modulation, Noise : Internal sources of noise , external sources of noise, signal to noise ratio, noise figure , noise factor due to amplifiers in cascade , measurement of noise temperature and noise factor , Noise in reactive circuit, transit time noise, addition of noise due to several sources .

Lectures-10, Marks -20.

UNIT – II

Amplitude modulation concept : Introduction, modulation index, frequency spectrum of AM wave, power and current calculation in AM, AM generation circuits low level and high level modulation, block diagram of AM transmitter , single side band techniques, balance modulation circuits. SSB generation methods. (Filter method, phase shift, third method,) extension of SSB pilot carrier system, ISB system, VSB system. Lectures-10, Marks -20

UNIT – III

Angle modulation concept: Introduction, modulation index, frequency spectrum of FM wave, phase modulation, comparison between PM and FM, FM modulator circuits, (direct method, basic reactance modulator, stabilizes reactance modulator, varactor diode modulator, indirect method.) pre-emphasis, de-emphasis, narrow band and wide band FM. Lectures-10, Marks -20

UNIT – IV

AM / FM receiver : TRF receiver, super heterodyne receiver block diagram of AM and FM receiver, characteristics of receiver , (sensitivity , selectivity , fidelity, image rejection ratio, tracking), mixer stage , mixer circuits, AM detectors, AGC types , Muting circuits, Pilot carrier receiver, suppressed carrier receiver, ISB receiver, FM demodulator, Amplitude limiter , slope detector, balance slope detector, phase discriminator , ratio detector .

Lectures-10, Marks -20

UNIT – V

Types of communication channels: transmission lines, parallel wire, coaxial cable, submarine cable, wave guide, optical fiber cable.

Multiplexing: TDM, FDM, concept of radiation, electromagnetic spectrum, mechanism of propagation, ground wave, sky wave, space wave, duct, tropospheric, concept of fading and diversity reception

Introduction to TV system and introduction to telephone system.(Primary treatment only)

Lectures-10, Marks -20

REFERENCES:

1. George Kannedy and Bemard Davis : Electronics Communication System, Tata McGraw Hill.4/e
2. Robort Schoenbeck : Electronics Communication , PHI, 2/e
3. Dennis Roddy and John Coolen : Electronics Communication, Prentic-Hall of India. 3/e
4. Wayne Tomasi : Electronic Communication system, Pearson LPE 5/e
5. Taub and Schilling : Principle of communication, Tata McGraw Hill.
6. T.G.Thomas, S.Chandrashekhar : Communication theory, TMH.

LIST OF EXPERIMENTS:

1) Study of AM transmitter and calculate of modulation index of AM wave by envelope method.
2) Study of Diode detector circuit.
3) Study of FM transmitter.
4) Study of Amplitude limiter circuit.
5) Calculate gain for RF / IF stage with AGC and without AGC.
6) To plot frequency response curve for IF Amplifier.
7) Study of Phase discriminator.
8) Study of AM super heterodyne receiver.
9) Study of FM receiver.
10) Study of AM Mixer circuit. / balanced Modulator circuit.
11) Study of TV system.
12) Study of Telephone system.

The term work should include a minimum EIGHT experiments from the list.

NORTH MAHARASHTRA UNIVERSITY JALGAON
S.E. (ELECTRONICS, ELECTRONICS & COMMUNICATION, ELECTRONICS & TELECOMMUNICATION)
W.E.F 2006 -2007
TERM - II
SOFTWARE APPLICATION – I

Teaching scheme: Examination scheme:
Practical : 2 hrs/week **Term Work : 25 Marks**

Objectives:
To make the students aware of:
1. Programming practice in C for numerical methods .
2. Use of application specific software tools in the design development simulation and testing of electronic circuits .
3. Use of mathematical software packages for understanding and modeling electrical signals and linear systems .

Section- A : Numerical computational techniques:
Instruction of following techniques assited by C programme/ function implimentation of at least THREE of them is expected .
Solution of transcendental &polynomial equation, bisection method,Newton Raphson ,secant, successive methods, solution of linear equations using Gauss elimination .Gauss-Jordan methods Newton's forward and backward difference equations, interpolation, numerical integration and differentiation: trapezoidal rule Simpson's 1/3 and 3/8 rule, Euler's Method.

List of suggested assignments:
1: Program to solve numerical methods : bisection method, Newton Raphson method using users defined functions. Functions should incorporate parameter passing techniques.
2. Program using Functions to solve differential equations by Euler's modified method.
3. Program using Function to find integration by Simpson's 1/3 and 3/8 method.

Section B: Simulation of typical circuits using circuit simulation tools
(a) Transistorized circuits.
 (1) Two stage amplifiers.
 (2) Series regulatator.
 (3) Audio Driver / Audio power Amplifiers.
(b) IC Based circuits
 (1) Sequential Digital circuits.
 (2) Combinational Logic
 (3) Timer Circuit

Section C : Simulation software based Experiments / Assignments:
Assignments related to Electronics Instrumentation, Digital circuits and logics design, Analog communication, Network and lines.

REFERENCES:
W H Hayt / J E Kemmerly / S M Durbin : Engineering circuit Analysis, TMH 6/e

Note: Term work should be based on minimum SIX assignments, THREE from section A and ONE each from section B (a), B (b) and C.

Faculty of Engineering & Technology

NORTH MAHARASHTRA UNIVERSITY,

JALGAON (M.S.)

THIRD ENGINEERING (T.E.)

ELECTRONICS AND COMMUNICATION,
ELECTRONICS AND TELECOMMUNICATION
TERM – I & II

W.E.F 2007 - 2008

NORTH MAHARASHTRA UNIVERSITY, JALGAON
STRUCTURE OF TEACHING AND EVALUATION
T.E.(Electronics & Communication / Electronics & Telecommunication)

FIRST TERM

W.E.F. 2007-08

Sr. No.	Subject	Teaching Scheme Hours/week			Examination Scheme				
		Lectures	Tutorial	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	*Feedback Control System	4	--	2	3	100	25	--	--
2	#Electromagnetic Engineering	4	1	--	3	100	25	--	--
3	Digital Communication	4	--	2	3	100	25	25	--
4	*Microprocessor and Micro controller System	4	--	2	3	100	25	50	--
5	*Network Analysis and Synthesis	4	1	2	3	100	25	25	--
6	*Software Application-II	--	--	2	--	--	25	--	--
	Total	**20**	**2**	**10**	**--**	**500**	**150**	**100**	**--**
	Grand Total	**32**			**750**				

SECOND TERM

Sr. No.	Subject	Teaching Scheme Hours/week			Examination Scheme				
		Lectures	Tutorial	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	*Electronics Measurements	4	--	2	3	100	25	--	--
2	Power Electronics	4	--	2	3	100	25	25	--
3	*Electronics Circuit Design	4	1	2	3	100	25	50	--
4	Information Theory and Coding Techniques	4	1	--	3	100	25	--	--
5	*Analog Integrated Circuits and Applications	4	--	2	3	100	25	25	--
6	#Practical Training / Mini Project / Special Study	--	--	2	--	--	25	--	--
	Total	**20**	**2**	**10**		**500**	**150**	**100**	**--**
	Grand Total	**32**			**750**				

* Common with TE (Electronics)
# Common with TE (Electronics) and T.E.(Electrical)

NORTH MAHARASHTRA UNIVERSITY JALGAON
T.E. (ELECTRONICS, ELECTRONICS & COMMUNICATION, ELECTRONICS & TELECOMMUNICATION)
W.E.F : 2007- 08
TERM - I

FEEDBACK CONTROL SYSTEM

Teaching scheme:
Lectures: 4 hrs / week
Practicals: 2 hrs / week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)
Term Work : 25 Marks

Unit I

Introduction to the control system, Servomechanisms, History and Development of Automatic Control, Digital Computer Control. Mathematical Models of Physical Systems, Differential Equations of Physical Systems, Transfer Functions, Block Diagram Algebra, Signal Flow Graph. Feedback and Non-feedback Systems, Reduction of Parameter Variations by Use of Feedback, Control Over System Dynamics by use of Feedback, Control of the Effects of Disturbance Signals by use of Feedback, Linearizing effect of Feedback, Regenerative Feedback.

Lectures 10, Marks 20

Unit II

Control system components: stepper motors, servomotors, synchros, and tachometer.
Standard Test Signals, Time Response of First and Second-order Systems, Steady-state Errors and Error Constants, Effect of Adding a Zero to a System, Design Specifications of Second-order Systems, Design Considerations for Higher-order Systems. The Concept of Stability, Necessary Conditions for Stability, Hurwitz Stability Criterion, Routh Stability Criterion, Relative Stability Analysis.

Lectures 10, Marks 20

Unit III

The Root Locus Concepts, Construction Root Loci, Root Contours, Systems with Transportation Lag, Sensitivity of the Roots of the Characteristic Equation, design of lead – lag compensator using Root locus. Effect of addition of poles and zeros on root locus

Lectures 10, Marks 20

Unit IV

Correlation between Time and Frequency Response, Polar Plots, Bode Plots, All-pass and Minimum-phase Systems, Log-magnitude versus Phase Plots. Nyquist Stability Criterion, Assessment of Relative Stability Using Nyquist Criterion. Design of Basic lead / lag compensators using Bode plot. Constant M and constant N circles

Lectures 10, Marks 20

Unit V

Concepts of State, State Variables and State Model, State Models for Linear Continuous-Time / Invariant Systems, State Variables and Linear Discrete-Time Systems, Diagonalization, Solution of State Equations, Concepts of Controllability and Observability, Pole Placement by State Feedback. Linear Approximation of Nonlinear Systems,
Introduction to Fuzzy Logic Control, Neural Networks, Robotic Control System. PI, PD, PID Controller. (Primary treatment only)

Lectures 10, Marks 20

References: -

1. I.J.Nagrath and M. Gopal - Control System Engineering - New Age International Publisher. 4th Ed.
2. Katsuhiko Ogata - Morden Control Engineering - Pearson Education Publication, Fourth Edition.
3. Ashok Kumar - Control System - Tata McGraw-Hill Publishing Company.

4. R. Ananda and P. Ramesh Babu - Control System Engineering - SciTech Publications (India)

List of Practicals:

1) Determine Magnitude and phase plot of lead electrical network.
2) Determine Magnitude and phase plot of lag electrical network.
3) Determine transient response of RLC Electrical network.
4) Study AC position control of Servomotor.
5) Study DC position control of Servomotor.
6) Study of flow control using PID controller (Simulation)
7) Study of synchros to observe angular displacement.
8) Study of stepper motor
9) Study of tachometer

Note: Minimum EIGHT practicals are to be performed

NORTH MAHARASHTRA UNIVERSITY JALGAON

T.E. (ELECTRONICS, ELECTRONICS & COMMUNICATION, ELECTRONICS & TELECOMMUNICATION, ELECTRICAL)

W.E.F : 2007- 08

TERM – I

ELECTROMAGNETIC ENGINEERING

Teaching scheme:
Lectures : 4 hrs / week
Tutorial : 1 hrs / week

Examination scheme:
Theory Paper : 100 Marks (3 Hrs)
Term Work : 25 Marks

UNIT I

Electrostatics:- Coulomb's law, Electric field due to line charge, Sheet charge and volume charge densities, Electric flux density, Gauss's law and Divergence theorem. Energy, Potential and Work-done, Potential gradient.Dipole and its electric field, Dipole movement. Energy density in electrostatic field.

Lectures 10, Marks 20

UNIT II

Conductor, Dielectrics and Capacitance:- Current and current density. Current continuity equation, Properties of conductors, Boundary conditions. Energy stored in capacitors, Poisson's and Laplace's equation's, Capacitance between parallel plates and co-axial cable using Laplace's equation.

Lectures 10, Marks 20

UNIT III

Magnetostatics:- Biot-Sarverts law and its vectorial form, Magnetic field due to infinitely long current carrying conductor ,Ampere's Circuital law. Application to co-axial cable. Curl operator, Magnetic flux density, Stoke's theorem. Scalar and Vector magnetic potential. Lorentz's Force equation. Energy stored in magnetic field. Lectures 10, Marks 20

UNIT IV

Time Varying Fields:- Faradays law , Maxwell's equations (Differential , Integral and Phasor forms). Uniform plane waves. Representation of wave motion in free space, perfect dielectrics and Lossy dielectrics (Wave equations). Poyinting Theorem and Power density. Propagation in good conductor and Skin effect. Reflection of Uniform plane waves. VSWR.

Transmission Line: - Impedance matching ,Single stub and Double stub transmission line. Introduction to Smith Chart.

Lectures 10, Marks 20

UNIT V

Radiation and antennas: - Radiation resistance. Radiation pattern. Calculation of Radiation resistance for short dipole, Short monopole, Half-wave dipole and Quarter-wave monopole antennas. Directivity, Reciprocity between Transmitting and Receiving antennas, Hertzian dipole, Vector retarded potential.

Types of Antennas: - Folded dipole, Yagi-uda, Horn antenna, Parabolic and Cassegrain feed antenna. Broadside, End fire, Binomial, Tchebysheff antenna arrays. Principle pattern multiplication, General pattern of two isotropic radiators. Lectures 10, Marks 20

References:

1) W. Hayt - Engineering Electromagnetics , TMH. (5th or 7th edition).
2) K. D. Prasad - Antenna and Wave Propagation, Satya Prakashan.
3) Guru and Hizirogli - Electromagnetic field theory fundamental, Thomson Publication
4) Narayan Rao - Basic Electromagnetics with application, PHI
5) J D Kraus - Electromagnetics, MGH ,4th edition.

Termwork:- Assignment will be based on the problems on EACH unit . (min.FIVE Assignments).

NORTH MAHARASHTRA UNIVERSITY JALGAON
T.E. (ELECTRONICS & COMMUNICATION, ELECTRONICS & TELECOMMUNICATION)
W.E.F : 2007- 08
TERM - I
DIGITAL COMMUNICATION

Teaching scheme:
Lectures : 4 hrs / week
Practicals : 2 hrs / week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)
Term Work : 25 Marks
Practicals : 25 Marks

UNIT I

Spectral Analysis and Sampling :- Fourier series and fundamentals, The Fourier transform, signal spectra, Energy density spectrum, Power density spectrum, Auto and cross correlation functions, properties of Fourier transform, Parseval's theorem, Rayleigh Energy theorem, LTI system response and distortion less transmission, Band limited and time limited signals, sampling theorem in frequency domain and time domain, Nyquist criteria, Reconstruction using inter polation filters, Ideal, natural, flat top sampling, Aperture effect,

Lectures 10, Marks 20

UNIT II

Random Variables and Processes :- Probability theory fundamentals, Bays theorem, Random variables, discrete and continuous random variables, probability density function, cumulative distribution function properties, standard models like Poisson, Binomial, Rayleigh, Gaussian,UDF. Central limit theorem, Mean moment, variance.

Random Processes: Mathematical definition, stationary process, Mean, correlation, co-variance function, Ergodic process, transmission of random process through LTI filter, Gaussian process, power spectral density, Noise , Narrow band noise.

Lectures 10, Marks 20

Unit III

Waveform Coding and Synchronization : Pulse code modulation; PCM generation and reconstruction, Quantization, Quantization error , Non – uniform Quantization and companding – PCM with noise Error threshold. Delta modulation, Delta- sigma modulation , Adaptive delta modulation, Differential PCM – LPC speech synthesis. Data encoding formats, Digital Multiplexers. ISI, Eye diagram , Bit synchronizer, Early late synchronizer , scrambling and un scrambling , carrier recovery.

Lectures 10, Marks 20

UNIT IV

Digital Continuous Wave Modulation Technique : Introduction BPSK, Differential PSK, DEPSK, Quadrature PSK, M- ary PSK, Quadrature Amplitude shift keying, Binary frequency shift keying , minimum shift keying, GMSK, $\pi / 4$ QPSK.

NON-coherent detection of FSK, DPSK, QPSK, calculation of error probability of BPSK and BFSK.

Lectures 10, Marks 20

UNIT V

Performance Analysis of Digital Signals and Spread Spectrum. : Baseband signal receiver, probability of error, optimum filter, White noise - matched filter. Properties, probability of error of match filter. Spread spectrum: PN sequence DSSS with coherent BPSK, signal space representation and processing Gain, Probability of error, Frequency hopped spread spectrum. Introduction to multiple

Access Techniques: TDMA, FDMA and CDMA.

Lectures 10, Marks 20

References :

1) A B Carlson – Communication Systems (MGH 4th Edition)
2) Simon – Digital Communication Techniques , PHI
3) Amitabh Bhattacharya – Digital Communication (TMH)
4) Taub and Schilling – Principle of Communication Systems (TMH) 2nd ed
5) Das Mullick, Chatterjee – Principle of Digital Communication (New Age)
6) Proakis – Digital Communication (MGH 4 th Edition)
7) S.K.Venkataram - Digital Communication , S. Chand

List of Practicals

1) Verification of sampling theorem. PAM techniques. (Flat top and natural sampling) Effect of variable sampling rate, filter cut off , reconstruction of original signal using filter , aliasing effect
2) Study of DM , ADM , Techniques ,observation of effect of slope over load , granular noise and SNR measurement
3) Companded PCM (using A- Law) Plot quantization curve. SNR measurement ,
4) Generation and reception of QPSK in presence of noise
5) Generation and detection of FSK
6) Generation and detection of Quadrature Amplitude shift keyng
7) Study of line codes (NRZ, RZ, polar RZ, bi polar (AMI), Manchester) and spectral analysis
8) Generation and detection of DSSS coherent BPSK and spectral analysis.
9) Noise analysis using any software tool (use of any discrete distribution). Find response by changing parameters
10) Noise analysis using any software tool (use of any continuous distribution). Find response by changing parameters

Note: Minimum EIGHT practicals are to be performed, out of which minimum TWO practical using software tools are compulsory

NORTH MAHARASHTRA UNIVERSITY JALGAON
T.E. (ELECTRONICS, ELECTRONICS & COMMUNICATION, ELECTRONICS & TELECOMMUNICATION)
W.E.F : 2007- 08
TERM - I

MICROPROCESSOR AND MICROCONTROLLER SYSTEM

Teaching scheme:	Examination scheme:
Lectures : 4 hrs / week	Theory Paper : 100 Marks (3 Hours)
Practicals : 2 hrs / week	Term Work : 25 Marks
	Practical : 50 Marks

UNIT I

Introduction to microprocessor and microcomputer system, functional pin diagram and detailed architecture of 8085 microprocessor, Demultiplexing of address / data bus, Generation of control signals, Instruction Set, Addressing modes. Programming for arithmetic and logical operation. Subroutine concepts.

Lectures 10, Marks 20

UNIT II

Functional pin diagram and architecture of 8031 / 51 microcontroller, Port structure, Instruction Set and assembly language programming.

Lectures 10, Marks 20

UNIT III

Timer / counter, modes of operation, Programming timer / counter.
Interrupt structure and Interrupts programming.
Serial communication programming in 8051 (only Standard 8-Bit UART Mode).
Memory interfacing (RAM, ROM, EPROM) - Basic concept in memory interfacing and address decoding.

Lectures 10, Marks 20

UNIT IV

Programmable Peripheral Interface (8255) – Block diagram, control words and modes and Interfacing.
Interfacing to external RAM and ROM, LED, Switch, 7-Segment display, Multiplexed 7-Segment display, Matrix Key-Board, Liquid Crystal Display, DAC, ADC, Stepper Motor with programs.

Lectures 10, Marks 20

UNIT V

Buses and Protocols – RS 232, RS 485, I^2C, MODBUS, IEEE 488.
Interfacing to EEPROM 93C46 / 56 / 66, 24C16 / 32 / 64, RTC DS1307.
Conceptual study of various derivatives of 8051 microcontroller from different manufacturers like Atmel, Phillips etc. Introduction to PIC microcontroller.

Lectures 10, Marks 20

References:

1. Gaonkar - Microprocessor Architecture , PHI.
2. Kenneth J. Ayala - 8051 Microcontroller, PHI.
3. Mazidi and Mazidi - The 8051 Microcontroller and Embedded Systems, Pearson.2nd ed
4. Mike Predko - Programming and Customizing 8051 micro controller, TMH.

List of Practicals:

1. Study of 8051 / 8085 assembler and Simulator.
    a) This is to be studied by writing program for addition / subtraction, multiplication / division.
    b) Executing external memory related instructions using MOVC / MOVX instruction (8051 only) *OR* Executing input / output or memory mapped input output related instructions (8085 only)
2. Writing a program which involves following any TWO (one using 8051and one using 8085):
    a) Celsius to Fahrenheit or Fahrenheit to Celsius conversion.
    b) Calculation of factorial.
    c) Multiple digit BCD arithmetic.
3. Write and Execute program to flash LED.
4. Write and Execute program to display 0 to 9 continuously on 7-Segment display,
5. Write and Execute program to demonstrate interfacing of 4 X 4 matrix Key-Board.
6. Write and Execute program to demonstrate interfacing of multiplexed 7-Segment display.
7. Write and Execute program to demonstrate interfacing of Liquid Crystal display.
8. Write and Execute program to demonstrate interfacing of DAC.
9. Write and Execute program to demonstrate interfacing of ADC.
10. Write and Execute program to demonstrate interfacing of Stepper Motor.
11. Write and Execute program to demonstrate Serial data Transmission.
12. Write and Execute program to demonstrate Serial data Reception.
13. Write and Execute program to demonstrate interfacing of Serial EEPROM 93C14 / 56 / 66 or 24C16 / 32 / 64.
14. Write and Execute program to demonstrate interfacing of RTC DS1307.

Note:

1. Experiments 3 to 14 should be performed with 8051 / 89c51 / 89c51RD2 kits using Assembler and downloading program.
2. Minimum EIGHT practicals are to be performed

NORTH MAHARASHTRA UNIVERSITY JALGAON
T.E. (ELECTRONICS, ELECTRONICS & COMMUNICATION, ELECTRONICS & TELECOMMUNICATION)
W.E.F : 2007- 08
TERM - I
NETWORK ANALYSIS AND SYNTHESIS

Teaching scheme:
Lectures : 4 hrs / week
Practical : 2 hrs / week
Tutorial : 1 hr / week

Examination scheme:
Theory Paper : 100 Marks (3 Hours).
Term Work : 25 Marks
Practical : 25 Marks

UNIT I

Concept of complex frequency, Characteristics of signals, standard signals, Laplace transform: Definition, Advantages in Network Analysis , Laplace Transform of waveforms , Network Analysis using Laplace Transform, Mesh Analysis. Node analysis , Thevenin Theorem and Nortons Theorem, Initial and final value theorem System Function, Impulse and state response of networks. , illustrative examples.

Lectures 10, Marks 20

UNIT II

System and Network Functions : Driving point admittance and impedance- Transfer impedance and admittance, voltages and current transfer Ratio, illustrative examples.
Natural frequencies, Poles and zeros in Network functions, significance of poles and zeros. Necessary conditions of driving point function and transfer function. Network with OP-Amps, Time domain behavior from poles and zeros plot in S domain.

Lectures 10, Marks 20

UNIT III

Two Port Networks Parameters: Z Parameter, Y parameter, h – parameter, ABCD parameter, Equivalent circuit using these parameters. Condition for reciprocity and symmetry of two port network in different parameters. Interconnection of two port networks. Cascade connection of two port networks parallel connection of two port networks. Series and series parallel connections. Inter conversion of parameters.

Lectures 10, Marks 20

UNIT IV

Synthesis of One and Two Port Networks : Hurwitz polynomials, positive Real functions. Synthesis of one port networks. Properties of LC immittance function, synthesis of LC driving point immittance, properties of RC driving point impedance or RL admittance, properties of RL impedances and RC admittances. Synthesis of RL , RC , LC , RLC functions. Synthesis in all Cauer / Foster form
Elements of Transfer function synthesis. Transfer function synthesis of two port networks.
Properties of transfer functions, zeros of transmission . synthesis of Y_{21} and Z_{21} and synthesis of constant resistance network.

Lectures 10, Marks 20

UNIT V

Filter Design: Frequency domain approximation of ideal low pass filter, Butterworth approximation, Tchebyshev approximation, synthesis of low pass filter, magnitude and frequency normalization, frequency transformation to generate high pass, band pass filter and band elimination filter from

normalized LPF.

Lectures 10, Marks 20

References:

1) Van- Vakenberg - Introduction to Modern Network Synthesis , PHI / Pearson 3rd ed
2) Franklin Kuo - Network Analysis and Synthesis
3) J Michael Jacob - Application of Design with Analog Integrated circuit , PHI 2nd ed
4) Gobind Daryanani - Principles of Active Network Synthesis and Design , Wiley
5) C P Kuriakose - Circuit Theory ; Elements of Network System , PHI
6) D Roy Chaudhary - Network and System , New Age
7) V K Atre - Network Theory and Filter Design, New age

List of practicals

1) Verify the Thevenin's theorem for given two port reactive circuit.
2) Determine transfer / driving point Impedance of given Two port reactive N/w.
3) Determine voltage and current transfer function of a given two port reactive N/w.
4) Determine pole - zero plot of given one port reactive N/w.
5) Determine Z parameter of networks connected in series.
6) Determine Y parameter of networks connected in parallel
7) Determine transmission parameter of networks connected in cascaded form.
8) Design and test low pass Butterworth filter
9) Design and test high pass Butterworth filter
10) Design and test low pass Tchebyshev filter

Note :- Minimum EIGHT practicals are to be performed..

NORTH MAHARASHTRA UNIVERSITY JALGAON
T.E. (ELECTRONICS , ELECTRONICS & COMMUNICATION, ELECTRONICS & TELECOMMUNICATION)
W.E.F : 2007- 08
TERM – I

SOFTWARE APPLICATION -II

Teaching scheme:
Practical : 2 hrs / week

Examination scheme:
Term Work : 25 Marks

Objectives:
Introduction to the various software tools in the design, simulation and testing of electronics circuits.

Section A:
Simulation of analog circuits using any software tool:

1) To find voltage and current of the given network using simulation tool.
2) To find transfer / Driving point impedance of two port network.
3) To design and test active filter.
4) Frequency domain analysis of given filter.

Section B:
Simulation of control system using any software tool:

1) To find the pole zero plot of the given network.
2) To find the polar / Nyquist plot of the given network.
3) To design and check any control system.
4) To obtain transient response and characteristics of any given network.

Section C:
Simulation of Radiation Patterns using any software tool:

To find the radiation pattern any four types of antennas and study the effects of varying parameters.

Note: Minimum SIX assignments, TWO from EACH section.

References :

i. RASHID - PSPICE
ii. Stephen Chapman - Matlab programming for Engineer, Thomson.
iii. Manuals / Books of concern software tools.

NORTH MAHARASHTRA UNIVERSITY JALGAON
T.E. (ELECTRONICS, ELECTRONICS & COMMUNICATION, ELECTRONICS & TELECOMMUNICATION)
W.E.F : 2007- 08
TERM – I I
ELECTRONICS MEASUREMENTS

Teaching scheme:
Lectures : 4 hrs / week
Practical : 2 hrs / week

Examination scheme:
Theory Paper : 100 Marks (3 Hours).
Term Work : 25 Marks

UNIT I

Analog instruments:

LCR-Q meter, True RMS meter, vector voltmeter, RF power and voltage measurement, Electronic multimeter, Amplified DC meter, AC voltmeter using rectifiers, Vector impedance meter, Output power meter, Field strength meter, Automatic bridge transmitter, Analog Ph meter, Bolometer method for power measurement.

Lectures 08, Marks 20

UNIT II

Digital Instruments

Microprocessor controlled bridges, Digital Readout Bridges, Digital counters and timers, Basic counter circuitry, main gate, Time base control circuit, Frequency measurement, measurement errors, Ratio of frequency measurement, Automation in digital instruments (Auto zeroing, auto polarity etc), Digital tachometer, Digital Ph meter, Phase meter, capacitance meter

Lectures 08, Marks 20

UNIT III

Signal Generators and Analyzers:-

Sine wave generator, Fixed Frequency AF Oscillator, Frequency synthesized signal generator, Random noise generator, sweep generator, Sweep marker generator, Colour bar generator, Vectroscope, Function generator.

Basic wave analyzer, Frequency selective wave analyzer, heterodyne wave analyzer, harmonic distortion analyzer, spectrum analyzer, Digital Fourier analyzer, logic analyzer, signature analyzer, OTDR meter, Wobbuloscope.

Lectures 10, Marks 20

UNIT IV

Oscilloscope:-

Introduction, principle, feature, block diagram, vertical amplifier, sweep types , delay line types , CRT diagram, CRT basics, PDA Tubes, dual beam CRO, dual trace CRO, VHF oscilloscope , VLF signal scope (analog storage and digital storage scopes), digital read out scopes, probes for CRO, attenuators, applications of CRO, fiber optic CRT, recording oscilloscope, hall effect probe , power scope.

Lectures 14, Marks 20

UNIT V

Data Aquisition, Conversion and Transmission:

Instrumentation system, interfacing transducer to electronic control, objectives of DAS , single channel multi channel DAS, ATS, computer based testing of audio amplifier ,radio receiver, data loggers, digital transducers. Data transmission systems, advantages and disadvantages of digital over analog transmitter, TDM, etc.

Lectures 10, Marks 20

References:

1) Helfrick and Cooper – Modern Electronics Instrumentation and Measurement Techniques , Pearson
2) Deoblin – Measurements systems: Applications and Design , TMH 5th ed
3) Nakra , Choudhari -- Instrumentation Measurements and analysis , 2/E TMH
4) H. S. Kalsi – Electronics Instrumentation, TMH 2nd ed

List of Practicals :

1) Measurement of reactive and resistive components with LCR Q meter.
2) Study of true RMS meter / DMM for measurement of EMS value of any AC signal.
3) Measurement of frequency Time with the help of frequency counter.
4) Study of Digital Tacho meter for measurement of motor speed .
5) Measurement of distortion and nature of distortion by harmonic distortion analyzer.
6) Study of spectrum analyzer for its application.
7) Measurement techniques using CRO (frequency, amplitude, phase, time and component tester).
8) Study of DSO to measure and store frequency and amplitude.
9) Study of DATA loggers for various parameter measurement.
10) Study of computerized analysis of radio receiver and measurement of power with it.
11) Study of ATS

Note :- Minimum EIGHT practicals are to be performed.

NORTH MAHARASHTRA UNIVERSITY JALGAON
T.E. (ELECTRONICS & COMMUNICATION, ELECTRONICS & TELECOMMUNICATION ENGINEERING)
W.E.F 2007 –2008
TERM – II
POWER ELECTRONICS

Teaching scheme:
Lectures: 4 hrs / week
Practical: 2 hrs / week

Examination scheme:
Theory Paper: 100 Marks (3 Hours)
Term Work: 25 Marks
Practical: 25 Marks

UNIT I

Power Devices : S.C.R. Structure, characteristics, transistor Analogy , ratings, R , RC, UJT Triggering, dv / dt and di / dt protection. Structure and characteristics of IGBT, GTO, FCT, MCT, Electrically isolated drive circuit for IGBT and MOSFET.

Lectures 10, Marks 20

UNIT II

Line Frequency Controlled Rectifiers : Natural and Line commutation, single phase, Half and full controlled bridge rectifier with R load, Circuit diagram, waveforms, average load voltage, efficiency, Ripple factor, Form factor. Single phase Half and fully controlled bridge rectifiers with inductive load, circuit waveforms, average output voltage, RMS load voltage, average load power, active power, reactive power, current distortion factor, displacement factor, input power factor, Effect of source inductance. 3 - ϕ Half and fully controlled bridge rectifier with highly inductive load, circuit, operation and waveform, derivation of average and rms load voltage.

Lectures 10, Marks 20

UNIT III

DC – DC Converter Control of dc - dc- converter, step – down and step - up dc-dc converter, circuit diagram, waveform, output voltage calculations. Continuous conduction mode, boundary between continuous and discontinuous conduction.

Full bridge dc-dc converter– PWM Bipolar voltage switching. Switch mode power supply – Block diagram , control of SMPS – voltage feed forward control, current mode control, power supply protection. Electrical isolation in feedback loops.

Lectures 10, Marks 20

UNIT IV

DC – AC Inverters: Parallel inverters, principle of operation, 1 – ϕ Half bridge and full bridge inverters with R and R-L load, square wave and sinusoidal PWM switching, selection of frequency modulation ratio and amplitude modulation ratio. Harmonic analysis of square and quasi – square waveform, Harmonic load current, Harmonic reduction.

3 - ϕ Bridge inverter with balanced star resistive load, 120 degree and 180 degree conduction sinusoidal PWM switching scheme and Harmonic spectrum.

Lectures 10, Marks 20

UNIT V

AC Controllers and Application Principle of integral cycle and phase angle control. 1 ϕ Half wave and full wave AC control with R and R -L load, derivation of output Voltage. 3 - ϕ Half and full wave AC control, circuit diagram, waveforms and operation.UPS- configurations, Battery- Ah, back up time and battery charger rating calculations. Study of speed control of DC motor, speed control of AC motor.

References:

1. M.H. Rashid - Power Electronics circuits, devices and applications, PHI, 3/e . Or Pearson
2. Ned Mohan, T.M. Undeland and W.P. Robbins- Power Electronics, converters , Application, and Design , John willey and sons , 3/e
3. M.S. Jamil Asgar, - Power Electronics , PHI, 2004, New Delhi.
4. S.K. Bhattacharya - Industrial Electronics and control , Tata Mc-graw-Hill (TMH)
5. M Ramamurthy - An Introduction to Thyristor and their application, Second Edition,
6. M.D. Singh , K.B. Khanchandi - Power Electronics, TMH
7. Deodatta Shingare , Industrial and Power Electronics, Electrotech Pub.

LIST OF Practicals :

Group A

1) Study of R , RC and UJT triggering circuits of SCR to plot waveforms for various values of firing angle..
2) Implement optically isolated driver circuit for IGBT and MOSFET.
3) Study of 1 - ϕ Half controlled Bridge rectifier with R and RL Load , plot input and output voltage waveforms ,average load voltage v/s firing angle.
4) Study of 1- ϕ full controlled bridge converter with R and R-L load , plot input and output voltage waveforms ,average load voltage v/s firing angle.
5) Study of circuit and waveforms of step-down dc –dc converter and plot output voltage v/s duty ratio and switching frequency.
6) Study of circuit and waveforms of step-up dc –dc converter and plot output voltage v/s duty ratio and switching frequency.
7) Plot characteristics of IGBT, GTO .

Group B

8) Find Line and load regulation of SMPS.
9) Study of Parallel Inverter and find efficiency.
10) Study of I- ϕ full bridge inverter and find efficiency.
11) Study of 3- ϕ Bridge inverter and find efficiency.
12) Study of UPS
13) Study of 1- ϕ AC controller with R load and measure load voltage and plot waveforms for different firing angles
14) Study of 3- ϕ AC controller with R load and measure load voltage and plot waveforms for different firing angles

.

Note :- Minimum EIGHT practicals are to be performed.(Minimum FOUR practicals from EACH group)

NORTH MAHARASHTRA UNIVERSITY JALGAON
T.E. (ELECTRONICS, ELECTRONICS & COMMUNICATION, ELECTRONICS & TELECOMMUNICATION)
W.E.F : 2007- 08
TERM – I I
ELECTRONICS CIRCUIT DESIGN

Teaching scheme:
Lectures : 4 hrs / week
Practicals : 2 hrs / week
Tutorial : 1 hr / week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)
Term Work : 25 Marks
Practical : 50 Marks

UNIT I

Design of Power Supplies : Design of Unregulated power supply , selection of transformer, diodes, capacitors , calculation of surge resistance (using bridge rectifier) Design of Discrete series regulated power supply with protection circuit , design of regulated power supply using IC LM- 340 series, design of Dual power supply using LM-317 and LM 337 IC's., Design of switching regulators , Buck regulator , Boost regulator, and Buck – Boost using switching regulator IC – LM 1577 / 2577 . Heat sink calculations for power supplies.

Lectures 10, Marks 20

UNIT II

Design of Small Signal (Voltage) Amplifier BJT / FET : Design of Bias circuits (BJT / FET) Design of single stage amplifiers (CE / CS , CG / CB / CC / CD) Use of negative feedback : feedback amplifier design. Designing of negative feedback amplifiers : voltage series , voltage shunt, current series, current shunt

Lectures 10, Marks 20

UNIT III

Design of Large Signal (power) Amplifiers: Class - A, class - B, Class - AB , Push-pull amplifier, complementary symmetry amplifiers , Monolithic power amplifier design using IC LM-379.

Lectures 10, Marks 20

UNIT IV

Design of High Frequency Amplifier : Design of Tuned amplifier BJT / FET single tuned , double tuned. Use of auto transformer (Tapped - inductor) High frequency, cascode amplifier. Design of oscillator circuits : Clapp, Colpitt , Hartley oscillaotor, Design of switching circuits: Astable multivibrator, Monostable multivibrator, Bistable multivibrator.

Lectures 10, Marks 20

UNIT V

Design using Analog Integrated Circuits. : Single supply amplifiers (AC inverting, AC Non inverting amplifiers) , instrumentation amplifier AD – 620 , V - I converter, I - V converter, V - F, F - V, converters.

Current amplifiers. Design of Non-linear circuits: Voltage comparators , peak detectors. , True RMS converter. Sallen-key active filter design: Second order Sallen-key low pass, high pass, band pass, band reject, unity gain and equal component circuit design for Butterworth, Chebyshev response. Higher order filter design.

Lectures 10, Marks 20

References:

1) M.M. Shah - Design of Electronics Circuits and Computer Aided Design , Wiley Eastem
2) Goyal , Khetan - Monograph on Electronics Design Principles , Khanna Pub.
3) Michael Jacob - Application and Design with Analog Integrated Circuits , PHI 2/e
4) Sergio Franco – Design with OP-AMP and Analog Integrated Circuits, TMH , 3/e.
5) Bell - Electronics Devices and Circuits, PHI or Pearson 4/e

6) Martin S Roden , Gordon – Electronics Design ,Shroff Pub. - 4/e.
7) Bell – Solid State Pulse Circuits , PHI 4/e
8) K.V.Ramanan - Functional Electronics, TMH

LIST OF Practicals :

UNIT – I

1) Design of Regulated power supply.
    a) Transformer selection.
    b) Rectifier (Bridge)
    c) Filter Designing (Capacitor)
    d) Transistor series Regulator (Feedback type) with current protection circuit (or) Design of Regulated power supply using IC LM 340 series.
2) Design of switching regulator circuit using switching Regulator IC LM1577 / 2577

UNIT – II

3) Design of single stage amplifier circuits using BJT / FET
    a) Inverting / non inverting amplifier.
    b) Self bias for BJT and potential divider for FET.
    c) Calculation of Performance parameters like A_v, R_i and R_o
4) Design Test and verify the negative feedback amplifier circuits using BJT / FET
    a) Design biasing network
    b) Feedback network
    c) Calculation of performance parameters like A_{vf}, R_{if} and R_{of}

UNIT – III

5) Design and Testing of monolithic power amplifier using IC LM 379
    a) Designing of External Components required.
    b) Measurement of output power.
6) Design of Transformer less class B push pull amplifier using BJT. For
    a) With cross over Distortion.
    b) Elimination of Cross over distortion.

UNIT – IV

7) Design the single stage tuned amplifier using BJT / FET for given center frequency.
    a) Design of biasing circuit
    b) Designing of tuned circuit
    c) Calculations and verification of f_o and Bandwidth.
8) Design of Astable multivibrator using BJT
    a) Selection of Transistor
    b) Design of all external components.
    c) Calculation and verification of desired output frequency and amplitude of output voltage.

UNIT – V

9) Design of Inverting / Non inverting single supply amplifier using LM 324
    a) Designing of Biasing circuits
    b) Verification of the given gain and input impedance.
10) Designing of Instrumentation Amplifier using AD 620
    a) Designing of External components for given value of gain.

    OR

    Design of voltage to frequency converters using IC AD 537 for given requirements and verification of the same.
11) Design and test a sallen – key second order low pass / high pass filter for given specifications.
12) Design and test a sallen – key second order band pass filter for given specifications.

NOTE : 1) Minimum FIVE practicals are to be performed ,at least ONE from EACH unit.
2) EACH experiments should be carried out in TWO turns. In FIRST turn designing

calculations are expected and in SECOND turn a complete circuit or major part of it be implemented.

3) Design using BJT must be carried out using h- parameters only.

NORTH MAHARASHTRA UNIVERSITY JALGAON

T.E. (ELECTRONICS & COMMUNICATION, ELECTRONICS & TELECOMMUNICATION)

W.E.F : 2007- 08

TERM – I I

INFORMATION THEORY AND CODING TECHNIQUES

Teaching scheme:	Examination scheme:
Lectures : 4 hrs / week	Theory Paper : 100 Marks (3 Hours)
Tutorial : 1 hrs / week	Term Work : 25 Marks

UNIT I

Information Theory and Channel Capacity : Introduction , Uncertainty, Information and Entropy, source coding theorem, Shannan fano algorithm data compaction, Discrete memory less channels, Mutual Information, channel capacity, channel coding theorem, differential entropy and mutual information for continuous ensembles . Information capacity theorem, Implication of the information capacity theorem, information capacity of colored noise channels, rate distortion theory, data compression.

Lectures 10, Marks 20

UNIT II

Error Control Coding : Introductions to error correcting codes, basic definitions, matrix description of linear block codes, equivalent codes . Parity check matrix, decoding of linear block codes, syndrome decoding , error probability after coding , perfect codes, hamming codes , optimal linear codes , maximum distance separable codes. Introduction to cyclic codes polynomials. The division algorithm for generating cyclic codes, matrix description of cyclic codes, Burst error correction, fire codes, golay codes, Cyclic Redundancy check codes, circuit implementation of cyclic codes . FEC and ARQ systems.

Lectures 10, Marks 20

UNIT III

Convolutional Codes and Coding Methods : Introduction to convolutional codes, Tree codes and trellis codes, polynomial description of convolutional codes, distance notions for convolutional codes, Generating functions, Matrix Description of convolutional codes, viterbi Decoding of convolutional codes, distance bounds for convolutional codes, Turbo codes, Turbo decoding, Introduction to TCM , concept of coded modulation. Mapping by set partitioning, ungerboecks TCM design rules, TCM decoder Performance evaluation for AWGN channel. Burst error correcting Codes,

Lectures 10, Marks 20

UNIT IV

Application of Information Theory : Introduction to BCH codes, primitive elements, Minimal polynomials, Generate polynomials in terms of Minimal polynomials, same examples of BCH codes, Reed solemen codes, implementation of Reed Solomon encoders and decoders. Data compression. Introduction to data compression, The JPEG standards for loss less compression. Introduction to crypto graphy. Overview of encryption Techniques. RS algorithm, application of information theory. An optimum modulation system. Comparison of Amplitude modulation system with optimum system. Feedback communication system.

Lectures 10, Marks 20

UNIT V

Communication Link Design : Introduction to multi-user radio communications . Multiple Access Techniques. Introduction to satellite communication , Radio link analysis, wireless communication , statistical characteristics of multipath channels. Binary signaling, Over a Rayleigh fading channel . TDMA and CDMA wireless communication systems, wireless standards IS 95.

Lectures 10, Marks 20

References:

1. Ranjan Bose - Information Theory Coding and Cryptography, TMH
2) Taub and Schilling - Principle of Communication Systems, (TMH) 2nd edition.
3) J. Das , K Mulik, P.K. Chatterjee - Principle of Digital Communication , (New Age Int.)
4) Theodore S. Rappaport - Wireless Communication – Principles and practice ,(Pearson Ed) 2nd Ed..
5) J.G. Proakis - Digital Communications, (MGH), 4th Ed.

Note: - Assignment will be based on the problems on EACH unit . (min.FIVE Assignment)

NORTH MAHARASHTRA UNIVERSITY JALGAON
T.E. (ELECTRONICS, ELECTRONICS & COMMUNICATION, ELECTRONICS & TELECOMMUNICATION)
W.E.F : 2007- 08
TERM – I I

ANALOG INTEGRATED CIRCUITS AND APPLICATIONS

Teaching scheme:
Lectures : 4 hrs / week
Practicals : 2 hrs / week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)
Term Work : 25 Marks
Practicals : 25 Marks

UNIT I

Op-amp Basics

Block diagram of op-amp, differential amplifier, various configurations, dc and ac analysis, constant current bias circuits, current mirror, active load, dc level shifter, output stage, op-amp symbol, packages, 741 op-amp pin diagram, overview of general purpose and special purpose op-amp, their peculiarities and application areas, FET op-amp, MOSFET op-amp.

DC parameters: definitions and typical values, input bias current, input offset current, input offset voltage, offset voltage and bias current compensation, thermal drift, A.C. parameters: frequency response, stability of op-amp, frequency compensation, internally compensated op-amp, slew rate, its effect on op-amp output, gain bandwidth product, rise time, full power bandwidth, CMRR, SVRR, open loop and close loop operation of op-amp, ideal op-amp, practical op-amp, inverting and non inverting amplifier, and analysis using ideal and practical op-amp, concept of virtual ground.

Lectures 10, Marks 20

UNIT II

Op-amp Applications

Voltage follower, difference amplifier, summing amplifier, substractor, adder-substractor, peaking amplifier, instrumentation amplifier using 3 op-amp and its applications, linearization, isolation techniques, monolithic instrumentation op-amp IC AD 5219 (pin and functional diagram), ac amplifier, dc amplifier, V to I (floating and grounded load) and I to V converter, its applications, integrator and differentiator, their practical considerations.

Half wave and full wave Precision rectifiers, clipper, positive and negative clamper, peak detector, sample and hold circuit, IC LF398 (pin and functional diagram), log and antilog amplifier, Analog multiplier and divider.

Lectures 10, Marks 20

UNIT III

Comparators and Signal Generators

Inverting and non inverting comparator, zero crossing detector, window detector, Schmitt trigger, its advantages, limitation of op-amp as comparator, comparator IC study LM311, introduction to OTA.

Square wave generator, monostable multivibrator, triangular wave and sawtooth wave generator, sine wave generator, phase shift oscillator, Wien bridge oscillator.

Timer IC 555: Functional diagram, monostable operation, astable operation, applications. Function generator IC 8038.

Lectures 10, Marks 20

UNIT IV

PLL and Audio Power Amplifiers

V to F converter, IC AD537. F to V converter, IC LM 2917. PLL: basic principles, block schematic, phase detector, low pass filter, VCO IC 566, transfer characteristics, free running frequency, lock range, capture range, pull in time, PLL IC 565, block diagram, circuit connection, PLL application: frequency synthesis, FM demodulator, AM demodulator, FSK demodulator.

Audio power amplifier: LM380 specifications, features, applications, features of other amplifier such as LM384, LM 377, LM810.RF and IF amplifier IC.

Lectures 10, Marks 20

UNIT V

Active Filters, D to A and A to D Converter

Active filter: Butter worth low pass, high pass, band pass and band reject filter, first order and second order filter design, frequency scaling.

DAC Specifications: resolution, offset error, gains error. Weighted resistor DAC, its disadvantages, R-2R ladder DAC, inverted R-2R ladder, AD 558.

ADC specification: resolution, quantization error, offset error, gain error, linearity error, conversion time. Flash ADC, counter type ADC, successive approximation type, integrating type ADC, dual slope ADC, AD670. Frequency response of ADC, sample and hold circuit.

Lectures 10, Marks 20

References:

1) D.Roy Chaudhary ,Shalil Jain- Linear Integrated Circuit, New Age International, 2/e.
2) Coughling,Driscoll - Op amps and Linear Integrated Circuits, Pearson education, 6/e
3) Ramakant Gaikward - Op amp and Integrated circuit, PHI
5) Sergio Franco - Design with Operational Amplifier and Analog Integrated Circuits , TMH- 3 / e
6) Botkar - Integrated circuits, Khanna Pub.

List of Practicals

Study of op-amp data sheets: LM 741, OP-07

1. Op-amp parameter measurement: input bias current, input offset current, input offset voltage, slew rate of op-amp 741.
2. Design and test active integrator and differentiator circuits for given frequency.
3. Study the operation of half wave and full wave precision rectifier.
4. Design and test positive and negative clamper.
5. Design and test Schmitt trigger circuit using LM 311 for given hysteresis.
6. Design and test of square wave and triangular and saw tooth wave generator using op-amp for given frequency.
7. Design and test timer using IC 555 in monostable and astable mode.
8. Design and test function generator using IC 8038.
9. Design and test PLL using IC 565 PLL for given lock and capture range.
10. Design and test audio amplifier using IC LM380 with and without positive feedback.
11. Setup DAC circuit Using IC AD 558 and study its performance
12. Setup ADC circuit Using IC AD 670 and study its performance
13. Design and test second order Butterworth LP / HP filter.
14. Design and test BP Butterworth filter.
15. Design and test BR Butterworth filter.

Note: Minimum EIGHT practicals are to be performed, at least ONE from each unit. All practical should be performed on bread board.

NORTH MAHARASHTRA UNIVERSITY JALGAON
T.E. (ELECTRONICS, ELECTRONICS & COMMUNICATION, ELECTRONICS & TELECOMMUNICATION, ELECTRICAL)
W.E.F : 2007- 08
TERM – I I

PRACTICAL TRAINING / MINI PROJECT / SPECIAL STUDY

Teaching scheme:
Practical : 2 hrs / week

Examination scheme:
Term Work : 25 Marks

- Every student has to undergo industrial / practical training for a minimum period of two weeks either during summer vacation between (S.E Second Term) fourth term and (T.E. First Term) fifth term or during winter vacation between fifth term and sixth term (T.E. First Term and Second Term).

- The industry in which practical training is taken should be a medium or large scale industry

- The paper bound report on training must be submitted by every student in the beginning of (T.E. Second Term) sixth term along with a certificate from the company where the student took training.

- The report on training should be a detailed one.

- Maximum number of students allowed to take training in a company should be five. Every student should write the report separately.

- In case if a student is not able to undergo practical training, then such students should be asked to

  prepare special study report on a recent topic from reported literature .

  or

  prepare a mini project related to the Electronics / Electronic and Communication / Electronic and Telecommunication branch of engineering.

  1. The circuit for mini project must be designed by a student.

  2. The circuit should be simulated using any of the standard simulation software available.

  3. Result verification for paper design and simulation should be carried out and discrepancies should be discussed.

  4. Verified circuit should be assembled and tested on general purpose PCB/ Protoboard for actual working and practical results.

  5. Layout of circuit using standard Layout tool (Orcad / Protel / CADstar / Pads / Ultiboard) should be designed and PCB making process should be carried out.

  6. Assemble and test the circuit on PCB. Prepare bill of materials.

7. Project report should be detail of work, carried out by student, including layouts, circuits, bill of materials and relevant details

- The practical training / special study / mini project shall carry a term work of 25 marks. Every student shall be required to present a seminar in the respective class in the presence of two teachers. These teachers (appointed by the head of department in consultation with the Principal) shall award marks based on the following:

(a) Report	10 marks.
(b) Seminar presentation	10 marks.
(c) Viva -voca at the time of Seminar presentation	05 marks.

Total	25 marks.

T.E. (ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

SR. NO.	OLD SUBJECTS	NEW SUBJECTS
1	NETWORK ANALISYS AND SYNTHESIS Term I	NETWORK ANALISYS AND SYNTHESIS Term I
2	MICROPROCESSOR TECHNIQUES Term I	
3	FEEDBACK CONTROL SYSTEM Term I	FEEDBACK CONTROL SYSTEM Term I
4	ELECTRONICS DESIGN - I Term I	
5	SIGNAL CONDITIONING AND DATA CONVERSION Term I	ANOLOG INTEGRATED CIRCUITS AND APPLICATIONS Term II
6	MICROPROCESSOR INTERFACING AND PERIPHERALS Term II	
7	POWER ELECTRONICS Term II	POWER ELECTRONICS Term II
8	COMMUNICATION SYSTEM - I Term II	
9	INDUSTRIAL MANAGEMENT Term II	MANAGEMENT SCIENCE at S.E. (E &C, E & T/c) Term II
10	ELECTRONICS DESIGN - II Term II	
11	Practical Training / Mini Project / Special Study Term II	Practical Training / Mini Project / Special Study Term II
12		ELECTRONICS CIRCUIT DESIGN Term II
13		MICROPROCESSOR & MICROCOLTROLLER SYSTEMS Term I
14		SOFTWARE APPLICATION - II Term I
15		DIGITAL COMMUNICATION Term I
16	ELECTRONIC MEASUREMENT at B. E. (E &C, E & T/c) Term II	ELECTRONIC MEASUREMENT Term II
17		INFORMATION THEORY AND CODING TECHNIQUES Term II
18	ELECTROMAGNETIC ENGINEERING at S. E.(E &C, E & T/c) Term I	ELECTROMAGNETIC ENGINEERING Term I

NORTH MAHARASHTRA UNIVERSITY,

JALGAON (M.S.)

BATCHELAR OF ENGINEERING (B.E.)

(FINAL YEAR)

ELECTRONICS AND COMMUNICATION,

ELECTRONICS AND TELECOMMUNICATION

TERM – I and II

W.E.F 2008 - 2009

NORTH MAHARASHTRA UNIVERSITY, JALGAON
STRUCTURE OF TEACHING AND EVALUATION
B.E. (ELECTRONICS and COMMUNICATION / ELECTRONICS and TELECOMMUNICATION)

FIRST TERM

W.E.F. 2008-09

SR.No.	Subject	Teaching Scheme Hours / Week			Examination Scheme				
		Lectures	Tutorial	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Radiation and Microwave Technology	4	-	2	3	100	25	25	-
2	* Fiber Optic Communication	4	-	2	3	100	25	-	-
3	***** Digital Signal Processing and Processors	4	-	2	3	100	-	25	-
4	***** Computer Communication Networks	4	-	-	3	100	25	-	-
5	Elective - I	4	-	2	3	100	25	25	-
6	***** Project - I	-	-	2	-	-	25	-	25
7	***** Seminar	-	-	2	-	-	25	-	-
	Total	**20**		**12**		**500**	**150**	**75**	**25**
	Grand Total	**32**			**750**				

SECOND TERM

SR. No.	Subject	Teaching Scheme Hours / week			Examination Scheme				
		Lectures	Tutorial	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Telematics	4	-	2	3	100	25	-	25
2	Television and Consumer Electronics	4	-	4	3	100	25	25	-
3	Satellite communication	4	-	2	3	100	25	-	-
4	Elective -II	4	-	2	3	100	25	25	-
5	***** Industrial Visit / Case Study	-	-	-	-	-	25	-	-
6	***** Project - II	-	-	4	-	-	100	-	50
	Total	**16**	**-**	**14**		**400**	**225**	**75**	**50**
	Grand Total	**30**			**750**				

*** Common with B.E. (Electronics Engineering)**

ELECTIVE I	i) Data Communication and Design
	ii) * Biomedical Instrumentation
	iii) System Programming
	iv) * VLSI Design
	v) Broad band Communication

ELECTIVE II	i) * Embedded System
	ii) * Digital Image Processing
	iii) * Neural Network and Fuzzy systems
	iv) Telecomm. Network Management
	v)Nanotechnology

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - I

RADITATION AND MICROWAVE TECHNIQUES

Teaching scheme:
Lectures: 4 hrs / week
Practicals: 2 hrs / week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)
Practical : 25 Marks
Term Work : 25 Marks

UNIT I

Guided waves and Transmission lines : Transmission line parameter, Transmission line equation, Transmission coefficient, reflection coefficient, Impedance matching, quarter wave transmission line, single stub, double stub matching (Analytically and using Smith chart), Solution of quarter wave transformer and single stub by using smith chart only

Electromagnetic Theory: Maxwell's Equation, Uniform waves, free space impedance Lectures 10, Marks 20

UNIT II

Wave guide Theory: Comparison between Transmission line and Waveguide, waveguide types rectangular and circular. Wave propagation through rectangular waveguide, Solution of wave equation in rectangular waveguide, Rectangular wave guide modes, Waveguide characteristics for TE and TM modes (for rectangular waveguide), equation for cut off wavelength, guided wavelength, guided velocity, group velocity

Passive Microwave components : Terminator, attenuator, ,traveling detector, Microwave filter, parametric amplifier, resonator, E-plane, H-plane, Magic Tee, Hybrid circuits, Ferrite Components, Microwave bridge Isolator, Circulator, Directional coupler, E-plane Tee, H-plane Tee, magic tees, Directional couplers, Ferrite components, Microwave bridge, Circulator, Isolator, slotted line, Tuners, coupling probes Lectures 10, Marks 20

UNIT III

Microwave Tubes: Limitations of conventional Tubes, Klystron tubes, Two cavity Klystron, Multi cavity Klystron, Modes of Reflex klystron, Efficiency of Reflex Klystron, Slow wave structure: (TWT) : O type, M type, Magnetron Efficiency, Advantages and disadvantages

Solid state Devices: GUNN diode, PIN diode, IMPATT, BARITT, TRAPATT, Monolithic Microwave strip line devices, Microwave Integrated circuits, Applications of Microwave Integrated Circuits Lectures 10, Marks 20

UNIT IV

Microwave Antenna

RF antenna and Microwave antenna, Horn antenna, Parabolic reflector with all types of feeding methods, slotted antenna, Lens antenna, Microwave strip line antennas, Equation for antenna gain, Directivity and Beam width of all above antenna types.

Microwave measurements: Frequency, Power, attenuation, VSWR, Impedance measurement. Lectures 10, Marks 20

UNIT V

Microwave Applications:

Wireless Microwave communication system: Radio Receiver Architecture, Noise Characterization
Radiometer System: Theory and application, total Power Radiometer, Dicke Radiometer
Microwave heating
Power Transfer
Bio-medical application
RADAR: Principle of Radar System, Pulse radar, Radar range equation, Doppler Effect, Blind Speed, CW Doppler MTI Radar

Lectures 10, Marks 20

References:

1. R. E. Collins - Foundation of microwave engineering, Tata McGraw hill
2. Pozar - Microwave Engineering , John Wiley
3. Annapurana Das, S. K das - Microwave Engineering, Tata McGraw Hill
4. Samuel Liao – Microwave Devices and circuits, Tata McGraw Hill
5. K. C. Gupta – Microwave, New Age
6. Peter A. Rizivi - Microwave Engineering,

List of Practical:

1. Reflex Klystron Characteristics
2. GUNN Diode Characteristics
3. Microwave Junction: Power splitting Characteristics
4. Directional coupler: Isolator, Coupling factor
5. Circulator, Isolator (Y type) Circulator and Isolation Calculation
6. VSWR Measurement (Using V_{max} / V_{min} Method)
7. Antenna Horn (Radiation Pattern and beam width)
8. Antenna parabolic (Radiation Pattern and beam width)
9. Measurement of attenuation (Fixed and variable)

Note: Minimum EIGHT practicals are to be performed.

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS, ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - I

FIBER OPTIC COMMUNICATON

Teaching scheme:
Lectures: 4 hrs / week
Practical: 2 hrs / week

Examination scheme:
Theory Paper: 100 Marks (3 Hours)
Term Work : 25 Marks

UNIT I

Introduction to Optical Fiber Communication System:

Block diagram of OFCS, Advantage and Disadvantage of OFCS over other communication systems. Ray theory of transmission and concept of acceptance angle and Numerical Aperture (Numericals based on this), Meridonial and skew propagate wave theory of optical propagation : cut – off wavelength. Group velocity and Group delay, Types of fibers (According to materials, Refractive index profile, Mode of propagation) Fiber Optic Splices, connectors, couplers, Directional Coupler.

Lectures 10, Marks 20

UNIT II

Light Sources and Detectors:

Sources : Factors or Characteristics for their selection in OFCS, Types : Light Emitting diodes, Laser diodes, Surface emitter LEDS, Edge emitter LEDS, Super luminescent LEDS, LED operating Characteristics, Modulation Bandwidth: 3-dB electrical bandwidth, 3-dB optical Bandwidth, Radiation patterns of surface and Edge emitters, Laser diode: Laser principles, semiconductor laser diode , Hetero junction Laser , strip- gromentry lasers, Distributed feedback lasers, laser diode operating Characteristics, Radiation patterns.

Detectors: Characteristics or factors for their Selection, P-N photo diode, P-I-N Photo diode, Avalanche photodiode, detector parameters: Quantum efficiency, Responsivity, speed of Response (Numericals based on this) Lectures 10, Marks 20

UNIT III

Modulation: Noncoherent / Coherent

Intensity Modulation: LED Modulation and Circuits (Analog and digital) Analog modulation formats; AM / IM Sub carrier Modulation, FM / IM Sub carrier Modulation. Digital Modulation formats; PCM: RZ, NEZ, Manchester, Bipolar codes, Other digital formats: PPM, PDM, OOK, FSK and PSK.

Detection: (Coherent detection / Heterodyne / Homodyne detection):- Optical heterodyne receivers, Optic Frequency Division Multiplexing. Lectures 10, Marks 20

UNIT IV

Losses in fibers: Absorption, scattering and bending losses. Signal distortion in optical fiber: Material dispersion, waveguide dispersion, intermodal dispersion. Noise in optical fiber: Thermal Noise, shot noise, S / N Ratio, Noise equivalent power (Numericals based on this)

Fiber Optics System Design: Optical power budgeting, Rise-time budget.

Optical Fiber Measurements: Measurement of Attenuation, dispersion, refractive index. Field Measurements: Optical time domain reflectometry. (OTDR) Lectures 10, Marks 20

UNIT V

Advanced Systems and Techniques: -

Wavelength Division Multiplexing, DWDM, optical amplifiers, Optical filters, Integrated optics, Optical Networks: SONET / SDH, Photonic switching, Local Area Networks, Optical Sensors. Lectures 10, Marks 20

References:

1. Jonn M. Senior - Optical fiber communication (Principles and Practice), Pearson
2. G. Keiser - Optical fiber communication, MH
3. Joseph Palais - Fiber optic communications, Pearson
4. Wilson Hawkes - Opto electronics, PHI
5. Selvrajan, Srinivas - Optical fiber communication, TMH
6. B.P.Pal - Optical fiber systems and sensors
7. Govind P. Agrawal - Fiber optic communications systems, wiley 3rd Ed.

List of Practical:

1. Electrical characteristics of (Different type LED)
2. Photometric characteristics of LED / LD (Polar Plot, Intensity Measurement)
3. NA Measurement for Single / Multi de, Gi / S1, fiber
4. Attenuation Measurement of optical fiber
5. Spectral characteristics of LED / LD
6. Fiber optic Analog / Digital transmitter / receiver parameter measurement
7. Study of fiber optical connectors
8. Spectral response of optical fiber
9. Parameter measurement of opto isolator
10. Study of OTDR.

Note: Minimum EIGHT practicals are to be performed

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS, ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - I

DIGITAL SIGNAL PROCESSING AND PROCESSORS

Teaching scheme:
Lectures: 4 hrs / week
Practical: 2 hrs / week

Examination scheme:
Theory Paper: 100 Marks (3 Hours)
Practical : 25 Marks

UNIT I

Discrete Time Signals and Systems:

Introduction: Basic elements of Digital Signal Processing Systems, Advantage and Limitation of Digital over Analog Signal Processing, Application of Digital Signal Processing: Spectral Analysis, Echo Cancellation, Image Processing, Biomedical Signal Processing, Classification of Signals. Discrete Time Signals: Representation, Standard Discrete Time Signals, Classification of Discrete Time Signals, Simple Manipulations of Discrete Time Signals, Sampling of Analog signals, Aliasing, Sampling Theorem. Discrete Time System: Block diagram representation of Discrete Time Systems, Classification of Discrete Time System, Convolution Sum, Properties of Convolution, Causality and Stability condition in terms of the Impulse Responses. Meaning of IIR, FIR, Recursive, Nonrecursive Systems, and Impulse Response of LTI Recursive System. Cross Correlation and Auto Correlation of two sequences. Lectures 10, Marks 20

UNIT II

Z Transform and its application to the analysis of LTI system:

Definition of Z transform, Meaning of ROC, Properties of ROC, Properties of Z transform, Inverse Z transform, Pole Zero plot of the function, Pole location and time domain behavior for causal sequences. Analysis of LTI Systems in Z domain: The System Function of LTI system, Response of LTI system with zero initial condition, Transient and Steady state responses, Causality and Stability of System. Pole zero cancellation. The one sided Z transform, Response of the system with nonzero initial conditions. Solution of difference Equations using Z transform. Lectures 10, Marks 20

UNIT III

Frequency Analysis of Discrete Time Signals and Systems:

The Fourier Transform of Discrete time Aperiodic Signals and Energy Density Spectrum, Frequency response of Discrete Time Systems, Magnitude and Phase response. Frequency Domain Sampling: The Discrete Fourier Transform, IDFT, The DFT as Linear Transformation, Twiddle factor, Properties of the DFT, Use of DFT in linear filtering, Frequency analysis of signals using DFT. Magnitude spectrum of signals. FFT Algorithms: Radix2 DIT and DIF algorithms to computer DFT and IDFT. Lectures 10, Marks 20

UNIT IV

Design and Realization of Digital Filters:

Basic Network Elements, FIR Filter Structure and Design: Direct form, cascade form, frequency sampling and linear phase structure. Fourier series, Windowing method. Gibbs phenomenon, Frequency sampling method of design. IIR Filter structure and Design: Direct form, Cascade form, Parallel form and Transposed structures. Impulse invariance, Bilinear Transformation method of design. Lectures 10, Marks 20

UNIT V

DSP Architecture:

Architectural features of DSP processors: Multiplier and Multiplier Accumulator (MAC), Modified Bus Structures and Memory Access schemes in DSP, Multiple access memory, Multiport Memory, Pipelining, Special addressing modes, Onchip Peripherals. Different generation of DSP Processors, Fixed point and floating point numeric representation and Arithmetic, Introducing the TI 6000 platform, Features of TMS320C62X Processors, EDMA, Host Port Interface, Expansion Bus, External Memory Interface (EMIF), Boot Loader, McBSP, Interrupts, Timers, Basic Interfacing Techniques. Lectures 10, Marks 20

References:

1. Proakis and Monolakis - Digital Signal Processing-Principles, Algorithms and Applications, Pearson Publication
2. Mitra S.K. - Digital Signal Processing, TMH Publication

3. B.Venkataramani, M.Bhaskar - Digital Signal Processor, Architecture, Programming and Applications,TMH.
4. Texas Instruments - Technical Reference Manual
5. Teaching Material for TI6000 platform from Texas Instruments
6. Thomas Cavicchi - Digital Signal Processing, Wiley

List of Practical:

1. Basic operations on sequences of equal and unequal lengths.
2. Sampling of continuous time signal and aliasing effect.
3. Convolution of two sequence\ Impulse response.
4. Spectrum of signals using DFT.
5. Frequency response of LTI Discrete time system.
6. Designing of FIR Filter.
7. Designing of IIR Filter.
8. Sampling audio signal at different sampling rate using DSP kit.
9. Interfacing with DSP Kit.
10. Implementation of digital filter using DSP Kit.
11. Using ADC and DAC for signal acquisition and play back after processing.

Note: Minimum EIGHT practicals are to be performed. At least TWO on any DSP platform.

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS, ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - I

COMPUTER COMMUNICATION NETWORK

Teaching scheme:
Lectures: 4 hrs / week

Examination scheme:
Theory Paper: 100 Marks (3 Hours)
Term Work : 25 Marks

UNIT I

Introduction to Computer Network: OSI model, TCP / IP and other network models, Different Networks: Novell Netware, Arpanet, NSFNET, Internet. Network Topologies: LAN, WAN, MAN

Physical Layer: Basic for data communication: Fourier analysis, Bandwidth Limited Signal. Transmission media: Twisted pair, Baseband coaxial cable, Broadband coaxial cable, Fiber optics. Wireless Transmission: Radio transmission, Microwave transmission, Infrared and light wave Transmission. Switching. ISDN: Narrowband ISDN: ISDN services, System architecture, Interface. Broadband ISDN: Virtual switching, Circuit switching, ATM Network, Transmission in ATM networks, ATM switches. Cable TV and internet over cable

Lectures 10, Marks 20

UNIT II

Data link layer: Design issues: Framing, Error detection and correction code, Flow control Data Link Protocols: Unrestricted Simplex Protocol, stop and wait protocol, Simplex Protocol for a Noisy Channel. Sliding Window Protocols: One bit sliding window, Using Go-Back n, Protocol using Selective Repeat. Practical Example of Data Link Protocols: The Data Link layer in HDLC, internet, ATM.

Medium access sub layer: Channel allocation Problem: Static Channel and dynamic Channel allocation in LANs and MANs. Multiple Access Protocols: ALOHA, Carrier Sense Multiple Access, Collusion Free Protocols, Wireless LAN Protocols. IEEE Standards For LANS and MANS:IEEE Standard 802.3 and Ethernet, (IEEE Standard 802.4) token Bus, (IEEE Standard 802.5) Token Ring, (IEEE Standard 802.6) distributed Queue Dual Bus. (IEEE Standard 802.2) Logical Link Control.

Lectures 10, Marks 20

UNIT III

Network layer : Design Issue: Internal Organization ,Virtual circuit and Datagram subnets, Routing algorithm: Shortest Path Routing, Flooding, Hierarchical Routing, Broad Cast Routing, Routing for mobile host, Multicast routing, Congestion Control Algorithms: Congestion Prevention Policies, Control in virtual Circuits Subnets, choke Packets, Load Shedding.

Lectures 10, Marks 20

UNIT IV

Internetworking: The network layer in the internet: IP Protocol, IP Address, Subnet, Internet control Protocols, Internet multicasting, IPv4: Datagram, Fragmentation, Checksum, Options ,IPv6: Advantages, Packets Formats Extension Headers. Address Resolution Protocol (ARP), RARP, DHCP. The Network Layer in the ATM Networks: Routing and Switching, Traffic Shaping, Congestion Control, ATM LANs.

Lectures 10, Marks 20

UNIT V

Transport layer: The Internet Transport Protocols: TCP: Services, Features, Segments, Connections, Flow control, Error Control, congestion Control, UDP. QOS (Quality of Services) ATM AAL layer protocol.

Application layer: Network security, Domain Name system, SNMP, Electronic Mail; the World Wide Web, Multi media.

Lectures 10, Marks 20

References:

1. Andrew S Tanebaum - Computer Networks, 4th Ed. PHI/ Pearson education.
2. Behrouz A Forouzan - Data Communication and Networks, 3rd Ed. TMH.
3. S. Keshav - An Engineering approact to Computer Networks, 5th Ed. Pearson.
4. W.A. Shay - Understanding communication and Networks, Thomson.
5. Irvine Olifer - Computer Networks: Principles, Technology and Protocols, Wiley India.
6. William Stalling – Data and Computer communications, 7th Ed. PHI

Term Work: It is 50% based on theory and 50% based on minimum FIVE assignments on above syllabus (one assignment for each unit)

W.E.F : 2008- 09

TERM - I

DATA COMMUNICATION AND DESIGN (ELECTIVE I)

Teaching scheme:
Lectures: 4 hrs / week
Practical: 2 hrs / week

Examination scheme:
Theory Paper: 100 Marks (3 Hours)
Practical : 25 Marks
Term work : 25 Marks

UNIT I

Digital Transmission Fundamentals

Digital signals, Limits of achievable data rate in digital communication, Data communication – components, data representation , Transmission impairment throughput, propagation speed, propagation time, wavelength, Attenuation distortion, delay distortion, Thermal noise , Inter modulation noise , Impulse Noise, Cross talk, channel capacity, source coding, data Rate, and channel capacity. Lectures 10, Marks 20

UNIT II

Digital Modulation

Modems, Digital continuous wave modulation techniques for Modem , Baud rate, QAM modern constellation patterns, Telephone modems- Modern stard,, traditional modems, 56M modems, Interface control for typical modem, EIA 232 / V.24 interface, interfacing with computer , Broad b modems. Cable modems. Lectures 10, Marks 20

UNIT III

Switching techniques High Speed Digital Access

Different switching techniques, circuit switching telephone , Signaling systems 1H Architecture overview , Packet switching N/w. T1 carrier system / E1 / , T3 / E3 carriers, SONET/ SDB, SDL Technical , ADSL technology, cellular Telephone systems, Lectures 10, Marks 20

UNIT IV

Data communication Media

Transmission media guided transmission media (Physical description , application , transmission char.) Twisted pair (unshielded , shielded , twisted pair) , category 3 , 5 , 5E , 6 . UTP, coaxial cable. Wireless transmission unguided media; (Terrestrial microwave satellite microwave) fiber optic communication, satellite communication. , wireless fidelity Lectures 10, Marks 20

UNIT V

Ethernet

Traditional Ethernet, fast Ethernet, gigabit Ethernet. Multiple access, rom access, MA, CSMA/ CD , CSMA/CA, control access, FDMA, TDMA, CDMA, . IEEE 802.3, 802.4, 802.5, X.21, X.25, SDLC/HDLC protocol stards. Introduction to N/w connecting devices, bridge , router, gateway, hub, etc. Lectures 10, Marks 20

Reference Book:

1) Behrouz A, Forouzan -Data communication, TMH
2) Stallings W. - Data Computer communication , PHI 6th Ed.
3) Shay W - Understanding Data communication and Networks, 3rd Ed., Thomson
4) Godbole A - Data communications, TMH

List of Practical:

1. Implementation of LAN using star topology and connectivity between two computers using crossover UTP5 cable.
2. To establish internet connectivity using dial up modem on windows system.

3. Study of network components such as Preparation of various cables, information attenuator, hubs, switches, bridges, routers, gateways, color codes of AT and T (2 Practicals)
4. Study of MODEM Trainer kit
5. Study of RAM for MODEM
6. Study of CDMA Trainer
7. study of GSM Trainer

Note: Minimum EIGHT practicals are to be performed

Teaching scheme:
Lectures: 4 hrs / week
Practical: 2 hrs / week

Examination scheme:
Theory Paper: 100 Marks (3 Hours)
Practical : 25 Marks
Term work : 25 Marks

UNIT I

Modern Imaging System:

Principles of NMR Imaging systems, Image reconstruction technique, Basic NMR components, biological effects of NMR imaging, Advantages, diagnostic ultrasound, physics of ultrasound waves, Medical ultrasound, Basic Pulse Echo Apparatus, A-scan, M- mode, B-scan, Real time Ultrasonic imaging system, Biological effects of ultrasound, Medical thermography, Physics of thermography, Infrared Detector, pyro-electric vidicon camera etc. Lectures 10, Marks 20

UNIT II

Cardiac Pacemakers and Defibrillators:

Need for pacemakers, external pacemakers, and Implantable pacemakers, recent developments, pacing system analyzer, need for defibrillators, DC defibrillators, Implantable defibrillators, and Defibrillators analyzers. Blood gas analyzers Acid base balance, Blood pH measurement, measurement of blood PCO_2, Blood PO_2 measurement, intra arterial blood gas monitoring, and complete gas analyzers, types of blood cells, coulter counters, and Auto recognition and differential counting of cells.

Lectures 10, Marks 20

UNIT III

Instruments for Surgery:

Principle of surgical diathermy, surgical diathermy machine, safety aspects, surgical diathermy analyzers, LASER, pulsed RUBY laser, Nd - YAG laser, He-Ne laser, Argon laser, CO_2 laser, laser safety, microwave diathermy, ultrasonic therapy unit,, pain relief through electrical simulation. Lectures 10, Marks 20

UNIT IV

Heamo-dialysis Machines and ventilators:

Function of kidneys, Artificial kidney , Dialysers, Membranes for Heamo-dialysis Heamo-dialysis Machine, Portable kidney machine, Mechanics of respiration Artificial ventilation , ventilators Types, ventilator terms, classification of ventilators Modern ventilators, HF ventilators, Humidifiers, Nebulisers and Aspirators. Lectures 10, Marks 20

UNIT V

Biomedical Telemetry and telemedicine:

Introduction, physiological parameters adaptable, wireless telemetry, single channel, Multi-channel, multi–patient telemetry, components of Bio-telemetry system, Implantable telemetry, Transmission of Analog and physiological signals over telephone , Telemedicine. Spectro-photometry, colorimeters, Automated Biochemical analysis. Infusion Pumps, Implantable Infusion systems. Lectures 10, Marks 20

References:

1. Cromwell - Biomedical Instrumentation, Pearson
2. Khandpur - Handbook of Biomedical Instrumentation
3. Webster - Biomedical Instrumentation, Wiley

List of Practical:

1. Measurement of echo with ultrasound system.
2. Study of Internal Pacemaker.
3. Study of Pacemaker simulator.
4. Measurement of pacing pubes with the pacemaker system.
5. Study of ON - DEMAND pacemaker system
6. Measurement of blood cell count.
7. Study of Surgical diathermy machine.

8. Study of Heamo dialysis Machine
9. Study of Nebulisers.
10. Measurement of Heart beats by wireless telemetry system.
11. Study of Ultrasonic therapy machine.
12. Study of Spectrophotometer.

Note: Minimum EIGHT practicals are to be performed

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - I
SYSTEM PROGRAMMING (ELECTIVE I)

Teaching scheme:
Lectures: 4 hrs / week
Practical: 2 hrs / week

Examination scheme:
Theory Paper: 100 Marks (3 Hours)
Practical : 25 Marks
Term work : 25 Marks

UNIT I

Introduction to system software: Types of Software and Application Software Spectrum of system Software, Need of system Software, Assembler, Loader, Compiler. Symbolic Debuggers, Interpreter, Macro, Operating system and its types. Assembler- Structure of Assembler, Basic Functions, Assembler directives, Types of Assembler, General design specification of an Assembler, Purposes of Passes, Databases for Passes, Literals, Design of Pass I and Pass II Assembler.

Lectures 10, Marks 20

UNIT II

Data Structure -Stack Array, Queue, Link list, Data Structure, Sorting Technique, Linear and binary search. Macro and Macroprocessor- Macro definition and call, Features of macro, Macro expansion, Nested Macros, Design of Macroprocessor single pass and two pass macroprocessor. Lectures 10, Marks 20

UNIT III

Loader and Linkage editor- Basic functions of Loader, Relocation and Linking concepts, and different Loader schemes, other Loader schemes, binders, Linking Loaders, overlay Dynamic Binders, Design issue of Direct Linking Loaders. Compiler- Concept, Phases of compiler, Types of complier, Parser, Parsing technique, Top-down and Bottom-up parsing, Shift reduce and recursive descent parser, Operator precedence parser, Predictive parser, L-R parser. Lectures 10, Marks 20

UNIT IV

Operating System Concepts- Need of OS, Types of OS, like Batch, Time sharing, Multiprogramming, Multitasking real time and personal OS.

Process Concepts and Management: - Process concepts, process state, process state Transition, PCB, operation on process, OS Services for Process Management.

Deadlocks - Principals, Detections, Preventions Recovery and Avoidance Algorithm. Scheduling - Process scheduling long term, middle term and short term scheduling CPU burst, scheduling algorithm and performance evolution.

Lectures 10, Marks 20

UNIT V

Memory Management -Concept of Memory management, Contiguous Memory allocation, paging and segmentation concepts, , virtual memory concept. File Management- File concepts, Access Methods, Directory Structure, single, two, three level structure, Protection, file sharing allocation methods. Dynamic Linking In Windows- (Introduction and concepts only) clipboard, OLE terminology and Technology, Dynamic Data Exchange Dynamic Linking Libraries (DLL) Lectures 10, Marks 20

References:

1. Jhon J. Donovan - System Programming, TMH.
2. Dhamdhere - System Programming and Operating System, TMH, 2nd Ed.
3. L Beck - System Software, Pearson, 3rd Ed.
4. Aho Ulman - Complier Construction, Pearson LPE.
5. Silberschatz, Galvin, Gagne.- Operating System Principles , John Wiley and Sons, 7th Ed(Wiley India).
6. Tanenbaum - Modern Operating System, Pearson, 2nd Ed.
7. J.P. Bennett - Compiling Technique, TMH

List of Practical:

1. Language Programming for 8085 / 8051.
2. Implementation of sorting method (Any two) in C / C++.
3. Implementation of searching methods (Linear and Binary Search) in C / C++.
4. Implementation of stack/queue using linked list data structure in C / C++.
5. Develop an application to simulate first pass of two pass assembler for 8085 Microprocesser.
6. Design of simple Loader.
7. Design of Parser for a subset of C by using C / C++.
8. Design of Line and Screen Editor in C / C++.
9. Design of Microprocessor (Nested Macro Calls within definition) in C / C++.
10. Implementation of CPU Scheduling algorithm,
11. Implementation of memory management algorithm.
12. Implementation of interprocess Communication.

Note: Minimum EIGHT practicals are to be performed

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS, ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - I
VLSI DESIGN (ELECTIVE I)

Teaching scheme:
Lectures: 4 hrs / week
Practical: 2 hrs / week

Examination scheme:
Theory Paper: 100 Marks (3 Hours)
Practical : 25 Marks
Term work : 25 Marks

UNIT I

Introduction:

History of HDL: Brief history of VHDL, brief history of Verilog. Structure of VHDL and Verilog module: Structure of Entity / Module, Port. Operators in VHDL and Verilog: Logical, Relational, Arithmetic Shift and Rotate Operators. Data types of VHDL and Verilog. Types of Architecture use in VHDL and Verilog: Behavioral Description, Structural Description, Switch level Description, Data-flow Description, Mixed-type Description. Simulation and Synthesis and comparison between them.

Lectures 10, Marks 20

UNIT II

Data-flow Description (VHDL / Verilog): Structure of Data-flow Description: Signal declaration and Signal assignment statements, Concurrent Signal assignment statements, Constant declaration and assignment statements, Assigning a delay to the signal assignment statements, VHDL / Verilog Programming using Data-flow description and Common errors occurs during programming.

Behavioral Description (VHDL / Verilog): Structure of Behavioral Description for both VHDL/Verilog. VHDL variable assignment statement. Sequential statements for VHDL / Verilog: IF statement, Signal and variable (only for VHDL) assignment, Case statement, Loop statement. VHDL/ Verilog Programming using Behavioral description and Common errors occur during programming. Lectures 10, Marks 20

UNIT III

i) Structural Description (VHDL / Verilog): Organization of structural design, Binding, State machines, Generic (VHDL), Parameter (Verilog), VHDL / Verilog Programming using Structural description and Common errors occurs during programming.

ii) Switch Level Description (VHDL / Verilog): Single NMOS and PMOS switches: NMOS and PMOS switch description for VHDL / Verilog, Serial and parallel combinations of switches. Switch level description of: Primitive gates, Combinational logics, Sequential circuits. CMOS switch. Bidirectional switches.

iii) Procedures (VHDL), Task (Verilog) and Functions (VHDL / Verilog) Lectures 10, Marks 20

UNIT IV

Mixed type Description (VHDL / Verilog): User defined data types in VHDL, VHDL Packages, Implementation of Arrays, and Mixed-type Description Programming.

Advanced HDL Description (VHDL / Verilog): File processing in VHDL / Verilog. VHDL record types. Programming of File processing for VHDL / Verilog.

Architecture of Xilinx 9500 series CPLD. Lectures 10, Marks 20

UNIT V

Xilinx Spartan 4000 series FPGA.

Testing of Logic Circuits:

Fault model, path sensitizing, random test. Design of testability, BIST (Built in self test), Boundary scan test.

Introduction to various Debugging Tools .Introduction to Simulation Tools.

Introduction to Digital Pattern Generator and Logic Analyser. Advantage of Logic Analyzer with built in Digital Pattern Generator over Simulator. Lectures 10, Marks 20

References:

1. John F. Wakerly - Digital Design, Principles and Practices, Pentice Hall Publication.
2. Nazeib M. Botros - HDL programming Fundamentals VHDL and Verilog , Thomson.
3. Stephen Brown and Zvonko Vranesic - Fundamentals of Digital Logic with VHDL design, McGraw Hill
4. Douglas Perry - VHDL , Tata MC-Graw Hill
5. Xilinx data manual - The Programmable Logic data Book
6. Sudhakar Yalamanchil - An Introduction to VHDL from Synthesis to Simulation
7. Bhaskar – A VHDL Primer, Pearson
8. Zwolinski – Digital System Design with VHDL, Pearson

List of Practical:

Minimum EIGHT Practical on VHDL / Verilog coding, simulation and synthesis with implementation on CPLD / FPGA devices. and test performance using 32 channel pattern generator integrated with logic analyzer apart from verification by simulation with tools . Use the pattern generator to generate input signal and truth tables. (PC Based instruments may also be used)

Simulation, Synthesis, and Implementation and observe Real-time validation using pattern generator and Integrated logic Analyzer:

Group A. Combinational Logic: (At least THREE of the following must be covered)

1. Write VHDL code to realize all the logic gates

2. Write a VHDL program for the following combinational designs
    a. 2 to 4 decoder
    b. 8 to 3 (encoder without priority & with priority)
    c. 8 to 1 multiplexer
    d. 4 bit binary to gray converter
    e. Multiplexer, demultiplexer, comparator

3. Write a VHDL code to describe the functions of a Full Adder Using following modeling styles.
4. Write VHDL code to display messages on the given seven segment display and LCD and accepting Hex key pad input data

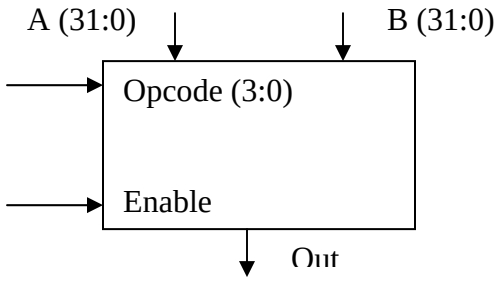
Group B. Sequential logic: (At least THREE of the following must be covered)

1. Develop the VHDL codes for the following flip-flops,
   SR, D, JK, T.

2. Design 4 bit binary, BCD counters (Synchronous reset and Asynchronous reset) and "any sequence" counters.
3. Implementation of 8 – Bit Left / Right Shift Register.

Group C. Implement 32 bit ALU for any (Arithmetic / Logical) Function.
(At least ONE of the following must be covered)

Write a model for 32 bit ALU using the schematic diagram shown below.(example only)



- ALU should use combinational logic to calculate an output based on the four bit op-code input
- ALU should pass the result to the out bus when enable line in high, and tri-state the out bus when the enable line is low.
- ALU should decode the 4 bit op-code according to the given in example below

OPCODE	ALU OPERATION
1.	A + B
2.	A - B
3.	A Complement
4.	A * B
5.	A AND B
6.	A OR B
7.	A NAND B
8.	A XOR B

Group D. INTERFACING (At least Two of the following must be covered)

1. Write VHDL code to control speed, direction of DC and Stepper motor
2. Write VHDL code to accept 8 channel Analog signals, Temperature sensors and display the data on LCD panel or seven segment displays.
3. Write VHDL code to generate different waveforms (Sine, Square, Triangle, Ramp etc.,) using DAC change the frequency and amplitude.
4. Write VHDL code to simulate Elevator operations
5. Write VHDL code to control external lights using relays.

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - I

BROADBAND COMMUNICATION (ELECTIVE I)

Teaching scheme:
Lectures: 4 hrs / week
Practical: 2 hrs / week

Examination scheme:
Theory Paper: 100 Marks (3 Hours)
Practical : 25 Marks
Term work : 25 Marks

UNIT I

Switching Techniques:

Introduction, circuit switching, Routing for circuit switching networks, control signaling. Common channel signaling, Packet switching, Packet size, X.25 protocol, packet level, sequence of events. Comparison of circuit and packet switching.

Lectures 10, Marks 20

UNIT II

Frame Relay:

Introduction, Frame relay protocols, architecture, comparison with X.25 protocol, frame mode call control, call control protocol. Frame relay congestion control, Congestion, Approaches, traffic rate management, explicit congestion avoidance, implicit congestion control.

Lectures 10, Marks 20

UNIT III

ISDN:

Introduction to ISDN, IDN, Principles of ISDN, Evolution of ISDN, ISDN Standards, Architecture, Transmission structure, User network interface configuration, ISDN protocol architecture, ISDN Connection, Addressing. Inter Networking ISDN – ISDN, ISDN – PSTN, ISDN – CSPDN.

Lectures 10, Marks 20

UNIT IV

ATM:

Overview, Virtual channels, Virtual paths, VP and VC switching, ATM cells, Header format, Generic flow control, Header error control, Transmission of ATM cells, Adaptation layer, AAL services and protocols. ATM switching building blocks, ATM cell processing in a switch, Matrix type switch, Input, Output buffering, central buffering, Performance aspects of buffering switching networks. Lectures 10, Marks 20

UNIT V

Broadband standards:

Broadband ISDN Standards, Broadband Services, Broadband Architecture, User network interface. Broad band ISDN protocol, architecture, physical layers, SONET / SDH. Lectures 10, Marks 20

References:

1) Williams stallings - ISDN and Broadband ISDN with frame Relay and ATM , PHI , 4/E
1) Mischa Schwartz - Broadband Internet Network, PHI
2) Bernand Forozen. - Data Communication. and Networking, TMH
3) Balaji kumar - Broadband Communication, MGH

List of Practical:

- Simulation of any one of the PSTN switch Configuration (T / S / T Switch)
- Implementation of congestion control algorithm
- Implementation of routing algorithm (Shortest path)
- Case Study – ISDN – ISDN and ISDN - PSTN

Note: Minimum EIGHT practicals are to be performed, based on the syllabus.

NORTH MAHARASHTRA UNIVERSITY JALGAON

B.E. (ELECTRONICS, ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - I

PROJECT I

Teaching scheme:
Practicals: 2 hrs / week

Examination scheme:
Oral : 25 Marks
Term Work : 25 Marks

1. Every student individually or in a group (group size is of 3 students. However, if project complexity demands a maximum group size of 4 students, the committee should be convinced about such complexity and scope of the work.) shall take a project in the beginning of the (B.E. first Term) seventh term in consultation with the guide and the project must be completed in the (B.E. Second Term) eighth term.

2. The project proposal must be submitted in the institute in the beginning of the (B.E. first Term) seventh term. While submitting project proposal care is to be taken that project will be completed within the available time of two term i.e 2 Hrs per week for (B.E. first Term) seventh term and 4 Hrs per week for (B.E. Second Term) eighth semester (total time become 12*2 + 12*4 = 72 Hrs per project partner). The final title of the project work should be submitted at the beginning of the (B.E. Second Term) eighth semester. .

3. Project title should be precise and clear. Selection and approval of topic:

   Topic should be related to real life application in the field of Electronics and Telecommunication

   OR

   Investigation of the latest development in a specific field of Electronics or Communication or Signal Processing

   OR

The investigation of practical problem in manufacture and / or testing of electronics or communication equipments

OR

The Microprocessor / Microcontroller based applications project is preferable.

OR

Software development project related to VHDL, Communication, Instrumentation, Signal Processing and Agriculture Engineering with the justification for techniques used / implemented is accepted.

OR

Interdisciplinary projects should be encouraged. The examination will be conducted independently in respective departments.

4. The group should maintain a logbook of activities. It should have entries related to the work done, problems faced, solution evolved etc., duly signed by guide.

5. The group is expected to complete details system design, layout etc. in (B.E. first Term) seventh term, as a part of term work in the form of a joint report. Project report must be submitted in the prescribed format only. No variation in the format will be accepted.

6. One guide will be assigned at the most three project groups.

7. The guides should regularly monitor the progress of the project work.

8. Assessment of the project for award of TW marks shall be done by the guide and a departmental committee (consisting of minimum two teachers with experience more than three years) as per the guidelines given in the following table.

A) ASSESSMENT OF PROJECT I TERMWORK B.E. FIRST TERM

NAME OF THE PROJECT _____
NAME OF THE GUIDE: _____

Sr No	Exam Seat No	Name Of Student Marks	Assessment by guide (70%)					Assessment by Departmental committee (30%)			Grand Total	Out of 25 Marks
			Literature survey	Topic Selection	Documentation	Attendence	Total	Evaluation (10%)	Presntaion (20%)	Total		
			10	05	15	05	35	05	10	15	50	25

Sign of Guide Sign. of Committee Members Sign. of H. O. D.

9. The guide should be internal examiner for oral examination (If experience is greater than three years).

10. The external examiner should be from the related area of the concerned project. He should have minimum of five years of experience at degree level / industry.

11 .The evaluations at final oral examination should be done jointly by the internal and external examiners.

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS, ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - I
SEMINAR

Teaching scheme:
Practical: 2 hrs / week

Examination scheme:
Term Work : 25 Marks

1. For seminar every student will individually study a topic assigned to him / her and submit a report and shall deliver a short lecture / Seminar on the topic at the end of term.
2. Selection of topic should be done by students in consultation with concerned guide
    a. Topic should be related to branch but it should be extended part of the branch (latest and advance topic).
    b. The topic should be such that the student can gain latest knowledge. Student should preferably refer at least one research paper
3. Seminar topic should not be repeated in the department and registration of the same should be done on first come first served basis
4. Seminar report should be submitted in paper bound copy prepared with computer typing
    a. Size of report depends on advancement of topic.
    b. Student should preferably refer minimum 5 reference books / magazines.
    c. Format of content
        i. Introduction.
        ii. Literature survey.
        iii. Theory 1) Implementation 2) Methodology
            3) Application 4) Advantages, Disadvantages.
        iv. Future scope.
        v. Conclusion.

5 ASSESSMENT OF SEMINAR for TERM WORK
Title of seminar: _____
Name of guide : _____

Sr.	Exam	Name of	Assessment by examiners	Grand

No.	Seat No.	Student	Topic Selection 5	Literature Survey 5	Report Writing 5	Depth of understanding 5	Presentation 5	Total 25

6 . Assessment of Literature survey will be based on
   a. Collection of material regarding history of the topic.
   b. Implementation.
   c. Recent applications.

7. Assessment of Depth of understanding will be based on
   a. Questioning by examiners.
   b. Questioning by students.
   c. What the student understands i.e. conclusion regarding seminar.

8. Assessment of presentation will be based on;
   a. Presentation time (10 minutes)
   b. Presentation covered (full or partial)
   c. Way of presentation
   d. Questioning and answering (5 minutes)

9. Examiners should be a panel of two one of them must be guide. Examiner must have experience at least 3 years. Examiners will be appointed by HOD in consultation with Principal.

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - II
TELEMATICS

Teaching scheme:
Lectures: 4 hrs / week
Practical: 2 hrs / week

Examination scheme:
Theory Paper: 100 Marks (3 Hours)
Oral : 25 Marks
Term work : 25 Marks

UNIT I

Telephone switching and Traffic Engineering:

Evolution of telecommunication, simple telephone communication, basics of switching systems Dialing mechanism, electronics switching, digital switching system, SPC configuration , Architecture features, centralized and distributed SPC, enhanced services.

Traffic Engineering, Introduction, Traffic usages, traffic measurement unit, traffic distribution, Grade of service Blocking probability, Numericals on above topics. Lectures 10, Marks 20

UNIT II

Switching networks

Single stage and multistage switching N/W, blocking probability, Lee's model to evaluate blocking probability of three stage network , concept of time division time switching, time multiplexed time and space switching, combination switch ST, TS, STS, TST stages, Brief description of combination switching. Lectures 10, Marks 20

UNIT III

Mobile cellular Telephony:

Limitations of conventional mobile Telephone system, Frequency band allocation, Basic cellular system components, operations of a cellular. Calculation of maximum number of calls per hour per cell, frequency channels per cell, concept of frequency reuse, cell splitting: Hand off mechanism, Delayed hand off, Forced hand off. Mobile assisted hand off. Cell site hand off, Inter system hand off, co-channel Interference reduction factor, fading. Multi-user communication . TDMA, FDMA and CDMA. Lectures 10, Marks 20

UNIT IV

Digital cellular systems:

GSM, radio aspects, features of GSM. Architecture details channel structure, security aspects, Authentication and ciphering key. Different call flow sequences in GSM, North American CDMA cellular standard , radio aspect, forward link and Reverse link structure, key features of standard. Lectures 10, Marks 20

UNIT V

IP telephony

Introduction to VOIP, low level protocols, - RTP / RTCP / UDP, voice activity detection and discontinuous transmissions. IP telephony protocols: - H.323 standard, session Initiation protocol (SIP), Gateway location protocol, QOS requirements, RSVP Architecture, message format , reservation merging. Lectures 10, Marks 20

References :

1. Vishwanathan - Telecommunication switching systems
2. William C.Y. LEE - Wireless and cellular Telecommunications, MGH ,3rd Ed.
3. Raj Pandya - Mobile and personal communication systems , PHI
4. Rappaport - Wireless communication , PHI
5. Alberto Leon Garcia - Communication network, TMH
6. Andreas F. Molisch - Wireless communication, Wiley

List of Practical:

1. Study of Electronic Telephone exchange (C-Dot OR E-10B)
2. Traffic Measurement calculations
3. Mobile Transmitter and Receiver (Trainer Kit)
4. To study GSM architecture
5. To Study cordless Telephone system
6. To study CDMA
7. To study VOIP
8. To study RSVP Architecture.
9. Study of DTMF signaling including DTMF decoder
10. Study of GSM AT commands.

Note: Minimum EIGHT practicals are to be performed

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09TERM - II

TELEVISION AND CONSUMER ELECTRONICS

Teaching scheme:
Lectures: 4 hrs / week
Practical: 2 hrs / week

Examination scheme:
Theory Paper: 100 Marks (3 Hours)
Practical : 25 Marks
Term work : 25 Marks

UNIT I

Basic concept of Television: TV broadcasting, Scanning methods, Synchronization, Aspect ratio, Kell factor, Horizontal and Vertical resolution, video bandwidth, positive and negative modulation. Composite video signal. Camera Tubes: Image Orthicon, Vidicon, Plumbicon, Saticon, Silicon diode array, Television transmission: VSB transmission, TV channels, TV standards, TV Channels bands, block diagram of monochrome TV receiver. Lectures 10, Marks 20

UNIT II

Colour Television receivers: Colour fundamentals, compatibility, frequency interleaving, colour mixing. Colour camera tube, picture tubes – static and dynamic convergence, colour purity. PAL, SECAM, NTSC system concept, encoder and decoder and their comparison. Colour TV transmitter and receiver block diagram. Lectures 10, Marks 20

UNIT III

Advanced TV system and techniques: Introduction to digital compression technique : GPEG, MPEG.,Block diagram of digital TV:- transmitter and receiver, HDTV- transmitter and receiver, DTH system, Video on demand. Introduction of Plasma and LCD TV. Cable TV. Introduction of 3D DTV system. CCTV, digital terrestrial TV (DTT). Lectures 10, Marks 20

UNIT IV

Methods of sound, video recording and reproduction: Disc recording, magnetic recording, optical recording- CD and DVD. Monophony, stereophony, Hi-Fi system. PA system: Block diagram, requirement, characteristics, its planning for various uses. Introduction to satellite radio reception (word space) Lectures 10, Marks 20

UNIT V

Modern Home Appliances : Block Diagram and working of FAX Machine, Washing Machine, Microwave Oven, Video Games, CD and DVD players, Digital diary. Internet Applications: E-mail, FTP, WWW. Solar Cells and Panels. Introduction to Palm Top, Pen Drive. Lectures 10, Marks 20

References:

1. A. M. Dhake - TV and Video Engineering , TMH
2. R. G. Gupta - TV Engineering and Video system , TMH
3. Kelth Jack - Video Demisified , Penram International
4. S. P. Bali - Colour TV Theory and Practice , TMH
5. Bernard Grobb, Charles E - Basic TV and Video system , TMH (sixth Edition)
6. R. R. Gulati - Monochrome and colour TV , New Age
7. Philips Handbooks on Audio, Video and Consumer Electronics application notes
8. Olson - High Quality Sound recording and reproduction

List of Practical:

1. Study of colour TV Receiver
2. Voltage and Waveform analysis for colour TV.
3. Alignment and fault finding of colour TV using wobbuloscope and pattern generator (02 Expts.)
4. Study of DTH and Set Top Box.
5. Study of CD / DVD player.
6. Practical Visit to TV transmitter / Studio.
7. Study of PA system with cordless microphone.
8. Study of Audio System, MP3 player, Satellite radio.
9. Study of HDTV.
10. Study of Digital TV.
11. Web page designing.
12. Study of Tape recorder

Note: Minimum EIGHT practicals are to be performed

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - II
SATELLITE COMMUNICATIONS

Teaching scheme:
Lectures: 4 hrs / week
Practical: 2 hrs / week

Examination scheme:
Theory Paper: 100 Marks (3 Hours)
Term work : 25 Marks

UNIT I

Introduction: General background, frequency allocations for satellite services, basic satellite system, system design considerations, applications. Satellite Orbits: Introduction, laws governing satellite motion, orbital parameters, orbital perturbations, Doppler effects, geostationary orbit, antenna look angles, antenna mount, limits of visibility, Earth eclipse of satellite, sun transit outage, inclined orbits, sun-synchronous orbit, launching of geostationary satellites.

Lectures 10, Marks 20

UNIT II

Wave Propagation and Polarization: Introduction, atmospheric losses, ionospheric effects, rain attenuation, other impairments, antenna polarization, polarization of satellite signals, cross polarization discrimination, ionospheric depolarization, rain depolarization, ice depolarization. Satellite Antenna: Antenna basics, aperture antennas, parabolic reflectors, offset feed, double reflector antenna shaped reflector systems. Lectures 10, Marks 20

UNIT III

Link Design: Introduction, transmission losses, link power budget equation, system noise, carrier to noise ratio for uplink and downlink, combined uplink and downlink carrier to noise ratio, intermodulation noise. Multiple Access Techniques: Introduction, FDMA, TDMA, FDMA / DMA, operation in a multiple beam environment, CDMA, multiple access examples .

Lectures 10, Marks 20

UNITT IV

Satellite Transponder: Transponder Model, Satellite front end, RF filtering of digital carrier, Satellite signal processing Transponder limiting. Communication Satellites: Introduction, design considerations, lifetime and reliability, spacecraft sub systems, spacecraft mass and power estimations, space segment cost estimates. Earth Stations: Introduction, design considerations, general configuration and characteristics. Lectures 10, Marks 20

UNIT V

Non Geostationary Orbit Satellite Systems: Introduction, reasons, design considerations, case study, example of systems. Satellite Applications: INTELSAT Series, INSAT, VSAT, DBS Television and Radio, Remote sensing, Mobile satellite services: GSM and GPS, Satellite navigation system, DTH, Internet Connectivity, Video Conferencing.

Lectures 10, Marks 20

.

References:

1. M. Richharia - Satellite Communications systems, Mc Millan publication ,2nd edition
2. Dennis Roddy - Satellite Communications, Mc-Graw Hill publication , 3rd edition
3. Timothy Pratt, Charles Bostian, Jeremy Allnut - Satellite communications , John Wiley & Sons , 2nd edition
4. J. Martin - Communication Satellite Systems, PH Publication.
5. Robert M. Gagliardi - Satellite Communication , CBS Publishers and Distributors , 2nd edition

Term Work: It is 50% based on theory and 50% based on minimum FIVE assignments on above syllabus (one assignment for each unit)

NORTH MAHARASHTRA UNIVERSITY JALGAON

B.E. (ELECTRONICS, ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - II

EMBEDDED SYSTEM (ELECTIVE II)

Teaching scheme:
Lectures: 4 hrs / week
Practical: 2 hrs / week

Examination scheme:
Theory Paper: 100 Marks (3 Hours)
Practical : 25 Marks
Term work : 25 Marks

UNIT I

Embedded system Introduction:

Introduction to Embedded System, History, Design challenges, optimizing design metrics, time to market, applications of embedded systems and recent trends in embedded systems, embedded design concepts and definitions, memory management, hardware and software design and testing, communication protocols like SPI, SCI, I2C, CAN etc

Lectures 10, Marks 20

UNIT II

System Architecture:

Introduction to ARM core architecture, ARM extension family, instruction set, thumb Instruction set, Pipeline, memory management, Bus architecture, study of on-chip peripherals like I / O ports, timers, counters, interrupts, on-chip ADC, DAC, RTC modules, WDT, PLL, PWM, USB etc. Lectures 10, Marks 20

UNIT III

Interfacing and Programming:

Basic embedded C programs for on-chip peripherals studied in system architecture. Need of interfacing, interfacing techniques, interfacing of different displays including Graphic LCD (320X240), interfacing of input devices including touch

screen etc, interfacing of output devices like thermal printer etc., embedded communication using CAN and Ethernet, RF modules, GSM modem for AT command study etc. Lectures 10, Marks 20

UNIT III

Real Time Operating System Concept:

Architecture of kernel, task scheduler, ISR, Semaphores, mailbox, message queues, pipes, events, timers, memory management, RTOS services in contrast with traditional OS. Introduction to Ucos II RTOS, study of kernel structure of Ucos II, synchronization in Ucos II, Inter-task communication in Ucos II, memory management in Ucos II, porting of RTOS.

Lectures 10, Marks 20

UNIT V

Embedded Linux:

Introduction to the Linux kernel, Configuring and booting the kernel, the root file system, Root file directories, /bin, /lib etc., Linux file systems, Types of file system: Disk, RAM, Flash, Network. Some debug techniques- Syslog and strace, GDB, TCP / IP Networking- Network configuration, Device control from user space- Accessing hardware directly, Multi processing on Linux and Inter Process Communication- Linux process model and IPCs, Multithreading using pThreads - Threads verses Processes and pThreads, Linux and Real-Time Standard kernel problems and patches. Lectures 10, Marks 20

`

References:

1. Rajkamal - Embedded Systems, TMH.
2. David Simon - Embedded systems software primer, Pearson
3. Steve Furber - ARM System-on-Chip Architecture, Pearson
4. Jean J Labrose - MicroC / OS-II, Indian Low Price Edition
5. DR.K.V.K.K. Prasad - Embedded / real time system, Dreamtech
6. Iyer, Gupta - Embedded real systems Programming , TMH
7. Steve Heath - Embedded System Design , Neuwans

LAB EXERCISE

- Integrated Development Environment Overview (Project creation, down load and debug)
- Study of JTAG Debugger/on-board debugger-emulator.
- ARM Instructions execution (Barrel Shifter, LDR / STR, SMT / LDM)

List of Practical:

GROUP - A

1) Writing basic C-programs for I / O operations
2) C-Program to explore timers / counter
3) C-programs for interrupts
4) Program to demonstrate UART operation

GROUP - B

5) Program to demonstrate I2C Protocol.
6) Program to demonstrate CAN Protocol.

GROUP - C

7) Program to interface LCD
8) Program to interface Keyboard and display key pressed on LCD

9) Program to interface stepper motor

GROUP - D

10) Program to demonstrate RF communication
11) Program to implement AT commands and interface of GSM modem
12) Implementation of USB protocol and transferring data to PC.
13) Implementation of algorithm /program for the microcontroller for low power modes.

uCOS II / Embedded Linux RTOS Examples

GROUP - E

14) Interfacing 4 x 4 matrix keyboards and 16 x 2 characters LCD displays to microcontroller / microprocessor and writing a program using RTOS for displaying a pressed key.
15) Writing a scheduler / working with using RTOS for 4 tasks with priority. The tasks may be keyboard, LCD, LED etc. and porting it on microcontroller/ microprocessor.

GROUP - F

16) Implement a semaphore for any given task switching using RTOS on microcontroller board.
17) Create two tasks, which will print some characters on the serial port, Start the scheduler and observe the behavior.

GROUP – G

18) RTOS based interrupt handling using Embedded Real Time Linux.
19) Program for exploration of (Process creation, Thread creation) using Embedded Real Time Linux.

GROUP – H

20) Program for exploring Message Queues using Embedded Real Time Linux.
21) Ethernet Based Socket Programming using Embedded Real Time Linux.

Note: 1) At least ONE practical should be performed from EACH GROUP.
2) TWO practical should be performed using the JTAG debugger / on-board Debugger- emulator.

NORTH MAHARASHTRA UNIVERSITY JALGAON

B.E. (ELECTRONICS, ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - II

DIGITAL IMAGE PROCESSING (ELECTIVE II)

Teaching scheme:
Lectures: 4 hrs / week
Practical: 2 hrs / week

Examination scheme:
Theory Paper: 100 Marks (3 Hours)
Practical : 25 Marks
Term work : 25 Marks

UNIT I

Digital Image Processing:

Introduction, Examples of Fields that use Digital Image Processing, Fundamental Steps in Digital Image Processing, Components of Image Processing Systems, Image Sensing and Acquisition, Image Sampling and Quantization, Representing Digital Images, Spatial and Gray level Resolution, Basic pixel relationship, Distance Measures, Statistical Properties: Histogram, Mean, Standard Deviation, Introduction to DCT, Walsh, Hadamard, and Wavelet Transform.

Lectures 10, Marks 20

UNIT II

Image Enhancement:

Enhancement in Spatial Domain: Basic Gray Level Transformations, Histogram Processing, Enhancements using arithmetic and logical operations, Basics of Spatial Filtering, Smoothening and Sharpening Spatial filters, Enhancement in Frequency Domain: Smoothening and Sharpening frequency Domain Filters. Lectures 10, Marks 20

UNIT III

Image Coding and Compression:

Image Coding Fundamentals, Image Compression Model, Error Free Compression, VLC, Huffman, Arithmetic, RLC, Lossless Predictive Coding; Lossy-Compression, Lossy Predictive Coding, Transform Coding, Discrete Cosine Transform, Image Compression Standards, JPEG Baseline Coder Decoder. Lectures 10, Marks 20

UNIT IV

Image Restoration and Color Image Processing:

Image Degradation Model, Noise Models, and Restoration in Presence of Noise in spatial Domain, Linear Filtering, Inverse Filter, Wiener Filter, Constrained Least Square Restoration, Geometric Transformation, Spatial Transformation, and Grey Level Transformation. Color Image Processing, Color Image Fundamentals, Color models, RGB to HIS and vice versa, Color Transforms, Smoothing and Sharpening Lectures 10, Marks 20

UNIT V

Image Segmentation:

Image Segmentation: Point, line, Edge detection, Canny Edge Detection, Second Order Derivative, Hough Transform, Thresholding, Region Based Segmentation, Region Growing, Region Splitting and Merging, Image Representation, Chain Codes, Signature, Texture, Use of Principal Component for Description. Lectures 10, Marks 20

References:

1. Gonzalez and Woods - Digital Image Processing, Pearson Education.
2. Arthur Weeks Jr - Fundamentals of Digital Image Processing, PHI.
3. A. K. Jain - Digital Image Processing
4. Pratt - Digital Image Processing, Wiley
5. Castleman - Digital Image Processing, Pearson

List of Practical:

1. Study of different file formats e.g. BMP, TIFF and extraction of attributes of BMP.
2. Study of statistical properties- mean, standard deviation, profile, variance and Histogram plotting.
3. Histogram equalization and modification of the image.
4. Gray level transformations such as contrast stretching, negative, power law transformation etc.
5. Spatial Domain filtering- smoothing and sharpening filters.
6. DCT / IDCT of given image.
7. Edge detection using Sobel, Prewitt and Roberts operators.
8. Capturing image through grabber card from camera and Process it.
9. Pseudo coloring.
10. Converting color image to B / W image and vice versa
11. Creating noisy image and filtering using MATLAB

Note: Minimum EIGHT practicals are to be performed.

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS, ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - II

NEURAL NETWORK AND FUZZY SYSTEM (ELECTIVE II)

Teaching scheme:
Lectures: 4 hrs / week
Practical: 2 hrs / week

Examination scheme:
Theory Paper: 100 Marks (3 Hours)
Practical : 25 Marks
Term work : 25 Marks

UNIT I

Introduction:

Biological neurons and their artificial model. Models of neuron: McCulloch-pitts Model, Perceptron, Adaline ,Topology: Basic structures of artificial neural network , Basic learning laws: Hebb's law, Perceptron learning law, Widrow and Hoff LMS learning law, Correlation learning law, Instar and Outstar learning law, Learning Methods: Hebbains learning , Competitive learning, Differential competitive learning , Error correction learning, Reinforcement learning, Stochastic learning.

Lectures 10, Marks 20

UNIT II

Perceptron Layer Network:

Perceptron learning Rule. Perceptron architecture: Single neuron Perceptron, Multiple-Neuron perceptron. Training Multiple neuron Perceptron. Limitations of Perceptron.

Supervised Hebbian Learning:

Linear association, Hebbs rule, Performance analysis, Variation of Hebians rule. Performance Surfaces and Optimum points: Taylor's series, Directional derivatives, Necessary condition for Optimality. Lectures 10, Marks 20

UNIT III

Widrow - Hoff Learning:

ADALINE Network, Single ADALINE, Mean square error, LMS algorithm, Analysis of convergence, Adaptive Filtering: Adaptive noise cancellation, Echo cancellation.

Backpropogation Network:

Multilayer Perceptron: Pattern classification, Function approximation. Back propagation algorithm: Performance index, Chain rule, Back propagation the sensitivity. Lectures 10, Marks 20

UNIT IV

Fuzzy Mathematics:

Classical sets, fuzzy sets, Fuzzy set operations, Procedure of Fuzzy Sets, Crisp Relations, Fuzzy Relations, Operation of Fuzzy Relations , Fuzzy Tolerance and Equivalence Relations membership functions, Defuzzyfication Methods. Manipulation of Linguistic Variables. Lectures 10, Marks 20

UNIT V

Application of Neuro - fuzzy System : Introduction to Neuro - Fuzzy System. Types of Neuro – Fuzzy nets, Neuro – Fuzzy Systems Design and implementation.

Fuzzy classification by equivalence relations: C-means clustering, hardening relations from clustering, Fuzzy pattern recognitions. Control applications: Control system design stages, Control Surface, System Identification Problem, Simple Neuro - Fuzzy Logic Controller, Industrial applications. Lectures 10, Marks 20

Reference Books:

1 Fausett - Fundamentals of Neural networks : Architectures, Algorithnors Applications , Pearson
2 B. Yegnanarayana - Artificial Neural Networks, Prentice Hall of India, New Delhi
3 Martin T. Hagan - Neural Network Design , PWS Publishing company (A devision of International Thomson Publishing Inc.)
4 J.M. Zurada - Introduction to Artificial Neural Network, Jaico Publishing House
5 Meherotra Kishan ,Mohan C.K, Ranka Sanjay - Elements Of Artificial Neural networks, Penram Int Pub Mumbai.
6 D.E Goldberg , Addision - Genetic Algorithm in Search Optimization and Machine Learning, Wesley Publication
7 Kalyanmoy Deb - Optimization for Engineering Design Algorithms and Examples, Prentice Hall of India New Delhi
8 George J. Klir / Bo Yuan - Fuzzy Sets And Fuzzy Logic, Prentice Hall of India New Delhi / Pearson
9 T. J. Ross - Fuzzy Logic With Engineering Application , McGraw hill Inc. 1995.

Practical: All the Practicals are based on Any Concerns Software .

1. Design and implementation of artificial neural network to compute XOR for two inputs using feedback artificial neural network.
2. Design a perceptron network to solve Classification problem with different classes of input vectors.(Take two or more classes of input vectors)
3. Design the Perceptron model for pattern recognition. (Take prototype pattern as example)
4. Simulate Adaline algorithm.
5. Implement Back-propagation simulator.
6. Find out the Fuzzy Relation of the given Fuzzy Sets.
7. Verify any one Defuzzification method.
8. Fuzzy pattern recognition.
9. Design any control system using fuzzy logic in simulink

Note: Minimum EIGHT practicals are to be performed.

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - II

TELECOMMUNICATION NETWORK MANAGEMENT (ELECTIVE II)

Teaching scheme:
Lectures: 4 hrs / week
Practical: 2 hrs / week

Examination scheme:
Theory Paper: 100 Marks (3 Hours)
Practical : 25 Marks
Term work : 25 Marks

UNIT I

Foundations and TMN architecture:

Network management standards, network management model, organization model, information model, abstract syntax notation 1 (ASN. 1), encoding structure, macros, functional model. Terminology, functional TMN architecture, Information architecture, physical architecture, TNN tube, TMN and OSI Lectures10, Marks 20

UNIT II

Network management application functional requirements:

Configuration management, fault management, performance management, error correlation technology, security management, accounting management, service level management, management service, community definitions, capturing the requirements, simple and formal approaches, semi formal and formal notations Lectures10, Marks 20

UNIT III

Information service element and modeling for TMN:

CMISE model, service definitions, errors, scooping and filtering features, synchronization, functional units, association services, common management information protocol specification. Rationale for information modeling, management information model, object oriented modeling paradigm, structure of management information, managed object class definition, management information base (MIB) Lectures10, Marks 20

UNIT IV

Simple Network Management Protocol:

SNMPv1: managed networks, SNMP models, organization model, information model, SNMPv2: communication model, functional model, major changes in SNMPv2, structure of management information (SMI), MIB, SNMPv2 protocol compatibility with SNMPv1, SNMPv3: architecture, applications, MIB security, remote monitoring SM and MIB, RMON1 and RMON2.
Lectures10, Marks 20

UNIT V

Network management examples and tools:

ATM integrated local management interface, ATM, MIB M1, M 2, M 3, M 4 interfaces, ATM digital exchange interface management, digital subscriber loop (DSL) and asymmetric DSL technologies, ADSL configuration management, performance management, network statistics management, network management system, management platform case studies: OPENVIEW, ALMAP Lectures10, Marks 20

References:

1. Mani Subramanium - Network management principles and practice , Pearson Education

2. Lakshmi Raman - Fundamentals of Telecommunication Network Management, PHI
3. Airdarous Salah - Telecommunication Network Management Technologies and implementations, Thomas (PHI)

List of Practical:

1. Connectivity of LAN computer to internet using dial up modem / leased line modem (installing and configuration)
2. Installation and configuration of network application like telnet.
3. Users creation, rights assignment, mappling drives, sharing files, printers etc using SNMP. Study and analysis of network
4. Design and implementation of network based on number of nodes and traffic.
5. Implementation of routing algorithms (software based) any TWO practicals, (shortest path)
6. Implementation of encryption and decryption (software based)
7. Campus networking – case study

Note: Minimum EIGHT practicals are to be performed, based on above syllabus.

NORTH MAHARASHTRA UNIVERSITY JALGAON

B.E. (ELECTRONICS, ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - II

NANO –TECHNOLOGY (ELECTIVE II)

Teaching scheme:
Lectures: 4 hrs / week
Practical: 2 hrs / week

Examination scheme:
Theory Paper: 100 Marks (3 Hours)
Practical : 25 Marks
Term work : 25 Marks

UNIT I

Nano, size of matter, different kind of small, Nano Challenges, Fundamental science behind Nanotechnology, Electrons, Atoms, Ions, Molecules, Metals, Other material, Biosystems, Molecular Recognition, Electrical conduction and ohm's law, Quantum Mechanics, Quantum ideas Lectures 10, Marks 20

UNIT II

Tools for measuring Nanostructures, Scanning probe Instrument, Nanoscale Lithograpthy, Dip. Pen. Lithography, E beam Lithogaphfy, Nanosphere Lithographty, Polarizmatization, nanobricks and building Blocks. Lectures 10, Marks 20

UNIT III

Smart Materials, Sensors, nanoscale Bio structure, Energy capture, Transformation and storage, Optics, Electronics, Natural nano scale Sensor, Electromagnetic sensors, Electronics Nose. Lectures 10, Marks 20

UNIT IV

Building blocks digital better, Linking brains with computer, End of transistor Road, FET to SET, Fabrication new chips, Semiconductor Quantum Dots, Synthesis of Quantum dots, Electronic Structure of Nanocrystals Lectures 10, Marks 20

UNIT V

Application in Medical, Understanding how pharmaceutical, Companies develop drug, Delivering new drug Technology, Oil and Water won't help, Mincells, special delivery cancer with Nanoshell. Lectures 10, Marks 20

References:

1. Mark Ratnakar, Daniel Ratnakar – Nanotechnology : A gentle Introduction to Next Big Idea, Prentice hall of India
2. Richard Booker, Eart Boy sen - Nanotechnology Fun and easy way, Wiley
3. Charles P. Poole J.V. Frank J. Owens - Introduction to Nanotechnology , Wiley India ISBN
4. T. Pradeep - Nano: The essentials, understanding Nanoscience and Nanotechnology , TMH

Note: Minimum EIGHT practicals are to be performed, based on above syllabus.

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS, ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - II
INDUSTRIAL VISIT / CASE STUDY

Teaching scheme:
NIL

Examination scheme:
Term Work : 25 Marks

EDUCATION TOUR / TECHNICAL VISITS / CASE STUDY AND ITS EVALUATION

1. During (B.E. First Term / Second Term) seventh and / or eighth terms or during vacation between (B.E. First Term / Second Term) seventh and eighth terms, every student; shall visit minimum two industries, factories arranged by colleges and accompanied by teachers. There shall be at least one teacher for a group of 20 students and at least one non-teaching staff accompanied with the students.

2. The colleges should obtain appropriate certificates of visit from the concerned organizations just after the visits.

3. Students should submit written report about the visits individually at the end of (B.E. Second Term) eighth term.

4. The report should contain information about the following points:

   (a) The organization - activities of organization and administrative setup technical personnel and their main duties.
   (b) The project / industry brief description with sketches and salient technical information.
   (c) The work / processes observed with specification of materials, products, equipments etc. and role of engineers in that organization.
   (d) Suggestions (if any) for improvement in the working of those organizations.

5. The evaluation of the report of technical visits will be made by panel of two teachers appointed by principal based on following points:

   (a) Coverage aspect: All above points should be covered.
   (b) Detailed observations: System / Process / Product explained with data, diagram specifications.
   (c) Quality of presentation: Report should be very objective and should consist of clear and systematic organization of topics and information.
   (d) Viva - voce: A viva -voce shall be conducted on the technical visit report by the teachers to assess the specific knowledge gained by the students for technical applications.

6. The case study should include the study problem in Electronics or in Electronics and telecommunication Engineering branch.

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS, ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - II
PROJECT II

Teaching scheme:
Practicals: 4 hrs / week

Examination scheme:
Oral : 50 Marks
Term Work : 100 Marks

1. The Project group in (B.E. first Term) seventh term will continue the project work in (B.E. Second Term) eighth term and complete project in all respect (assembly, testing, fabrication, tabulation, test result etc.)
2. The group should maintain a logbook of activities. It should have entries related to the work done, problems faced, solution evolved etc., duly signed by guide.
3. The guides should regularly monitor the progress of the project work.
4. The project work along with project report should be submitted as part of term work in (B.E. Second Term) eighth term on or before the last day of the (B.E. Second Term) eighth term
5. Project report must be submitted in the prescribed format only. No variation in the format will be accepted.
6. Assessment of the project for award of TW marks shall be done by the guide and a departmental committee (consisting of minimum two teachers with experience more than three years) as per the guidelines given in the following table.

B) ASSESSMENT OF PROJECT II TERMWORK (B.E. SECOND TERM)

NAME OF THE PROJECT: _____

NAME OF THE GUIDE: _____

Sr. No	Exam. Seat No	Name Of Students	Assessment by guide (70%)						Assessment by department (30%)			Grand Total
			Fabrication /software / actual work	Execution of project	Project report	Scope/ Cost / Utility	Attende-nece	Total	Evaluation (10%)	Prese-ntaion (20%)	Total	
		Marks	20	10	20	10	10	70	10	20	30	100

Sign of Guide Sign. of Committee Members Sign. of H. O. D.

7. The guide should be internal examiner for oral examination (If experience is greater than three years).

8. The external examiner should be from the related area of the concerned project. He should have minimum of five years of experience at degree level / industry.

9. The evaluation at final oral examination should be done jointly by the internal and external examiners.

NORTH MAHARASHTRA UNIVERSITY, JALGAON
STRUCTURE OF TEACHING AND EVALUATION
S.E.(I.T.)
First term

W.E.F. 2006-07

Sr. No.	Subject	Teaching Scheme Hours/week			Examination Scheme				
		Lectures	Tutorial	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Programming Paradigm and Methodology	4	--	--	3	100	25	--	25
2	*Discrete Structure and Graph Theory	4	--	--	3	100	--	--	--
3	*Digital Systems and Microprocessor	4	--	2	3	100	50	25	--
4	*Industrial Management and Economics	4	--	--	3	100	- -	--	--
5	*Engineering Mathematics –III	4	1	--	3	100	25	--	--
6	*Programming Laboratory I	3	--	4	--	--	50	50	--
	Total	**23**	**1**	**6**	**- -**	**500**	**150**	**75**	**25**
	Grand Total	**30**			**750**				

SECOND TERM

Sr. No.	Subject	Teaching Scheme Hours/week			Examination Scheme				
		Lectures	Tutorial	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	*Microprocessor I	4	--	2	3	100	25	25	--
2	*Data Structure and Files	4	--	4	3	100	50	50	--
3	*Computer Organization	4	--	--	3	100	--	--	--
4	Information Theory	4	--	--	3	100	--	--	--
5	*Data Communication	4	--	--	3	100	--	--	--
6	*Programming Laboratory II	2	--	4	--	--	50	50	--
	Total	**22**	**0**	**10**	**--**	**500**	**125**	**125**	**--**
	Grand Total	**32**			**750**				

* Common Subject with SE (Computer)

NORTH MAHARASHTRA UNIVERSITY, JALGAON

SE (INFORMATION TECHNOLOGY)
(w.e.f. 2006-07)

TERM – I

PROGRAMMING PARADIGMS AND METHODOLOGY

Teaching Scheme:
Lectures: 4 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term work: 25 Marks
Oral: 25 Marks

Unit – I

Introduction: Different types of programming languages .i.e. Machine level, Assembly ,high level, 4GL, characteristics of HLL, programming languages ,role seed ,Genealogy of programming languages ,software Engineering and programming languages , characteristics of good programming languages , programming languages paradigms.
Languages description –character set, tokens (lexical issue), sentence –syntax and semantics, grammar, types and representation.

(10 Hrs, 20 Marks)

Unit – II

Implementation of Basics Blocks of a languages: Data types, classification, structure and Nonstructural data types, variables and constants, Derived and abstract data types, Data types-character, integer, float double, array, set, enum, Boolean, void, pointer, structure, class, union, sub range etc. with respect to programmer view, implementation, storage representation, values associated and boundary(range). operation on data types–arithmetic, conditional, logical, programming languages and control statements–expression, assignments, control flow statements, iterative statements, introduction to function call and definition, macro.

(10 Hrs, 20 Marks)

Unit – III

Procedures: Need of procedure referencing environment's-local, no local, global for block structure and non block structure language, procedure v/s block scope virility and life time OS variable static and dynamic scope. Activation record, study of procedure call in C and Pascal, Different parameter passing method, storage management – static and dynamic.

(10 Hrs, 20 Marks)

Unit – IV

Object Oriented programming – limitations of procedural programming, characteristics and application of object oriented programming, Genealogy of OOP, basic concepts in oop such as information hiding, abstraction

(10 Hrs, 20 Marks)

Unit – V

Functional programming –procedural programming V/s functional programming, mathematic function v/s functional programming, elements of functional programming, Genealogy of functional programming, various operation functional programming, function call, recursive function, data v/s function in context of functional programming, scooping issue.

(10 Hrs, 20 Marks)

Reference Books –

1. Ravi Sethi, “Programming Languages, Concept and Principles ”, Addison Wesley
2. Horowitz Sahani, “Principles of Programming Languages”
3. Sebesta,”Principles of Programming Languages”.
4. Balguruswamy,”Object Oriented Programming in C/C++.
5. R.D.Tennet,”Principles of Programming languages”.
6. T.W.Pratt,M.V.Zelkowtz,”Programming languages:Design and implementation”,Pearson
7. C.Ghezzi,M.Jazayeri,Programming Language concepts,Wiley

NORTH MAHARASHTRA UNIVERSITY, JALGAON

SE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2006-07)

TERM – I

DISCRETE STRUCTURE AND GRAPH THEORY

Teaching Scheme:
Lectures: 4 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)

Unit - I

Sets, Logic and Proofs
Propositions, proposition and logical operations, Conditional Statements, Propositional Calculus, Quantifiers: universal and existential quantifiers, methods of proofs, Set Theory: Set, Combinations of Sets, Finite and Infinite sets, uncountably infinite sets, Mathematical Induction, Principle of inclusion and Exclusion.
Discrete Probability, Information and Mutual information (10 Hrs, 20 Marks)

Unit - II

Relations, functions, Recurrence Relations
Definitions, properties of Binary relations, Equivalence Relations and partitions, Partial ordering relations and lattice, chains and antichains, Transitive Closure and Warshall’s Algorithm.
Functions Definitions, Pigeonhole principle.
Recurrence Relation, Linear Recurrence Relations with constant Coefficients, Homogeneous Solutions, Particular Solutions, total solutions, Solution by the method of generating functions.
(10 Hrs, 20 Marks)

Unit - III

Graphs
Basic terminology, multigraphs and weighted graph , paths and circuits , shortest path algorithms, Euler and Hamiltonian Paths and circuits , factors of a graph, Planer graph and Kuratowski theorem, graph coloring.
Trees
Trees, rooted trees, path length in rooted trees, prefix code, binary search trees, spanning trees and cut set, minimum spanning trees, kruskal’s and prim’s algorithms for minimum spanning tree.
(10 Hrs, 20 Marks)

Unit - IV

Analysis of Algorithm and Algebraic systems - Time Complexity of algorithms, shortest path algorithms, complexity of problems, tractable and intractable problem.
Algebraic system - Groups, subgroups, Isomorphisms and Automorphisms, Homomorphisms and Normal subgroup, Rings, Integral domains and fields. (10 Hrs, 20 Marks)

Unit - V

Boolean algebra - Lattice and Algebraic systems, Principle of duality, basic properties of lattice defined by lattices, distributive and complemented lattices, Boolean lattices and Boolean algebras, Boolean functions and Boolean Expressions.
Binary Number systems- binary, octal, hex conversion. Application of Boolean algebra.
(10 Hrs, 20 Marks)

Reference Books

1. C.L. Liu , " Elements of Discrete Mathematics", 2nd edition, Tata McGraw-Hill, 2002
2. Kenneth H. Rosen, Discrete Mathematices and its Application, 5th edition, TMH
3. Lipschutz, lipson, " Discrete Mathematics", 2nd edition, Tata McGraw- Hill, 1999.
4. V. K. Balakrishnan, " Graph Theory", Tata McGraw- Hill
5. B. Kolman , R. Busby and S. Ross, "Discrete Mathematical Structures" 4th edition, Pearson education,2002
6. J. Treamblay , R. Manohar ," Discrete Mathematical structures with application to computer science" , Tata McGraw-Hill

---

NORTH MAHARASHTRA UNIVERSITY, JALGAON

SE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2006-07)

TERM – I

DIGITAL SYSTEMS AND MICROPROCESSOR

Teaching Scheme:
Lectures: 4 Hrs / Week
Practical: 2 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term work: 50 Marks
Practical: 25 Marks

Unit – I

Review of fundamental concepts: Basic gates, universal gates & Exclusive gates. Digital Signal, Positive & Negative logic,
Boolean Algebra: Boolean postulate and Theorems, Examples of realization of Boolean functions using Boolean algebra.
Introduction to digital logic families: DTL, TTL & CMOS (10 Hrs, 20 Marks)

Unit – II

Combination logic design: Standard representation of logical function, K map representation of logical function, simplification of logical function using K map, for 2, 3 & 4 variables. K map with Don't care condition. Introduction to five and six variable K map with don't care condition. Design of half adder, full adder, half sub tractor, full sub tractor (10 Hrs, 20 Marks)

Unit – III

Combination logic design examples: Various Example of combinations logic circuit (truth table – K map – circuit diagram) with the help of K map and their implementation with the help of Basic/Universal gates.
Design of multiplexer & Demultiplexer: Design of comparator circuits using logic gates. Design of parity generator & checker circuit using logic gates
Introduction to sequential logic circuit: function of one bit memory cell, Truth table and excitation tables of S – R, JK, D & T Flip – Flop. (10 Hrs, 20 Marks)

Unit – IV

8085 Microprocessor
Introduction to 8085 Microprocessor - Architecture, functional pin diagram, register model , programming model , Bus architecture
Instruction Set of 8085 - Instruction cycle, fetch operation, execute operation machine timing diagram for op code fetch cycle, memory read, I/O read, memory write, I/O write, various addressing modes, various instruction set such as data transfer group, arithmetic group, logical group, branch group, stack, input, output and machine control group, instruction format, various addressing modes (10 Hrs, 20 Marks)

Unit – V

8085 assembly programming - Assembly Language, comparison of high level language and assembly language, role of assembler, Assembly language programming of 8085: addition and subtraction of 8 and 16 bit numbers, one's and two's complements of 8 and 16 bit numbers, multiplication and division of 8 and 16 bit numbers, largest and smallest number using array, sorting of numbers using array, finding square from look up table, square root of number, program related to shift and masking operation of 8 and 16 bit numbers.
(10 Hrs, 20 Marks)

List of Experiments

Group A

1. Verity the truth table of logic gates and verification of DeMorgance theorem.
2. Construction on of basic gates using universal gate (NAND / NOR)
3. Construction of half adder & full adder circuit. Also implement full adder with the help of two half adder circuit & one OR gate.
4. Construction of Half subtractor & full subtractor Circuit.
5. Gray to Binary and Binary to gray code converter.
6. Verification of truth table of multiplexes & flip flops.

Group B (8085 Assembly Language Programming)

1. Addition and subtraction of 8 and 16 bit numbers
2. Determining maximum and minimum elements in array
3. Look up table for BCD to 7 Segment conversions
4. HEX To BCD and BCD to HEX conversion
5. Arranging the numbers in ascending and descending order
6. Shift and mask off operation of 8 bit number

The term work should include minimum four experiments from Group A and minimum four experiments from Group B.

Reference Books

1. Modern Digital Electronics by R.P. Jain, 3rd Edition, TMH.

2. Digital Logic and Computer Design by M. Morris Mano, Pearson.
3. Fundamentals of Digital Circuits by A Anandkumar, Pearson.
4. Microprocessor and Interfacing , 2nd edition ,Douglas V Hall
5. Advanced Microprocessors and Interfacing , B Ram, TMH
6. Microprocessor architecture, programming and applications , 2nd ed , Ramesh Gaonkar
7. Introduction to Switching Theory and Logic Design, Hill and Peterson , John Wiley and Sons.
8. Digital system, James E Palmer, David E Parlman, McGraw Hill.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

SE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2006-07)

TERM – I

INDUSTRIAL MANAGEMENT AND ECONOMICS

Teaching Scheme:
Lectures: 4 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)

Unit - I

History of Management, Scientific Management, & its Principles, Administration Management, Neo – Classical Theory, Gilberth's contribution, Modern management Theories, Relation between Administration and organization, Levels of managements, Function of Management.

(10 Hrs, 20 Marks)

Unit – II

Organizational structures: Line, functional, Line staff forms of Business ownerships: Proprietorship, partnership Joint stock Co - Pvt. Ltd. Co., public Ltd Co., Co-operative organizations, public sector, joint ventures, Their meanings, formation, Advantage, Limitations & Applications.

(10 Hrs, 20 Marks)

Unit – III

Engineering Economics. Wants, Utility, Demand, Supply, Elasticity of demand & supply. Capital: Fixed, Working capital, sources of finance Credit, shares, Debentures, ploughing Back, Loans from banks, Trade Public Deposits, financial Institution, foreign capital. Cost Estimating, Cost Accounting, Fixed costs, veriable costs selling price. (No Numericals)

(10 Hrs, 20 Marks)

Unit – IV

Manpower planning, factors affecting manpower planning sources of Recruitment, Need, objectives & benefits of Training, Method of Training workers, supervisors and Executives. Job Evaluation & Merit rating (Concept Only) Selling & Marketing Concept, Sales promotion, Advertising.

(10 Hrs, 20 Marks)

Unit – V

Quality (International Standard Organization of standards) ISO certificate Intellectual property rights (IPR), patents, Trademarks, copyrights, Management information system (MIS), Definition, Need & objectives of MIS, MIS & Computer, Designing of MIS, Application of MIS.

(10 Hrs, 20 Marks)

Reference Books –

1. Industrial Engineering & Production Management by M. Mahajan.
2. Engineering Management by Mazda, Pearson
3. Industrial Organization and Management by O.P. Khanna, Dhanpat Rai & Sons
4. Management Information system by Jawdekar, THM
5. Information systems: Foundation of eBusiness by Alter, Pearson
6. Management by Stoner, Pearson

NORTH MAHARASHTRA UNIVERSITY, JALGAON

SE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2006-07)

TERM – I

ENGINEERING MATHEMATICS - III

Teaching Scheme:
Lectures: 4 Hrs / Week
Tutorial: 1 Hr / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term work: 25 Marks

Unit – I

Linear Differential Equation – Linear differential equation of order n, solution of LDE with constant coefficient, method of variation of parameters, equation reducible to linear form with constant coefficients, Cauchy's linear equation, Legendre's linear equation, Solution of simultaneous and symmetric simultaneous differential equation, applications to electric circuits.

(10 Hrs, 20 Marks)

Unit – II

Fourier and Z-transforms –
Fourier Transform (FT) – Fourier integral theorem, sine and cosine integrals, Fourier transform, Fourier cosine transform, Fourier sine transform and their inverses, Problems on wave equation.
Z-Transform – definitions, standard properties (without proofs), ZT of standard sequences and inverse, Solution of simple differential equations, Applications of Z-transform to discrete system analysis.

(10 Hrs, 20 Marks)

Unit – III

Laplace Transform (LT) – definition of LT, inverse LT, properties and theorems, LT of standard functions, LT of some special functions, (1^{st} order Bessel's periodic, unit step, unit impulses and ramp), Problems on finding LT and inverse LT, initial and final value theorems, applications of LT for network analysis.

(10 Hrs, 20 Marks)

Unit – IV

Statistics – mean, mode, median, standard deviation, variance, co-efficient of variation, Moments, skewness and kurtosis, Bivariate distribution, correlation and regression, rediability of regression estimates

Probability – Theorems on probability, Binomial distribution, Poisson distribution, Normal distribution

(10 Hrs, 20 Marks)

Unit – V

Probability – Beta distribution, Gamma distribution, Chi-square distribution

Theory of sampling – Sampling, types of sampling, sampling distribution, testing Hypothesis, Null hypothesis, level of significance, Test of significance, test of significance of large sample, decision quality control.

(10 Hrs, 20 Marks)

Text Books –

1. Advanced Engineering Mathematics – Erwin Kreyszig (Wiley Eastern Ltd)
2. Advanced Engineering Mathematics – H K Dass (S Chand)

Reference Books –

1. Advanced Engineering Mathematics – Wylie C R and Barrett, McGraw Hill
2. Higher Engineering Mathematics – B S Grewal, Kanna Publication
3. Engineering Mathematics – B V Raman, Tata McGraw Hill
4. Applied Mathematics Vol 1 and 2 – P N Wartikar and J N Wartikar (Pune Vidharthi Griha Prakashan Pune)
5. Advanced Engineering Mathematics with MatLab, 2nd Edition – Thomas L Harman, James Dabney and Norman Richert , Thomson Learning
6. Engineering Mathematics – III – Dr. Gokhale, Dr. Chaudhary and Dr. Singh

---

NORTH MAHARASHTRA UNIVERSITY, JALGAON

SE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2006-07)

TERM – I

PROGRAMMING LABORATORY - I

Teaching Scheme:
Lectures: 3 Hrs / Week
Practical: 4 Hrs / Week

Examination Scheme:
Term work: 50 Marks
Practical: 50 Marks

Unit –I

Introduction to C - C Fundamentals, data types , constants , variables, Statements, operators, expressional, control statements.
Arrays - Representation and declaration of array one dimensional array, two dimensional array, multidimensional array.
Strings - Representation, array of string, operation on sitting.
Pointers - Fundaments, declaration, advantage, pointers to different data types , array and pointers, array to pointers, operations on pointers
Functions - Need function definition, prototype, function, parameter, recursion, scope of Variables in the function, library functions, passing array to function, pointer to function

Unit – II

Structure - Definition, declaration, array to structures, structures within structures, structures, and function, structures and pointers, self referential structures user defined data types – typedef .
Union - Need definition, operation, bit fields, difference between structure and union.
File Handling - Structure of file, file types, file operations
Macros - Substitution, File inclusion, complier, controlled directives.

Unit – III

Inter-conversion – Inter-conversion of Number system: decimal, binary, octal, hexadecimal.
System of liner equation - Gauss Elimination, Gauss Jordan, Jacobi or Gauss Siedel.
System of differential Equation - Taylor, Heun's method, Euler's modified method.

Unit – IV

Root of equations, Methods - Newton-Raphson, Raquel, faisi, Bolzano.
Interpolation - Newton backward, forward difference, table, divided difference.
Integration - Trapezoidal, Simpson's 1/3, 3/8 rule.

Unit – V

Permutation, Combination, powerset, Sorting - Insertion, Quick, Merge, Bubble, study of algorithms and implementation, analysis of sorting methods.
Searching - Linear search, binary search.

List of Experiments -

1. Matrix Operation (Addition, Multiplication, Inverse)
2. Swapping of numbers using single pointer.
3. Processing student records using structure.
4. File manipulation opening closing, input and output operation files.
5. Program for macros.
6. Nesting of macro.
7. Macro with arguments
8. Inter conversion of number system.
9. To find value of unknown using Guass Elimination.
10. To find value of unknown using Guass Siedal.
11. To find root of equation using Newton Raphson.
12. To find root of equation using Regula-Falsi.
13. Find interpolating values using interpolation methods.
14. Find integral values using Simpson's 1/3, 3/8 rules.
15. Generation of Permutation for given list.
16. Generation of Combination for given list.
17. Generation of Power set.
18. String Operations.
19. Sorting using Bubble Sort.
20. Sorting using Quick Sort
21. Searching of given element using linear search.
22. Searching of given element using Binary search.

The term work should include minimum 15 experiments from the above list.
The programs should be developed with integrated development environment (IDE) like Turbo C with emphasis on step by step development and debugging.

Reference Books -

1. M.K.Jain lyanger "Numerical Method of Scientific and Engineering Computer" 3rd edition, New age publications.

2. E. Balaguruswami " programming in ANSI C" Tata McGraw Hill.
3. H. Schildt, " C The complete Reference" Tata McGraw Hill
4. Venugopal, K.R. and Prasad Sudeep R, "Programming With C" Tata McGraw Hill.
5. V. Rajaraman " Computer Oriented Numerical Methods" 3rd Edition Prentice Hall of India, Eastern Economy Edition.
6. Steven Chapra "Numerical Methods for Engineers" Tata McGraw Hill.
7. Ellis Horowitz and Sahani " Fundamentals of Data Structure" Tata McGraw Hill.
8. Kanetkar Y P, "Let us C" BPB Publications.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

SE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2006-07)

TERM – II

MICROPROCESSOR - I

Teaching Scheme:
Lectures: 4 Hrs / Week
Practical: 2 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term work: 25 Marks
Practical: 25 Marks

Unit – I

8086/ 8088 CPU architecture programming model Segmentation, Addressing modes, Instruction sets, Assembly language programming BIOS and DOS interrupts. (10 Hrs, 20 Marks)

Unit - II

BIOS AND DOS Interrupts:, Introduction to DOS, Assembly language Programming in MSDOS using BIOS and DOS Interrupts, programming Technique, Time delay loop, produce and macros. (10 Hrs, 20 Marks)

Unit – III

8086 Configuration:, Basic 8086 configuration, maximum and minimum modes, System bus timing, Interrupt priority management, programmable interrupt controller (PIC) 8259A 8089 (IOP) (10 Hrs, 20 Marks)

Unit – IV

Main memory design: 8086 CPU Read/ Write timing SRAM and ROM interfacing requirement, address decoding technique full partial block PROM, Troubleshooting the memory module. DMA: Basic DMA operation, 8237 DMA Controller (10 Hrs, 20 Marks)

Unit – V

Multiprocessor Configuration: Queue status and block facility 8086 based multiprocessor system, co-processor configuration, closely coupled configuration Overview of loosely coupled configuration, 8087 NDP, 8087 Data types and processor architecture, 8087 programming. (10 Hrs, 20 Marks)

List of Experiments -

Assembly language programming of 8086:

1. Study of BIOS and DOS interrupts
2. Study of MASM directives
3. Program for string manipulation
4. Program for password
5. HEX- BCD conversion
6. BCD- HEX conversion
7. BCD Addition
8. Program using MACRO
9. Program using NEAR procedure
10. Program using FAR procedure
11. Program to display Date and Time
12. Program using structures
13. Program using 8087 instruction set
14. Program using 8087 instruction set

The term work should include minimum 12 experiments. Program based on 8087 are compulsory.

Reference Book:

1. John E. Uffenteck , “The 8086/ 8088 Family: Design, Programming and Interfacing, “ Pearson.
2. S.P. Dandomudi,“ Introduction to Assembly Language Programming – From 8086 to Pentium Processor” Springer.
3. Yu – Cheng Liu and Gleen A Gibson, “Microcomputer systems; The 8086 / 8088 Family Architecture, Programming and Design” 2nd Edition, Pearson.
4. Allen Wyatt, “Assembly Language Programming” QUE.
5. Peter Abel, “IBM PC Assembly Language and Programming” Pearson.
6. Douglas V. Hall “Microprocessor and Interfacing” Programming and Hardware” Pearson.
7. Barre B Brey “The Intel Microprocessor: 8085/ 8088, 80186/ 80286, 80386, 80186, Pentium, and Pentium Pro Processor- Architecture Programming and Interfacing” 4th Edition, Pearson.
8. A.K.Rai and K.M.Bhurchandi, “Advance Microprocessors and Principles- Architecture Programming and Interfacing” Tata McGraw Hill.
9. B.Ram “Advanced Microprocessors and Interfacing”, Tata McGraw Hill.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

SE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2006-07)

TERM – II

DATA STRUCTURES AND FILES

Teaching Scheme:
Lectures: 4 Hrs / Week
Practical: 4 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term work: 50 Marks
Practical: 50 Marks

Unit – I

Introduction: Concept of data, data types, data objects, structure, abstract data type, (ADT) and study .Implementation of data structure.
Stack and Queues:- Fundamental of stacks and queues, Data Structure of stack and queues, Basic operations on stacks and queues, Disadvantages and applications of stacks and queues, Concept of circular queues, basic operation on stacks and queues, Multi-stack and queues, priority queues.
Applications of Stacks:- Polish notation (infix, postfix, prefix) Evaluation of prefix and postfix expression , inter conversion of infix, prefix and postfix expression. Use of stack by function call and recursive function call, Multi-stack machines, Parenthesis matching, Towers of Hanoi, Queue application. (10 Hrs, 20 Marks)

Unit – II

Linked list: Concept of Linked list, Basic Operations on a single linked list (Creation, insertion, deletion, traversing, concatenating, inverting and length finding) Linked stack and Queues, circular linked list, advantages of circular linked list, erasing circular linked list, Double linked list with basic operations like copy, storing polynomial using linked list, polynomial addition, and Generalized list, operations like copy, and equal depth on generalized list, Data representation for strings, pattern matching in string.
Storage Pool :- Initializing Storage Pool, allocating and (GETNODE) and deal locating (RET) a node Dynamic storage Management Procedure for allocation and freeing of blocks, First Fit, Best fit and Worst fit memory allocation Strategies. (10 Hrs, 20 Marks)

Unit – III

Binary Tree: Basic terminology, Data structure and representation of binary tree, Binary tree traversal, and recursive and non recursive procedure for tree traversal, basic operations on binary tree, (Creation, insertion, deletion, printing, copy, equal and depth finding) Threaded binary tree, insertion in order threaded binary tree, In order traversal of in order threaded binary tree, Concept of binary search tree, Static tree labels, Huffman, Algorithms, Constructions, of optimal binary search tree, Dynamic tree tables, Basic Operation on it-insertion, deletion, height balanced binary tree, LL, LR, RL, RR Rotations (10 Hrs, 20 Marks)

Unit – IV

Sorting - Algorithm for bubble sort, Insertion sort, Quick sort, selection sort, shell sort, merge sort, Heap sort, Radix sort, Radix exchange sort, Best average and worst case time complexity of each of the sorting and searching Algorithm
Hashing: Hashing function, overflow handling, collision, linear probing deletion, clustering re-hashing bucket and chaining selection of good hash function (10 Hrs, 20 Marks)

Unit – V

File Handing - Sequential and Relative Files: Description and organization, primitive operations on sequential and relative file.
Direct access file - Description and organization, primitive operations on direct access files
Indexed Sequential files and Indexes:-Description and organization, primitive operations on indexed sequential files, Indexed concept, linear indexes, tree indexes, algorithm for B-tree.
Multi Indexed files:- Description and organization of Inverted files, Multi list files, and algorithms for addition and deletion of records from the files. (10 Hrs, 20 Marks)

List of Experiments -

List of programming assignments to be developed in C/C++ with emphasis on developing debugging abilities

1. Implementation of stack using array or linked list
2. Implementation of Queue using array or linked list
3. Implementation of circular Queue using array or linked list
4. Conversion of Infix expression to postfix expression
5. Conversion of postfix expression to infix expression
6. Addition of two single variable polynomial using linked list
7. Implementation of double linked list and perform insertion, deletion and searching
8. Creation of binary tree and perform all non-recursive traversals.
9. Creation of binary search tree and perform insertion, deletion printing and in a tree shape.
10. Implementation of pattern matching in starting using linked listed.
11. Create a hash table and handle the collisions using liner probing with or without replacement.
12. Implementation of simple index file.
13. Insertion and deletion of a record from a direct access file using changing with and without replacement.
14. Insertion and deletion of a record from a sequential file.
15. Insertion and deletion of a record from a relative file
16. Insertion and deletion of a record from a multi list file

Term work should be minimum 12 experiments from the above list.
The programs should be developed with integrated development environment (IDE) like Turbo C with emphasis on step by step development and debugging.

Reference Books -

1. Ellis Horowitz and Sahani, “Fundamentals of data Structure” Galgotia.
2. Thomas R. Harborn, “ File system and Algorithms”, Prentice- Hall International
3. Trembaly and Sorenson “An Introduction to Data structures with Applications” Tata McGraw Hill.
4. Tannenbaum, “Data Structure C and C++, Pearson.
5. Sahani, “Data Structures, Algorithms and Applications in C++ McGraw Hill.
6. Seymour Lipschutz, “Data Structures”, Schaum’s Outline.
7. Weiss, “Data structure and Algorithm analysis in C”, Pearson

NORTH MAHARASHTRA UNIVERSITY, JALGAON
SE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2006-07)

TERM – II

COMPUTER ORGANIZATION

Teaching Scheme:
Lectures: 4 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)

Unit – I

Introduction to system concepts: Functional Units, Basic operational concepts, instruction formats for machines, fixed and expanding opcodes, zero, two and three address schemes, concept of stack processor. General Addressing Modes.
Processor Organization: Instruction set design. 68000 architecture – Register structure and addressing modes, normal and exceptional processing. Bus structures. (10 Hrs, 20 Marks)

Unit – II

Information representation, Big-endian and little-endian, data types, fixed and floating point representation, IEEE format for floating point and decimal algorithm, Booths algorithm, bit pairing methods, Restoring and non-restoring division algorithm. Floating point operations, guard bits and rounding (10 Hrs, 20 Marks)

Unit – III

Control unit design, design levels, one / two / three bus CPU, hardwired control design methods and implementations, Microprogrammed control unit concepts and control unit design considerations, Wilkes design, Nano programmed computers, bit-slice architecture, 2900 family CPU designs, emulation. (10 Hrs, 20 Marks)

Unit – IV

Memory Organization: Memory hierarchies, memory interleaving, cache memories organization, virtual memory and organization, performance considerations, content addressable memories, memory management in 68000 family and cache designs, Introduction to SRAM, DRAM, RDRAM, Flash memory. (10 Hrs, 20 Marks)

Unit – V

System Organization: Buses, interconnection system bus, CPU and IO bus-bus operation, UNIBUS, multibus and IEEE 488 I/O addressing, data transfer, synchronization, serial and parallel ports, I/O interfaces, I/O channel, PCI bus, SCSI bus, Universal Serial Bus. RISC architecture, concepts, CISC versus RISC, advantages of RISC (10 Hrs, 20 Marks)

Reference Books –

1. Hamacher, Vransic, Zaky, “Computer Organization”, 5th Ed., McGraw Hill international.
2. J. P. Hayes, “Computer Architecture and Organization”, 3rd Ed. McGraw Hill international.
3. Tanenbaum, “Structured Computer Organization”, Pearson.
4. William Stallings, “Computer Organization And Architecture”, 6th ed., Pearson.
5. Nicholas Carter, “Computer Architecture”, Schaum’s Outline.

NORTH MAHARASHTRA UNIVERSITY, JALGAON
SE (INFORMATION TECHNOLOGY)
(w.e.f. 2006-07)
TERM – II

INFORMATION THEORY

Teaching Scheme:
Lectures: 4 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)

Unit – I

Foundation - Terminology, stegnography, substitution cipher & transposition cipher, simple X-OR, one-time pads.
Cryptographic protocol-Introduction to protocol, communication using symmetric cryptography, one-way hash function, communication using public key cryptography.

(10 Hrs, 20 Marks)

Unit - II

Cryptographic Techniques - Key management – Generating, Transferring & Verifying keys, Lifetime of keys, Destroying keys.
Algorithmic types & modes- Electronic codebook, Cipher block chaining mode, Stream cipher, Public key algorithm-RSA.

(10 Hrs, 20 Marks)

Unit - III

Cryptographic algorithm - Information theory-entropy & uncertainty, rate of language, unicity distance, confusion & diffusion, Complexity theory, Number theory-modular arithmetic, Chinese remainder theorem, Factoring, Prime number generation, Data Encryption Standards (DES)-description of DES.

(10 Hrs, 20 Marks)

Unit – IV

Compression Algorithm – Entropy, Huffman algorithm, Adaptive Huffman coding – Adaptive coding, Updating Huffman tree, Statistical modeling, Dictionary based model Compression.

(10 Hrs, 20 Marks)

Unit - V

Sliding window compression – algorithm, LZSS Compression, Speech compression – Digital Audio concept, Lossless compression of sound, Lossy graphics compression – Lossy compression, JPEG Standards, implementing DCT.

(10 Hrs, 20 Marks)

Reference Book:

1. Bruce Schneider, “Applied cryptography”, Protocols, Algorithms and sources code in C, John Wiely and Sons.
2. Mark Nelson, “The Data compression Book”, 2nd Edition M & T book.
3. Darrel Hankerson , Grey A Harrige , Peter D. Johnson Jr, Introduction to Information Theory & Data compression CRC .
4. Alfred Menezes , Paul Van Oorschot, Vanstone , Handbook of applied cryptography , CRC

NORTH MAHARASHTRA UNIVERSITY, JALGAON

SE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2006-07)

TERM – II

DATA COMMUNICATION

Teaching Scheme:
Lectures: 4 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)

Unit – I

Introduction to data communication and networks –
Data communication – Components, data representation, direction of flow
Networks – network criteria, network hardware, network software, protocol hierarchy, design issues for the layer, ISO OSI reference model
Signals – Analog signals, digital signal, analog verses digital signal, data rate limits, transmission impairment, throughput, propagation speed, propagation time, wavelength etc.

(10 Hrs, 20 Marks)

Unit – II

Digital transmission and analog transmission –
Digital transmission – line coding, characteristics, schemes. Block coding, transformation and common block codes. Sampling – PAM, PCM, Nyquist's theorem, bit rate, transmission modes.
Analog transmission – Analog modulation, AM, FM, PM. Digital modulation, ASK, FSK, PSK, QAM. Bit/baud comparison.
Telephone modems – Modem standards, traditional modems, 56K modems etc.

(10 Hrs, 20 Marks)

Unit – III

Multiplexing – FDM – Multiplexing process, de-multiplexing process, applications of FDM, WDM, TDM – Time slots, frames, interleaving, synchronization, bit padding, DSS, T-Lines, inverse TDM, Applications of TDM.
Transmission media – Guided media, twisted pair, coaxial cable, fiber optics, unguided media, radio waves, microwaves, infrared.
Switching – Circuit switching, packet switching and message switching. Telephone networks – components, LATAs, making conections, analog services and digital services.

(10 Hrs, 20 Marks)

Unit – IV

Error detection and correction –
Types of errors, single bit burst errors. Detections – redundancy, parity, CRC, checksum. Error correction – Correction by retransmission, FEC, Burst error correction.
Flow control and error control – stop and wait ARQ, Go-back-N ARQ, selective repeat ARQ.

(10 Hrs, 20 Marks)

Unit – V

Ethernet – Traditional Ethernet, fast Ethernet, gigabit Ethernet.

Multiple access – random access, MA, CSMA, CSMA/CD, CSMA/CA, control access, FDMA, TDMA, and CDMA.
IEEE 802.3, 802.4, 802.5, X.21, X.25, SDLC/HDLC protocol standards.
Introduction to network connecting devices – repeater, bridge, router, gateway, hub etc.

(10 Hrs, 20 Marks)

Reference Books –

1. "Computer Networks" A S Tanenbaum 4th edition, Pearson
2. "Data Communication and Networking" B Forouzan, 3nd edition, TMH
3. "Data Communication and Networking" Achyut Godbole, TMH

NORTH MAHARASHTRA UNIVERSITY, JALGAON

SE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2006-07)

TERM – II

PROGRAMMING LABORATORY - II

Teaching Scheme:
Lectures: 2 Hrs / Week
Practical: 4 Hrs / Week

Examination Scheme:
Term work: 50 Marks
Practical: 50 Marks

Unit – I

Introduction to Object Oriented Programming - Need of Object Oriented Programming: A look at Procedure Oriented Programming, Object Oriented Programming Paradigm Basic Concept of OOP - Objects, classes, Data Abstraction, Encapsulation, Inheritance, Polymorphism, Data hiding ,Message Passing. Benefits of OOP, Application of OOP

Beginning with C++ : What is C++, Structure of C++ Program, A simple C++ program, comments, output using Cout, input using Cin, declaration of variables, Reference variables, Token, Keywords, Identifier, Constant, Basic data types, Derived data types.

Unit – II

Control structures , Classes and Objects - Control Structures: If statement, switch statement, Do while statement, while statement and For statement.
Classes and objects: Specifying a Class, Defining Member function, A C++ program with class, Nesting of member function, Private member function, Array within a class, memory allocation for objects, Static Data member, Static member function, Array of Objects, Objects as function argument, Friendly function, Returning objects.
Constructor and destructor - Constructor Parameterized Constructor ,Multiple Constructor in a class, Constructor with default argument, Dynamic Initialization of Objects,
Copy Constructor, Destructor

Unit – III

Functions and Operator overloading - Function in C++: The main function, Function prototype, Call by value, Call by reference, Return by reference, Inline Function, Default Argument, Function Overloading,
Operator - Operator in C++, Scope Resolution Operator, Operator Precedence
Operator Overloading - Defining Operator overloading, Overloading Unary Operator, Overloading Binary operator, Overloading binary operator using friend, Rules for operator overloading
Type conversion

Unit – IV

Inheritance and Pointer, Virtual function and Polymorphism, Inheritance: Introduction, Defining Derived classes, Single inheritance, Making a Private member inheritable, Multilevel Inheritance, Multiple Inheritance, Hierarchical Inheritance, Hybrid inheritance, Virtual base classes, Abstract classes, Constructor in derived class.
Pointer, Virtual Function and Polymorphism: Introduction, Pointer to Object, this pointer, Pointer to Derived classes, Virtual function.

Unit – V

Managing Console I/O operation and File Operation - Managing Console I/O operation: C++ Stream, C++ Stream Classes, Unformatted I/O Operation, Formatted Console I/O operation, Managing Output with manipulators
Working with files: Classes for File Stream Operations, Opening and Closing a File, Detecting End Of File ,More about Open() : File Modes, File Pointer and their manipulator, Sequential Input and Output Operations, Updating a File: Random Access. Error handling during file operation, Template: Function template, Class Template

List of Experiments -

1. One Simple C++ Program
2. C++ Simple Program using Control Structure.
3. Program to create array of Object.
4. Program that illustrate use of various types of constructor
5. Program for String Manipulation
6. Program for Unary Operator Overloading.
7. Program for Binary Operator Overloading
8. Program for Function Overloading
9. Program for Multilevel inheritance
10. Program for Run time polymorphism using Virtual Function
11. Program to format output using manipulator
12. Program for File Handling
13. Program using Template
14. Mini project in C++ (e.g. Banking system, Railway reservation system etc.)
15. Program for stack operations using class
16. Program for Queue operations using class

Term work should include minimum 12 experiments from the above list.
The programs should be developed with integrated development environment (IDE) like Borland C++ with emphasis on step by step development and debugging.

Reference Books –

1. E. Balgurusamy ," Object Oriented Programming with C++ ", III Edition TATA McGraw –Hill Publication
2. Kanetkar Y. , " Let Us C++" , BPB Publication
3. Schildt , " C++ The Complete Reference " ,Tata McGraw Hill Publication.

North Maharashtra University, Jalgaon
New Syllabus with effect from Year 2006-07
TE IT Term I

Sr. No	Subject	Teaching Scheme per Week			Examination Scheme				
		L	T	P	Paper Hr.	Paper	TW	PR	OR
1	Multimedia Techniques	4	-	2	3	100	25	25	-
2	Theory of Computer Science *	4	-	-	3	100	-	-	-
3	Computer Network *	4	-	2	3	100	25	-	25
4	Computer Graphics *	4	-	2	3	100	25	-	-
5	Systems Programming *	4	-	2	3	100	50	-	25
6	Advanced Development Tools Laboratory *	-	-	4	-	-	50	-	-
	Total	20	0	12		500	175	25	50
	Grand Total	**32**			**750**				

TE IT Term II

Sr. No	Subject	Teaching Scheme per Week			Examination Scheme				
		L	T	P	Paper Hr.	Paper	TW	PR	OR
1	Management Information Systems	4	-	-	3	100	-	-	-
2	Operating Systems *	4	-	2	3	100	25	-	-
3	Software Engineering *	4	-	2	3	100	25	-	50
4	Database Management System *	4	-	2	3	100	25	25	-
5	Web Design	4	-	4	3	100	25	-	50
6	Practical Training/Mini Project/Special Study		-		-	-	25	-	-
	Total	20	0	10		500	125	25	100
	Grand Total	**30**			**750**				

* Common subject with TE Computer

NORTH MAHARASHTRA UNIVERSITY, JALGAON

TE (INFORMATION TECHNOLOGY)
(w.e.f. 2007-08)

TERM – I

Multimedia Techniques

Teaching Scheme:
Lectures: 4 Hrs / Week
Practical: 2 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term Work: 25
Practical: 25

Unit – I
What is Multimedia? Medium, Types of media, Properties of multimedia system, Data stream characteristics Multimedia applications, Multimedia system architecture, Objects for multimedia system: text, images, audio, video. Basic sound concepts, Computer representation of sound, Music: MIDI, MIDI Devices, MIDI Messages, MIDI Software.

(10 Hrs, 20 Marks)

Unit – II
Image and Graphics : Digital Image representation, Computer image processing, Dithering, Image recognition steps.
Rich Text Format (RTF), Introduction to TIFF and RIFF.
Video: Video Signal Representation, Properties of Visual representation,
Animation: Computer based animation, Basic concepts, Methods of controlling animation.

(10 Hrs, 20 Marks)

Unit – III
Data Compression: Need of compression, Coding requirements, Classification of compression techniques, Major steps of data compression,
Basic compression techniques: Run length Encoding, arithmetic, Huffman coding, DCT
JPEG: Steps of JPEG Image Compression, Image Preparation, Lossy sequential DCT based mode, Expanded Lossy DCT based mode., lossless, hierarchical mode.
H.261, MPEG, MPEG audio encoding

(10 Hrs, 20 Marks)

Unit – IV
Multimedia database management system, Characteristics of MDBMS, Data analysis, data structure, operations on data, Integration in database model.
User interfaces : General design issues, Video at the user interface, audio at the user interface

(10 Hrs, 20 Marks)

Unit – V
Multimedia Network communications: Quality of multimedia data communication, , Multimedia over IP, Multimedia over ATM Networks, Transport of MPEG-4, Media on demand, Multimedia over wireless networks.

(10 Hrs, 20 Marks)

Reference Books -

1. Steinmetz & Klara Nahrstedt, “Multimedia Computing Communication & Applications”, Innorative Tech Series.
2. Chapman,” Digital Multimedia” Wiley India.
3. Prabhat, Kiran Thakar, “Multimedia System Design”, PHI

4. Ze-Nian Li, Mark S Drew, “Fundamentals of Multimedia Systems”, Pearson
5. Ranajan Parekh, “Principles of Multimedia”, Tata McGraw Hill
6. Tay Vaughan - “Multimedia, Making it Work.” Vth Ed, Tata McGraw Hill
7. Buford – “Multimedia Systems”, Pearson
8. Vikas Gupta,” Multimedia and Web Design with Tutor CD” Dreamtech Press(Wiley India)

Term Work / List of experiments -

Any six lab assignments should be framed by concern staff member based on above syllabus.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

TE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2007-08)

TERM – I

Theory of Computer Science

Teaching Scheme:
Lectures: 4 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)

Unit – I
Mathematical Preliminaries: Alphabets, Strings, Languages, States, Graphs and trees, Concept of basic machine.
Finite State Machines: State tables, Transition graph, Adjacency matrix, Moore and Mealy FSM’s, Deterministic and Non-deterministic FSM’s, Equivalence of DFA and NFA, FSM with Epsilon moves, Minimization of FSM

(10 Hrs, 20 Marks)

Unit – II
Regular Expressions: Definition, Building RE, Converting DFA’s to RE, Conversion of RE to NFA.
Properties of Regular Sets: Pumping lemma for regular sets, Applications of Pumping lemma, Closure properties of Regular sets, and Decision algorithms for regular sets.

(10 Hrs, 20 Marks)

Unit – III
Grammars: Definition, Production rules, Formalization, Derivation trees, Ambiguous grammar, Removal of ambiguity, Reduced form grammar – Removal of unit productions, Epsilon productions, Useless symbols, Chomsky hierarchy.
Context Free Grammars: Definition, Simplification of CFG, Regular Grammar – Definition, Left linear and right linear regular grammar, Interconversion between left linear and right linear grammar, Reduced Forms – CNF and GNF, Reduction to CNF and GNF, Construction of regular grammar from DFA, Construction of FA from regular grammar.
Context Free Languages: Definition, Properties, Pumping lemma for CFL’s, Decision algorithms for CFL’s, CYK algorithm

(10 Hrs, 20 Marks)

Unit – IV
Pushdown Stack Memory Machines: Definition, PDM examples, Power of PDM, Deterministic and Non-deterministic PDM, PDA and CFL, Construction of PDA from CFG, Construction of CFG from PDA.
Production Systems: Definition, Post canonical system, PMT systems, Acceptors and Generators, Markov algorithm

(10 Hrs, 20 Marks)

Unit – V
Turing Machine: Definition, Notations, Transition diagram, Power of TM over FSM, PDM and PM, Design of TM, Universal TM, Church's Turing Hypothesis, Multi-stack TMs, TM limitations, Halting problem, Undecidability, Tractable and intractable problems

(10 Hrs, 20 Marks)

Reference Books -

1. E V Krishnamurthy, 'Theory of Computer Science', EWP.
2. Hopcroft, Ullman, 'Introduction to Automata Theory' Narosa.
3. K.L.P.Mishra, 'Theory of Computer Science', PHI.
4. Daniel Cohen, 'Introduction to computer Theory', Wiley India.
5. John Martin, 'Introduction to Language and Theory of Computations', TMH.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

TE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2007-08)

TERM – I

Computer Network

Teaching Scheme:
Lectures: 4 Hrs / Week
Practical: 2 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term Work: 25
Oral: 25

Unit – I
Review of Data Communication and Introduction to computer networks.
Data Link layer: Data Link layer design issues, Elementary data link layer protocols, Sliding window protocols, Data Link Layer switching, Bridges 802.x to 802.y, Local inter-networking, Spanning tree and remote bridges.
Review of network connecting devices and multiple access protocols.

(10 Hrs, 20 Marks)

Unit – II
Network Layer: Logical Addressing - IPv4 addresses- Address space, notations, Classful addressing, Classless Addressing, Network Address Translation.IPv6 addresses- Structure and address space
Internet Protocols: Internetworking- Need of network layer, datagram network, connectionless network
IPv4- Datagram, Fragmentation, Checksum, Options
IPv6- Advantages, packet formats, extension headers
Transition from IPv4 to IPv6: Dual stack, Tunneling, Header Translation

(10 Hrs, 20 Marks)

Unit – III
Network Layer: Address Mapping - ARP, RARP, BOOTP and DHCP
ICMP: Types of messages, message formats, error reporting, query, debugging tools
IGMP: Group Management, messages, message format, IGMP operations, Encapsulation, Netstart utility.
ICMPv6: Error reporting and queries
Delivery: Direct versus Indirect delivery
Forwarding: Techniques, process, routing tables

(10 Hrs, 20 Marks)

Unit – IV

Unicast Routing Protocols: Optimization, Intra and Inter domain routing, distance vector routing, link state routing, path vector routing

Multicast Routing Protocols: Unicast, Multicast and Broadcast, applications, routing protocols

Transport Layer: Process to process delivery, UDP

(10 Hrs, 20 Marks)

Unit – V

TCP/IP Protocol Suite: Addressing+

TCP: Services, features, segments, connections, flow control, error control, congestion control

Congestion control: Data Traffic, open- loop, closed- loop congestion control, congestion control in TCP and frame relay

Quality of Service: Flow characteristics and classes, techniques to improve QOS such as Scheduling, Traffic shaping, resource reservation, admission control

Integrated Services: Signaling, flow specification, admission, Service Classes, RSVP, problems with Integrated Services

(10 Hrs, 20 Marks)

Reference Books -

1. Andrew S. Tanenbaum, “Computer Networks”, 4th edition, Pearson.
2. Behrouz Forouzan, “Data Communications and Networking”, TMH, 4th Ed.
3. Irvine,”Data Communication and Networks:An Engg. Approach” Wiley India
4. S. Keshav, “An Engineering Approach to Computer Networking”, Pearson Education, 5th Ed
5. Irvine Olifer,”Computer Networks:Principles,Technologies and Protocols” Wiley India

List of experiments -

1. Study of network resources and various components.
2. TCP/IP Socket Programming.
3. Implementation of Data link layer protocol.
4. Implementation of Network routing algorithm.
5. Implementation of data compression and decompression algorithm (Huffman Algorithm).
6. Implementation of Network security algorithm (Encryption and Decryption Algorithm).
7. Program using FTP to exchange files between computers,
8. Study of proxy server/DNS Server/mail server/NFS server.

1 to 6 assignments are compulsory.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

TE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2007-08)

TERM – I

Computer Graphics

Teaching Scheme:
Lectures: 4 Hrs / Week
Practical: 2 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term Work: 25

Unit – I

Basic Concepts: Introduction to computer graphics, Types of Computer Graphics, Application of Computer Graphics, Graphics Standards, Graphics file formats such as BMP, TIFF, PCX and GIF

Interactive Computer Graphics: Working of Interactive Computer Graphics, Graphics Hardware, CRT, display and controller, Interlaced and non interlaced display, Vector and raster scan display, Random scan display, Frame buffers, Display adapters, VGA, SVGA, Bios video support, Various input devices, Graphics device drivers, Graphics software, Co-ordinates representations, Graphical functions, Plotters, Scanners, Digitizers and Light Pen.

Linear and Circle Generation: Line generation – DDA and Bresenhams /algorithm Thick line generation, Antialiasing, Circle Generation – DDA and Bresenham's Algorithm, Character Generation – Stroke principal, Starburst principle, Bitmap method.

(10 Hrs, 20 Marks)

Unit – II

Polygons: Types, representations, entering polygon, Polygon filling: Fance fill, Edge flag, Seed fill, Edge fill, Scan conversion algorithm. Scan conversion algorithm. Scan conversion: Real time scan conversion, Solid area scan conversion, Run length encoding, Cell encoding.

Segments: Concepts, Segment table, Segment creation, Deletion, Renaming, Image Transformation.

(10 Hrs, 20 Marks)

Unit – III

2D & 3D Geometry: 2D transformation primitives and concepts Translation, Rotation, Rotation about an arbitrary point, Scaling and Shearing, 3 D transformations, Rotation about an arbitrary axis, 3D viewing transformation , Concept of parallel perspective projections, Viewing parameters.

Clipping Fundamentals, Types of clipping.

(10 Hrs, 20 Marks)

Unit – IV

Windowing and Clipping: Viewing transformation, 2 D clipping and 3D clipping, Sutherland Cohen line clipping algorithm, Mid-point subdivision algorithm, Generalized clipping, Cyrus-Beck Algorithm, Interior and Exterior clipping, Polygon Clipping, Sutherland-Hodgman algorithm.

Hidden Surfaces and Lines: Back face removal algorithm, Hidden line methods, Z-buffer, Warnock and Painter algorithm, Floating horizon.

(10 Hrs, 20 Marks)

Unit – V

Light, Color and Shading: Diffused Illumination, Point source illumination, Shading algorithm, Color Models – RGB, HVS, CYM etc Elimination back faces, Transparency, polygons, B-Splines and corner, Bezier Curves, Fractals, Fractal Surfaces and lines

Graphical User Interface: Concepts of X-Windows, Concept of client/server model, Protocols, Message passing (only GUI related) Motif – widget, gadget structure (Only GUI concept) Concept of MS Windows, Open GL, Why 3D? Why Open GL? OpenGL and Animation

Graphics Standard: Introduction to graphics kernel system with basic primitives

Graphics Applications: Scientific and engineering applications, Business applications, Application concept in Animation and concept in Animation and Simulation

(10 Hrs, 20 Marks)

Reference Books -

1. David F. Rogers, "Procedural Elements for Computer Graphics:, Tata McGraw Hill, 2nd Ed
2. Steven Harringtom, "Computer graphics A Programming Approach", MGH
3. Hill, "Computer Graphics using OpenGL", Pearson, 2nd Ed
4. Foley, Vandam, Feiner, Hughes, "Computer Graphics Pricipals & Practice", Pearson LPE, 2nd Ed
5. Donald Hearn and Pauline Baker," Computer Graphics", Pearson LPE, 2nd Ed
6. Rao and Prasad," Graphics user interface with X windows and MOTIF", New Age
7. ISRD, "Computer Graphics", Tata McGraw Hill
8. Mukherjee, "Fundamentals of Computer Graphics and Multimedia", PHI

List of experiments -

1. Study of various Graphics Commands
2. Line generation using DDA
3. Different Line Style using Bresenhams Algorithm
4. Circle Generation using Bresenhams Algorithm
5. Program for Polygon Filling
6. Program for 2D Transformations (Translation, Rotation and Scaling)
7. Program for Segmentation
8. Program for line clipping
9. Program for Polygon clipping
10. Program for 3D rotation
11. Program for Parallel Projections
12. Program for Perspective Projection
13. Program for Animation
14. Program for Bezier Curve
15. Mini Project: Developing some Graphics application
16. Study assignment on any latest GUI application or mini-project.

The term work should include a minimum of ten assignments.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

TE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2007-08)

TERM – I

Systems Programming

Teaching Scheme:
Lectures: 4 Hrs / Week
Practical: 2 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term Work: 50
Oral: 25

Unit – I

Introduction: Introduction to system programming, Types of s/w and application software, System programming and system programs, Need of system software, Assemblers, Loaders, Compilers, Interpreters, Macros, Operating system and formula system, Translators and its types.

Assemblers: Structure of assembler, Basic function, Machine dependent and machine independent features of assembler, Types of assemblers – single pass, multi-pass, cross assembler, General design procedure of assembler, Design of Pass-I and Pass-II assembler (with reference to 8086 assembler), Single pass assembler for IBM PC, Implementation examples – MASM example.

(10 Hrs, 20 Marks)

Unit – II

Macros and Macro Processors: Definition and function of Macro Processor, Features of macro facility, Macro expansion, Nested macros, Design of macro processor – single pass and two pass macro processor, Detailed design of two pass macro processor.

Loaders and Linkage Editors: Basic loader functions, Relocation and linking concepts, Various loader schemes with their advantages and disadvantages, Other loader schemes – binders, Linking loaders, Overlays, Dynamic binders, Design of direct linking loaders, Specification of problem, Specification of data structures, Format of databases.

(10 Hrs, 20 Marks)

Unit – III

Design of a linker, A linker for MS DOS, Linking for overlays

Grammar and scanner, Overview of compilation process, Programming language grammar, Derivation, Reduction and syntax tree, Ambiguity, Regular grammar and regular expression, Basic functions of complier, Machine dependent and machine independent features of compiler, Types of compilers – single pass, multi-pass, cross compiler and pseudo code compiler, Phases of compiler

(10 Hrs, 20 Marks)

Unit – IV

Design of lexical analyser, Software tools for program development YACC and LEX.

Functions of parser, Parsing techniques, Top-down and Bottom-up parsing, Limitations of top-down parsing, Shift reduce and recursive descent parser, Operator precedence parser, Predictive parser, L-R parser, Syntax directed translation (design of parser not expected)

(10 Hrs, 20 Marks)

Unit – V

Symbol table organization and memory allocation, Elementary symbol table organization, Hash tables, Linked list and tree structure symbol tables, Memory allocation – static and dynamic memory allocation.

Dynamic linking in Windows (only introduction and concepts only) – concept of clipboard, OLE terminology and technology, Dynamic Data Exchange, Dynamic Link Libraries (DLL)

(10 Hrs, 20 Marks)

Reference Books -

1. John J. Donovan “System Programming”, TMH
2. Dhamdhere “System Programming & Operating System”, TMH, 2nd Ed
3. L. Beck “System Software”, Pearson, 3rd Ed
4. Aho, Ulman “Compiler Construction” Pearson LPE
5. J P Bennett, “Compiling Techniques”, TMH
6. Dick Grune,”Modern Compiler Design” Wiley India
7. David Galles,”Starting out with Modern Compiler Design” Dreamtech Press(Wiley India

List of experiments -

1. Develop an application to simulate first pass of 2-pass assembler
2. Develop an application to simulate second pass of 2-pass assembler
3. Design a simple loader
4. Develop an application to create a simple text editor
5. Develop an application for simulating Lexical phase of Compiler
6. Develop an application for simulating Syntax Analysis phase of Compiler

The term work should include a minimum of five assignments.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

TE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2007-08)

TERM – I

Advanced Development Tools Laboratory

Teaching Scheme:
Practical: 4 Hrs / Week

Examination Scheme:
Term Work: 50

Part I: Windows Programming
Basic Windows SDK programming, Programming involving Dialog Boxes, Menus and standard GUI components, Writing of Windows Help file using "HC", Writing DLLs and VXDs (Win 95/98/2k)

Part II: Front-End Tools
Assignments based on packages like C# / .NET / VC++ / VB / Java. Assignments should cover basic GUI components, Database Access, ActiveX technology, Network applications.

Part III: Internet Programming Tools
HTML programming, Java Scripts or VB Scripts programming, Internet programming using Java / C# / .NET, (Assignments should cover dynamic page creation) database connectivity (e.g. search engine), online communication (e.g. chatting, email-editor)

Reference Books -

1. Charles Petzold "Programming Windows", Microsoft Press, 5th Ed
2. Herbert Schildt, "Programming Windows 2000 – Ground Up", Tata McGraw Hill
3. Andrew Troelson,"C# and .Net Platform, A Press (Wiley India)
4. Schurman and Pardi, "Dynamic HTML in Action", Microsoft Press, 2nd Ed
5. Sells, "Windows Forms Programming in Visual Basic .NET", Pearson
6. Deitel, "C# How to program", Pearson
7. Bakharia, "Microsoft C# fast and easy web development", PHI
8. Steven Hozner," Java 2(Jdk 5) Progg. Black Book" Dreamtech Press(Wiley India)
9. Ivor Horton,"Beginning VC++" Wrox Press(Wiley India)
10. Steven Hozner ," VB.Net Progg. Black Book" Dreamtech Press(Wiley India)
11. Steven Hozner ,"HTML Black Book" Dreamtech Press(Wiley India)
12. Eric Brown,"Windows Forms in Action" Manning Press(Wiley India

Term work -

Term work should include at least four assignments from each part.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

TE (INFORMATION TECHNOLOGY)
(w.e.f. 2007-08)

TERM – II

Management Information Systems

Teaching Scheme:
Lectures: 4 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)

Unit – I
Introduction to information system: Why study information system, Functions of management, Managerial roles, Levels of management, Overview of management system, Operation support system, Management support system, Other classification of IS system, Alternative framework for information system as operational system

(10 Hrs, 20 Marks)

Unit – II
Introduction to concept of system and organization: System concepts, System & their environments, How system works, system approach for problem solving, Importance of feedback, Learning organizations. Internet, Intranet & Enterprise collaboration: Business value of internet, Interactive marketing, Customer value of internet, Internet and Intranet in business, Applications, Resource business value, Roles, Future enterprise collaboration, System concepts & tools

(10 Hrs, 20 Marks)

Unit – III
Operational information system: Accounting & finance, Marketing, Production, Human resource. Management information system & Design support system, Data warehouses, OLTP Vs OLAP, Overview of data mining, Management information system: DSS model and application using decision system, Executive information systems, Characteristics of Decision making process, Features, Components, Tools, Case studies Benefits & Risks of a DSS, GDSS.

(10 Hrs, 20 Marks)

Unit – IV
Planning & Development of MIS. MIS planning strategies, problems in determining information requirement, Business system planning (BSP),BSP study activities, assessment of business problems, Management strategies, organizing the information system plan, application development, Organization & management of information processing.

(10 Hrs, 20 Marks)

Unit – V
Tactical and Strategic information system: Nature of tactical and strategic information systems, Tactical & Strategic information system in Marketing & human resources.
Security & Ethical issues & challenges: Risks, Common control, Common threats, Protection of information system, Ethical issues.

(10 Hrs, 20 Marks)

Reference Books -

1. James A. O'Brien, "Management Information Systems", Tata McGraw Hill
2. W. S. Jawadekar, "Management Information System", Tata McGraw Hill
3. S. Sadagopan, "Management Information System", PHI
4. Robert Schulthesis and Mary Summer, "Management Information System", Tata McGraw Hill

5. Kenneth C Laudon and Jane Laudon, “Management Information System”, Pearson LPE
6. Gerald V. Post &David L. Anderson, “Management Information Systems”, Tata McGraw Hill
7. Mcnurlin, “Information Systems Management in Practice, 6th Ed., Pearson LPE

NORTH MAHARASHTRA UNIVERSITY, JALGAON

TE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2007-08)

TERM – II

Operating Systems

Teaching Scheme:
Lectures: 4 Hrs / Week
Practical: 2 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term Work: 25

Unit – I
Introduction: Need of OS, Evolution of OS, Types of OS like Batch, Timesharing, Multiprogramming, Multitasking, Real-time and Personal OS.
OS Views and Concepts: Shell command language, system calls, user view, OS components, OS structure like monolithic, layered, kernel based, micro-kernel based, virtual machine.
Process and Process management: Process concepts, interleaved CPU and IO operations, CPU burst, Process states, OS services for process management, threading.

(10 Hrs, 20 Marks)

Unit – II
Scheduling: Process scheduling, schedulers – long term, middle term and short term. Scheduling algorithms and performance evaluation.
Inter-process communication and synchronization needs: Mutual exclusion, semaphores, critical regions and monitor. Classical problems in concurrent programming.

(10 Hrs, 20 Marks)

Unit – III
Deadlock: Principles, detection, prevention, avoidance and recovery with Bankers algorithm.
Process management in UNIX: Structure of process, process control, process system calls – fork, join, exec, system boot (No algorithms).
Memory Management: Types, contiguous and non-contiguous, segmentation and paging concepts.

(10 Hrs, 20 Marks)

Unit – IV
Virtual memory management: Concepts, implementation, allocation, fetch and replacement.
Memory management in Unix: Policies, swapping and demand paging
File management: Organization, concepts, files and directories, hierarchical structures, space allocation, free space management
Security and protection: Overview, goals of security and protection, security and attacks, formal and practical aspects of security, authentication and password security.

(10 Hrs, 20 Marks)

Unit – V
File management in Unix: Internal representation of files, inodes
File structure in Unix: Structure of file and directories, super block, inode assignment to a new file. Allocation of disk blocks, file creation, and pipes. (No algorithms)
Mass storage structures, disk scheduling, disk management and swap space management.

Distributed OS: Concepts, design issues and system models.

(10 Hrs, 20 Marks)

Reference Books -

1. Silberschatz, Galvin, Gagne, "Operating System Concepts", John Wiley and Sons, 7th Ed, Wiley India
2. D.M. Dhamdhere, "Operating Systems", Tata McGraw Hill, 2nd Ed.
3. Milenkovic, "Operating Systems Concepts and Design", Tata McGrawHill
4. M.J. Bach, "The design of Unix Operating System", Pearson LPE.
5. Tenenbaum, "Modern Operating Systems", Pearson, 2nd Ed
6. William Stallings, "Operating systems-Internals and design principles", Pearson LPE, 5th Ed.
7. Deitel, "Operating systems", Pearson, 2nd Ed
8. Paul Love, " Beginning Unix", Wrox Press, Wiley India

List of experiments -

1. Study of Unix / Linux commands.
2. Implementation of command interpreter using system calls
3. Simulation of windows explorer
4. Implantation of CPU scheduling algorithm
5. Implementation of Memory Management algorithms – best fit, first fit, worst fit
6. Simulation of page replacement algorithm
7. Implementation of Bankers algorithm
8. Implementation of Inter process communication
9. Implementation of threading
10. Installation of Unix/Linux/Windows server installation with configuration of web-mail and proxy server systems

The term work should include a minimum of six assignments.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

TE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2007-08)

TERM – II

Software Engineering

Teaching Scheme:
Lectures: 4 Hrs / Week
Practical: 2 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term Work: 25
Oral: 50

Unit – I

Introduction: What is and why software engineering? Product: Evolving role of software, Software Characteristics, Components, Applications, Software crisis and Myths, Software Engineering Process, Software development phases and Software Process Models, Prototyping and RAD Model, Water fall, Incremental Model, Spiral Model, 4 GT Model, CASE tools.

(10 Hrs, 20 Marks)

Unit – II
Planning and Managing Software projects:

People, Problem and Process, Measures, Metrics and Indicators, Metrics for software quality, Scoping, Software Project Estimation, Make by decision, Software Acquisition Software risks - Identification, Projection, Assessment, Monitoring Project Scheduling and tracking tasks/Work break down structures, Time line charts, Project plan, CASE tools.

System Engineering: Computer based system, System engineering hierarchy.

Information engineering: Information strategy, Planning Enterprise modelling, Business area analysis, Information flow modelling, Product engineering, System analysis, Feasibility study, Economic and Technical feasibility analysis, Modelling system architecture diagram, CASE tools.

(10 Hrs, 20 Marks)

Unit – III
Requirement Analysis: Communication Techniques, FAST, Quality deployment, Analysis Principals: Modelling, partitioning, Prototyping, Specification,

SRS and SRS review analysis models: Data modelling, Functional modelling, Information flow, Data flow Diagrams, Extension to real time systems, Behavioural models, Mechanism of structural analysis, E-R diagrams, controlled modelling, Data dictionary, CASE tools.

(10 Hrs, 20 Marks)

Unit – IV
Design Fundamentals: Software Design and software design process, principals and concepts, Abstractions, Refinement and modularity, Software architecture, Control hierarchy, Partitioning, Data structure, Information hiding, Effective modular design,

Cohesion, coupling, Design Model, Design documents, CASE tools

Design Methods: Architectural design and design process, transform and transaction flow, design steps, interface design, procedural design, graphical and tabular design notations.

(10 Hrs, 20 Marks)

Unit – V
Software Testing Techniques and Strategies: Software testing fundamentals, Test case design, White box testing, Black box testing, Control structure testing, Strategic approach to testing, Strategic issues, Unit testing, Integration testing, Validation testing, System testing, CASE Tools

Introduction to OOSE.
Introduction Unified Modeling Language (UML)

(10 Hrs, 20 Marks)

Reference Books -

1. Pressman, “Software Engineering”, McGraw Hill, 6th Ed
2. Ghezzi, Jazayeri, Mandrioli, ”Fundamentals of Software Engineering”, Pearson/PHI, 2nd Ed
3. Peters,” Software Engineering” Wiley India
4. Sommervile, “Software Engineering”, Pearson, 7th Ed
5. Rajib Mall, “Fundamentals of Software Engineering”, PHI, 2nd Ed

6. Javadekar, “Software Engineering” Tata McGraw Hill
7. Pfleeger,” Software Engineering : Theory & Practice”,6th Edition-Pearson LPE
8. Thayer ,”Software Engineering Project Management “2nd edition, Wiley India
9. Tian ,”Software Quality Engineering” 2nd Edition, Wiley India

Term Work-

The term work should include a minimum of four software mini projects covering problem definition, analysis, design and documentation for each.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

TE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2007-08)

TERM – I

Database Management System

Teaching Scheme:
Lectures: 4 Hrs / Week
Practical: 2 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term Work: 25
Practical: 25

Unit – I
Introduction to DBMS: Basic concepts, advantages of a DBMS over file processing system, Data abstraction, Data models and data independence, components of a DBMS and overall structure. Database terminology
Database administration issues: DBA role, indexes. Data dictionary, security, backups, Replication, SQL support for DBA, commercial RDBMS selection
Data modeling: Basic concepts, types of data models, E-R data model and Object oriented data model, relational, network and hierarchical data models and their comparison, E-R and ERR diagramming.

(10 Hrs, 20 Marks)

Unit – II
Relational Model: Basic concepts, attributes and domains, interaction and extensions of a relation, concept of integrity and referential constraints. Relational query languages (relational algebra, relational calculus), concepts of view and trigger

(10 Hrs, 20 Marks)

Unit – III
SQL: Structure of a SQL query, DDL and DML, SQL queries, set operations. Predicates and join membership, tuple variables, set comparison, ordering of tuples, aggregate functions, nested query. Database modification using SQL, Dynamic and embedded SQL and concepts of stored procedure, Query optimization

(10 Hrs, 20 Marks)

Unit – IV
Relational database design: Need of normalization, Notation of a normalized relation, Normalization using functional dependency, Multi-valued dependencies and join dependency, 1NF, 2NF, 3NF, BCNF, 4NF.
Transaction Management: Basic concepts of transaction, components of transaction management (concurrency control, Recovery system), Different concurrency control protocols such as Time stamps

and locking, different crash recovery such as log based recovery and shadow paging, concepts of cascaded abort, Multi-version concurrency control methods.

(10 Hrs, 20 Marks)

Unit – V

Object oriented DBMS: Review of object oriented concepts: Objects, Classes, attributes, Messages, Inheritance, and Polymorphism etc. Object schemas, Class subclass relationships, inter-object relationships, features of object oriented DBMS and ORDBMS, concepts of OID, persistence of objects in OODBMS, Physical organization, object-oriented queries, schemas modifications, Temporal databases, Active databases.

(10 Hrs, 20 Marks)

Reference Books -

1. Singh," Database Systems: Concepts,Design & Apllication"- Pearson LPE
2. Kahate, " Introduction to Database Management Systems"- Pearson LPE
3. Henry F. Korth, Abraham silberschatz, "Database system concepts", 5th Ed.Mc Graw Hill Inc.
4. Date, "Introduction to Database Management Systems", 8/e Pearson LPE.
5. Rajesh Narang, "Database Management System", PHI
6. Elmasri, Navathe, Somayajulu, Gupta, "Fundamantals of Database Systems", Pearson
7. ISRD, "Introduction to Database Management System", Tata McGraw Hill
8. Connolly, " Database Systems" – Pearson LPE.
9. Bipin Desai, "Introduction to database management systems", Galgotia.
10. Renu Vig, "Fundamentals of database management systems", ISTE learning materials centre
11. Phillip Pratt, "Concepts of DBMS", Thomson Learning, 3rd Ed.
12. Phillip Pratt, "A Guide to SQL", Thomson Learning, 5th Ed.
13. V.K.Jain, " Database Management System" Dreamtech Press (Wiley India)
14. Oracle Sql,Pl/Sql for 9i and 10 g, Dreamtech Press(Wiley India)
15. Andy Oppel, " Rational Databases-Principles and Fundamentals, Dreamtech Press(Wiley India)
16. Paul Wilton," Beginning SQL" Wrox Press, (Wiley India)

List of experiments -

1. Creating a sample database application using conventional file processing mechanism and "C" language. The program should provide facilities for retrieving, adding, deleting and modifying records
2. Prepare an E-R diagram for the given problem definition. Prepare and verify a relational database design using concepts of normalization techniques in appropriate normal form.
3. Creating a sample database file and indexes (for the design made in experiment No. 2) using any client server RDBMS (oracle/Sybase) package using SQL DDL queries. This will include constraints (key reference etc.) to be used while creating tables.
4. SQL DML queries: Use of SQL DML queries to retrieve, insert, delete and update the database created in experiment No. 3. The queries should involve all SQL features such as aggregate functions, group by, having, order by, sub queries and various SQL operators.
5. PL/SQL: Fundamentals of cursors, stored procedures, stored functions.
6. Screen design and Report generation: Sample forms and reports should be generated using Developer 2000 (in case of Oracle) or through Power builder or Visual basic front end tools or any prototyping software engineering tool.
7. Prototype of OODBMS/ Active database/ Temporal Database in C++

The term work should include a minimum of six assignments.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

TE (INFORMATION TECHNOLOGY)
(w.e.f. 2007-08)

TERM – II

Web Design

Teaching Scheme:
Lectures: 4 Hrs / Week
Practical: 4 Hrs / Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Term Work: 25
Oral: 50

Unit – I
Basic of Web Design, Web design process, Web site evaluation procedure, website design principles, Developing Effective Web Strategy, Server Issues : Discuss Pros and Cons of having own server with hiring server, Domain name issues (Choosing registration etc.) Website User Requirements and Interaction, Marketing on Internet.

(10 Hrs, 20 Marks)

Unit – II
Website Organisation, Site Types and Architecture, Navigation Theory and Practice, Use of Graphics, Marketing Site Appealing, Search and Design, Site Maps Indexes, Other Navigational and Use Aids, Basic of Web Page Design : Page Types, Layouts, Text and Fonts, Colour, Images and Backgrounds. Making Use of Mail Delivery Systems, Online Customer Services, Online payments

(10 Hrs, 20 Marks)

Unit – III
History of HTML, DTD, CSS, HTML Documents Representation, Character Encoding Set, HTML Elements, Attributes, Entity References (Numeric, Character)

Structure of HTML Documents, Discuss all Block Level Tags, Text Level Tags, Linking Tags, Images Maps, Tables, Frames, Forms, Integration With CGI, Integrating Components in a HTML Page

(10 Hrs, 20 Marks)

Unit – IV
Web Mastering Skills and Roles: Internet Specialist, Information Design Scientist, Media Designer, Technical Designer, Technical Manager Etc. Web Site Security Issues, Website publishing and maintaining Procedure

(10 Hrs, 20 Marks)

Unit – V
Introduction to XML, XML Advantages, XML implementations, XML Approach to Web Designing, Logical and Physical Structures of XML Documents, XML Prolog, DTD, Elements, Attributes, Entities, Linking in XML, Style Sheets, XML Processor, Morphing HTML into XML.

(10 Hrs, 20 Marks)

Reference Books -

1. Thomas A Powell, “The Complete Reference – Web Design”, TMH, 2nd Ed

2. Daniel Gary,"Web Design Fundamental Handbook" Dreamtech Press(Wiley india)
3. Wynkoop, "Running a perfect web site", PHI
4. Lehnert,"Web 101: making the Network for You",- Pearson LPE
5. James L Mohler, "Teach Yourself How to Become a Webmaster in 14 Days", Samsnet, Techmedia
6. Richard Light, "Presenting XML", Sams, Macmillan Computer Publishing
7. Joel Sklar, "Principles of Web Design", Thomson Learning
8. James L. Mohler, Jon M. Duff, "Designing Interactive Web Sites", Thomson Learning
9. Kathleen Kalata, "Internet Programming with VBScript and JavaScript", Thomson Learning
10. Vikas Gupta," Comdex multimedia and Web Design with Tutor CD," Dreamtech Press(Wiley India)
11. Jon Duckett," Beginning Web Proggramming" Wrox Press(Wiley India)
12. Bryan, "HTML,XHTML and CSS Bible", Wiley India.

List of experiments -

1. Detail Study of at least one of the Web Servers like PWS, IIS, Apache, Java Webserver.
2. Detail Study of and HTML Authoring Tool: Netscape Composer/Front page/First Page etc.
3. Detail Study of One Imaging Tool
4. Design, Publish a Website with not less than 15 full size pages for a selected topic (Commercial, Institute, Portal or decided jointly by the student and teacher). Exercise the Web Mastering Skills in various phases of the development of the site.
5. Develop an XML application for Inventory Control, Museum Information System or on the topic given by the teacher
6. Design Active Web Page Using any Scripting Language.

The term work should include a minimum of Five assignments.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

TE (COMPUTER ENGINEERING / INFORMATION TECHNOLOGY)
(w.e.f. 2007-08)

TERM – II

Practical Training/Mini Project/Special Study

Examination Scheme:
Term Work: 25

Every student needs to complete following requirements for term work of Practical Training / Special Study / Mini Project.

Practical training in any industry for a period of minimum two weeks and submit training report certified by personnel manager or works manager or any other higher authority of that industry.

OR

Special study on a recent topic from reported literature and submit a report on it

OR

One mini Theoretical or development project and submit a report on it.

Notes:

1. Practical training is to be undergone in summer vacation after SE and / or in winter vacation after first term of TE.

2. Report should be typed on A4 size paper and two copies paper bounded are to be prepared, one copy for the candidate, and one for the library.

North Maharashtra University, Jalgaon
New Syllabus with effect from Year 2008-09
BE (Information Technology)
Term I

Sr. No	Subject	Teaching Scheme per Week			Examination Scheme				
		L	T	P	Paper Hr.	Paper	TW	PR	OR
1	Elective I	4	-	2	3	100	25	-	25
2	Enterprise Resource Planning	4	-	-	3	100	25	-	-
3	Advanced Unix Programming *	4	-	2	3	100	25	25	-
4	Object Oriented Modeling and Design *	4	-	2	3	100	25	-	25
5	E-Commerce	4	-	-	3	100	-	-	-
6	Seminar	-	-	2	-	-	25	-	-
7	Project I			2		-	25	-	25
	Total	20	0	10		500	150	25	75
	Grand Total	**30**			**750**				

Elective I
1. Operational Research * 2. Embedded Systems *
3. Image Processing *

BE IT
Term II

Sr. No	Subject	Teaching Scheme per Week			Examination Scheme				
		L	T	P	Paper Hr.	Paper	TW	PR	OR
1	Elective II	4	-	2	3	100	25	-	25
2	Data Warehousing and Mining *	4	-	2	3	100	25	-	25
3	Software Metrics and Quality Assurance *	4	-	2	3	100	25	-	25
4	Internet Security	4	-	2	3	100	25	-	-
5	Industrial Visit / Case Study		-			-	25	-	-
6	Project II		-	6	-	-	100	-	50
	Total	16	0	14		400	225		125
	Grand Total	**30**			**750**				

Elective II
1. Artificial Intelligence and Neural Networks 2. Mobile Network *
3. Information Retrieval

* Common subject with BE Computer

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (COMPUTER ENGINEERING / IT)
(w.e.f. 2008-09)

TERM – I

Elective – I
Operation Research

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 2 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25
Oral: 25

Unit – I **(10 Hrs. 20 Marks)**

Introduction to Operation Research – Modeling in operation research, principles of modeling, Main phases of operation research, scope, role of operation research in decision making, linear programming, model formulation, graphical method, simplex method, advantages of Linear Programming.

Unit – II **(10 Hrs. 20 Marks)**

Dynamic Programming - Introduction ,Basic concepts and applications, characteristics of dynamic programming approach, special techniques of Linear programming, Transportation problems, North – West corner rule, Least cost method, Vogel's approximation method, Balanced and unbalanced problems, Assignment problems, Hungarian method, balanced and unbalanced problems, traveling sales man problem.

Unit – III **(10 Hrs. 20 Marks)**

Project Planning Using PERT/CPM : Phases of project management, construction of network or arrow diagrams, time estimates, earliest expected time, latest allowable time and slack, critical path computations for PERT, calculations on CPM networks various floats for activities, critical path, Difference between CPM and PERT , Project time Vs project cost, use of CPM/PERT in project management.

Unit – IV **(10 Hrs. 20 Marks)**

Replacement Model – Deterministic and probabilistic considerations, Replacement of old equipment by the most efficient by the sudden failure items, failure trees, examples of failure trees, sequencing model Terminology and notations, Principles assumptions, Solution of sequencing problems, Processing of n jobs through two machines, Processing n jobs through three machines, Two jobs through m machines, Processing n jobs through m machines .

Unit – V **(10 Hrs. 20 Marks)**

Decision theory and game theory: Decision trees, classes of decision model, decision under certainty, uncertainty and risk.

Game Theory: Theory concept characteristics, maximum and minimum principles saddle points, dominance, basic concept, terminology of two persons zero sum game, MXZ and ZX games subgames methods, graphical method.

Reference Books:

1. N. D. Vohra, Quantitative Techniques in Management, TMH
2. Taha H. A., Operation Research – An Introduction PHI
3. S. D. Sharma, Operation Research, Kedarnath Ramnath Compay
4. N. G. Nair, Operation Research, Dhanpat Rai
5. Prem kumar Gupta, D. S. Hira, Operation Research, S. Chand & Company
6. L. S. Srinath, PERT and CPM Principles & Applications, EWP

Term work:

Assignment based on:

1. Implementation of Linear Programming Model

2. Implementation of Simplex Method
3. Implementation of Dynamic Programming
4. Implementation of transportation model
5. Implementation of assignment model
6. Implementation of Traveling Sales man problem
7. Implementation of sequencing model
8. Implementation for replacement model
9. Game playing with min / max search
10. Program for decision tree

Any Five Lab Assignment should be framed by concern staff member based on above list.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (COMPUTER ENGINEERING / IT)
(w.e.f. 2008-09)

TERM – I

Elective – I
Embedded Systems

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 2 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25
Oral: 25

Unit – I **(10 Hrs. 20 Marks)**

Embedded system Introduction

Introduction to Embedded System, History, Design challenges, optimizing design metrics, time to market, applications of embedded systems and recent trends in embedded systems, embedded design concepts and definitions, memory management, hardware and software design and testing, communication protocols like SPI, SCI, I2C, CAN etc

Unit – II **(10 Hrs. 20 Marks)**

System Architecture

Introduction to ARM core architecture, ARM extension family, instruction set, thumb Instruction set, Pipeline, memory management, Bus architecture, study of on-chip peripherals like I/O ports, timers, counters, interrupts, on-chip ADC, DAC, RTC modules, WDT, PLL, PWM, USB etc.

Unit – III **(10 Hrs. 20 Marks)**

Interfacing and Programming

Basic embedded C programs for on-chip peripherals studied in system architecture. Need of interfacing, interfacing techniques, interfacing of different displays including Graphic LCD (320X240), interfacing of input devices including touch screen etc, interfacing of output devices like thermal printer etc., embedded communication using CAN and Ethernet, RF modules, GSM modem for AT command study etc.

Unit – IV **(10 Hrs. 20 Marks)**

Real time Operating System Concept

Architecture of kernel, task scheduler, ISR, Semaphores, mailbox, message queues, pipes, events, timers, memory management, RTOS services in contrast with traditional OS. Introduction to uCOSII RTOS, study of kernel structure of uCOSII, synchronization in uCOSII, Inter-task communication in uCOSII, memory management in uCOSII, porting of RTOS.

Unit – V **(10 Hrs. 20 Marks)**

Embedded Linux

Introduction to the Linux kernel, Configuring and booting the kernel, the root file system, Root file directories, /bin, /lib etc., Linux file systems, Types of file system: Disk, RAM, Flash, And Network. Some debug techniques- Syslog and strace, GDB, TCP/IP Networking- Network configuration, Device control from user space- Accessing hardware directly, Multi processing on Linux and Inter Process Communication- Linux process model and IPCs, Multithreading using pThreads - Threads vs. Processes and pThreads, Linux and Real-Time- Standard kernel problems and patches.

Reference Books:

1. Rajkamal, “Embedded Sytems “, TMH.
2. David Simon, “Embedded systems software primer”, Pearson
3. Steve Furber, “ARM System-on-Chip Architecture”, Pearson
4. DR.K.V.K.K. Prasad, “Embedded /real time system”, Dreamtech
5. Iyer,Gupta, “Embedded real systems Programming“, TMH

Laboratory exercise

- Integrated Development Environment Overview (Project creation, down load & debug)
- Study of JTAG Debugger/on-board debugger-emulator.
- ARM Instructions execution (Barrel Shifter, LDR/STR, SMT/LDM)

Term Work:

Group - A

1) Writing basic C-programs for I/O operations
2) C-Program to explore timers/counter
3) C-programs for interrupts
4) Program to demonstrate UART operation

Group - B

5) Program to demonstrate I2C Protocol.
6) Program to demonstrate CAN Protocol.

Group - C

7) Program to interface LCD
8) Program to interface Keyboard and display key pressed on LCD
9) Program to interface stepper motor

Group - D

10) Program to demonstrate RF communication
11) Program to implement AT commands and interface of GSM modem
12) Implementation of USB protocol and transferring data to PC.
13) Implementation of algorithm /program for the microcontroller for low power modes.
uCOSII /Embedded Linux RTOS Examples

Group - E

14) Interfacing 4 x 4 matrix keyboards and 16 x 2 character LCD display to microcontroller / microprocessor and writing a program using RTOS for displaying a pressed key.
15) Writing a scheduler / working with using RTOS for 4 tasks with priority. The tasks may be keyboard, LCD, LED etc. and porting it on microcontroller/ microprocessor.

Group - F

16) Implement a semaphore for any given task switching using RTOS on microcontroller board.
17) Create two tasks, which will print some characters on the serial port, Start the scheduler and observe the behavior.

Group – G

18) RTOS based interrupt handling using Embedded Real Time Linux.
19) Program for exploration of (Process creation, Thread creation) using Embedded Real Time Linux.

Group – H

20) Program for exploring Message Queues using Embedded Real Time Linux.
21) Ethernet Based Socket Programming using Embedded Real Time Linux.

Note: 1) At least one practical should be performed from each group.
2) Two practicals should be performed using the JTAG debugger/on-board Debugger-emulator.

Term work will be based on above list.

NORTH MAHARASHTRA UNIVERSITY, JALGAON
BE (COMPUTER ENGINEERING / IT)
(w.e.f. 2008-09)

TERM – I

Elective – I
Image Processing

Teaching Scheme:	**Examination Scheme:**
Lectures: 4 Hrs./ Week	Theory Paper: 100 Marks (03 Hrs.)
Practical: 2 Hrs./ Week	Term Work: 25
	Oral: 25

Unit – I **(10 Hrs. 20 Marks)**

Introduction - What is digital image processing?, Fundamental steps in digital image processing, A simple Image formation model, Image sampling and quantization , Representing Digital Images, Basic relationship between pixels,

Image Enhancement in the spatial domain: Basic Gray level transformations, Histogram Processing(Equalization, Matching), Basics of spatial filtering, Smoothing spatial filters, Sharpening spatial filters.

Unit – II **(10 Hrs. 20 Marks)**

Image Enhancement in the frequency domain: Fourier Transform and Frequency domain, Filtering in the frequency domain, Basics of filtering in the frequency domain, Basic filters and their properties, Smoothing Frequency domain filters, Sharpening Frequency domain filters, Homomorphic Filtering
Properties of 2 D Fourier Transform, The Convolution and Correlation Theorems

Unit – III **(10 Hrs. 20 Marks)**

Image Restoration: Model Of Image Restoration/ Degradation Process, Noise Models, Restoration in the presence of Noise- Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Filtering Techniques to restore image.

Image Compression- Compression models- Lossy Compression- Lossless Compression.

Unit – IV **(10 Hrs. 20 Marks)**

Color Image Processing : Color Fundamentals, Color Models, Converting Colors from different color models, Gray Level to Color Transformations, Color Transformations, Color Slicing, Color Image Smoothing.

Morphological Image Processing
Basic Concepts, Dilation, Erosion, Thinning, Thickening, Pruning, Gray level Morphology

Unit – V **(10 Hrs. 20 Marks)**

Segmentaion- Edge linking and Boundary detection, Thresholding, Region Based Segmentation, Histogram Analysis,

Application of Image Processing,

Introduction to Content Based Image Retrieval.

Reference Books:

1. R.C. Gonzalez, R.R. Woods, Digital Image Processing Person Education, Pearson Education
2. B. Chanda, D.Datta Mujumdar, “Digital Image Processing And Analysis”, PHI ,
3. William Pratt, “Digital Image Processing”, John Willey & Sons
4. Anil Jain, “Fundamentals Of Digital Image Processing”, PHI

Term work:

1. Develop C/C++ code to create a simple image and save the same as bitmap image in .bmp file.
2. Develop C/C++ code to implement basic gray level transformations(Any One)
3. Develop C/C++ code to perform basic image enhancement operations
4. Develop C/C++ code to implement image histogram processing (Equalization or Matching)
5. Develop C/C++ code to find basic relationship between pixels.(Any One)
6. Develop C/C++ code to implement image compression (any one algorithm)
7. Implement gray scale thresholding to blur an image.
8. Implement C/C++ code to implement an algorithm for edge detection.
9. Implement C/C++ code to implement image morphological operations.(Any One)

The term work will be based on any 5 assignments from above list.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (Information Technology)
(w.e.f. 2008-09)

TERM – I

Enterprise Resource Planning

Teaching Scheme:
Lectures: 4 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25

Unit – I **(10 Hrs. 20 Marks)**

Introduction to ERP, Evolution of ERP, What is ERP? Reasons for the growth of ERP, Scenario and justification of ERP in India, Evaluation of ERP, Various modules of ERP, Advantages of ERP, An overview of Enterprise, Integrated Management of Information, Business Modeling ERP for Small Business, ERP for Make to Order Companies

Unit – II **(10 Hrs. 20 Marks)**

Business Process Mapping for ERP Module Design, Hardware Environment and its selection for ERP implementation, ERP and Related Technologies, Business Process Reengineering (BPR), Management Information Systems (MIS), Executive Information Systems (EIS), Decision Support System (DSS), Supply Chain Management (SCM)

Unit – III **(10 Hrs. 20 Marks)**

ERP Modules: Introduction, Finance, Plant Maintenance, Quality Management, Materials Management, ERP Market: Introduction, SAP AG, Baan Company, Oracle Corporation, People Soft, JD Edwards, World Solutions Company, System Software Associates, Inc. (SSA), QAD, A comparative assessment and selection of ERP packages and modules

Unit – IV **(10 Hrs. 20 Marks)**

ERP Implementation Lifecycle, Issues in implementing ERP packages, Pre-evaluation Screening, Package Evaluation, Project Planning Phase, Gap Analysis, Reengineering, Configuration, Implementation, Team Training, Testing, Going Live, End-user Training, Post-implementation (Maintenance mode)

Unit – V **(10 Hrs. 20 Marks)**

Vendors, Consultants and Users, In-house Implementation – Pros and Cons, Future directions in ERP,

New Markets, New Channels, Faster Implementation Methodologies, Business Models and BAPIs, Convergence on Windows NT, Application platforms, New Business Segments, More features, Web Enabling, Market Snapshots.

Reference Books:

1. S. Sadagopan, "ERP – A Managerial Perspective", Tata McGraw Hill
2. Alexis Leon, "Enterprise Resource Planning", Tata McGraw Hill
3. Vinod Kumar Garg, N.K Venkitakrishna, "ERP Concepts and Practice", PHI
4. Henandez, "The SAP R/3 Handbook", 2nd ED., Tata McGraw Hill

Term Work:

It should contain at least 6 lab assignments covering the above syllabus.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (COMPUTER ENGINEERING / IT)
(w.e.f. 2008-09)

TERM – I

Advanced Unix Programming*

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 2 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25
Practical: 25

Unit – I **(10 Hrs. 20 Marks)**

UNIX System Overview – Introduction, UNIX Architecture, Logging In, Files and Directories, Input and Output, Programs and Processes, Error Handling, User Identification, Signals, Time Values, System Calls and Library Functions.

File I/O – Introduction, File Descriptors, open Function, creat Function, close Function, lseek Function, read Function, write Function, I/O Efficiency, File Sharing, Atomic Operations, dup and dup2 Functions, sync, fsync, and fdatasync Functions, fcntl Function, ioctl Function, /dev/fd.

Files and Directories – Introduction, stat, fstat, and lstat Functions, File Types, Set-User-ID and Set-Group-ID, File Access Per missions, Ownership of New Files and Directories, access Function, umask Function, chmod and fchmod Functions, Sticky Bit, chown, fchown, and lchown Functions, File Size, File Truncation, File Systems, link, unlink, remove, and rename Functions, Symbolic Links, symlinkand readlink Functions, File Times, utime Function, mkdirand rmdir Functions, Reading Directories, chdir, fchdir, and getcwd Functions, Device Special Files, Summary of File Access Per mission Bits.

Unit – II **(10 Hrs. 20 Marks)**

System Data Files and Information – Introduction, Password File, Shadow Passwords, Group File, Supplementary Group Ids, Implementation Differences, Other Data Files, Login Accounting, System Identification, Time and Date Routines.

Process Environment – Introduction, main Function, Process Termination, Command-Line Arguments, Environment List, Memory Layout of a C Program, Shared Libraries, Memory Allocation, Environment Variables, setjmp and longjmp Functions, getrlimit and setrlimit Functions.

Process Control – Introduction, Process Identifiers, fork Function, vfork Function, exit Functions, wait and waitpid Functions, waitid Function, wait3 and wait4Functions, Race Conditions, exec Functions, Changing User IDs and Group IDs, Interpreter Files, system Function, Process Accounting, User

Identification, Process Times.

Unit – III **(10 Hrs. 20 Marks)**

Signals – Introduction, Signal Concepts, signal Function, Unreliable Signals, Interrupted System Calls, Reentrant Functions, SIGCLD Semantics, Reliable-Signal Terminology and Semantics, kill and raise Functions, alarm and pause Functions, Signal Sets, sigprocmask Function, sigpending Function, sigaction Function, sigsetjmp and siglongjmp Functions, sigsuspend Function, abort Function, system Function, sleep Function, Job-Control Signals, Additional Features.

Advanced I/O – Introduction, Nonblocking I/O, Record Locking, STREAMS, I/O Multiplexing, 2 poll Function, Asynchronous I/O, readv and writev Functions, readn and written Functions, Memory-Mapped I/O.

Unit – IV **(10 Hrs. 20 Marks)**

Threads – Introduction, Thread Concepts, Thread Identification, Thread Creation, Thread Termination, Thread Synchronization.

Thread Control – Introduction, Thread Limits, hread Attributes, Synchronization Attributes, Reentrancy, Thread-Specific Data, Cancel Options, Threads and Signals, Threads and fork, Threads and I/O.

Daemon Processes – Introduction, Daemon Characteristics, Coding Rules, Error Logging, Single-Instance Daemons, Daemon Conventions, Client-Server Model.

Unit – V **(10 Hrs. 20 Marks)**

Interprocess Communication – Introduction, Pipes, popen and pclose Functions, Coprocesses, FIFOs, XSI IPC, Message Queues, Semaphores, Shared Memory, Client-Server Properties.

Network IPC: Sockets – Introduction, Socket Descriptors, Addressing, Connection Establishment, Data Transfer, Socket Options, Out-of-Band Data, Nonblocking and Asynchronous I/O.

Advanced IPC – Introduction, STREAMS-Based Pipes, Unique Connections, Passing File Descriptors, An Open Server, Version 1, An Open Server, Version 2.

Reference Books:

1. W. Richard Stevens and Stephen A. Rago, Advanced Programming in the UNIX Environment, 2/E, Pearson Education
2.W. Richard Stevens, Unix Network Programming - Interprocess Communications, Volume 2, 2/E, Pearson Education

Term Work:

Concerned staff members should suitably frame the term work (at least 6) based on above syllabus and implementation of Unix commands using library functions as well as implementation of shell scripts.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (COMPUTER ENGINEERING / IT)
(w.e.f. 2008-09)

TERM – I

Object Oriented Modeling and Design

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practicals: 2 Hrs./Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25 Marks
Oral: 25 Marks

Unit – I **(10 Hrs. 20 Marks)**

Review of Object Modeling, New Paradigms, Object Oriented Thinking, UML Concepts: Overview of UML.
UML 2.0 New Features.
Rational Unified Process emphasizing Inception, Elaboration, Construction, Transition Phases. 4+1 View architecture, Architectural approaches: Use case Centric, Architecture driven, Iterative approach, OO Concepts Review.

Unit – II **(10 Hrs. 20 Marks)**

Introduction to UML. UML MetaModel. Extensibility mechanisms like stereotypes, tagged values, constraints and profiles. OCL. Overview of all diagrams in UML 2.0.

Unit – III **(10 Hrs. 20 Marks)**

Object diagrams, CRC method, Review of OO concepts. Class diagrams, Classes and Relationships, Interfaces and ports, Templates, Active Objects, Advanced relationships generalization, association, aggregation, dependencies. Composite structure diagrams including composite structures, collaborations.

Unit – IV **(10 Hrs. 20 Marks)**

Interaction diagrams. Interaction Overview diagrams including interactions, signals, exceptions, regions, partitions, Sequence diagrams, Communication diagrams.
State Machine diagrams, States, encapsulation of states, transitions, submachine, state generalization. Timing diagrams, Activity diagrams, Activities, sub activities, signals, exceptions, partitions, regions.

Unit – V **(10 Hrs. 20 Marks)**

Support for modeling Architecture in UML. Package diagrams, Component diagrams, Deployment diagrams. Applications of UML in embedded systems, Web applications, commercial applications.

Reference Books:

1. Grady Booch, James Rumbaugh, Ivar Jacobson “Unified Modeling Language User Guide”, Addison-Wesley
2. Joseph Schmuller “SAMS Teach yourself UML in 24 Hours”, Third edition.
3. Martin Fowler, “UML Distilled: A Brief Guide to the Standard Object Modeling Language”, Third Edition (Paperback) ,Addision Wesley
4. Dan Pilone, Neil Pitman “UML 2.0 in a Nutshell”, O'Reilly
5. Rambaugh, “Object Oriented Modeling and Designing”. PHI
6. Bouch. “Object Oriented Analysis and Design with Applications”. Addison Wesley.
7. Schah, “Introduction to OOAD with UML and Unified Process”, TMH

Term Work:

Concerned staff members should suitably frame the term work at least 5 assignments based on above

syllabus. Each assignment must consider definition, analysis, design and modeling of a project.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (Information Technology)
(w.e.f. 2008-09)

TERM – I

E-Commerce

Teaching Scheme:
Lectures: 4 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)

Unit – I **(10 Hrs. 20 Marks)**

Overview of electronic commerce- Introduction, Definition of Electronic Commerce, Electronic Business, Potential benefits of electronic commerce, Impact of Electronic Commerce on business model, Overall Business and E-commerce goal congruence, The impact of electronic commerce security, Implications for the Accounting profession.

Unit – II **(10 Hrs. 20 Marks)**

Electronic Commerce and the role of Independent Third parties – Introduction, Consulting practices and Accountants Independence, CPA Vision Project, New assurance services identified by AICPA, The Elliott committee and the Cohen Committee, Impact of electronic commerce on the traditional assurance function, Third party assurance of Web based electronic commerce.

Unit – III **(10 Hrs. 20 Marks)**

EDI, Electronic commerce and the Internet – Introduction, traditional EDI Systems, data transfer and standards, Financial EDI, EDI Systems and the internet, Impact of EDI- Internet applications on the accounting profession. PGP Email, Encryption Software.

Unit – IV **(10 Hrs. 20 Marks)**

Risks of Insecure Systems – Introduction, Internet Associated Risks, Social Engineering, Risk associated with Business transaction data transferred between Trading and Partners. Risk associated with Viruses and malicious code overflows, Implications for the accounting profession. Fire walls security issues, Authentication.

Unit – V **(10 Hrs. 20 Marks)**

Electronic Commerce Payment Mechanism – Introduction, The SET Protocol, Magnetic Strip cards, smart cards, Electronic checks, Electronic cash.

Reference Books:

1. Greenstein, Feinnon, " Electronic Commerce", Tata McGraw Hill Edition
2. Ravi Kalakota, et al, " Electronic Commerce – A Manager's Guide", Addison Wesley Longman.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (Information Technology)
(w.e.f. 2008-09)

TERM – I

Seminar

Teaching Scheme:
Practical: 2 Hrs./ Week

Examination Scheme:
Term Work: 25 Marks

1. For seminar every student will individually study a topic assigned to him / her and submit a report and shall deliver a short lecture / Seminar on the topic at the end of term.
2. Selection of topic should be done by students in consultation with concerned guide
    a. Topic should be related to branch but it should be extended part of the branch (latest and advance topic).
    b. The topic should be such that the student can gain latest knowledge. Student should preferably refer at least one research paper
3. Seminar topic should not be repeated in the department and registration of the same should be done on first come first served basis
4. Seminar report should be submitted in paper bound copy prepared with computer typing
    a. Size of report depends on advancement of topic.
    b. Student should preferably refer minimum 5 reference books / magazines.
    c. Format of content
        i. Introduction.
        ii. Literature survey.
        iii. Theory
            1. Implementation
            2. Methodology
            3. Application
            4. Advantages, Disadvantages.
        iv. Future scope.
        v. Conclusion.
5. ASSESSMENT OF SEMINAR for TERM WORK
    Title of seminar : _____
    Name of guide : _____

Sr. No.	Exam Seat No.	Name of Student	Assessment by examiners					Grand Total
			Topic Selection	Literature Survey	Report Writing	Depth of understanding	Presentation	
			5	5	5	5	5	25

6. Assessment of Literature survey will be based on
    a. collection of material regarding history of the topic,
    b. implementation,
    c. recent applications.

7. Assessment of Depth of understanding will be based on
    a. Questioning by examiners.
    b. Questioning by students.
    c. What the student understands i.e. conclusion regarding seminar.

8. Assessment of presentation will be based on;
    a. Presentation time (10 minutes)
    b. Presentation covered (full or partial)
    c. Way of presentation
    d. Questioning and answering (5 minutes)
9. Examiners should be a panel of two one of them must be guide. Examiner must have experience at least 3 years. Examiners will be appointed by HOD in consultation with Principal.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (Information Technology)
(w.e.f. 2008-09)

TERM – I

Project - I

Teaching Scheme:	**Examination Scheme:**
Practical: 2 Hrs./ Week	Term Work: 25
	Oral: 25

1. Every student individually or in a group (group size is of 3 students. However, if project complexity demands a maximum group size of 4 students, the committee should be convinced about such complexity and scope of the work) shall take a project in the beginning of the (B.E. first Term) seventh term in consultation with the guide and the project must be completed in the (B.E. Second Term) eighth term.

2. The project proposal must be submitted in the institute in the beginning of the (B.E. first Term) seventh term. While submitting project proposal care is to be taken that project will be completed within the available time of two term i.e 2 Hrs per week for (B.E. first Term) seventh term and 4 Hrs per week for (B.E. Second Term) eighth semester (total time become 12*2 + 12*4 = 72 Hrs per project partner). The final title of the project work should be submitted at the beginning of the (B.E. Second Term) eighth semester. .

3. Project title should be precise and clear. Selection and approval of topic:
   Topic should be related to real life or commercial application in the field of Information Technology

   OR

   Investigation of the latest development in a specific field of Information Technology

   OR

   Commercial and Interdisciplinary projects should be encouraged. The examination will be conducted independently in respective departments.

4. The group should maintain a logbook of activities. It should have entries related to the work done, problems faced, solution evolved etc., duly signed by guide.
5. The group is expected to complete details system/problem definition, analysis, design, etc. in (B.E. first Term) seventh term, as a part of term work in the form of a joint report. Project report must be submitted in the prescribed format only. No variation in the format will be accepted.

6. One guide will be assigned at the most three project groups.
7. The guides should regularly monitor the progress of the project work.
8. Assessment of the project for award of term work marks shall be done by the guide and a departmental committee (consisting of minimum two teachers with experience more than three years) as per the guidelines given in the following table.

A) ASSESSMENT OF PROJECT I TERMWORK B.E. FIRST TERM

NAME OF THE PROJECT: _____
NAME OF THE GUIDE: _____

Sr No	Exam Seat No	Name Of Student Marks	Assessment by guide (70%)					Assessment by Departmental committee (30%)			Grand Total	Out of 25 Marks
			Literature survey	Topic Selection	Docum-entation	Attendance	Total	Evaluation (10%)	Pres-ntaion (20%)	Total		
			10	05	15	05	35	05	10	15	50	25

Sign of Guide Sign. of Committee Members Sign. of H. O. D.

9. The guide should be internal examiner for oral examination (If experience is greater than three years).
10. The external examiner should be from the related area of the concerned project. He should have minimum of five years of experience at degree level / industry.
11. The evaluations at final oral examination should be done jointly by the internal and external examiners.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (Information Technology)
(w.e.f. 2008-09)

TERM – II

Elective – II
Artificial Intelligence and Neural Networks

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 2 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25
Oral: 25

Unit – I **(10 Hrs. 20 Marks)**

Introduction to Artificial Intelligence:
Definition, AI Problems, AI Technique ,Turing test, Problem as a state space search, production system, water jug problem, Problem characteristics, breadth first search, depth first search, Properties of internal Representation, Heuristic search techniques, Best first search, OR graph, AND-OR graph , A* and AO* Algorithms, Means and ends analysis.

Unit – II **(10 Hrs. 20 Marks)**

Knowledge Representation using Predicate Logic:
Predicate calculus, Predicates and Arguments, ISA hierarchy, Frame notation, Resolution,
Knowledge Representation using Non-monotonic Logic:
TMS (Truth Maintenance System), Knowledge representation, Semantic Net, Frames, Conceptual dependency, Script.

Unit – III **(10 Hrs. 20 Marks)**

Planning:
Types of planning, Block world, strips, Implementation using goal stack, Nonlinear planning with goal stacks, Hierarchical planning, List commitment strategy.
Perception:
Robot architecture, Vision, Representing and recognizing scenes, Constraint determination, Trihedral and Nontrihedral figures labeling, Waltz algorithm.

Unit – IV **(10 Hrs. 20 Marks)**

Introduction to Neural Network:
Biological Neuron, Artificial Neuron, Characteristics of Neural Network, Neural Network Architectures, Learning in Neural Networks, Various learning Methods and Learning Rules, Single layer Perceptron , Applications of Neural Networks for Pattern Recognition, Classification and Clustering.

Unit – V **(10 Hrs. 20 Marks)**

Multilayer and Recurrent Neural Network:
Multilayer Perceptron: - Introduction, different activation functions, Error Back Propagation Algorithm, Introduction and working of counter propagation network .
Introduction to Hopfield/Recurrent Networks, Associative and Bidirectional Associative Memory.

Reference Books:

1. Elaine Rich, K. Knight, “Artificial Intelligence". TMH.
2. Eugene Charniak, Drew McDermott, "Introduction to Artificial Intelligence".
3. J.M.Zurada, “Introduction to Artificial Neural Networks”, Jaico Publishing House.
5. Robert J. Schalkoff, “Artificial Neural Networks”, McGraw-Hill
6. Philip D.Wasserman “Neural Computing:- theory and practice”.
7. Eugene Charniak, Drew McDermott, "Introduction to Artificial Intelligence".

Term Work:

1. Design and Implement Water Jug Problem.
2. Implementation of Unification Algorithm.

3. Implementation of Dynamic database.
4. Implementation of Waltz algorithm.
5. Implementation of single perceptron training algorithm.
6. Application development using Neural Network.
7. Development of Intelligent Perception System.

Any five lab assignments should be framed by concern staff member based on above list.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (Computer Engineering / Information Technology)
(w.e.f. 2008-09)

TERM – II

Elective – II
Mobile Network

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 2 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25
Oral: 25

Unit – I **(10 Hrs. 20 Marks)**

Introduction – PCS Architecture, Cellular Telephony, Cordless Telephony and Low-tier PCS, Third Generation wireless system

Mobility Management – Handoff, Inter - BS handoff, Intersystem handoff, Roaming management, Roaming management under SS7 and Roaming management for CT2.

Handoff Management – Detection and Assignments, Handoff detection, Strategies for handoff detection, Mobile controlled handoff, Network controlled handoff, Mobile assisted handoff, Handoff failure, Channel assignment, Non- prioritized scheme and Reserved channel scheme, Queuing priority scheme, Sub rating scheme, Implementation issues, Hard handoff – MCHO link transfer, MAHO/NCHO link transfer, Sub rating MCHO link transfer, Soft handoff – adding new BS, dropping a BS.

Unit – II **(10 Hrs. 20 Marks)**

GSM Overview – GSM Architecture, location tracking and call setup, Security, Data Services – HSCSD, GPRS, Unstructured supplementary service data.
GSM Network Signaling – GSM MAP service frame work, MAP protocol machine, MAP dialogue.
GSM Mobility management – GSM location update, Mobility databases, Failure restoration, VLR Identification algorithm, VLR Overflow control.

Unit – III **(10 Hrs. 20 Marks)**

GSM short message service – SMS architecture, SMS protocol hierarchy, Mobile originated messaging, Mobile terminated Messaging.
International Roaming for GSM – International GSM call setup, Reducing the International call delivery cost
GSM Operations, Administration, and Maintenance – Call recording functions, Performance Measurement and Management, Subscriber and Service data Management.
Mobile number portability – Fixed network number portability, Number portability for Mobile networks, Mobile number portability mechanism.

Unit – IV **(10 Hrs. 20 Marks)**

VoIP Service for mobile networks – GSM on the Net, iGSM wireless VoIP solution, iGSM procedures and Message flows.

General Packet Radio Services – Architecture, Network nodes, Interfaces, Procedures, Billing, Evolving from GSM to GPRS.

Unit – V **(10 Hrs. 20 Marks)**

Wireless Application Protocol – WAP Model, WAP Gateway, WAP Protocol – WDP, WTLS, WTP, WSP, WAE, Mobile station Application execution environment.

Third Generation Mobile Services – Paradigm shifts in 3G Systems, W-CDMA, cdma 2000, Improvements on core network, Quality of service in 3G, Wireless Operating System for 3G Handset.

Paging Systems – Paging Network Architecture, User Access Interface – Telocator Alphanumeric Input Protocol (TAP), Telocator Message Entry Protocol (TME), Intersystem Interface.

Wireless Local Loop – WLL Architecture, WLL technologies.

Reference Books:

1. Yi-Bing Lin and Imrich Chlamtac "Wireless and Mobile Network Architecture", Wiley Publication.
2. Kasera Sumit, Narang Nishit, "3G Networks: Architecture, Protocols and Procedures", TMH

Term Work:

1. Setting up wireless network with and without infrastructure support.
2. Configuring Access Point with bridging mode (Point to Point and Point to Multi Point).
3. Configuring Routing between wired and wireless Networks.
4. Configuring Security in wireless network with and without infrastructure support.
5. At least 3 lab assignments based on above syllabus using any network simulator such as NS2, OPNET, OMNET etc.

Concerned staff members should suitably frame the term work (at least 6) based on above syllabus. Oral will be conducted based on the above syllabus and the term work submitted in the form of journal.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (Information Technology)
(w.e.f. 2008-09)

TERM – II

Elective – II
Information Retrieval

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 2 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25
Oral: 25

Unit – I **(10 Hrs. 20 Marks)**

Background: traditional methods, classification systems, classification of documents, cataloguing, types of catalogues, indexing, types of collections, user requirements

Automatic text analysis: Introduction, Generating document representatives – conflation, Indexing, Index term weighting, Probabilistic indexing, Discrimination and/or representation, Automatic keyword classification, Normalization

Unit – II **(10 Hrs. 20 Marks)**

Automatic classification: Introduction, Measures of association, Classification methods, The cluster hypothesis, The use of clustering in information retrieval, Single-link, The appropriateness of stratified hierarchic cluster methods, Single-link and the minimum spanning tree, Implication of classification methods

Unit – III **(10 Hrs. 20 Marks)**

Search strategies: Introduction, Boolean search, Matching functions, Serial search, Cluster

representatives, Cluster-based retrieval, Interactive search formulation, Feedback

Unit – IV **(10 Hrs. 20 Marks)**

Retrieval: user requirements, performance of information systems, manual and automatic methods compared, Retrieval of relevant information in a world-wide web environment, Information retrieval on WWW, advances in searching

Unit – V **(10 Hrs. 20 Marks)**

Retrieval Strategies: Boolean retrieval, Vector space retrieval, Probabilistic retrieval

Reference Books:

1. Korfhage, R.R. "Information Storage and Retrieval", John Wiley & Sons
2. Kowalski, G. "Information retrieval systems: theory and implementation", Kluwer
3. Charles T. Meadow "Text Information Retrieval Systems", Academic Press
4. Salton, G. and McGill, M.J. "Introduction to modern information retrieval", McGraw-Hill
5. Frakes and Baeza-Yates, "Information Retrieval: Data Structures and Algorithms" Prentice-Hall

Term Work:

It should contain at least 6 lab assignments covering the above syllabus.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (COMPUTER ENGINEERING/IT)
(w.e.f. 2008-09)

TERM – II

Data Warehousing and Mining

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 2 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25
Oral: 25

Unit – I **(10 Hrs. 20 Marks)**

Evolution of database technology, What is data mining?, Data Mining Applications, Steps in Knowledge Discovery, Architecture of typical data mining System, Data mining- On What kind of data, Data mining Functionalities, Classification of data mining systems, Major Issues in Data Mining.

What is Data Warehouse? Difference between Operational Database systems and Data Warehouse (OLTP and OLAP), Why Separate Data Warehouse?

A Multidimensional Data Model, Schemas for Multidimensional Databases: Stars, Snowflakes, and Fact Constellations. Measures, Concept Hierarchies, OLAP Operations in the Multidimensional Data Model.

Unit – II **(10 Hrs. 20 Marks)**

Data Warehouse Architecture, Process of Data Warehouse design, A Three tier Data Warehouse Architecture., Types Of OLAP servers.

Data Preprocessing: Why Preprocess Data? Data Cleaning Techniques, Data Integration and Transformation, Data Reduction Techniques, Discretization and Concept Hierarchy Generation for numeric and categorical data.

Data mining Primitives, A Data Mining Query Language.

Unit – III **(10 Hrs. 20 Marks)**

Concept Description: What is Concept Description? Data Generalization and Summarization-Based Characterization, Attribute Oriented Induction, Analytical Characterization: Attribute Relevance Analysis, Methods, Mining Descriptive Statistical Measures in Large Databases.

Mining Association Rules: Association Rule Mining, Market Basket Analysis, Association Rule classification, Mining Single-Dimensional Boolean Association Rules from Transactional Databases,

The Apriori Algorithm, Mining Multilevel Association Rules, Constraint-Based Association Mining.

Unit – IV **(10 Hrs. 20 Marks)**

Classification and Prediction: What is Classification and Prediction? Data Classification Process, Issues Regarding Classification and Prediction., Classification by Decision Tree Induction, Bayesian Classification, , Classification by Back propagation, A Multilayer Feed Forward Neural Network, Classification Based on Association Rule Mining, Other Classification Methods

Cluster Analysis: What is Cluster Analysis? Types of Data in Cluster Analysis, A Categorization of Clustering Methods, Partitioning Methods, Hierarchical Methods, Density Based Methods, Grid Based Methods, Model Based Clustering Methods.

Unit – V **(10 Hrs. 20 Marks)**

Cluster Analysis: What is Cluster Analysis? Types of Data in Cluster Analysis, A Categorization of Clustering Methods, Partitioning Methods, Hierarchical Methods, Density Based Methods, Grid Based Methods, Model Based Clustering Methods

Mining Complex Types Of Data: Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Mining Multimedia Databases, Mining Text Databases, Mining the World Wide Web.

Reference Books:

1. Han and Kamber, “Data Mining: Concepts and Techniques”, Morgan Kaufmann Publishers
2. Alex and Berson, “Data warehousing, Data Mining and OLAP”, TATA McGraw Hill

Term Work:

1. Develop a application to construct a multidimensional data model (Star, Snowflake or Fact constellations)
2. Develop a application to perform OLAP operations.
3. Develop a application to implement data preprocessing techniques.
4. Develop a application to implement data integration techniques.
5. Develop a application to implement data generalization and summarization techniques
6. Develop a application to extract association mining rules.
7. Develop a application for classification of data.
8. Develop a application for implementing one of the clustering technique.
9. Study of commercial data mining tools.

Any 6 laboratory assignments should be framed by concern staff member based on above list.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (COMPUTER ENGINEERING / IT)
(w.e.f. 2008-09)

TERM – II

Software Metrics and Quality Assurance

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 2 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25
Oral: 25

Unit – I **(10 Hrs. 20 Marks)**

Software Measurements: Measurement in Software Engineering, Scope of Software Matrices, The representational theory of measurements, Measurement and Models, Measurements Scales and scale types, Meaningfulness in measurement, Classifying software measures, Applying the framework, Software measurement validation.

Unit – II **(10 Hrs. 20 Marks)**

Measuring internal product attributes: Size- Aspects of software size, Length, Reuse, Functionality, Complexity.

Measuring internal product attributes: Structure- Types of structural measures, Control-flow structure, Modularity and information flow attributes, Data structure, Difficulties with general "complexity" measures.

Measuring internal product attributes: Modeling software quality, Measuring aspects of quality.

Unit – III **(10 Hrs. 20 Marks)**

Software Reliability: Basics of reliability theory, software reliability problem, parametric reliability growth models, predictive accuracy, importance of operational environment.

Good estimates, cost estimation: problems and approaches, models of effort and cost, problem with existing modeling methods, dealing with problems of current estimation methods, implication for process predictions.

Unit – IV **(10 Hrs. 20 Marks)**

Software documentation, Standards, Practices, Conventions and metrics, The software inspection process, The walkthrough process, Audit process, Document verification, The ISO 9000 Quality Standards, Comparison of the ISO 9000 model with SEI's CMM.

Unit – V **(10 Hrs. 20 Marks)**

Cleanroom Software Engineering: The cleanroom approach, Functional Specification, Cleanroom design, Cleanroom testing.

Reengineering: Business process reengineering, Software reengineering, Reverse reengineering, Reconstructing, Forward engineering, The economics of reengineering.

Reference Books:

1. Flanton, Pfleeger, "Software Metrics- A Rigorous and Practical Approach", Thompson Learning
2. Mordechai Ben-menachem/Garry S.Marliss, "Software Quality", Thompson Learning
3. Roger S. Pressman, "Software Engineering- A Practitioner's Approach", TMH
4. Swapna Kishore and Rajesh Naik, "ISO 9001:2000 for Software Organizations", TMH

Term Work:

Concerned staff members should suitably frame the term work at least 5 assignments based on above syllabus.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (Information Technology)
(w.e.f. 2008-09)

TERM – II

Internet Security

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 2 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25

Unit – I **(10 Hrs. 20 Marks)**

Security Basics – Define information security as process. Anti virus Software, Accesses controls, smart cards, biometrics, intrusion detection, policy management Encryption, physical security mechanism. Type of attacks – assess attacks modification attacks, Denial of services attacks repudiation attacks.

Unit – II **(10 Hrs. 20 Marks)**

Hackers techniques – Hackers motivations, historical hacking techniques, advanced techniques. Identification – Malicious code, Method of untargeted hackers, Methods of targeted hacker. Information security services, confidentiality, integrity, availability, accountability, Understanding of laws of India and U.S. Understanding privacy, civil issues.

Unit – III **(10 Hrs. 20 Marks)**

Policy- importance various policies, creating policy, Deploy policy, using effectively policy. Management Risk – risk, identification of risk , measure risk

Information security Process. Conduct an assessment, develop policy, implementation of security conduct training and audit.

Unit – IV **(10 Hrs. 20 Marks)**

Information security, Best practices administrative, technical security university, make use of ISO 17799. Firewalls – types configuration, Rule set. Encryption- private key, public key, digital signature, understand key management, trust in system, Intrusion detection.

Unit – V **(10 Hrs. 20 Marks)**

Unix security issues, setup a system. User management system management, Windows 2000/windows2003 server issues set up system, manage users ,manage the system, use active directory.

Reference Books:

1. Roberta Bragg, Mark Rhodes, Keith Strassberg, “Network Security- The complete Reference”, TMH
2. Eric Maiwald , “Network security a Beginner’s guide”
3. Basics of n/w security, firewalls and VPN , PHI
4. Tanenbaum, “Computer Networks”, PHI

Term Work:

Any five lab assignments should be framed by concern staff member based on above syllabus.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (Information Technology)
(w.e.f. 2008-09)

TERM – II

Industrial Visit / Case Study

Teaching Scheme: -

Examination Scheme:
Term Work: 25

EDUCATION TOUR / TECHNICAL VISITS / CASE STUDY AND ITS EVALUATION

1. During (B.E. First Term / Second Term) seventh and / or eighth terms or during vacation between (B.E. First Term / Second Term) seventh and eighth terms, every student; shall visit minimum two industries, factories arranged by colleges and accompanied by teachers. There shall be at least one teacher for a group of 20 students and at least one non-teaching staff accompanied with the students.

2. The colleges should obtain appropriate certificates of visit from the concerned organizations just after the visits.

3. Students should submit written report about the visits individually at the end of (B.E. Second Term) eighth term.

4. The report should contain information about the following points:

   (a) The organization - activities of organization and administrative setup technical personnel and their main duties.
   (b) The project / industry brief description with sketches and salient technical information.
   (c) The work / processes observed with specification of materials, products, equipments etc. and role of engineers in that organization.
   (d) Suggestions (if any) for improvement in the working of those organizations.

5. The evaluation of the report of technical visits will be made by panel of two teachers appointed by principal based on following points:

   (a) Coverage aspect: All above points should be covered.
   (b) Detailed observations: System / Process / Product explained with data, diagram specifications.
   (c) Quality of presentation: Report should be very objective and should consist of clear and systematic organization of topics and information.
   (d) Viva - voce: A viva -voce shall be conducted on the technical visit report by the teachers to assess the specific knowledge gained by the students for technical applications.

6. The case study should include the study problem in Computer Engineering branch.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (Information Technology)
(w.e.f. 2008-09)

TERM – II

Project - II

Teaching Scheme:	**Examination Scheme:**
Practical: 6 Hrs./ Week	Term Work: 100
	Oral: 50

1. The Project group in (B.E. first Term) seventh term will continue the project work in (B.E. Second Term) eighth term and complete project.
2. The group should maintain a logbook of activities. It should have entries related to the work done, problems faced, solution evolved etc., duly signed by guide.
3. The guides should regularly monitor the progress of the project work.
4. The project work along with project report should be submitted as part of term work in (B.E. Second Term) eighth term on or before the last day of the (B.E. Second Term) eighth term.
5. Project report must be submitted in the prescribed format only. No variation in the format will be accepted.
6. Assessment of the project for award of TW marks shall be done by the guide and a departmental committee (consisting of minimum two teachers with experience more than three years) as per the guidelines given in the following table.

B) ASSESSMENT OF PROJECT II TERMWORK (B.E. SECOND TERM)

NAME OF THE PROJECT: _____
NAME OF THE GUIDE: _____

Sr. No	Exam. Seat No	Name Of Students Marks	Assessment by guide (70%)						Assessment by department (30%)			Grand Total
			Fabrication /software / actual work	Execution of project	Project report	Scope/ Cost / Utility	Attende-nece	Total	Evaluation (10%)	Prese-ntaion (20%)	Total	
			20	10	20	10	10	70	10	20	30	100

Sign of Guide Sign. of Committee Members Sign. of H. O. D.

7. The guide should be internal examiner for oral examination (If experience is greater than three years).
8. The external examiner should be from the related area of the concerned project. He should have minimum of five years of experience at degree level / industry.
9. The evaluation at final oral examination should be done jointly by the internal and external examiners.
10. The Project work should be kept in department for one academic year after University Examination.

NORTH MAHARASHTRA UNIVERSITY, JALGAON
STRUCTURE OF TEACHING AND EVALUATION
S.E. (MECHANICAL ENGINEERING)

FIRST TERM

W.E.F. 2006-07

Sr. No.	Subject	Teaching Scheme Hours/week			Examination Scheme				
		Lectures	Tutorial	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	***Engineering Mathematics-III	4	--	--	3	100	--	--	--
2	***Strength of Materials	4	--	--	3	100	25	--	--
3	***Material Science	4	--	2	3	100	25	--	25
4	Manufacturing Engineering-I	4	--	--	3	100	--	--	--
5	Applied Thermodynamics	4	--	2	**3**	100	25	--	25
6	Machine Drawing	--	--	2	--	--	25	--	--
7	**Computer Graphics	--	--	2	--	--	25	25	--
8	***Workshop Practice -III	--	--	2	--	--	50	--	--
	Total	**20**	**--**	**10**		**500**	**175**	**25**	**50**
	Grand Total	**30**			**750**				

** Common with Automobile Engineering
******* Common with Production Engineering and Automobile Engineering

SECOND TERM

Sr. No.	Subject	Teaching Scheme Hours/week			Examination Scheme				
		Lectures	Tutorial	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	**Theory of Machines	4	--	2	3	100	25	--	25
2	***Industrial Engineering	4	--	--	3	100	25	--	--
3	***Fluid Mechanics	4	--	2	3	100	25	--	25
4	***Electrical Machines and Industrial Electronics	4	--	2	3	100	25	--	--
5	Manufacturing Engineering-II	4	--	--	3	100	25	--	--
6	***Workshop Practice-IV	--	--	4	--	--	25	--	50
	Total	**20**	**--**	**10**		**500**	**150**	**00**	**100**
	Grand Total	**30**			**750**				

** Common with Automobile Engineering
******* Common with Production Engineering and Automobile Engineering

Engineering Mathematics-III

(Common with Production Engineering And Automobile Engineering)

Teaching Scheme
Lecture: 4 Hours/Week

Examination Scheme
Theory Paper: 100 Marks
Paper Duration: 3 Hours.

Unit: I Linear Differential Equations

Linear Differential Equations of order n, Solution of LDE with constant coefficient, method of variation of parameters, Equations reducible to linear form (with constant coefficient), Cauchy's linear equation, Legendre's linear equation. Whirling of Shafts.

(10 Hrs, 20 Marks)

UNIT: II

a) Simultaneous differential equation. Introduction to Applications to mass spring system.

b) Solution of Partial Differential Equations.

(i) One dimensional heat flow equation : $\partial u/\partial t = a^2 \partial^2 u/\partial x^2$

(ii) Laplace's equations (Two dimensional heat flow equation):

$\partial^2 u/dx^2 + \partial^2 u/dx^2 = 0$ by separating variables only. Applications of Partial Differential equations to problems of Mechanical and Allied Engineering.

(10 Hrs, 20 Marks)

Unit: III Lap lace transforms

Laplace Transform (LT): Defination, Exisistance, Laplace transforms of elementary/slandered functions, Theorems & Properties of LT(without proof), Inverse LT, Solution of differential equations using LT

(10 Hrs, 20 Marks)

Unit: IV Statistics

Introduction to Mean, Mode, Median, Standard deviation.
Variance, Coefficient of variation, Moments, Skewness and Kurtosis.
Correlation and Regression, Chi-square tests.

(10 Hrs, 20 Marks)

UNIT: V a) Probability

Revision of probability theorems. Probability distribution, Binomial, Poission & Normal distributions.

b) Fourier Transform (FT)

Fourier Integral theorem, Sine & Cosine Integrals. Fourier Transforms, Fourier Cosine Transforms, Fourier Sine Transform and their inverse.

(10 Hrs, 20 Marks)

* No question is to be set on introductory part.

Text Books

1. P.N. Wartikar & J.N. Wartikar A text of applied Mathematics (Volume –III), Pune Vidyarthi Griha Prakashan, Pune.
2. B.S. Grewal Higher Engineering Mathematics, Khanna Publication, New Delhi.
3. H.K. Das, Advance Engineering Mathematics S. Chand & Co. New Delhi.

Reference Books

1 Erwin Kreyszig, Advanced Engineering Mathematics (7^{th} edition) Wiley Eastern Ltd., Bombay.

2. C.R. Wylie, Advanced Engineering Mathematics McGraw Hill Publications, New Delhi.

3 Peter V.O'Neil, Advanced Engineering Mathematics (5^{th} edition) Thomson Brook Cole, Singapore.

4 Kishore S, Trivedi, Probability & Statistics with reliability, queuing & Computer Science application Prentice Hall of India Pvt. Ltd., New Delhi.

STRENGTH OF MATERIALS

(Common with Production Engineering And Automobile Engineering)

Teaching Scheme
Lecture: 4 Hours/Week

Examination Scheme
Theory Paper: 100 Marks
Term Work: 25 Marks
Paper Duration: 3 Hours.

UNIT: I SIMPLE STRESSES AND STRAIN

Concept of stress and strain (linear, lateral, shear and volumetric), Hook's law, Poisson's ratio, modulus of elasticity, modulus of rigidity, stress-strain diagram for ductile and brittle materials, factor of safety and working stress, concept of 3-D stress state, bulk modulus, inter relation between elastic modulus.

Axial force diagram, stress-strain, deformations in determinate homogeneous and composite bars of following types.

1) Prismatic
2) Linearly varying
3) Stepped section under concentrated loads and self-weights.

Axial stresses and strain in determinate members –axial stress, strain and deformation in following indeterminate, homogeneous and composite bars.

1) Prismatic
2) Linearly varying
4) Stepped section under concentrated loads, self-weights and temperature changes.

(9 Hrs, 20 Marks)

UNIT: II PRINCIPLE STRESSES AND STRAINS

Normal and shear stress on any oblique plane, concept of principle plane, derivation of expression for principle stresses and planes and plane of max. Shear stress, position of principle plane and plane of max. Shear, graphical solution using Mohr's circle of stresses, combined effect of shear and bending in beams.

Strain energy and impact-concept of stain energy, derivation and use of expression for deformation of axially loaded members under gradual, sudden and impact loads. Strain energy due to self-weight.
Theories of failure- Maximum stress, maximum strain, maximum shear stress, maximum total strain energy.

(9 Hrs, 20 Marks)

UNIT: III SHEAR FORCE AND BENDING MOMENT DIAGRAM

Concept and definition of shear force and bending moment in determinant beams due to concentrated loads, UDL, UVL and couple.

Relation between SF, BM and intensity of loading, construction of shear force and bending moment diagram for cantilever, simple and compound beams, defining critical and maximum value and position of point of contra flexure.

Construction of BMD and load diagram from SFD, Construction of load diagram and SFD from BMD.

Slope and deflection for member in bending relation between moment and slope, slope and deflection of determinate beams, double integration method (Macaulay method) Derivation of formulae for slopes and deflections for standard cases, moment area method, conjugate beam method.

(9 Hrs, 20 Marks)

UNIT: IV BENDING STRESSES

Theory of simple bending, assumptions in bending theory, Derivation of flexural formula, Area center and moment of inertia of common cross section (regular section, T- section, channel section, I-section) with respect to centroidal and parallel axis, bending stress distribution diagram, moment of resistance and section modulus calculations.

Direct and bending stresses in short column and other structural component, Stress distribution diagram, axial load for single eccentric self weight combined with lateral loads, concept of core section, middle third rule.

Shear stresses: - Concept, derivation of shear stress distribution formula, shear stress distribution diagram for common cross section, maximum and average shear stresses, shear connection between flange and web.

(9 Hrs, 20 Marks)

UNIT: V TORSION IN CIRCULAR SHAFTS

Stresses, strains and deformations in solid and hollow shafts, homogeneous and composite circular cross-sections subjected to torsion. Derivation of torsion equation. Stress due to combined torsion, bending and axial force on shafts.

Thin and thick walled pressure vessels: - Stress, strain and deformation in thin wall seamless cylindrical and spherical vessel due to internal fluid pressure, change in volume, constants, effects of additional compressible and incompressible fluid injected under pressure, use of I.S.code.

(9 Hrs, 20 Marks)

REFERENCE BOOKS

1) Timoshenko, Mechanics of Materials, CBS Publisher &Distributor
2) Ramamruthum, Strengths of Materials, Dhanpat Rai Publication
3) Junnarkar & Advi, Mechanics of Structure, Charorar Publication House, ANAND
4) Bear &Johnson, Mechanics of Materials
5) Shigley J.E., Mechanical Engineering Design

MATERIAL SCIENCE

(Common with Production Engineering And Automobile Engineering)

Teaching Scheme	Examination Scheme
Lecture: 4 hrs/week	Theory Paper: 100 Marks
Practical: 2-hrs/week	Term work: 25 Marks
	Oral: 25 Marks
	Paper Duration: 3 hrs.

UNIT-I Nature of Engineering Materials

Nature of metals and alloys, structure-property relationship, atomic structure, atomic bonds, atomic arrangements in materials, crystal structure of metals, development of grain structure, elastic and plastic deformation of single crystals, dislocation theory of slippage, strain hardening or work hardening, plastic deformation in polycrystalline metals, ductile and brittle fractures, cold working, recrystallization and hot working.

Non-metallic materials: Plastic elastomers, ceramics and composites, property and structures. Application of these materials in various engineering fields.

(9 Hrs, 20 Marks)

UNIT-II Mechanical Properties and Testing

Static property, tensile test, engineering and true stress, true strain curves, evaluation of properties and significance of test, typical engineering stress-strain diagrams, compression test, cupping test on sheet metals. Hardness test- Brinell, Poldi, Vickers, Rockwell superficial, Micro hardness test, Sceleroscope, Durometer, Mohr's test, relationship among the various hardness test, relationship of hardness to tensile strength, Dynamic properties, Impact tests, Charpy and Izod, Fatigue

test and the endurance limit, temperature effects, creep test, machinability, formability and weldability.

Non-destructive testing: Advantages and limitations of destructive and non-destructive testing, liquid penetrant, magnetic particle inspection, and ultrasonic test, radiography and eddy current test.

(9 Hrs, 20 Marks)

UNIT-III Equilibrium Diagrams

Equilibrium Diagrams: Introduction, alloys, alloy types, phases, Hume Rothery's rule of solid solubility, Gibb's phase rule, Polymorphism, cooling curves, plotting of equilibrium diagrams, utilization of diagrams, solidification of alloy, types of equilibrium diagram, Isomorphs, eutectic and partial eutectic and layer type, Non-equilibrium cooling and it's effects.

Strengthening mechanisms: Refinement of grain size, solid solution, hardening, desperation hardening, age hardening, martensitic transformation.

(9 Hrs, 20 Marks)

UNIT-IV Powder Metallurgy and Pyrometry

Powder Metallurgy: Introduction Basic process, power manufacturing, powder testing and evaluation, powder mixing and blending, compacting, sintering, hot isostatic pressing, secondary operations, applications, merits and demerits.

Pyrometry: principle, operation and uses of various pyrometers, thermocouples, thermocouple materials, resistance pyrometer, disappearing filament pyrometer, radiant pyrometer.

(9 Hrs, 20 Marks)

UNIT-V Corrosion and Prevention

Corrosion and Prevention: Cost of corrosion, dry corrosion, wet corrosion, electrochemical mechanism, corrosion tendency and electrode potential polymerization, corrosion rates, passivity, forms of corrosion, galvanic pitting, crevice and intergranular corrosion, stress corrosion etc. Prevention of corrosion: selection of materials, modification of environment, design of components, cathodic protection, coating, anodizing, Inhibitors

Methods of surface improvement, surface treatment, coating, painting, paint application, methods- spray painting, electrostatic deposition, electro- coating, hot dip coating, chemical conversions coatings, electroplating, anodizing, electroless plating, vaporized metal coating, vacuum metallizing, spurting, chemical vapuor deposition.

(9 Hrs, 20 Marks)

Term Work:

1. Tensile test on mild steel and aluminum test pieces.
2. Rockwell and Rockwell superficial test on different samples with different scales.
3. Brinell hardness test on steel, cast iron, brass and aluminum alloys.
4. Vicker's hardness test on mild steel, hardened steel and cast iron.
5. Poldi hardness test on samples of three different metals.
6. Erichson cupping test.
7. Non-destructive tests: Dye penetrant test.
8. Magnetic particle testing or eddy current test.
9. Izod and charpy impact test.
10. Effect of cold working on hardness of minimum two materials.
11. Testing of bulk properties such as flow rate, apparent density and tap density of metal powder.

MANUFACTURING ENGINEERING-I

Teaching Scheme
Lecture: 4 Hours/Week

Examination Scheme
Theory Paper: 100 Marks
Paper Duration: 3 Hours.

UNIT: I CASTING

Molding Sand: Types and Properties, Patterns: Types, Allowances, Cores: Types, Chaplets, Moulding Box, Principle of Operation, sketch, applications of Sand mould casting, Die Casting, Permanent mould Casting, Centrifugal Casting, Investment Casting, Continuous Casting. Defects in Casting, Cleaning and finishing of casting, Inspection and testing of casting.

(9 Hrs, 20 Marks)

UNIT: II MECHANICAL WORKING OF METALS

Re-crystallization temperature, Hot Working and Cold Working of Metals, Principle of Operation, Sketch, Advantages, limitations and applications of: Rolling-rods, Wires, Tubes; Sheet Metal Working-Shearing, Piercing, Blanking, Drawing, Bending; Forging-Open Die, Closed Die, Drop Forging, Press Forging, Machine Forging, Cold Forging.

(9 Hrs, 20 Marks)

UNIT: III JOINING PROCESSES

Welding, Classification of Welding Processes, Principle of Operation, Sketch, Advantages, limitations and applications of: Forge Welding, Friction Welding, Thermit Welding, Spot Welding, Seam Welding, Projection Welding, Arc Welding, Difference between AC and DC Welding, Shielded Metal Arc Welding, Gas Welding: Flames and Techniques, Tungsten Inert Gas Welding, Metal Inert Gas Welding, Submerged Arc Welding, Brazing, Soldering, Welding Defects.

(9 Hrs, 20 Marks)

UNIT: IV GEAR AND THREAD MANUFACTURING

Gear Manufacturing Processes, Form Cutter Method, Gear Generating Method, Gear Cutting by Single Point Cutting Tool, Gear Shaping, Gear Manufacturing by –Casting, Roll Forming, Extrusion, Cold Drawing, Stamping, Hot Forging, Gear Finishing Operations-Gear Shaving, Gear Burnishing, Gear Grinding. Thread Manufacturing Methods-Casting, Chasing, Thread Rolling and Die Threading and Tapping, Thread Milling, Thread Grinding.

UNIT: V MACHINING PROCESSES & CAPSTAN AND TURRET LATHE

Machining Processes – Turning, shaping, planning, boring, drilling, milling

Capstan & Turret Lathe --Introduction, Difference between Engineering Lathe, Capstan and Turret Lathe, Indexing mechanisms, Bar feeding mechanisms, Work holding devices, tool holding devices, Automates-single and multi spindle automates.

(9 Hrs, 20 Marks)

Reference Books

1 Bawa, Manufacturing Technology- I (Ascent Series),Tata McGraw Hill, New Delhi

2 P.C. Sharma, A text Book of Production Technology - S. Chand Publication.

3 K. C. Jain Production Engineering – Tata McGraw Hill,New Delhi

4 E. Paul De Garmo, Materials & Processes in Manufacturing – Prentice Hall of India

5 Hajara Choudhari, Bose S.K. Elements of Workshop Technology Volume I&II Asia Publishing House

APPLIED THERMODYNAMICS

Teaching Scheme
Lecture: 4 Hours/Week
Practical: 2 Hours/ Week

Examination Scheme
Theory Paper: 100 Marks
Term Work: 25 Marks
Oral: 25 Marks
Paper Duration: 3 Hours.

UNIT: I FUELS AND COMBUSTION

Types of fuels, Ultimate and proximate analysis of fuel, Gravimetric and volumetric analysis and their conversions, Physical law of combustion, basic combustion equations, composition of dry air, Stoichiometric air-fuel ratio, Actual air fuel relation, excess air, determination of actual quantity of air from combustion analysis, Fuel gas analysis, Orsat apparatus, Enthalpy of formation, Enthalpy of combustion, calorific values and their determination.

(9 Hrs, 20 marks)

UNIT: II STEAM GENERATORS

Classification of boilers, introduction to water tube and fire tube boiler, introduction to IBR laws, characteristics and features of high pressure boilers, Stirling, Lamount, Loeffler, benson boilers, Boiler mountings and accessories, boiler draught, natural and artificial draught, draught losses, regulation and calculation for chimney height, Condition for maximum discharge, Equivalent evaporation, boiler efficiency, Heat balance.

(9 Hrs, 20 Marks)

UNIT: III STEAM CYCLES AND CONDENSERS

Introduction to steam power plant, carnot vapour power cycle, Rankine cycle, work ratio, back work ratio, specific steam consumption. Effect of operating variables (boiler pressure, condenser pressure and super heat) on Rankine cycle, Reheat and regenerative Rankine. Introduction to condensers, Jet and Surface condensers, types of condensers, condensres vacuum and vacuum efficiency, air pumps, capacity of air extraction pumps, sources of air leakage and effect of air leakage, cooling towers.

(9 Hrs, 20 Marks)

UNIT: IV COMPRESSIBLE FLUID FLOW AND STEAM NOZZLES

Static and stagnation properties, sonic velocity, Mach number, types of nozzles, one dimensional steady isentropic flow through nozzles and diffusers, critical pressure ratio and maximum discharge, supersaturated

flow, effect of variation in back pressure on nozzle characteristics, shocks and losses, effect of friction and nozzle efficiency.

(9 Hrs, 20 Marks)

UNIT: V RECIPROCATING AIR COMPRESSORS

Introduction, uses of compressed air, classification of compressors, air compressor terminology, Constructions and workings of single cylinder, single stage, single and double acting reciprocating air compressors, indicated work done (polytropic, isothermal and isentropic) without clearance, isothermal efficiency, effect of clearance, volumetric efficiency, F.A.D., theoretical and actual indicator diagrams, methods of improving volumetric efficiency, Multistage compression: requirement, work done in multistage compression, inter cooling and after cooling, condition for maximum efficiency.

(9 Hrs, 20 Marks)

LIST OF EXPERIMENTS

Minimum eight experiments should be performed from following lists:

1. Determination of calorific value of solid/ liquid/gaseous fuel.
2. Analysis of flue gases by Orsat / PUC apparatus.
3. Study of high-pressure boilers.
4. Determination of Isothermal and Volumetric efficiency of reciprocating air compressor.
5. Study of steam nozzles.
6. Study of steam condensers and cooling towers.
7. Study of thermal power plant by actual visit.
8. Study of boiler draughts.
9. Study of Rankine cycle (five numericals based on the syllabus)
10 Study of on boiler efficiency and heat balance sheet. (Assignment on the same)

REFERENCE BOOKS

1. R. K. Rajput, Thermal Engineering, Laxmi Publication, New Delhi.
2. Domkundwar, Refrigeration & Air Conditioning, Dhanpatrai and Sons, New Delhi.
3. P.L. Ballany, Thermal Engineering, Khanna Publication, New Delhi.
4. Kumar, Vasandani Heat Engineering, Metropolitan Book Company. Pvt.Ltd. New Delhi.
5. Rudramurthy, Thermal Engineering, Tata McGraw Hill, New Delhi.
6. S.C. Gupta, Thermal Engineering, Pearson Education Pvt. Ltd. New Delhi.
7. P. K. Nag, Thermodynamics, Tata McGraw Hill, New Delhi.

Machine Drawing

Teaching Scheme	Examination Scheme
Practical: 2 Hours/Week	Term Work: 25 Marks

Term work shall consist of:

Two projects consisting of a full imperial size sheet each involving assembly drawing with a part list, overall dimensions and detailed drawing of couplings, bearings, lathe parts, screw jack, vices, valves etc.

Manufacturing tolerances, surface finish symbols and geometric tolerances should be specified so as to make it a working drawing.

Third sheet should contain all the machining symbols, tolerances, welding symbols etc.

REFERENCE BOOKS

1. N D Bhatt, Machine Drawing, Charotar Publishing Company.
2. J E Shigley & C R Mischke, Mechanical Engineering Design, 5th Edition, McGraw Hill Publications New Delhi.
3. N Sidheswar & Kannaiah, Machine Drawing, Tata McGraw Hill Publications New Delhi.

WORKSHOP PRACTICE – III

(Common with Production Engineering And Automobile Engineering)

Teaching Scheme — Examination Scheme

Practical: 2 Hours/Week — Term Work: 50 Marks

1. Jobs: -

A. CARPENTARY SHOP [4 hrs]

Preparation & Manufacturing of solid pattern involving Wood Turning from component drawing. (1 job)

B. MACHINE SHOP [8 hrs]

One composite job involving different machine operation on Lathe, Shaper, Slotter, Drilling, Milling & Grinding operations.

NOTE: Group of maximum 3 to 4 students depending upon the work involved.

C. FOUNDRY SHOP [4 hrs]

Preparation of mould of above pattern, casting from this mould. Actual weight calculation, yield & casting of item should be performed.
(1 job)

D. WELDING SHOP [4 hrs]

One job on welding (fabrication) preparing a component comprising welding joints such as shoe rack, book rack, stands for flower pots, house hold applications etc.

2. Journals and Demonstration: -

A journal containing records of following assignments based on the demonstration on machine tools (sketches and relevant description)

(i) Block Diagrams (any Two)
1. Lathe,
2. Universal Milling Machine,
3. Radial Drilling Machine,
4. Cylindrical Grinder.

(ii) Mechanisms (any Two)
1. All geared head stock of a Center Lathe,
2. Spindle arbor (assembly) drive of a Milling Machine,

3. Crank and slotted lever quick return drive of Shaping Machine,
4. Spindle assembly in a Drilling Machine.

(iii) Accessories (any Two)
1. Taper turning attachment for a Center Lathe,
2. Universal Driving Head,
3. Milling Cutter.

(iv) 1. Process planning sheet of the components of the job to be under taken.
2. Tool profile sheet for job of turning.
3. Introduction to industry.

Special grinding machines – honing, lapping, super finishing, buffing, burnishing.

NOTE

A) The candidates are required to finish the job to the following limits.
1. Lathe: - + /- 0.05 mm
2. Grinding: - + /- 0.05 mm
3. Shaper: - + /- 0.05 mm
4. Milling: - + /- 0.05 mm

B) Work Book shall include description with detailed drawing i.e. Working drawing of each job showing all dimensions, limits, finishing processes, material used, machining symbol etc.

C) Theory concered is to be taught in workshop only to every batch going to work shop for practical, during only in practical hours only.

Reference Books

1. Hajara Chauidhary Bose S. K., Element of Workshop Technology
Volume II, Asia Publishing House.
2. P.N. Rao, Production Technology Volume I & II, Tata McGraw Hill
Publication.
3. R.K. Jain, Production Technology, Khanna Publishers.
4. P.C. Sharma Production Technology, Khanna Publishers.
5. Chaprnan W.A. J., Workshop Technology, Volume II, ELBS Publishers.
6. HMT, Production Technology Tata McGraw Hill Publication.

COMPUTER GRAPHICS
(Common with Automobile Engineering)

Teaching Scheme	Examination Scheme
Practical: 2 Hours/Week	Term Work: 25 Marks
	Practical: 25 Marks

Term work shall consists of:

a) Two assignments on AutoCAD (preferably latest version).
b) Two assignments on Auto LISP (such as Design and drafting of any mechanical component through Auto LISP)

REFERENCE BOOKS

1. AutoCAD reference manual
2. Auto LISP reference manual
3. George Omura, ABCs of Auto LISP, BPB. Publication.

THEORY OF MACHINES-I

(Common with Automobile Engineering)

Teaching Scheme	Examination Scheme
Lecture: 4 Hours/Week	Theory Paper: 100 Marks
Practical: 2 Hours/ Week	Term Work: 25 Marks
	Oral: 25 Marks
	Paper Duration: 3 Hours.

UNIT: I

Fundamentals of kinematics, Types of motion, degree of freedom, Grubler's criterion, mechanisms with lower pairs, hooks joint, steering gear mechanism, straight line mechanism, Geneva mechanism ,Inversion of mechanism.

1. Velocity analysis by ICR method, relative velocity method.
2. Acceleration analysis by relative acceleration method, Coriolis acceleration. (9 Hrs, 20 Marks)

UNIT: II

1. Algebraic method of velocity & acceleration analysis.
2. Klein's construction.
3. Static force analysis.
4. Inertia force analysis of IC engine mechanism, geared system.
5. Dynamical equivalent system, compound pendulum, bifilar suspension & trifler suspension method for inertia analysis.

(9 Hrs, 20 Marks)

UNIT: III

1. Velocity & acceleration analysis by complex algebra method.
2. Velocity & acceleration by vector algebra method.

(Four bar & single slider mechanism only)

UNIT: IV

1. Friction, laws, efficiency of inclined plane, screws, clutches.
2. Friction circle and friction axis of mechanism.
3. Lubrication, system,types,proper

(9 Hrs, 20 Marks)

UNIT: V

1. Types of friction drives, open belt, cross belt, length of belt.
2. Slip. Creep, crowning of pulleys, steeped pulley.
3. Power transmitted, maximum power transmitted by belt drive.
4. Chain, types, length of chain, power transmitted.

(9 Hrs, 20 Marks)

List of Practicals:

1. To determine the mass moment of inertia of compound pendulum.
2. To determine the mass moment of inertia of bifilar/triflar suspension method.
3. To determine the slip of belt drive.
4. Velocity analysis by ICR method (2 problems)
5. Relative velocity & acceleration method (4 problems)
6. Klein's construction (4 problems)
7. Inertia force analysis of IC engine mechanism by graphical method.

Assignments: Five assignments on above topics in addition to above practicals

References:

1) P.L.Ballany Theory of Machines & Mechanism ,Khanna Publication New Delhi
2) Jagdish Lal, Theory of Machines & Mechanism

3) S.S Ratan, Theory of Machines & Mechanism,Tata McGraw Hill
4) R.S.Khurmi, Theory of Machine
5) Sadhu singh , Theory of Machine, Pearson Education
6) Thomas Bevan ,The Theory of Machine ,CBS Publication and Distributors
7) Shighley J.E, Theory of Machines,Tata McGraw Hill
8) Hannah & Stephen, Mechanics of Machines

INDUSTRIAL ENGINEERING

(Common with Production Engineering And Automobile Engineering)

Teaching Scheme	Examination Scheme
Lecture : 4Hrs/week	Paper : 100 Marks
	Paper Duration : 3Hrs
	Term Work : 25 Marks

UNIT I: -

1) Introduction to Industrial Engineering, origin and growth, contribution of Taylor, Gilberths relevance and importance in the economics & industrial development through productivity.
2) Work study
    a) Work study and productivity improvement; scope and application.
    b) Method study:-
    i) Introduction, scope and application
    ii) Select criteria for selecting assignments; record charting symbols. Flow process chart, multiple activity chart. Examine- questioning technique,. Develop motion economy, work place layout, improvement and working condition, implement and maintain
    c) Work Measurement
    i) Aims objectives scope and application
    ii) Stop watch study- equipment and procedure, rating allowance and standard time; activity sampling- principle, procedure and applications.

(9 Hrs, 20 Marks)

UNIT II: -

1) PLANT LAYOUT AND MATERIAL HANDLING

a) Criteria for plant location, site selection, types of plant layout, planning for utilities

b) Material Handling- necessity of material handling, procedure for analyzing material handling system, methods and equipment of material handling. Effect of layout and material handling system on productivity and profitability

c) Safety in material handling and factory operation

2) a) Factories act

c) Indian Boiler Act

(9 Hrs, 20 Marks)

UNIT III: -

PRODUCTION AND MATERIAL PLANNING CONTROL

a) Production Planning

1. Production and material planning as in integral and interdependent system
2. Production Planning- for casting, capacity estimation, planning scheduling and control

b) Material Planning- need and basis for material planning, planning and control of raw material. Ark- in and brought out components

c) Progress Control - introduction, step involved, bar chart, Gantt char, transmission of report and corrective action.

(9 Hrs, 20 Marks)

UNIT IV: -

Wage administration- job analysis, job description, job rating, wage survey, wage scale.

i) Job evaluation and payment of result:-

Job evaluation- necessity and principles of job evaluation, systems of job evaluation, application.

ii) PBR as a motivating factor, incentive scheme- basis of schemes, Taylor, Rowan, Halsey and Bedoux plan, incentive to indirect workers, preplanning for introduction incentive scheme.

iii) Value analysis/ engineering- concepts, procedure and steps in value analysis/engg. Scope and application

(9 Hrs, 20 Marks)

UNIT V: -

Ergonomics:

Definition and importance: historical background. Human machine systems- interfaces. Anthropometry: need, important body dimensions, data collections, statically analysis, percentile. Applied Anthropometry and work space design and seating, ergonomics and safety.

(9 Hrs, 20 Marks)

References:-

1) Maynard, Industrial Engineering. Hand book, McGraw Hill book company
2) ILO, Introduction to Work Study
3) Khanna O.P. , Industrial Engineering. and Management, Dhanpat Rai Publication, New Delhi.
4) Factory Act -1948
5) Indian Boiler Act- 1923 (Revised 1983)
6) L.C. Jhamb " A text book of Industrial Engineering", Everest Publishing House, India.

FLUID MECHANICS

(Common with Production Engineering And Automobile Engineering)

Teaching Scheme	Examination Scheme
Lecture : 4 Hrs/week	Theory : 100 Marks
Practical : 2 Hrs/week	T/W : 25 Marks
	Oral : 25 Marks
	Paper Duration: 3 Hours

UNIT – 1

FLUID STATICS

Fluid properties & definition, definition of fluid, Viscosity, Bulk modulus of elasticity, Vapour pressure, Surface tension, Capillary, Speed of sound, Pressure at a point, Liquid pressure on plane area, Curved surface, Center of pressure, Manometer, Buoyancy, Stability of floating and submerged body, Metacentric height, Uniform rotation of open vessels, Pascal's law.

(9 Hrs, 20 Marks)

UNIT – 2

KINEMATICS OF FLUID FLOW

Types of flow, Definition of steady, Unsteady, Uniform, Non uniform, Laminar, Turbulent, 1D-2D flows, Stream line, Streak line, Path line, Irrotational flow, concept of Velocity, potential & stream function flow net (no mathematical treatments) , Continuity equation,2D Eulers equation, Bernoulli's equation along a stream line for compressible and incompressible flow and its application , pitot tube, Ventury meter, Differential monocircular sharp edge mouth pieces and orifice rotometer, Orifices, Orifices meter.

(9 Hrs, 20 Marks)

UNIT – 3

LAMINAR FLOW

Definition, Relation between shear stress & pressure gradient, Flow between parallel plates, Circular tube, Lubrication mechanism, Hagen poiseuille's theory.

TURBULENT FLOW:

Definition, Prandtl's mixing length theory, Velocity distribution, Variation of flow through pipe, Minor loses in pipes & fittings, Darcy-Weisbach equation for frictional head loss, Moody diagram.

(9 Hrs, 20 Marks)

UNIT-4

FLOW THROUGH PIPES

Reynolds's experiment, pipe discharging from a reservoir, pipe connecting two reservoir, pipes in series and parallel, siphon, transmission of power and flow through nozzle.

Introduction to compressible flow, sound wave and Mach no. introduction to unsteady flow in closed conduit oscillation of liquid , phenomenon of surges and water hammer and other there control .

Dimension: - Dimensional homogeneity, dimensional analysis method. Raleigh's method and Buckingham's pi theorem, model analysis, dynamic forces, dimensional less no. , -similitude – based on Reynolds and mach numbers .

(9 Hrs, 20 Marks)

UNIT – 5

RECIPROCATING PUMP

Introduction, main parts, working, single & double acting, slip of reciprocating pump, classification, variation of velocity & acceleration, indicator diagram, air vessel's

HYDRAULIC CIRCUITS

Flow control valve, direction control valves, pressure regulating valves, symbols, different types of hydraulic circuits

(9 Hrs, 20 Marks)

List of practical :-(any eight)

1. Determination of viscosity of given liquid
2. Study Of Manometer
3. Study of stability of floating body.
4. Study of forced vertex motion
5. Flow net by Electrical Analogy Method
6. Calibration of venturi meter/ orifice meter
7. Verification of Bernoullis theorem.
8. Study of Sharp edged circular orifice / mouth piece.
9. Study of momentum equation
10. Study of Laminar and Turbulent flow by use of Reynolds apparatus
11. Study of flow through pipe

Reference Books :

1. R.K. Bansal , Text book of Fluid Mechanics & Hydraulic Machines , Laxmi Publications, Delhi.
2. Dr. P.N Modi , S.M Seth, Hydralic and Fluid Mechanics .
3. S. Ramamurtham ,Fluid Mechanics, Hydraulics and Hydraulic machine ,Danpat Rai & Sons
4. K.L.Kumar , Engineering Fluid mechanics, Eurosa publications House Delhi.
5. S.K Agarwal., Fluid Mechanics & Machinery

Electrical Machines & Industrial Electronics

(Common with Production Engineering And Automobile Engineering)

Teaching Scheme	Examination Scheme
Lecture: 4 Hours/Week	Theory Paper: 100 Marks
Practical: 2Hours/Week	Term Work: 25 Marks
	Paper Duration: 3 Hours.

UNIT-I D.C. MACHINES

Construction, types of generators, Action of motors, significance of back emf, Types of Dc motors, Voltage & current relationship of different motors, Different method of starting (Need of starters), Different methods of speed control, Different types of motor reversing & jogging, Motor stopping, applications.

(9Hrs,marks20)

UNIT-II Induction Motors

Single phase AC Motors, Single phase Induction Motors, Stepper Motor, Servo Motor, their construction, operation & application.

Three-phase induction motors: construction, principle of operation, slip, power flow diagram, torque equation, Maximum & Full load torque, torque slip characteristics, various methods of speed control, different types of starter & application.

(9 Hrs, 20 Marks)

UNIT-III Synchronous Machine

Alternators: construction, synchronous speed, frequency of induced emf, and regulation by synchronous impedance methods.

Synchronous Motors: principle of working, effect of variation of load & excitation, Hunting, method of starting, applications.

Relays: Electromechanical control relays, solid-state relay, timing & latching relays,

(9 Hrs, 20 Marks)

UNIT-IV INDUSTRIAL CONTROL DEVICES

Primary & pilot control devices, manually operated switches, mechanically operated switches. Transducers, Strain guage, LVDT.

Sensors: Proximity sensors, light sensors, Hall effect sensors, Ultrasonic sensors, pressure & temperature sensors, thermistors, IC sensors.

(9 Hrs, 20 Marks)

UNIT-V

Actuators: Classification of actuators, selection criteria of control valves, single acting & double acting cylinders, Electro hydraulic: 3/2 valves, 4/2 valves, and 5/3 valves.

Different types of control systems: motion, pressure, temperature, time, count & sequence controls.

Process & Machines control systems: Types of processes, structure of control systems, controller responses, data acquisition system, computer numerical control & robotics, Basics of PLC programming. Computers in process & machine control

(9 Hrs, 20 Marks)

LIST OF EXPERIMENTS: - (Any Eight)

1. Study of DC Motors.
2. Single phase & 3 phase Alternators.
3. Study of DC generator.
4. Study of AC & DC starters.
5. Study of Single phase & 3 phase Induction motors.

6. Study of LVDT
7. Study of photoconductive & solar cell.
8. Study of Speed control of DC Motor by solid-state devices.
9. Study of Data Acquisition Systems.
10. Study of Transducers

REFERENCE BOOKS

1. Stephen J Chapman, Fundamentals of Electrical Machinery International Student Edition.
2. Nagrath & Kothari, Electrical Machines Tata Mc Graw Hill Publication.
3. Dr. P.S. Bhimra, Generalise Theory of Electrical Machines, Khanna Publication.
4. Frank D. Petruzulla, Industrial Electronics, Mc Graw Hill International Editions.
5. Singh & Khanchandani , Power Electronics, Mc Graw Hill

MANUFACTURING ENGINEERING- I I

Teaching Scheme	Examination Scheme
Lecture: 4 Hours/Week	Theory Paper: 100 Marks
	Term Work: 25 Marks
	Paper Duration: 3 Hours.

UNIT: I THEORY OF METAL CUTTING

Introduction, Mechanics of chip formation, single point cutting tool, method of machining, type of chips, determination of shear angle, undeformed chip thickness, force relation, Energy considerations in metal cutting, Tool wear and tool life, Tool material, economic of metal cutting, Machinability, design of single point cutting tool.

(9 Hrs, 20 Marks)

UNIT: II JIG AND FIXTURES

Definition, purpose and advantages, elements of jig and fixtures, principle of jig and fixture design, locating devices, design principle for location purpose, champing devices, material for location and clamping elements, drill jigs, drill bushes, drill bush material, types of drill jigs, Milling fixture lathe fixture, Economic of jig and fixture selection.

(9 Hrs, 20 Marks)

UNIT: III PRESS TOOL DESIGN

Introduction, Press operation, classification of power presses, Press selection, press working terminology, working of cutting die, principle of metal cutting, clearance, cutting forces, die design fundamentals, blanking and piercing die construction, pilots, strippers and presser pads, press work materials, strip layout, bending die, drawing

operations, variable that affect metal flow during drawing, determining blank size, drawing force.

(9 Hrs, 20 Marks)

UNIT: IV ADVANCE MACHINES

Introduction to CNC Machines, Advantage of CNC, classification of CNC machine, CNC Machine block diagram, part of CNC, steps in CNC manufacturing, CNC part programming, Computer assisted part programming, APT programming.

(9 Hrs, 20 Marks)

UNIT: V FINISHING AND UNCONVENTIONAL MACHINING PROCESSES

Principle of operation, Sketch, advantages, limitations and applications of: Grinding, Honing, Lapping, Buffing, Burnishing, Polishing, Abrasive Jet Machining, Electric Discharge Machining, Electro Chemical Machining, Ultrasonic Machining, Electron beam machining, Laser Beam Machining, Plasma Arc Machining, Ion Beam Machining.

(9 Hrs, 20 Marks)

TERM WORK:

1. Any Assignment on Unit. I
2. Design of jig/ fixture for drilling / milling operation of a given component.
3. Any Assignment on Unit. III
4. Write a program for manufacturing a component on CNC Milling or CNC Lathe.
5. Any Assignment on Unit. V

REFERENCE BOOKS

1 Bawa, Manufacturing Process I & II - Tata McGraw Hill Publication Company. Ltd.

2 E. Paul DeGarmo, J.T. Black, Ronald A. Kohser, Materials and Process Manufacturing - John Willey Publication Ninth edition.

3 Erik K. Henriksen ,Jig and Fixture Design Manual - Industrial Press Inc.

4 Donaldson, Lecain, Goold Tool Design - Tata McGraw Hill Publishing Company. Ltd.

5 P. C. Sharma ,A Textbook of Production Engineering by - S. Chand & Company. Ltd.

6 Grover M. P. CAD/CAM by Grover- Tata McGraw hill Publication Company. Ltd.

WORKSHOP PRACTICE – IV

(Common with Production Engineering And Automobile Engineering)

Teaching Scheme	Examination Scheme
Practical: 4Hours/Week	Term Work: 25 Marks
	Oral: 50 Marks

A] Machine shop

A mini project on die making for Sheet Metal Working, Rubber or Plastic die/ vice assembly/ hammer assembly/ pulley assembly/ coupling assembly/ drilling jig.

B] Plumbing Shop

One pipe assembly including Union, T-joint, Elbow, Cock fitting.

C] Disassembly and assembly of following mechanisms for preventive maintenance

a) All geared head stock
b) Apron mechanism
c) Quick return mechanism
d) Spindle assembly in a Drilling Machine

D] CNC Lathe

One job of programming and manufacturing on CNC, Lathe or Trainer.

E] CNC Milling

One job of programming and manufacturing on CNC, Milling Machine or Trainer.

NOTE: - All jobs specified A to E should be allocated to batch of 5 students and different batches should have different designs of jobs.

DEMONSTRATIONS OF FOLLOWING MACHINES AND PROCESSES TO BE CARRIED OUT IN THE WORKSHOP ONLY.(One hour for each demonstration). (Any Four).

1. Gear Hobbing or Gear Shaping Operation.
2. Operations on Capstan & Turret Lathe and Single Spindle Atocrats.
3. Sheet metalworking on Mechanical or Hydraulic Process.
4. Super finishing operations like Lapping, Honing, etc.
5. Plastic moulding operation Ton-injections moulding machines.
6. Die forging on power hammer.
7. Spot Welding Machine.
8. Different types of grinding wheels, selection criteria, standard marking system of grinding wheel, wheel balancing, truing & dressing operation.
9. Planner.

SCOPE OF THE THEORY: - Theory concerned with different machines, their capabilities, applications & limitations, tool holding, work holding devices etc. for above jobs & demonstrations is to be taught in the workshop only for every batch going to the workshop. Concept of alignment & geometric tolerance required for job No. 1 is to be taught in the classroom.

1. Marketable utility items should be selected & it should be manufactured as per IS codes, e.g. Nuts, bolts, bushes, pins, gas nozzles etc.
2. Setting of turret / caption for assigned jobs should be done by individual student.
3. Preparations of CNC programs for job on CNC machine should be done by groups of students for their jobs.
4. CNC maintenance should be done practically i.e. demonstrations regarding various components of both categories; electronics and mechanical.
5. Determination of cutting speeds, feeds, machining times and other parameters required for above job such as cost estimation etc. and should be compared with market rates.

Reference Books

1.Hajara Choudhary, Bose S. K., Element of Workshop Technology Volume II, Asia Publishing House.

2.P.N. Rao, Production Technology Volume I & II, Tata McGraw Hill Publication.

3.R.K. Jain, Production Technology, Khanna Publishers.

4.P.C. Sharma, Production Technology, Khanna Publishers.

5.Chaprnan W.A. J., Workshop Technology, Volume II, ELBS Publishers.

6.HMT, Production Technology, Tata McGraw Hill Publication.

Faculty of Engineering & Technology

NORTH MAHARASHTRA UNIVERSITY, JALGAON (M.S.)

THIRD YEAR ENGINEERING (T.E.)

(MECHANICAL ENGINEERING)
TERM-I & II

W.E.F.: 2007-08

NORTH MAHARASHTRA UNIVERSITY, JALGAON
T.E. (MECHANICAL)
W.E.F.: 2007-08
TERM-I
Heat Transfer and Mass Transfer
(Common with Automobile Engineering)

Teaching Scheme	Examination Scheme
Lectures: 4 Hrs/ week.	Paper: 3 Hours
Practical: 2Hrs/week.	Paper: 100 Marks
	Practical: 25 Marks
	Term Work: 25 Marks

Unit-I **(10 Hours)**

Concepts and Mechanism of heat flow: Steady and unsteady state heat transfer, Modes of heat transfer, their physical mechanism, Laws of heat transfer, thermal conductivity, heat transfer coefficient, radiation heat transfer coefficient, isotropic and an-isotropic materials. Insulation materials. Thermal resistance and thermal conductance.

Steady state heat conduction without heat generation in plane and composite wall, hollow cylinder, hollow sphere, Thermal contact resistance, critical thickness of insulation on cylindrical bodies.

Generalized one dimensional heat conduction equation and reduction to Fourier, Poisson and Laplace equations. Boundary conditions. Steady state heat conduction with heat generation in plane wall, cylinder and sphere.

(20 Marks)

Unit –II **(10 Hours)**

Extended Surface: Types of fins, governing equation, Fin performance, fin efficiency, fin effectiveness, overall fin effectiveness, approximate solution of fins. Error in temperature measurement by thermometer.

Thermal radiation: Concept, Black body radiation, Spectral and total emissive power, Stefan Boltzmann law, Radiation laws, irradiation and radiosity, Surface absorption, reflection and transmission, emissivity, Radiation view factor, Properties of view factor, (*No numerical treatment on view factor*), radiation heat exchange between two diffuse gray surface, radiation shield. **(20 Marks)**

Unit-III **(10 Hours)**

Principle of heat convection: mechanism, natural and forced convection, convection boundary layers: laminar and turbulent, momentum and energy equation an, Laminar flow over bodies, turbulent flow inside circular and non-circular ducts, Reynolds Colburn analogy for flow over flat plate and flow inside tube, coefficient of friction and friction factor, Heat transfer in fully developed flow, Natural convection over vertical planes, use of empirical correlation for forced and natural convection. Dimensional analysis.

Principle of condensation and boiling (No numerical treatment)

(20 Marks)

Unit-IV **(10 Hours)**

Classification of heat exchangers, temperature distribution in parallel, counter flow arrangement, condenser and evaporator, overall heat transfer coefficient, fouling factor, Log-mean temperature difference method and NTU –effectiveness method of analysis for rating and sizing of heat exchangers. Requirement of good heat exchanger and heat exchanger and design and selection, practical applications, heat pipe. **(20 Marks)**

Unit-V **(10Hours)**

Mass Transfer

Introduction, Modes of Mass transfer, Concentrations, Velocities and fluxes, Concentrations, Velocities, Fluxes, Fick's Law, General Mass Diffusion Equation in Stationary Media, Steady State Diffusion Through a Plain Membrane, Steady-State Equimolar Counter Diffusion, Isothermal evaporation of Water into Air from a Surface, Mass Transfer Coefficient, Convective Mass Transfer, Correlations for Mass Transfer **(20 Marks)**

Note for paper setter:

Paper setter should provide the required data for numerical problems in question paper it self. No use of data book should allow.

Experiment must be set simultaneously and the no. of student in each group working on a setup shall not exceed 05 (five) student.

Any **Eight** Experiments from the following list:

1) Determination of thermal conductivity of metal rod.
2) Determination of thermal conductivity of insulating powder.
3) Determination of thermal conductivity of composite wall.
4) Determination of heat transfer coefficient in natural convection.
5) Determination of heat transfer coefficient in forced convection.
6) Determination of temperature distribution, fin efficiency in natural and forced convection.
7) Determination of emissivity of a test surface.
8) Determination of Stefan Boltzmann constant.
9) Study of pool boiling phenomenon and determination of critical heat flux.
10) Determination of log-mean temperature difference, overall heat transfer coefficient and effectiveness of heat exchanger in parallel and counter flow arrangement.
11) Determination of heat transfer from a heat pipe.
12) Calibration of thermocouple.

Instructions for practical Exam. :-

1. Five experiments shall be selected for Practical Examination.
2. The Number of Students for each Practical set up would not be more than 5 Students.

3. Oral will be based on the Practical Performed in the examination and the experiments included in the Journal.

Recommended Books :

1) J.P.Holman 1992 “Heat Transfer”Mc Graw Hill VII Edition.
2) P.Kothandaraman ,”Fundamentals Of Heat And Mass Transfer”.
3) R.K.Rajput,”Heat And Mass Transfer”, S.Chand & Company Ltd.,New Delhi.
4) D.S.Kumar “Heat And Mass Transfer” D.S.Kumar S.K.Kataria & Sons,Delhi.
5) P.K.Nag, “Heat Transfer” Tata Mcgraw Hill Publishing Company Ltd.,New Delhi.
6) Sachdeva R.C., “Fundamentals Of Heat And Mass Transfer” Wiley Eastern Limited, Third Edition.
7) Sukhatme S.P, “A Text Book On Heat Transfer” (1989) , IIIrd Edition, Orient Longmans Ltd., New Delhi.
8) Arora S.C. & Domkundwar S., “A Course In Heat And Mass Transfer” (1994) , Dhanpat Rai & Sons, IVth Edition.
9) Chapman A.J., “Heat Transfer” (1989), , IVth Edition.
10) Yunus A. Cengel, “Heat Transfer –A Practical Approach” (Tata McGraw Hill)
11) M. M. Rathore “Engineering Heat and Mass Transfer”, 2nd Edition, Laxmi Publications, New Delhi.
12) M. Thirumalseshwar,”Fundamentals Of Heat And Mass Transfer” Pearson Education.
13) R. Rudramoorthy, K. Mayilsomy, “ Heat Transfer”, Pearson Education.

NORTH MAHARASHTRA UNIVERSITY, JALGAON
T.E. (MECHANICAL)
W.E.F.: 2007-08
TERM-I
Machine Design I

Teaching Scheme	Examination Scheme
Lectures: 4 Hrs/ week.	Paper: 4 Hours
Practical: 2Hrs/week.	Paper: 100 Marks
	Oral: 25 Marks
	Term Work: 25 Marks

UNIT:- I Introduction and Design of Simple Machine Parts (10 hours)

a) Design Process

Machine Design, Traditional design methods, Basic procedure of Machine Design, Requisites of design engineer, Design of machine elements, Sources of design data, Use of standards in design, Selection of preferred sizes, Design synthesis, Creativity in design.

b) Stresses and Material Properties

Simple stresses- Tension, compression, bending and torsion, combined effect of different stresses, different material properties

c) Theories of Failures

Maximum principal Stress Theory, Maximum shear stress theory, Maximum principal strain Theory, Maximum strain energy Theory, Maximum Distortion energy Theory

d) Design of Simple Machine Parts

Factor of safety, Service factor, Design of simple machine parts-Cotter joint, Knuckle joint and Stresses in curved beams (for circular cross-section only).

(20 marks)

UNIT:-II Shafts, Keys and Couplings (10 hours)

a) Shafts

Design considerations in Transmission shafts, splined shafts, Shaft design on strength basis, Shaft design on torsional rigidity basis, A.S.M.E. code for shaft design,

b) Keys

Classification of keys, Design considerations in parallel and tapered sunk keys, Design of square, flat and Kennedy keys, Splines.

c) Couplings

Design considerations, Classification, Design of Rigid, Muff coupling, Flange coupling and Flexible bushed pin coupling. **(20 marks)**

UNIT:- III Threaded and Welded joints (10 hours)

a) Threaded Joints: Basic types of screw fastenings-cap screws and set screws, Bolts of uniform strength, Locking devices, I.S.O. metric screw threads, Bolts under tension, Eccentrically loaded bolted joint in shear, Eccentric load perpendicular to axis of bolt,

Eccentric load on circular base, Torque requirement for bolt tightening, Dimensions of standard fasteners, Design of cylinder bolts and turn buckle.

b) Welded Joints

Advantages and limitations of welded joints, Butt and fillet welds, Stresses in butt and fillet welds, Strength of butt welds, parallel and transverse fillet welds, Axially loaded unsymmetrical welded joint, Eccentric load in plane of welds, Welded joint subjected to bending and torsional moments

(20 marks)

UNIT:-IV Power Screws and Mechanical Springs (10 hours)

a) Power Screws

Power screw thread forms, Multiple threaded screws, Torque analysis with square and trapezoidal threads, Self-locking screw, Collar friction torque, Stresses in power screws, Screw jack design.

b) Mechanical Springs

Types, Applications and materials of springs, Stress and deflection equations for helical springs, Style of ends, Design of helical compression and tension springs, Springs in series and parallel, Concentric helical springs, Helical torsion spring, Multi-leaf spring, Shot peening**.** **(20 marks)**

UNIT:- V Design for variable Loads and Statistical consideration in Design (10 hours)

a) Design for Fluctuating Loads

Stress concentration - causes and remedies, Fluctuating stresses, Fatigue failure, S-N curve, Endurance limit, Notch sensitivity, Endurance strength modifying factors, Reversed stresses, Design for finite and infinite life, Cumulative damage in fatigue failure, Solderberg and Goodman diagrams, Modified Goodman diagram, Fatigue design of components under combined stresses such as shafts, bolts and springs.

b) Statistical consideration in design

Frequency distribution – Histogram and frequency polygon – Normal distribution – Units of measurement of central tendency and dispersion – Standard variable – population combinations – Design and natural tolerances –Design for assembly- Statistical analysis of tolerances – Mechanical reliability and factor of safety. **(20 marks)**

Term Work:

1) Term work shall consist of **TWO** design projects. Each design project shall consist of two imperial size sheets –one involving assembly drawing with a part list and overall dimensions and other sheet involving drawings of individual components. Manufacturing tolerances, surface finish symbols and geometric tolerances should be specified so as to make it working drawing. A design report giving all necessary calculations of the design of components and assembly should be submitted in a separate file.

Design projects should be in the form of ‘Design of Mechanical System’ comprising of machine elements studied and topics covered in the syllabus. Design data book shall be used wherever necessary to achieve selection of standardized components.

2) Problem based assignment on each unit

Recommendation:

As far as possible, preference should be given to prepare drawing sheets using computer.

Recommended Books :

1) Shigley J.E. and Mischke C.R., “Mechanical Engineering Design”, McGraw Hill Publication Co. Ltd.
2) Spotts M.F. and Shoup T.E. , “Design of Machine Elements” , Prentice Hall International.
3) Bhandari V.B., “Design of Machine Elements”, Tata McGraw Hill Publication Co. Ltd.
4) Black P.H. and O. Eugene Adams, “Machine Design” , McGraw Hill Book Co. Inc.
5) Willium C. Orthwein, “Machine Components Design”, West Publishing Co. and Jaico Publications House.
6) Design Data”, P.S.G. College of Technology, Coimbatore.
7) Juvinal R.C., “Fundamentals of Machine Components Design”, John Wiley and Sons.
8) Hall A.S., Holowenko A.R. and Laughlin H.G., “Theory and Problems of Machine Design”, Schaum’s Outline Series.
9) P. Kannaiah, “Machine Design”, Scitech publication

NORTH MAHARASHTRA UNIVERSITY, JALGAON
T.E. (MECHANICAL)
W.E.F.: 2007-08
TERM-I
NUMERICAL ANALYSIS AND COMPUTATIONAL METHODS

Teaching Scheme	Examination Scheme
Lectures: 4 Hrs/ week.	Paper: 3 Hours
Practical: 2Hrs/week.	Paper: 100 Marks
	Term Work: 25 Marks

Unit-I **(10 Hours)**

A) Software development -

Software development principles mathematical modeling problem solving, Algorithm, Flowchart , Errors , Graphical method,

B) Solution of transcendental equation -

Bisection method, False position method, successive approximation method, Newton-Raphson method, Horner's method, rate of convergence.

(20 Marks)

Unit-II **(10 Hours)**

A) Numerical Integration

Trapezoidal rule, Simpson's 1\3rd rule, Simpson's 3\8th rule, Gauss quadrature technique,

B) Solution of ordinary Differential Equation

Taylor's series method, Euler's method, Improved & modified Euler's method, Fourth order Range- Kutta method. **(20 Marks**)

Unit-III **(10 Hours)**

A) Interpolation -

Linear and quadratic interpolation, Lagrange's interpolation, Newton's forward interpolation, Newton's backward interpolation, Newton's divided difference interpolation, Stirling interpolation,

B) Curve fitting

Linear & quadratic regression, Logarithmic curve fitting, Exponential curve fitting.

(20 Marks)

Unit-IV **(10 Hours)**

A) Solution of Linear Algebraic Equation -

Gauss elimination method , Gauss Jordan method LU- decomposition method ,

B) Iterative method -

Jacobi iteration method, gauss seidel interactive method, Cholesky method convergence analysis, choice of method. **(20 Marks**)

Unit-V **(10 Hours)**

A) Finite Difference Method

Solution of ordinary differential equation, solution of elliptical equation for various boundary condition, solution of parabolic equation by explicit , implicit and crank-Nicolson method ,

B) Finite Element Method

Finite element method introduction, comparison with finite difference method, general approach, interpolation function, finite element application on one dimensions

(20 Marks)

Term-Work:

Scope of programming should be restricted to practical class only.

Assignments: (Term work include only **EIGHT** assignments.)

1. Introduction to C – Language
   Simple input output, formatted various, if statement, loops, array functions & subroutine introduction algorithm development, flowchart.
2. General program like sorting, conditional interest etc.
3. Solution of quadratic equation.
4. Solution of transcendental (exponential or logarithmic) equation related with engineering application.
5. Calculation of work/heat transferred by using any integration method.
6. One exercise on numerical integration related to mechanical engineering application.
7. Solution of Poisson equation.
8. Solution of one dimensional parabolic equation by Crank-Nicolson method.
9. Curve fitting for the data related to mechanical engineering application.
10. Solution of one/two dimension problem by finite element method using any compatible software.
11. Interpolation for any tabulated data used in mechanical engineering.

Recommended Books:

1) Chapra, Canale," Numerical Method for Engineer",McGraw Hill Co.
2) Joh. H. Mathews," Numerical Methods", Pearson Education.
3) P. Kandaswamy," Numerical Methods",S. Chand & Co. New Delhi.
4) J. N. Reddy," Finite Element Method",McGraw Hill Co.
5) Jain, Jain & Iyangar," Numerical Method for Scientist & Engineering Computation",New Age International Pvt. Ltd.
6) S. S. Shastri," Introductory Method of Numerical Analysis ",Prentice Hill India.
7) Belegundupatla," Introduction to Finite Element Method",Prentice Hill India.
8) Y. Kanitkar, "Let us C", BPB Publications
9) Balgurusamy, "Programming in C", TMH

NORTH MAHARASHTRA UNIVERSITY, JALGAON
T.E. (MECHANICAL)
W.E.F.: 2007-08
TERM-I
THEORY OF MACHINE – II
(Common with Automobile Engineering)

Teaching Scheme	Examination Scheme
Lectures: 4 Hrs/ week.	Paper: 3 Hours
Practical: 2Hrs/week.	Paper:100 Marks
	Oral: 25 Marks
	Term Work:25 Marks

UNIT:-I BRAKES AND DYNAMOMETERS (10 Hours)

A} BRAKES: - a) Types of brakes, b) Force analysis of brakes, external and internal expanding shoe brakes, block brakes, band brakes, block and band brakes, c) Breaking torque.
B} Dynamometer: - a) Absorption dynamometers: prony brakes, rope brake, band brake, transmission dynamometer- belt transmission type, b) Eddy current dynamometer: construction and working principle, c) Torque measurement, d) Fluid coupling. **(20 marks)**

UNIT:- II KINEMATICS OF CAM AND FLYWHEEL (10 Hours)

A} CAM: - a) Types of cams and followers, b) Analysis of motion of follower, c) Determination of cam profile for given follower motion, d) Analysis of cam with specified counters – circular arc cam, tangent cam, e) Cycloidal cam, polydyne cam, kinematics equivalent of cam.
B} FLYWHEEL: - a) Turning moment diagram and fluctuation of the crankshaft speed, D' Alemberts principle b) Equivalent offset inertia force, c) Determination of flywheel size for different types of engine and machine.

(20 marks)

UNIT- III MECHANISMS FOR CONTROL – GOVERNORS AND GYROSCOPES: (10 Hours)

A} GOVERNOR: a) Types of governors – Watts, Porter, Proel, Hartnell governor, b) Sensitiveness of governors, c) Hunting, Isochronisms, stability, d) Effect of governor, e) Power of governor, controlling force.
B) GYROSCOPE: a) Angular velocity and acceleration, b) Gyroscopic forces and couple, c) Gyroscopic effect on naval ships, d) Gyroscopic stabilization, stability of two wheel vehicle. **(20 marks)**

UNIT–IV GEAR AND GEAR TRAIN **(10 Hours)**

GEAR:

a) Spur Gears:- Terminology used in gears, conjugate action, in volute and cycloidal profile, path of contact, arc of contact, contact ratio, interference, undercutting, methods to avoid undercutting and interface, gear standardization, effect of center distance variation on the velocity ratio for involute profile tooth gears, friction between gear teeth.

b) Helical Gears: - Torque transmitted by helical gears on parallel shafts, normal and transverse module.

c) Spiral Gears: - Spiral angle, shaft angle, and efficiency of spiral gear.

d) Worm and Worm Gear: - Terminology and geometrical relationship, efficiency of worm gears.

GEAR TRAINS: - Types of gear trains, velocity ratio, tooth load, torque transmitted Holding torque **(20 Marks)**

UNIT: - V BALANCING: **(10 Hours)**

Balancing of rotating masses in one and several planes

Balancing of reciprocating masses in single and multi-cylinder engine, radial and V-types.

Primary and secondary balancing analysis,

Concept of direct and reverse cranks.

Balancing of locomotive engines and effect of partial balancing.

Static and dynamic balancing machine. **(20 marks)**

Term-Work:

Term work shall consist of any '**EIGHT**' experiments of the following: -

1) Study of various types of gearboxes such as industrial gearboxes, Synchromesh gearbox, Differential gearbox.
2) To draw the conjugate profile for any general shape of gear tooth.
3) To generate gear tooth profile and to study the effect of undercutting and rack shift using models.
4) To determine torque capacity of dynamometer.
5) To study epi-cyclic gear train and to measure torque transmitted and holding torque.
6) To draw cam profile for various types of follower motion.
7) To determine the characteristics curve of a centrifugal governor and to find its coefficient of insensitiveness and stability.
8) Verification of principle of gyroscopic couple.
9) Study of any two gyro controlled instruments.
10) To study the dynamic balancing machine and to balance a rotor.
11) Study of different types of brakes.
12) Study of gyroscopic effect on Naval ship and Four wheel vehicle.

ORAL:

Oral will be based on the prescribed term-work presented in the form of certified journal only.

Recommended Books:

1) Thomas and Bevan, “Theory of Machines” Tata Mc Graw Hill
2) P.L.Balany, “Theory of Machines and Mechanisms”, Khanna Publications.
3) Jagdishlal, ”Theory of Machines and Mechanisms” Metropolitan Book Company.
4) S.S.Ratan , “Theory of Machines and Mechanisms” Tata Mc Graw Hill
5) Shigley, “Theory of Machines and Mechanisms” Mc Graw Hill International
6) Sadhu Singh, “Theory of Machine” Pearson Education
7) J.S.Rao, ”Theory of Machines” New Age International Publishers.
8) J.S.Rao, “Theory of Machines”, New Age International Publishers.
9) J Srinivas, “ Mechanism and Dynamics of Machinery “, Scitech Publication.

NORTH MAHARASHTRA UNIVERSITY, JALGAON
T.E. (MECHANICAL)
W.E.F.: 2007-08
TERM-I
INTERNAL COMBUSTION ENGINE
(Common with Automobile Engineering)

Teaching Scheme	Examination Scheme
Lecture: 4 Hour/Week	Paper: 3 Hours
Practical: 2 Hours/Week	Paper: 100 Marks
	Term Work: 25 Marks

UNIT:- I BASIC CONCEPTS AND ENGINE CYCLES (10 hours)

Availability of energy (Elementary treatment only): Introduction to available and unavailable energy, availability of system with heat transfer. Entropy generation and second law efficiency. (No numerical treatment on above contents)

Introduction, Classification, engine components and their functions, Terminology, Work (indicated and brake), mean effective pressure, torque and power (brake and indicated), mechanical efficiency, thermal and volumetric efficiencies of engine, air fuel ratio, specific fuel consumption.

Air Standard Cycles: Assumptions, Otto, Diesel, Dual Combustion cycle, derivation of their efficiency equation, work done and mean effective pressure. Comparison on the basis of heat input, compression ratio, Maximum pressure and temperature, Actual cycle, deviation from theoretical cycles. Pumping losses, time losses, Stirling and Ericsson cycle.

(20 Marks)

UNIT:- II FUEL FEEDING SYSTEMS (10 hours)

Charge, intake valve and manifold, valve timing diagram, valve overlap, choked flow.

Carburetion: Requirement, types of carburetors according to fluid flow, simple carburetor, Air fuel ratio calculation, effect of altitude, disadvantages of simple carburetor, compensating devices for starting, economy range, acceleration, compensating jet etc. additional systems in modern carburetors, Solex carburetor. Disadvantages of carburetion and gasoline injection, MPFI.

Fuel feeding systems in CI engines: Requirement, classification, fuel feed pump, jerk type injection fuel pump, distributor type pump, injection pump governor, fuel injector and nozzles. **(20 Marks)**

UNIT:- III OPERATING SYSTEMS (10 hours)

Cooling systems: requirement, types of cooling systems, thermostat and additives.

Lubrication: Mechanism of lubrication, different methods, important properties of lubricating oils.

Governing of IC engines: requirement, quantity, quality, hit and miss type governing.
Ignition Systems: requirement, battery ignition, magneto ignition, electronic ignition system in two stroke engines, Ignition timing, spark timing advance.
Starting methods of engines. types of superchargers, Super charging, effect of super charging, limitations and advantages of supercharging, and turbo charging of engines.

(20 Marks)

UNIT:- IV COMBUSTION IN SI AND CI ENGINES (10 hours)

Homogeneous and heterogeneous mixtures, Combustion in SI engines: Stages in combustion, Ignition lag, velocity of flame propagation, factors influencing flame speed, rate of pressure rise, Detonation, factors affecting the detonation, pre-ignition. Rating of SI engines fuels, Dopes, combustion chamber of SI engines.
Combustion in CI engine; stages of combustion, factors affecting the delay period. Diesel knock, Effect of engine variables on Diesel knock , Rating of CI engine fuels: Cetane number, performance number, comparison of knock in SI and CI engines. Combustion chamber for CI engines.

(20 Marks)

UNIT:- V ENGINE TESTING AND PERFORMANCE (10 hours)

Measurement of indicated power, brake power, Morse test, energy balance and efficiency calculations, BIS specification. Recent trends in internal combustion engines.
Engine emission, air pollution due to engines, EURO I and EURO II norms, Unburnt hydrocarbon emission in two stroke and CI engines, CO and Nox emission, particulate traps, EGR, emission control methods catalytic converters (Introductory), crank blow by losses. **(20 Marks)**

List of Experiments

Minimum **EIGHT** experiment should be performed form the following lists:
1) Study of cooling systems.
2) Study of lubrication systems.
3) Study of simple and Solex carburetors.
4) Study of fuel pump and fuel injector.
5) Trial on a petrol engine and calculation of air/fuel ratio, volumetric, thermal and mechanical efficiencies.
6) Trial of a Diesel engine and calculation of air/fuel ratio, volumetric, thermal and mechanical efficiencies.
7) Morse test and determination of bsfc and isfc.
8) Study of combustion chambers of SI engines.
9) Study of combustion chambers of CI engines.
10) Study and demonstration of mechanical and Pneumatic governors.
11) Study and analysis of exhaust emission from the engine (PUC).

Recommended Books :

1) V. Ganeshan, “Internal Combustion Engines”, 2/e, Tata McGraw Hill, New Delhi.
2) R. K. Rajput , “Internal Combustion Engines”’, Laxmi Publications, New Delhi.
3) W. W. Pulkrabek , “Fundamentals of Internal Combustion Engines”, Prentice Hall of India (P) Ltd., New Delhi.
4) E. F. Obert , “Internal Combustion Engines and Air Pollution”, Harper and Row, New York.
5) Ferguson C. R , “Internal Combustion Engines”, Wiley Inc. New York.
6) Sharma R.P. and Mathur M.L., “Internal Combustion Engines”, Standard Publications, New Delhi.
7) Domkundwar, ., “Internal Combustion Engines”, Dhanpat Rai & Co. New Delhi.
8) Willard W Pulkrabek. “Internal Combustion Engines”, Pearson Education
9) Shyam K. Agrawal, “Internal Combustion Engines”, New Edge International Publication.
10) K.K. Ramalingam, “Internal Combustion Engines”, Scitech Publication.

NORTH MAHARASHTRA UNIVERSITY, JALGAON
T.E. (MECHANICAL)
W.E.F.: 2007-08
TERM-I
COMPUTER PROGRAMMING IN C / C++
(Common with Automobile Engineering)

Teaching scheme	Examination Scheme
Practical: 2hrs/week	Term work: 25 marks

a) One assignment on introduction to computer

b) To develop and Run "C/C++" programs for machine elements like

(Any two on C and two on C++)

a) Design of knuckle joint or turnbuckle joint

b) Design of power screw

c) Design of helical spring

d) Design of splines

e) Design of muff coupling

f) Theories of failure etc.

Recommended Books:

1) Balgurusamy, "Programming in C" Tata McGraw Hill Publication Co. Ltd.
2) Y. Kanitkar, "Let us C" BPB Publications.
3) M. P. Grover and Zimmer, "CAD/CAM" PHI Pvt. Ltd.
4) Shigley J.E. and Mischke C.R. "Mechanical Engineering Design" McGraw Hill Publication Co. Ltd.
5) Spotts M.F. and Shoup T.E. "Design of Machine Elements" Prentice Hall International.
6) Bhandari V.B. "Design of Machine Elements" Tata McGraw Hill Publication Co. Ltd.
7) Balgurusamy, "Object Oriented Programming with C++" Tata McGraw Hill, New Delhi
8) Ravi Chandran, "Programming in C++" Tata McGraw Hill Publication Co. Ltd.

NORTH MAHARASHTRA UNIVERSITY, JALGAON
T.E. (MECHANICAL)
W.E.F.: 2007-08
TERM-I
Entrepreneurship Development Skill/ Human Research Training
(Common with Automobile Engineering and Production Engineering)

Examination Scheme
Term Work: 25 Marks

Study the following topic from Entrepreneurship Development from the literature/ books and submit a report it.

1) Introduction
- Entrepreneur
- Entrepreneur-ship.

2) Information gathering for identification of opportunity.
- Entrepreneurial process.

3) Information gathering techniques.

4) Product and Services
- Theory
- Product specifications.
- Market research, survey.
- Functions of marketing.
- Research and Development activity.

5) Procedures for estimation of resources required for establishment enterprise or starting service business.
- 5.1 Space.
- 5.2 Human Resources.
- 5.3 Equipments.
- 5.4 Financial Resources

6) Establishing and running enterprise
- Management of enterprise.
- Team spirit.
- Motivation.
- Communication

7) Budgeting and accounting expenditures for running enterprises.
- 7.1 Concept of budgeting.
- 7.2 Budget preparation.
- 7.3 Different type of budgets

8) Procedure of accounting expenditures
- 8.1 Preparation of P&L account and Balance sheet.

9) Quality Control

10) Procedure of report writing for getting approval from financial agencies.

10.1 Financial Resources.

10.2 Financial Corporations

OR

Attend a course of Entrepreneurship Development conducted by college and submit a report on it.

OR

Attend a course of H. R. Training conducted by college and submit a report on it.

NORTH MAHARASHTRA UNIVERSITY, JALGAON
T.E. (MECHANICAL)
W.E.F.: 2007-08
TERM-II
ENGINEERING METALLURGY
(Common with Automobile Engineering and Production Engineering)

Teaching Scheme	Examination Scheme
Lectures: 4 hrs. /week	Paper: 3 Hours
Practical: 2 hrs. /week	Paper: 100 marks.
	Term-work: 25 marks.

UNIT I : **(10 Hours)**

Metallography, Introduction, Microscopy and macroscopy, Sample preparation, sampling or sectioning, mounting, Grinding, Polishing Etching, Mechanism of Etching for single phase and multiphase alloys, Etching Reagents, Electrolytic polishing, Metallurgical microscope working principal Properties of lenses such as magnifying power, numerical aperture, Resolving power etc, Macroscopy, sulphur printing Flow line observations, Examination of fractures.

Steels: - Plain carbon steels, Iron – carbon Equilibrium Diagram, various phases in the diagram, various phase reactions identified in the diagram, solubility of carbon in iron, Allotropy, critical temperature, Microstructure of slowly cooled steels, estimation of carbon from microstructure, Non – Equilibrium cooling of steels. Specification of some commonly used steels for engineering applications.

(20 Marks)

UNIT II : **(10 Hours)**

Heat Treatment, Introduction, and Principles of heat treatment of steel, Transformation. Products of Austenite, Equilibrium diagrams as Aids, Heat Treatments for steel-principles & processes such as annealing, normalizing, Heat treatment used to incrase strength of steel, Isothermal tranformation Diagram, Tempering of martensite, oter heat treatment methods such as austempering, patenting,isoforming, martemperig, Ausforming,etc., continious cooling Transformation, Jominey Test for Hardenability, Hardenability considerations, Quenching media, Techinques to reduce the cracking,

(20 Marks)

UNIT III: **(10 Hours)**

Surface Hardening Treatments of steel : selective Heating Techniques, Flame Hardening, Induction and laser beam hardening, Electron beam hardening, Techniques Involving Altered surface chemistry, carburising, pack, Gas and liquid Carburizing, Nitrding,

Heat Treatment furnaces & Atmospheres : Furnace types, Furnace controls, Heat Treatment and energy, controlled atmosphere. **(20 Marks)**

UNIT IV: **(10 Hours)**

Engineering Alloy steels :- Effect of alloying elements, types of alloy steels, stain less steel, types,and Applications and method of selection. Sensitization and weld decay of stainless steel.Heat-treatment of high speed steels, classification and types tool steels, such as water hardening, shock resistance, cold work and Hot work tool steels and their heat treatment.

Cast irons: - classification, Effect of controlling eutectic reaction on microstructure and properties of cast iron, carbon Equivalent,white cast iron, malleable cast iron, gray cast iron, S.G.iron, chilled and alloy cast iron, Properties, specifications and applications in machine tools, Automobile and pump Industry. **(20 Marks)**

UNIT V: **(10 Hours)**

Engineering Non- Ferrous metals and Alloys : Introduction, Copper and it's alloys, Brasses and Bronzes, Copper-Nickel alloys, Aluminum and it's alloys, Bearing Materials, Lead, Tin and it's alloys Heat Treatment of Non- Ferrous metals, Precipitation or Age Hardening.

Composite Materials: Classification, different types of composite material and it's applications **(20 Marks)**

List of Experiments:

Note: Minimum **EIGHT** experiments must be performed out of following ten experiments.

1) Micro Specimen Preparation and use of metallurgical microscope, objective (a) To provide the practice in the techniques of micro specimen selection, grinding, polishing and etching; (b) To provide initial training in the use of metallurgical microscope

2) Study and drawing microstructure of low carbon, medium carbon, eutectoid steel, hypereutectoid steel in annealed condition.

3) Study and drawing microstructure of Gray, White, Malleable and Spheroidal Graphite Cast Iron.

4) Furnace operations and spark testing, objectives (a) to determine the natural (empty furnace) heating and cooling rates of an available laboratory furnace. (b) to draw the spark diagrams of low , medium, high carbon steel, cast iron, stainless steel

5) Sulphur print test on steel specimen or flow lines examination on forged components

6) Study of change in microstructure of annealed and normalized medium carbon steel, Objective (a) To anneal and normalized the sample of medium carbon steel in to the laboratory furnace and to find out hardness and microstructure of steel

7) Jomney Harden ability test, Objective (a) To conduct the Jomney harden ability test on two types of steel specimen.

8) To study the effect of carbon on hardness of harden and tempered steel

9) Study and drawing microstructure of alpha brass, alpha-beta brass, Aluminum Bronze and bearing metal

10) To study the effect of temperature on hardness of tempered steel

Recommended books:

1) E Paul Degarmo, J.T. Black, Ronald A. Kosher, “Material and Process In Manufacturing”, 9th Edition, John Wiley Inc.
2) V.D.Kodgire, “Material Science and Metallurgy for Engineers”, Everest Publishing House. Pune
3) B. K. Agrawal, “Introduction to Engineering Materials”, Tata Mcgraw Hill, New Delhi.
4) S.H. Avner, “An Introduction to Physical Metallurgy”, Tata Mcgraw Hill, New Delhi.
5)Raymond A.Higgins,” Engineering Metallurgy (Part I&II)”,ELBS Publication,London
6) Clark D.S.,” Physical Metallurgy for Engineers”, Affiliated East-West Press pvt. Ltd., New Delhi
7) Rollason A.C.,” Metallurgy for Engineers”, ELBS publication,London
8) W Calister, Material Science and Engineering, Wiley-Students Edition.
9) A.S.T.M./A.S.M. Hand books on Metallography, Steels, Heat Treatment of Steels & Furnaces
10) Kenneth G. Budinski and Michael K. Budinski, “ Engineering Materials Properties and Selection”, Pearson Education.

NORTH MAHARASHTRA UNIVERSITY, JALGAON
T.E. (MECHANICAL)
W.E.F.: 2007-08
TERM-II
Machine Design II

Teaching Scheme	Examination Scheme
Lectures: 4 Hrs/ week.	Paper: 4 Hours
Practical: 2Hrs/week.	Paper: 100 Marks
	Oral: 25 Marks
	Term Work: 50 Marks

UNIT:- I Friction Clutches and Brakes (10 Hours)

a) Friction Clutches:

Classification and selection of friction clutches, Torque transmitting capacities and Design of single-plate, multi-plate, cone and centrifugal clutches, Types of friction materials - their advantages, limitations and selection criteria.

b) Brakes:

Energy absorbed by brake, Design considerations in pivoted block brake with long shoe, internal expanding shoe brake and disk brake, Temperature rise in brake operation. **(20 marks)**

UNIT:- II Belts and Chain Drives (10 Hours)

a) Belts

Materials and construction of flat and V-belts, Geometric relationships for length of belt, Power rating of belts, Maximum power condition, Selection of flat and V-belts from manufacturer's catalogue, Belt tensioning methods, Relative advantages and limitations of flat and V-belts, Construction and applications of timing belts.

b) Chain Drives

Construction and materials of roller chain, Length of chain and number of links, Polygonal effect, Power rating of roller chains, Construction of sprocket wheels, Silent chains, Relative advantages and limitations of chain drives.

c) Aesthetic and Ergonomic considerations in Design

Asthetic considerations- Basic types of product forms, design features like shape,colour, materials and finishes, quality etc. Ergonomic considerations- Man-Machine closed loop system, design of display panels, design of controls etc. **(20 marks)**

UNIT:-III Spur and Helical Gear Drives (10 Hours)

Classification of gears, Selection of types of gears, Standard systems of gear tooth.

a) Spur Gears:

Number of teeth and face width, Types of gear tooth failure, Desirable properties and selection of gear material, Constructional details of gear wheel, Force analysis, Beam strength (Lewis) equation, Velocity factor, Service factor, Load concentration factor, Effective load on gear, Wear strength (Buckingham's and spott's) equation, Estimation

of module based on beam and wear strength, Estimation of dynamic tooth load by velocity factor and Buckingham's equation, Methods of gear lubrication.
b) Helical Gears:
Transverse and normal module, Virtual number of teeth, Force analysis, Beam and wear strengths, Effective load on gear tooth, Estimation of dynamic load by velocity factor and Buckingham's equation, Design of helical gears.

(20 marks)

UNIT:- IV Bevel and Worm Gear Drives (10 Hours)

a) Bevel Gears:
Straight tooth bevel gear terminology and geometric relationship, Formative number of teeth, Force analysis, Design criteria of bevel gears, Beam and wear strengths, Dynamic tooth load by velocity factor and Buckingham's equation, Effective load, Design of straight tooth bevel gears, Selection of materials for bevel gears, comparison of spiral bevel gears and hypoid gears and straight tooth bevel gears.
b) Worm Gears:
Worm and worm gear terminology and geometrical relationship, Types of worm and worm gears, Standard dimensions, Force analysis of worm gear drives, Friction in Worm gears and its efficiency, Worm and worm-wheel material, Beam strength and wear strength of worm gears, Estimation of dynamic load by velocity factor and Buckingham's equation, Thermal consideration in worm gear drive, Methods of lubrication. **(20 marks)**

UNIT:- V Rolling contact Bearings and Pressure Vessels (10 Hours)

a) Rolling Contact Bearings
Types of rolling contact bearings, Static and dynamic load carrying capacities, Striback's equation, Equivalent bearing load, Load-life relationship, Selection of bearing life, Selection of rolling contact bearings from manufacturer's catalogue, Design for cyclic loads and speed, Bearing with probability of survival other than 90%, Lubrication and mounting of bearings, Types of failure in rolling contact bearings - causes and remedies.
b) Design of Cylinders and pressure vessels: Thick and thin cylinders – Thin cylindrical and spherical vessels – Lame's equation – Clavarino's and Birnie's equations– Auto frettage and compound cylinders – Gasketed joints in cylindrical vessels. Unfired pressure vessels – Classification of pressure vessels as per I. S. 2825 – categories and types of welded joints – weld joint efficiency – Corrosion, erosion and protection vessels, stresses induced in pressure vessels, materials of construction. Thickness of cylindrical and spherical shells and design of end closures as per code – Nozzles and Openings in pressure vessels –Reinforcement of openings in shell and end closures. Area compensation method. **(20marks)**

Term Work

1.Term work shall consist of "ONE" design project. The design project shall consist of two imperial size sheets – one involving assembly drawing with a part list and overall dimensions and the other sheet involving drawing of individual components.

Manufacturing tolerances, surface finish symbols and geometric tolerances should be specified so as to make it working drawing. A design report giving all necessary calculations of the design of the components and assembly should be submitted in a separate file.

Design projects should include selection of prime mover and design of mechanical systems comprising of machine elements:

Spur gears and helical/bevel/worm gears OR Belt/chain/rope and clutch/brake etc.

Design data book shall be used extensively for the selection of the components.

2.Problem based assignment on each unit

Recommendation

As far as possible, preference should be given to prepare drawing sheets using computer.

Recommended Books :

1) Shigley J.E. and Mischke C.R., "Mechanical Engineering Design" McGraw Hill Pub. Co. Ltd.
2) Spott's M.F. and Shoup T.E., "Design of Machine elements", Prentice Hall International.
3) Bhandari V.B., "Design of machine elements", Tata McGraw Hill Public Co. Ltd.
4) Black P.H. and O. Eugene Adams, "Machine Design", McGraw Hill Book Co. Ltd.
5) Willium C. Orthwine, "Machine Components Design", West-Pub. Co. an Jaico Pub. House.
6) "Design Data", P.S.G. College of Technology, Coimbatore.
7) Juvinal R.C., "Fundamentals of Machine Components Design", John Wiely and Sons.
8) Hall A.S., Holowenko A.R. and Laughlin H.G., "Theory and Problems of Machine Design", Schaum's Outline Series.
9) P. Kannaiah , "Machine Design", Scitech Publication

NORTH MAHARASHTRA UNIVERSITY, JALGAON
T.E. (MECHANICAL)
W.E.F.: 2007-08
TERM-II
TURBO MACHINERY

Teaching Scheme	Examination Scheme
Lectures: 4 Hrs/ week.	Paper: 3 Hours
Practical: 2Hrs/week.	Paper: 100 Marks
	Oral: 25 Marks
	Term Work:25 Marks

Unit-I **(10 Hours)**

STEAM TURBINES : Types of turbines, constructional details impulse turbine, compounding of turbine, velocity diagrams, output efficiency, losses in turbines, reaction turbine, velocity, diagrams, degree of reaction, constructional features of blades.

Governing of turbines, application of turbines, types of seals, and packing to reduce leakage, losses in turbines. **(20 marks)**

Unit-II **(10 Hours)**

GAS TURBINE : Theory and fundamentals of gas turbines, principles, classification, Joule's cycles, assumptions for simple gas turbines, cycle analysis, work ratio, concept of maximum and optimum pressure ratio, actual cycle, effect of operating variable on thermal efficiency, regeneration, intercooling, reheating, their effects on performance, closed cycle and semiclosed cycles gas turbine plant, applications of gas turbines.

(20 marks)

Unit-III **(10 Hours)**

JET PROPULSION:- Introduction, theory of jet propulsion, types of jet engines, energy flow through jet engines, thrust, thrust power, and propulsive efficiency, turbo jet, turbo prop, turbo fan engines, pulse jet and ram jet engines, performance characteristics of these engines, thrust segmentation application of jet engines, concept of rocket propulsion.

ROTARY COMPRESSOR :-

Concepts of rotary compressors, root blower and vane type compressors, centrifugal compressors, velocity diagram and expression for work done, introduction to terms like slip factor, power input factor.

(20 marks)

Unit-IV **(10 Hours)**

HYDRAULIC TURBINES :

Impulse momentum principle, fixed and moving flat plate and curve vanes, series of plates & vanes, velocity triangles and their analysis, work done, efficiency etc. classification of hydraulic turbines, Heads & various efficiencies,

Impulse turbine : Main components and constructional features of pelton wheel, velocity diagrams & work done, condition for max. hyd. Efficiency, number of buckets, jets, Non dimensional parameters (speed ratio, jet ratio).

(20 marks)

Unit-V **(10 Hours)**

HYDRAULIC TURBINES (REACTION TYPE)

Reaction turbine, main components & constructional features, types of reaction turbine (Francis, Kaplan), draft tube types, efficiency, cavitations, governing mechanisms for pelton wheel, Francis, Kaplan turbines, Types of characteristic curves, unit quantities, selection of turbine considering various factors, specific speed, Application of similarity as applied to turbines, scale effect.

(20 marks)

Any **Eight** Experiments based on the following list:

1) Study of steam turbine power plant.
2) Study of steam turbine systems.
    a) Methods of compounding
    b) Methods of governing
    c) Losses in steam turbine
    d) Lubrication system.
3) Trial on steam turbine.
4) Study of gas turbines.
5) Study of hydraulic turbines.
6) Trial on pelton wheel.
7) Trial on Francis turbine.
8) Trial on Kaplan turbine.
9) Trial on gas turbine plant.
10) Trial on centrifugal / rotary flow air compressor.
11) Study of various jet propulsion devices / engine.
12) Visit to hydraulic power plant.

Note : Oral will be based on the prescribed term-work presented in the form of certified journal.

Recommended Books :

1) Domkundwar, “Thermal Engineering”, Dhanpat Rai and Co Ltd. Delhi
2) P L Ballaney , “Thermal Engineering”. Khanna Publications, Delhi.
3) R K Rajput , “Thermal Engineering”, Laxmi Publication ltd. New Delhi.
4) Dr. R. K. Bansal, “Fluid Mechanics and Hydraulic M/c”, Laxmi publication Ltd. New Delhi.
5) Dr. Jagdish Lal, “Hydraulic Machine”. Metro politan book co. pvt Ltd. Delhi
6) Dr Modi seth, “Hydraulics & Fluid Machine”. Standard book house Delhi.

7) R. Yadav “Steam & Gas turbine”, Central Publications, Allahbad.
8) J. K. Jain “Gas Turbine Theory & Jet Populsion”, Khanna Publications, New Delhi.
9) Cohen, Roger “Gas Turbine theory”, Longman Publications.
10) Gopalkrishnan “A Treatise on Turbomachines”, Scitech Pub. (India)pvt.Ltd,Chennai
11) Kadambi V. & Prasrd M, “Turbo Machinery”, New Age International Publication New Delhi.

NORTH MAHARASHTRA UNIVERSITY, JALGAON
T.E. (MECHANICAL)
W.E.F.: 2007-08
TERM-II
MECHANICAL MEASUREMENT AND METROLOGY
(Common with Automobile Engineering and Production Engineering)

Teaching Scheme	Examination Scheme
Lectures: 4 Hrs/ week.	Paper: 3 Hours
Practical: 2Hrs/week.	Paper: 100 Marks
	Oral: 25 Marks
	Term Work:25 Marks

Unit-I **(10 Hours)**

Fundamental of instrumentation, Block diagram of measuring instruments, Static and dynamic characteristics, Errors and source of error, Sensors and Transducers.

Signal transmission and processing:Intermediate Modifying devices-Mechanical, electrical & electronics,Terminating devices- Meter indicators, Mechanical Counters, CRO, XY plotters, oscillograph,

Data acquisition system: Introduction, Digital recording system,microprocessor based system **(20 Marks)**

Unit-II **(10 Hours)**

Measurement of force and torque: Introduction, Different type of load cells, dynamometers- Mechanical, electrical, hydraulic.

Pressure and flow measurement: Bourdon tube, diaphragm and bellows, vacuum measurement – McLeod gauge, thermal, conductivity gauge, Dead weight gauge tester, Electromagnetic flow meter, Ultrasonic flow meter, rotameter

Strain measurement: Types of strain gauge & their working, strain gauge circuits, Temperature compensation, Strain rosettes, Temperature measurement by electrical effects, RTD, Pyrometer. **(20 Marks)**

Unit-III **(10 Hours)**

Metrology Introduction: Definition and concept of metrology, standards of measurements. Classification of methods of measurement, precision and accuracy

Linear Measurement: Line standard and end standard, Wavelength standard, Slip gauges,

Measurement of geometric features, Machine tool metrology, Design and manufacture of gauges.

Comparators: Types, construction and working of different Mechanical, Optical, Electrical, Pneumatic comparators, Interferometry: Basic principles, Source of light, Optical flats, Fringe pattern and their interpolation.

(20 Marks)

Unit-IV **(10 Hours)**

Angular Measurement Angle standard, Sine bars, Sine centers, Angle gauges, autocollimator, angle Dekker, optical square, taper measurement, Universal bevel protractor,

Measurement of surface finish Surface texture, assessment of surface roughness as per IS, Tomlinson surface meter, and other surface measuring devices

Screw thread measurement: Terminology, errors in thread, Measurement of elements of external & internal threads,

Gear metrology: Gear terminology, measurement of element of gears

Toolmakers microscope, Profile projector. **(20 Marks)**

Unit-V **(10 Hours)**

Measuring Machines

UMM, CMM, Numerically controlled CMM, Fluidic system NC system, Recent trends in Engineering Metrology, Development in optical measurement, Precision instruments based on laser, Probes, telemetric system, Isometric viewing of surface defects, Nano technology

Quality control:

Introduction, Inspection, Sampling plans, Control charts. (X, R, C,P), Problems based on control charts, Recent trends in quality control (TQM,TQC,Six Sigma, Zero defect)

(20 Marks)

Any **Eight** Experiments based on the following list:

1) Determination of linear and angular dimension.
2) M/c tool alignment tests on any M/c tool like Lathe, Drilling m/c, Milling m/c
3) Measurement of surface finish and testing of surface flatness by optical flat
4) Study and measurement of parameter using tool makers microscope Use of comparator.
5) Measurement of screw parameter using floating carriage micrometer
6) Measurement by gear parameter- Gear tooth thickness, constant chord, pitch circle diameter
7) Measurement of temperature using thermocouple and pyrometer
8) Calibration of strain gauge meter
9) LVDT for displacement measurement
10) Flow measurement-using rotameter.

Recommended Books:

1) Beckwin Marrongoni and Lienhard , “Mechanical Measurement”, Pearson Educations
2) I.C.Gupta, “Engineering Metrology” , Dhanpat Rai & Sons
3) M.S.Mahajan, “Engineering Metrology”, Dhanpat Rai & Sons.

4) R.K.Jain, “Engineering Metrology”, Khanna Publications.
5) Doeblin, “Measurement System Application & Design”,McGraw Hill New Delhi.
6) D.S.Kumar, “Mechanical Measurement”,
7) A.K.Sawhaney, “ Mechanical Measurement and Instruments”, Dhanpat Rai and Sons
8) H.S.Kalsi, “ Electronic Instrumentation”, TMH
9) K.L.Narayanan, “Engineering Metrology”, Scitech Publication
10) R.S.Sirohi, H.S.Radhakrishnan, “Mechanical Measurement’’, New Age International

NORTH MAHARASHTRA UNIVERSITY, JALGAON
T.E. (MECHANICAL)
W.E.F.: 2007-08
TERM-II
PROJECT AND BUSINESS MANAGEMENT

Teaching Scheme	Examination Scheme
Lectures: 4 Hrs/ week.	Paper: 3 Hours
Practical: 2Hrs/week.	Paper:100 Marks
	Term Work:25 Marks

Unit-I **(10 Hours)**

Introduction, Basic concept of project management, Types of projects, Project identification & Formulation scheduling, Monitoring, Control benefits, Basic tool & techniques for project scheduling, Calendar schedule, Bar chart, Project life cycle curves, Line & balance, Problems on Line balancing.

(20 Marks)

Unit-II **10 Hours)**

Net Work Models: Introduction to PERT and CPM , Fundamental concept and network models and construction of network diagrams . PERT activity , time cstimatcs,critical and project time duration. Optimization of project time and cost in PERT network.

(20 Marks)

Unit-III **(10 Hours)**

Forms Of Business Organization: Concept of Ownership Organization , Types of ownership, Individual Ownership, Partnership organization ,Distinction between individual ownership & Partnership ,joint stock companies ,types of stock companies ,comparison between private & public Ltd. Co's.,distinction between partnership and joint stock, Co-operative Organisations,varuios types of co-operative societies, distinction between co-operative & joint stock companies ,distinction between private sector and public sector ,Public sector organization, State ownership, public co-operation, choice of form of organization ,comparative evaluation of different forms of business ownership. **(20 Marks)**

Unit-IV **(10 Hours)**

Financial Management: Introduction, Definition of financial management, functions of financial management , Sources of Funds, Capital, classification of capital, working capital, need for working capital, assessment of working capital ,Factors affecting working capital, Capitalization ,Sources of finance (Shares, debentures, difference between preference shares and equity shares, loans from banks, trade credit public deposits financial institutions)

Cost and cost control : Elements of cost, direct cost, indirect cost, variable and fixed cost, cost control technique, marginal costing, break even analysis.

(20 Marks)

Unit-V **(10 Hours)**

Material & Purchase Management: Scope, advantages of material management, function of material management, objectives of scientific purchasing ,functions of purchase department, classification of functions, 5R's Of Buying ,Methods of buying, Centralized versus decentralized buying, buying procedure, organization structure

Inventory management : Objective, types of inventory, selective inventory technique(ABC,VED,SDE,GOLF), Inventory model (Economic lot size with fixed price, EOQ with quantity discount) **(20 Marks)**

TERM WORK : Any **FIVE** assignments based on each unit.

Recommended Books:

1) Chase, Aquilano," Production and Operation Management",7th Edition-McGraw Hill Publishing Co. New Delhi., 1995.
2) Chary," Theory And Problems in Production and Operations Management",2nd Reprint, Tata McGraw Hill Publishing Co. New Delhi., 1996.
3) Nair,N.G.,"Production & Operations Management",Tata McGraw Hill Publishing Co. New Delhi.,1997.
4) Phillips,Don.T.,Ravindran,A.& James Solberg,"Operations Research Principle & Practice",John Wiley & Sons,1986.
5) Chadra Presanna ," Fundamentals of Financial Management" Tata McGraw Hill New Delhi.,1994.
6) Kolter Philip,"Marketing Management",Prentice-hall of India,1988.
7) Vyuptakesh Sharan.,"Fundamental of Financial Management", Pearson Education
8) L.C.Jhamb ,"Production(Operation)Management", Everest publishing house .
9) S.M.Inamdar, "Cost and Management Acounting"
10) M.K.Khan &P.K.Jain,"Financial Management", Tata McGraw Hill Publishing Co. New Delhi.
11) J.P.Bose, S.Talukdar, "Business Management", New Central Agencies (P) Ltd.

NORTH MAHARASHTRA UNIVERSITY, JALGAON
T.E. (MECHANICAL)
W.E.F.: 2007-08
TERM-II
Practical Training/ Mini Project/ Special study

Teaching Scheme	Examination Scheme
Practical: 2Hrs/week.	Term Work: 25 Marks

- Every student has to undergo industrial / practical training for a minimum period of two weeks during summer vacations between (S.E Second Term) fourth and (T.E First Term)fifth term or during winter vacation between fifth and sixth term(T.E. First Term and Second Term).

- The industry in which practical training is taken should be a medium or large scale industry

- The paper bound report on training must be submitted by every student in the beginning of (T.E. Second Term) sixth term along with a certificate from the company where the student took training .

- The report on training should be a detailed one.

- Maximum number of students allowed to take training in accompany should be five. Every student should write the report separately.

- In case if a student is not able to undergo practical training , then such student should be asked to

  Prepare special study report on a recent topic from reported literature.

  or

  A mini project related to mechanical branch of engineering.

1. A student must design the model for mini project.

2. The model should be simulated using any of the standard simulation software available.

3. Result verification for paper design an simulation should be carried out and discrepancies should be discussed.

4. Assemble the model. Prepare bill of materials.

5. Project report should be detail of work , carried out by student ,including layouts , models, bill of materials and relevant details.

- The practical training /special study / mini project shall carry a team work of 25 marks. Every student shall be required to present a seminar in the respective class in the presence of two teachers. These teachers (appointed by head of department in consultation with the principal) shall award marks based on the following.

(a) Report	10 marks
(b) Seminar presentation	10 marks
(c) Viva – voca at the time of seminar presentation	05 marks

Total	25 marks

Engineering & Technology Faculty
Equivalence Subject of TE Mechanical Engineering

Sr. No.	Old Subject	Sr. No	New Subject
1	Heat Transfer and Gas Dynamics	**1**	Heat Transfer and Mass Transfer
2	Engineering Metallurgy	**2**	Engineering Metallurgy
3	Machine Design-I	**3**	Machine Design-I
4	Industrial Engineering and Mgt.	**4**	Industrial Engineering of SE (Mech.) New
5	Numerical Analysis and Computational method	**5**	Numerical Analysis and Computational Method
6	Machine Design –II	**6**	Machine Design-II
7	Dynamics of Machinery –II	**7**	Theory of Machine-II
8	Metrology and Quality Control	**8**	Mechanical Measurement and Metrology
9	Manufacturing Technology	**9**	Manufacturing Engineering –II of SE (Mech.) New
10	Turbo Machinery	**10**	Turbo Machinery

==========XXXXXX==========

NORTH MAHARASHTRA UNIVERSITY, JALGAON (M.S.)

FINAL YEAR ENGINEERING (B.E.)

(MECHANICAL ENGINEERING)

TERM-I & II

W.E.F.: 2008-09

NORTH MAHARASHTRA UNIVERSITY, JALGAON
STRUCTURE OF TEACHING AND EVALUATION
B.E. (MECHANICAL ENGINEERING)

FIRST TERM **W.E.F. 2008-09**

Sr. No.	Subject	Teaching Scheme Hours/week			Examination Scheme				
		Lectures	Tutorial	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Refrigeration And Air Conditioning	4	--	2	3	100	25	--	25
2	CAD/CAM	4	--	2	4	100	25	--	25
3	***Mechatronics Systems	4	--	2	3	100	25	--	25
4	Operational Research	4	--	--	3	100	--	--	--
5	Elective – I	4	--	--	3	100	25	--	--
6	***Seminar	--	--	2	--	--	25	--	--
7	***Project	--	--	2	--	--	25	--	25
	Total	**20**	**--**	**10**	**--**	**500**	**150**	**--**	**100**
	Grand Total	**30**			**750**				

*** Common with Production Engineering and Automobile Engineering

SECOND TERM

Sr. No.	Subject	Teaching Scheme Hours/week			Examination Scheme				
		Lectures	Tutorial	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Finite Element Analysis and Simulation	4	--	4	4	100	25	--	25
2	Mechanical Vibration	4	--	2	3	100	25	--	25
3	Tribology	4	--	2	3	100	25	--	25
4	Elective – II	4	--	--	3	100	25	--	--
5	***Project	--	--	4	--	--	100	--	50
6	***Industrial Visit / Case Study	--	--	--	--	--	25	--	--
	Total	**16**	**--**	**12**		**400**	**225**	**--**	**125**
	Grand Total	**28**			**750**				

*** Common with Production Engineering and Automobile Engineering

Elective-I
1. Energy Conservation and Management
2. Advanced Machine Design
3. Machine Tool Design
4. Product Development And Rapid Prototyping
5. Automobile Engineering
6. Fluid Machinery

Elective-II
1. Power Plant Engineering
2. Process Equipment Design
3. Introduction To Robotics
4. Advanced Welding Technology
5. Energy Engineering
6. Industrial Fluid Power

B.E. (MECHANICAL ENGINEERING): FIRST TERM
REFRIGERATION AND AIR CONDITIONING

Teaching Scheme
Lectures : 4 Hours/week
Practical : 2 Hours/week

Examination Scheme
Theory Paper : 100 Marks
Term Work : 25 Marks
Oral : 25 Marks
Paper Duration : 3 Hours

UNIT - I **10 Hours (20 Marks)**

Introduction, standard rating of refrigerating machine, coefficient of performance of refrigerator and heat pump.
Reversed Carnot cycle and its limitations, reversed Brayton cycle, application to air craft refrigeration, Bootstrap refrigeration cycle, reduced ambient air cooling system, regenerative air cycle system. (Numerical treatment)
Designation of refrigerant, selection of refrigerant, chemical, physical and thermodynamic requirements of refrigerants, lubricant in refrigerating system, secondary refrigerant, azeotropes and its uses.

UNIT - II **10 Hours (20 Marks)**

Vapour compression refrigeration system study of theoretical and actual vapour compression cycle, use of p-h & T-s charts, effect of evaporator and condenser pressure and temperature on the performance of the refrigeration cycle, effect of sub cooling and super heating. (Numerical treatment)
Compound vapour compression system with inter cooling, flash chamber, multi compressor and multi evaporators systems. (Numerical treatment)
Cascade refrigeration system, production of dry ice, Joule Thomson coefficient, and inverse curve, liquefaction of air and gases. (no numerical treatment)

UNIT - III **10 Hours (20 Marks)**

Vapour absorption refrigeration simple & modified vapour absorption refrigeration systems, Electrolux refrigerator.
Desirable properties of solvent, absorbent & refrigerant combinations, aqua ammonia & lithium bromide refrigeration system use of enthalpy concentration charts. (Numerical treatment)

UNIT - IV **10 Hours (20 Marks)**

Psychometric- properties of moist air, psychrometric chart and process, mixing of air stream, bypass factor, sensible heat factor, room sensible heat factor, Gross sensible heat factor, humidifying efficiency, air washer. Study of various types of psychrometers, sling, aspirating, and industrial type. (Numerical treatment)

UNIT - V **10 Hours (20 Marks)**

Introduction to industrial and comfort air conditioning, human requirements of comfort, effective temperature and comfort chart.Air conditioning load calculations, inside and outside design conditions, Building cooling & heating load calculation, Effective sensible heat factor advanced psychrometry. (Numerical treatment)
Window and central air conditioning systems year round air conditioning, Direct and chilled water air conditioning.

TERM WORK

LIST OF PRACTICAL**:** Any eight out of the following to be performed with minimum three trials.
1) Trial on vapour compression refrigeration system.
2) Trial on ice plant/domestic refrigeration system.
3) Study and trial on vapour absorption refrigeration system.
4) Study and trial on window/central air conditioner.
5) Study and trial on heat pump test rig.
6) Study of construction of hermetically sealed compressor and actual viewing of a cut model of the same (reciprocating, rotary and car A/C compressor).
7) Study of evacuation and charging of refrigeration system.
8) Study and trial on cooling towers.
9) Study of expansion devices, solenoid valve and safety devices used in vapor compression system.
10) Study of thermostat and humidistat, dryer, oil separator.
11) Study of measuring instruments and various tools used in refrigeration and air-conditioning systems.

12) Visit to cold storage/ice plant/ central air conditioning system.
13) Cooling load calculation of any laboratory / class room in the institute & suggest the requirement of Air conditioner unit in terms of capacity.

Note: Oral will be based on the prescribed term work presented in the form of certified journal.

REFERENCE BOOKS

1) Arora C. P.," Refrigeration and air conditioning", TMH, New Delhi.
2) Monohar Prasad," Refrigeration and air conditioning", New Age Publishers New Delhi.
3) Ananthnarayanan," Basics of Refrigeration", TMH, and New Delhi.
4) Stocker W. F. and Jones," Refrigeration and air conditioning", McGraw Hill.
5) Dossat," Principles of Refrigeration", John Wiley Inc.
6) Arora and Domkundawar," Refrigeration and air conditioning", Dhanpatrai and sons, New Delhi.
t) Faye C McQuistom,"Heating Ventilatging nad Air conditioning",Wiley India Pvt.Ltd. New Delhi

B.E. (MECHANICAL ENGINEERING): FIRST TERM
CAD/CAM

Teaching Scheme
Lectures : 4 Hours/week
Practical : 2 Hours/week

Examination Scheme
Theory Paper : 100 Marks
Term Work : 25 Marks
Oral : 25 Marks
Paper Duration : 4 Hours

UNIT – I **10 Hours (20 Marks)**

INTRODUCTION TO CAD/CAM AND NETWORKING
Define CAD/CAM, Product Life Cycle & CAD/CAM, Application of Computers for Design Process, Selection of a CAD system, Desirable relationship of CAD/CAM database, Benefits & Application of CAD
Hardware in CAD, Introduction, The Design Work Station, The graphics terminal, Operator input/output devices,
Computer communication,Principle of networking, Classification of network, Transmission media & interface, LAN system.

UNIT – II **10 Hours (20 Marks)**

COMPUTER GRAPHICS
Introduction, Graphic Primitives, Point plotting, Drawing of lines, Co ordinate system used in graphic element, Transformation in graphics, D transformation, Homogeneous transformation, Concatenate co ordinate transformation, Translation, Rotation, Scaling, Mirror, Reflection, Inverse co ordinate transformation, clipping, 3D transformation, Projections, Scan conversion, Rendering, Shaving, View Port, Windowing, Standardization in graphics IGES files

UNIT – III **10 Hours (20 Marks)**

GEOMETRIC MODELING
Requirement of Geometric Modeling, Geometric Model, Geometric Model Construction Method,, Wire Frame Modeling, Surface Modeling, Solid Modeling, Representation of Curve & Surfaces, Design of curve shape, Cubic Spline, Bezier curve, B-spline curve, Nurbs B-spline, Representation of surfaces
AUTOMATION
Concept of Automation, Types of Automation, Advantages & limitations of Automation, Levels of Automation, Advanced Automation Function

UNIT – IV **10 Hours (20 Marks)**

INDUSTRIAL CONTROL SYSTEM
Continuous control system, Discrete control system, Computer process control, Forms of CPC, Computer process Monitoring, Direct Digital Control, Numerical Control & Robotics, Programmable logic controller, Supervisory control, Distributed Control & Personnel Computers
CNC PROGRAMMING
Axis of CNC Machines, Manual Part Programming using G codes, Use of Sub routines, Computer Aided Part Programming using APT or any other language/G- coding /M- coding.

UNIT – V **10 Hours (20 Marks)**

FMS, GT AND ROBOTICS
FMS – Introduction, Components of FMS, Types of FMS, Application & Benefits, Planning & implementation issue, Typical FMS layout.
GT – Part families, Part classification & coding, optic coding system, Multiclass coding system, Application of GT.
Robotics – Robot Anatomy, Robot Control System, End effectors, Sensors, Industrial Robot, Application and its selection.

TERM WORK

List of Practical-
1. Modeling of any three Machine Component *
2. Any Two Assembly of Mechanical Components*
3. Three assignments based on above syllabus

* Modeling & Assembly can be done by using any modeling software

Note: Oral will be based on the prescribed term-work presented in the form of certified journal.

REFERENCES

1) P. Radhkrishnan, S. Subramanyam, V. Raju ,"CAD/CAM/CIM" , New Age Publication
2) Grover, Automation, "Production System and Computer Integrated Manufacturing", Pearson Education.
3) Mikell P. Grover, Emory W. Zimmers ,"Computer Aided Design and Manufacturing", P.H.I
4) Rao, Tiwari, Kundra ,"Computer Aided Manufacturing" ,T.M.H
5) Zeid ,"CAD/CAM" ,T.M.H
6) James G. Keramas ,"Robot Technology Fundamentala", Vikas Publication House
7) B.S.Pabla, M.Adithan ,"CNC Machine ", New Age International(P) Ltd.
8) Rudra Pratap, "Getting Started with Matlab 7", OUP, New Delhi.

B.E. (MECHANICAL ENGINEERING): FIRST TERM
MECHATRONICS SYSTEMS
(Common with Production Engineering and Automobile Engineering)

Teaching Scheme
Lectures : 4 Hours/week
Practical : 2 Hours/week

Examination Scheme
Theory Paper : 100 Marks
Term Work : 25 Marks
Oral : 25 Marks
Paper Duration : 3 Hours

UNIT – I **10 Hours (20 Marks)**

INTRODUCTION TO MECHATRONICS
Scope and importance of mechatronics, Key issue, Systems, Measurement systems.
TRANSDUCERS AND SENSORS
Introduction, Difference between transducer and sensor, Transducer types, Transduction principle, Photoelectric transducers – photoemissive transducers, photoconductive transducers, photovoltaic transducers, Thermistors, Thermodevices, Thermocouple, Inductive transducers, Capacitive transducers, Pyroelectric transducers, Piezoelectric transducer, Half-effect transducer, Ionization transducers, Light Emitting diode, Optical encoder – incremental encoder, absolute optical encoder, Bimetallic strip, Bourdon tube, Strain gauge, Load cell, Diaphragms, Mechanical switches, Flow transducers, Fibre optic transducers.

UNIT – II **10 Hours (20 Marks)**

SIGNAL CONDITIONING
Introduction, Voltage divider, Rectification, Diode voltage stabilizer, Clipping and Clamping circuit, Amplifier – OPANP circuits, more about filter circuits, Isolator, Instrumentation amplifier, Bridge circuit, Comparator, Oscillator, 555 Timer, Sample and Hold, Clock, Analog to Digital conversion – digital to analog converter, counter based analog to digital converter, successive approximation, Galvanometer, Ammeter and Voltmeter, Cathode ray oscilloscope.
DATA PRESENTATION AND DATA LOGGING SYSTEMS
Introduction, Recorders – Graphic recorders, Strip chart recorders, X-Y recorders, Magnetic tape recorder.
Data loggers – block diagram description , Data acquisition system – generalized data acquisition system, computer based data acquisition system.

UNIT – III **10 Hours (20 Marks)**

ACTUATORS AND MECHANISMS
Introduction, Actuator types and application areas, Electromechanical actuators, DC Motors – brushed DC motor, brushless, coreless, AC Motors – induction motors, synchronous motors, stepper motor, Fluid power actuators – pneumatic actuators, valves actuators, hydraulic actuators, comparison, Piezoelectric actuators – an illustration, piezoelectric motor, Magnetostrictive actuators, Memory metal actuators, Ion-exchange polymer metal composites, Chemical actuator.
Mechanisms, Bearings – slide bearing, journal bearing, rolling element bearing, magnetic bearing, molecular bearing, Belt, Chain, Pulleys, Gears – gear ratio, Rack and pinion, Ratchet, Pawl and Crank, Slider and crank, Cam and Follower – shape of the cam, shape of the follower, Chain and Sprocket, Geneva wheel, Four bar linkages.

UNIT – IV **10 Hours (20 Marks)**

INTRODUCTION TO MICROPROCESSORS AND MICROCONTROLLERS
Microprocessor – Introduction, Basic element of control systems
Microcontrollers – Introduction, Difference between Microprocessors and Microcontrollers
Programmable logic controllers – Introduction.
CONTROL SYSTEMS AND CONTROLLERS
Introduction, Control system, Open-loop control systems, Closed-loop control systems – notations, reachability, transfer function.
The Controllers – on-off controller, proportional controller, integral controller, derivative controller, proportional plus integral controller, proportional plus derivative controller, proportional plus integral plus derivative controller, comparison, More about automatic control, Difing automatic control methods.

UNIT – V **10 Hours (20 Marks)**

INTEGRATION

Introduction, Background, Advanced actuators – advanced motorized actuators, pneumatic actuators, servo actuator systems, Consumer mechatronic products, Hydraulic fingers, Surgical equipment, Industrial robot – different parts of a robot, controller, drive, arm, end effector, sensor, functional requirements, robot based automation, Autonomous guided vehicle – AGV architecture, components based DCS view, man machine interface, design with fieldbus technology, Drilling machine, Conveyor based material handling systems – validation, design.

INDUSTRIAL DESIGN, AESTHETICS AND ERGONOMICS

Introduction, Element of product design – product physiogonomy aesthetics, product physiogonomy ergonomics, ergonomics in machine tool design, ergonomics in machine tool safety, product safety audit, Ergonomic factors for advanced manufacturing systems – machine oriented industrial design, factory without people, ergonomic problems in new technology.

TERM WORK

Term work shall consist of any five experiments and three assignments.

1) Study of Basic block diagram of mechatronics system components.
2) Study and demonstration of motion / force transducers.
3) Study and demonstration of temperature / pressure transducers.
4) Study and demonstration of AD / DA converter
5) Study and demonstration of hydraulic actuator / pneumatic actuator.
6) Study and demonstration of graphic / magnetic tape recorders.
7) Study of Microprocessors and Microcontrollers
8) Study of Robot / Autonomous guided vehicle

Note: Oral will be based on the prescribed term-work presented in the form of certified journal.

REFERENCE BOOKS

1)D.R. Appukuttan,"Introduction to Mechatronics", Oxford University Press, New Delhi
2)N.P.Mahalik,"Mehatronics", Tata McGraw-Hill Publishing Company Limited, New Delhi
3) W. Bolton," Mechatronics", Pearson Education, New Delhi
4) Dan Necsulescu , "Mehatronics", Pearson Education, New Delhi
5) R.P. Borole," Mehatronics", Nirali Prakashan, Jalgaon.
6) D. V. Alciatore, "Introduction to Mechatronic and Measurement Systems", Tata McGraw- Hill Publishing Company Limited, New Delhi
7) HMT Limited, "Mechatronics", Tata McGraw-Hill Publishing Company Limited, New Delhi
8) J.G. Joshi, "Mechatronics", Prentice Hall of India, New Delhi
9) A.Smaili, "Applied Mechatronics", Oxford University Press, New Delhi.

B.E. (MECHANICAL ENGINEERING): FIRST TERM
OPERATIONAL RESEARCH

Teaching Scheme
Lectures : 4 Hours/week

Examination Scheme
Theory Paper : 100 Marks
Paper Duration : 3 Hours

UNIT – I **10 Hours (20 Marks)**

Introduction to O.R., Models in O.R., Scope, Phases, O.R. in Decision Making, Linear Programming,-model formulation, Graphical Method, Simplex Method(ONLY THEORY) , Concept of Quality and its application, Sensitive Analysis.

UNIT – II **10 Hours (20 Marks)**

Linear Programming – Simplex Method, Standard Form of an L.P. Problem , Simplex algorithm (Maximization Case), Simplex Algorithm(Minimization Case) Two Phase Method, The Big- M Method.

UNIT – III **10 Hours (20 Marks)**

Dynamic Programming- Introduction, Basic Concepts and Application, Characteristic of D.P., Dynamic Programming Approach.
Special Techniques of L.P. such as Transportation Model, Assignments Model, Traveling Salesman, Transshipments Problem.

UNIT – IV **10 Hours (20 Marks)**

Decision Theory- Decision Trees, Classes of Decision Model, Utility, Decision under Certainty, Uncertainty and Risk.
Games Theory – Theory Concept, Characteristics, Maximum And Minimum Principles, Saddle Point, Dominance Basic Concept and Terminology of Two Person Zero Sum Games, MXZ and ZXN Games, Sub Games Method, Graphical Method.

UNIT – V **10 Hours (20 Marks)**

Job Sequencing – Introduction, Sequencing Algorithm, Processing N Jobs Through Two Machines, Three Machines and M – Machines, two Jobs and M-Machine Graphical Method.
Replacement Models – Introduction, Types of Failure, Replacement of Items whose efficiency deteriorates with time(Model I & II), Replacement of Item that fail suddenly.

RECOMMENDED BOOKS

1) L.C. Jhamb ,"Quantities Techniques" Vol I and II, Everest Publication
2) Hira , Gupta ,"Operation Research "
3) Taha ,"Operation Research"
4) S.D. Sharma, "Operation Research", Khanna Publication
5) Manohar Mahajan, "Operation Research"
6) J.K.Sharma ,"Operation Research, Problem and Solution" , Macmillan
7) N.D.Vohra ,"Quantitative Techniques in Management" ,TATA Mc Graw Hill
8) Ravindran," Operation Research Principles and Practice ",Wiley India Pvt.Ltd. New Delhi

]

B.E. (MECHANICAL ENGINEERING): FIRST TERM
ENERGY CONVERSION AND MANAGEMENT
ELECTIVE - I

Teaching Scheme
Lectures : 4 Hours/week

Examination Scheme
Theory Paper : 100 Marks
Term Work : 25 Marks
Paper Duration : 3 Hours

UNIT - I **10 Hours (20 Marks)**

Global and linear market - Energy scenario in various sector and Indian economy. Need and importance of energy conservation and management pay back period. Return on investment (R.O.I.), life cycle cost, sanyes diagrams, specific energy consumption. Load management.

UNIT - II **10 Hours (20 Marks)**

Energy auditing - Methodology, analysis and reporting, portable and on-line instruments. Costing of utilities like steam, compressed air, electricity and water. Energy system modeling analysis general concepts, classification of models and use of digital computers in modeling and analysis.

UNIT - III **10 Hours (20 Marks)**

Steam and condensate systems boilers (including package boilers), efficiency testing, Demand control, power factor improvement its benefit and ways of improvement, load scheduling.
Electric motors, lowers, efficiency, energy efficient types of electrical motors for energy conservation, motor speed control variable speed drive.
Lighting: Illumination level, fixtures, timers, energy efficient illumination.

UNIT - IV **10 Hours (20 Marks)**

Energy conservation compressed air systems, refrigeration and air conditioning systems, and water systems. Elementary converge of energy conversation in pumps and fans co-generation concepts, options (steam/gas turbine/D C T based) selection criterion.

UNIT - V **10 Hours (20 Marks)**

Energy action planning : Key elements, force field analysis, energy policy purpose, perspective contents, formulation, ratification, organizing, location of energy management, top management support, managerial function, roles and responsibilities of energy manager, accountability, motivating – motivation of employees, information system designing barriers, strategies, marketing and communicating, training & planning.

TERM WORK

Term work shall consist minimum eight assignments based on above syllabus.

RECOMEMNDED BOOKS:

1) Prof. Henderson," India the energy sector", oxford university press.
2) L.J. Nagrath ," System modeling and analysis", Tata McGraw Hill Press.
3) D.A.Ray," Industial energy conservation pergamon press".
4) IGC Drydin editor," The efficient use of energy" (butter worths)
5) W.C.Turner editor,"Energy management handbook (Wiley)
6) Patrick Steven R, Patric Dake R, Fordo Stephen,"Energy conservation guidebook". Fairmont press Inc.
7) F. William Payne & Richard E. Thompsion ," Efficient Boiler" Operation Source Book.
8) W.C.Turner editor: energy management handbook (Wiley)

B.E. (MECHANICAL ENGINEERING): FIRST TERM
ADVANCED MACHINE DESIGN
ELECTIVE- I

Teaching Scheme
Lectures : 4 Hours/week

Examination Scheme
Theory Paper : 100 Marks
Term Work : 25 Marks
Paper Duration : 3 Hours

UNIT - I **10 Hours (20 Marks)**

OPTIMUM DESIGN
Introduction to optimum design, Adequate design, Johnson's method of optimum design, Case of normal specifications, Case of redundant specifications, Case of incompatible specifications.

UNIT - II **10 Hours (20 Marks)**

SYSTEM APPROACH
Introduction, System approach to design mathematical model, Dynamic response to a distributed system, Dynamic response to a lumped system, Modelling the elasticities, Modelling the masses, Modelling the inertia, Modelling friction and damping, Mathematical model for shock analysis, Cam system, Value engineering approach to design problem.

UNIT - III **10 Hours (20 Marks)**

CAM:
Introduction, Advance cam curves, Polynomical cam, 3-4-5 polynomoal cam, 4-5-6-7 polynomial cam, Jerk cycloidal cam, Sine acceleration cam, Forces on cam, Mathematical model with elasticity, Jump phenomenon, Ramp of the cam – Precam, Polydyne cam.

UNIT - IV **10 Hours (20 Marks)**

DESIGN OF I.C. ENGINE COMPONENTS
Introduction, Principal part of IC engine, Design of piston, piston rings and piston pin, Design of cylinder and cylinder head, Design of connecting rod, Design of crank shaft, Design of valve gear mechanism.

UNIT - V **10 Hours (20 Marks)**

DESIGN OF HOISTING MECHANISMS
Introduction, Design of hoisting chains and drums, Design of ropes, Design of wire ropes, Stress in curved beams, Design of crank hook.

TERM WORK

Term work shall consist minimum eight assignments based on above syllabus.

REFERENCE BOOKS

1) Dr. Rajendra Karwa ," A text book of Machine Design", Laxmi Publications (P) Ltd, New Delhi
2) J. Uicker,"Theory of Machines and Mechanism", 3ed., Oxford University Press, New Delhi.
3) Farazdak Haideri ," Machine Design", Nirali Prakashan, Jalgaon
4) M.F. Spotts," Design of Machine Elements", Pearson Education
5) N.C.Pandya ," Element of Machine Design", Charotar book stall, Anand
6) Norton ," Dynamics of Machinery", Tata Mc-Graw Hill, New Delhi
7) P.C.Sharma ,"Machine Design", S K Katuria & Sons
8) R. S. Khurmi ," A text book of Machine Design", Eurasis Publishing House Pvt. Ltd, Delhi
9) R.B.Patil ,"Design of Machine Elements", Tech- Max Publications, Pune

B.E. (MECHANICAL ENGINEERING): FIRST TERM
MACHINE TOOL DESIGN
ELECTIVE- I

Teaching Scheme
Lectures : 4 Hours/week

Examination Scheme
Theory Paper : 100 Marks
Term Work : 25 Marks
Paper Duration : 3 Hours

UNIT - I **10 Hours (20 Marks)**

DESIGN OF SPEED AND FEED RATES
Aim of speed and feed rate regulation, Stepped regulation of speed : Design of speed box, Design of feed box, Machine tool drives using multiple speed motors, Special cases of gear box design, General recommendations for developing the gearing diagram, Determining the number of teeth of gears, Classification of speed and feed boxes, Stepless regulation of speed and feed rates.

UNIT- II **10 Hours (20 Marks)**

DESIGN OF MACHINE TOOL STRUCTURES
Functions of Machine tool structures and their requirements, Design criteria for tool structures, Static and dynamic stiffness, Profiles of machine tool structures, Basic design procedure of machine tool structures, Design of beds, Design of columns, Design of housings, Design of bases and tables, Design of cross rails, arms, saddles and carriages, Design of rams.

UNIT - III **10 Hours (20 Marks)**

DESIGN OF GUIDEWAYS AND POWER SCREWS
Functions and types of guideways, Design of slideways, Design criteria and calculations for slideways, Guideways operating under liquid friction conditions, Design of aerostatic slideways, Design of anti-friction guideways, Combination guideways, Protecting devices for slideways, Design of Power screws.

UNIT - IV **10 Hours (20 Marks)**

DESIGN OF SPINDLES AND SPINDLE SUPPORTS
Functions of spindle unit and requirements, Material of spindles, Effect of machine tool compliance on machining accuracy, Design calculations of spindles, Antifriction bearings, Sliding bearings.
DYNAMICS OF MACHINE TOOLS : Machine tool elastic system cutting process closed loop system, General procedure for assessing dynamic stability of EES cutting process closed loop system, Dynamic characteristics of elements and systems, Dynamic characteristic of the equivalent elastic system, Dynamic characteristic of the cutting process, Stability analysis, Forced vibrations of machine tools.

UNIT - V **10 Hours (20 Marks)**

CONTROL SYSTEMS IN MACHINE TOOLS
Functions, Requirements and classification, Control systems for changing speeds and feeds, Control systems for executing forming and auxiliary motions, Manual control systems, Automatic control systems Adaptive control systems.
NUMERICAL CONTROL OF MACHINE TOOLS : Fundamental Concepts, Classification and structure of numerical control systems, Manual part programming, Computer aided part programming

TERM WORK

Term work shall consist minimum eight assignments based on above syllabus.

REFERENCE BOOKS

1) S.K. Basu," Design of Machine Tools"
2) Koenigs, "Berger Principles of Machine Tools "
3) Sen and Bhattacharya," Principles of Machine Tool"
4) N Acherkan, "Machine Tool Design", MIR Publication, Moscow 1973
5) Mehta Machine Tool Design

B.E. (MECHANICAL ENGINEERING): FIRST TERM
PRODUCT DEVELOPMENT AND RAPID PROTOTYPING
ELECTIVE- I

Teaching Scheme
Lectures : 4 Hours/week

Examination Scheme
heory Paper : 100 Marks
Term Work : 25 Marks
Paper Duration : 3 Hours

UNIT – I **10 Hours (20 Marks)**

Product Development history and product development process tool, product development verses design, modern product development theories and methodologist in design. Product development teams, product development planning, technical and business concerns. Understanding customer needs, Establishing product functions. Functionality, augmentation. Aggregation, common basis, functional functional modeling methods.

UNIT – II **10 Hours (20 Marks)**

Product tear down and experimentation, benchmarkting and establishing engineering specification. Product portfolios and portfolio architecture. Tear down process, tear down methods, post teardown reporting, benchmarking approach, support tools, setting specifications, portfolio architecture, types, platform, functional architecting, optimization selection, Product modularity, modular design.

UNIT – III **10 Hours (20 Marks)**

Concepts and Modeling - Generation of concepts, information gathering and brain storming, directed search, morphological analysis, combining solutions. Decision making, estimation of technical feasibility, concept selection process, selection charts, measurement theory, numerical concept scoring, design evaluation scheme, concept embodiment, geometry and layout, system modeling, modeling of product metrics, selection of model by performance specifications, physical prototyping, informal and formal models.

UNIT – IV **10 Hours (20 Marks)**

Rapid Product Development - Product Development: Classical steps of product development, Requirement of New Product development strategies, Critical factors affecting success, The Principle of simultaneous Engineering.
Model: Model classes, Influence of models to speed up product development.
Model making by Rapid prototyping: Definitions of rapid prototyping (RP), Rapid Tooling (RT), Rapid Manufacturing (RM). Relating Rapid prototyping models to product development phases.

UNIT – V **10 Hours (20 Marks)**

Generation of Layer information – description of the geometry by a 3D data record, Data flow, CAD model types.
Rapid prototyping Technologies –
Photo polymerization Stereo lithography (SL), Laser Sintering, Layer Laminate Manufacturing (LLM), Extrusion Processes.
Rapid Prototyping Materials-Photopolymers, SL Resins, Sintering Materials, FDM Materials, LOM Materials.
Rapid Prototyping Industrial Applications.

TERM WORK

Term work shall consist minimum eight assignments based on above syllabus.

REFERENCE

1) Roozenburg, J. Eekels, “Product Design : Fundamentals and Methods NFM”, John Wiley and Sons Ltd.,
2) D.Whitney, “Mechanical Assemblies”, Oxford University Press, New Delhi.
3)Geoftry Boothroyd, “Peter dew Product Design for manufacturing and Assembly”
4) Mike Baxter, “Product Design: A Practical guide to systematic methods of new product development”, Champman and Hall.
5) A. K. Chitale, R. C. Gupta,” Product Design and Manufacturing”, Prentice Hall India
6) John R. Lindbeck,”Product Design and Manufacturing”, Prentice Hall International Editime

7) Kevin Otto, Kristin wood, “Product Design : Techniques in Revenue Engineering and New Product Development”, Pearson Education Inc.
8) Andreas Gebharat, Hanser,” Rapid Prototyping” ,Gardner Publication Inc. Cincinnati.
9) Naber H., Macht M., “Fast Prototype Tools in : Rapid Protyping & Manufacturing”
10) Geuer A. Society of Manufacturing Engineers, Dearborn
11) D. Kochan, “Solid Free from Manufacturing ? Advanced Rapid Prototyipng “, Elsevier Science Publisher, B.V. New York.
12) Roozenburg, J. Eekels, Product Design : Fundamentals and Methods NFM, John Wiley and Sons Ltd.,

B.E. (MECHANICAL ENGINEERING): FIRST TERM
AUTOMOBILE ENGINEERING
ELECTIVE – I

Teaching Scheme
Lectures : 4 Hours/week

Examination Scheme
Theory Paper : 100 Marks
Term Work : 25 Marks
Paper Duration : 3 Hours

UNIT - I **10 Hours (20 Marks)**

Chassis & Breaking System
Classification of Automobile, Layout of Automobile Vehicle , Chassis and Frame , Sub- frame, Articulated Vehicle and Trailers, Breaking Systems- Necessity, requirement of good breaking system, classification, types of breaks- mechanical, hydraulic, pneumatic power break. Brake shoe & lining, brake testers. Brake effectiveness, factors controlling stop of an automobile

UNIT - II **10 Hours (20 Marks)**

Transmission Devices
Clutches:- Requirement of Clutches , Single Plate Clutch, Multiplate, Cone, Centrifugal ,Semi centrifugal ,and Fluid Coupling ,Troubleshooting of Clutches,Gear Box:- Sliding Mesh , Constant Mesh, Synchromesh, Epicyclic Gear Train, Torque Converter , Troubleshooting of Gear Box, Propeller Shaft , Differential Axle.

UNIT - III **10 Hours (20 Marks)**

Suspension and Steering System
Suspension System :- Spring, Types of Spring , Coil and helper spring ,Leaf, Transverse Leaf Spring , Independent suspension, Rubber suspension, Self Leveling suspension ,Pneumatic suspension, Troubleshooting of suspension System.
Steering System :- Function and Geometry, Types of Steering System ,Caster and Camber, Toe-in and Toe-out, Steering Linkage and Gear , Reversible Steering and Power Steering .

UNIT - IV **10 Hours (20 Marks)**

Wheel , Tyres and Tubes
Construction and Types of Wheel , Wheel Dimensions , Types of Tyres , Tyre Properties , Tyre Material , Specification of Tyre Size , Ply Rating , Class Ply, Radial Ply, Consideration in Tread Design , Wheel and Tyre Troubleshooting ,Retreading of Tyre Process, Precautions , Controls, Conventional and Procured retreading processes,Tubes ,Natural Rubber and Butyl Flops, Rims , types and Maintenance.

UNIT - V **10 Hours (20 Marks)**

Automobile Electrical System
Starting system - Introduction, battery, starting motors(self starters)
Charging system - Introduction, generator(dynamo),alternator-(A.C. generator)
Ignition system -Introduction, purpose, requirement, basic, ignition system-battery, magneto, and electronics ignition system, firing order, ignition timing, vacuum controlled distributor, spark plug

TERM WORK

Term work shall consist minimum eight assignments based on above syllabus.

RECOMMENDED BOOKS

1) W.L.Crouse, “Automotive Mechanics”, MaGraw Hill International.
2) G.B.S.Narang ,”Automotive Engineering” , Khanna Publishers.
3) Kripal Singh ,”Automobile Engineering” I & II , Standard Publisher distributors.
4) Heitner ,”Automotive Mechanics” , CBS Publisher distributors.
5) Dr. K.M.Gupta,”Automobile Engineering”, Umesh Publication.
6) R.K.Rajput,” Automobile Engineering”, Laxmi Publication, New Delhi

B.E. (MECHANICAL ENGINEERING): FIRST TERM
FLUID MACHINERY
ELECTIVE- I

Teaching Scheme
Lectures : 4 Hours/week

Examination Scheme
Theory Paper : 100 Marks
Term Work : 25 Marks
Paper Duration : 3 Hours

UNIT - I **10 Hours (20 Marks)**

MOMENTUM EQUATION AND ITS APPLICATION
Impulse momentum principle, fixed and moving flat plates and curved vanes ,series of plates and vanes, Velocity triangles and their analysis, work done, efficiency etc.
HYDRODYNAMIC MACHINES
Classification, General theory, Centrifugal head and fundamental equations, (Eulerean, Degree of reaction etc.) head on machines, various efficiencies, condition for max hyd. Efficiency.

UNIT - II **10 Hours (20 Marks)**

IMPULSE TURBINES
Main components and constructional features of a pelton wheel, velocity diagrams and analysis, Number of buckets, jets, non-dimensional parameters (speed ratio, jet ratio)
REACTION TURBINE
Main components and constructional features draft tube –types, efficiency, limitation to the use of draft tube, cavitations, types of reaction turbines (Francis, Kaplan,Deriaz, reversible.)
Governing mechanisms for Francis, Kaplan turbines, pelton wheels, safety devices of turbines (pressure regulator surge tanks, farebay.)
Types of characteristics curves and related terms (unit quantities.) specific speed and shape of runner. Selection of turbine considering various factors.

UNIT - III **10 Hours (20 Marks)**

HYDRODYNAMIC PUMPS
Components of centrifugal pumps. Its installations. Classifications, various terms associated with centrifugal pump (various head, velocity triangles and there analysis, effect of outlet blade angle.) cavitation, NPSH (Thomas cavitation factor), priming of pumps, installation, and specific speed and pump classification. Performance and characteristic of centrifugal pump. Axial thrust case and maintenance, troubles and remedies.

UNIT - IV **10 Hours (20 Marks)**

APPLICATION OF SIMILARITY AS APPLIED TO TURBINES AND PUMPS
Principals, scale effects.
SPECIAL PUMPS
Jet pump, lift pump, hyram pump, deep well pump, regenerative pump, accumulator, intensifier, screw pump.
FLUID COUPLING AND TORQUE CONVERTERS
Construction, working characteristic curves, applications.

UNIT - V **10 Hours (20 Marks)**

HYDRAULIC SYSTEMS
Study of elements such as pump valves packing, motors, Introduction to elements, hydraulic circuits, pertaining of machine tools, selection of fluids.
PNEUMATIC POWER
Basic principles study of elements used in circuits and control of pneumatic power. Applications in mechanical engineering practice. Comparison of pneumatic and hydraulic systems.

TERM WORK

Term work shall consist minimum eight assignments based on above syllabus.

REFERENCE BOOKS

1) S.Ananthswamy, “Fundamentals on hydraulic machinery” ,United book corporation , Pune.
2) V.P. Vasandani, “Theory of hydraulic machinery”Khanna publishers, Delhi.
3) Dr. J. Lal,” Hydraulic machines “ , Metropolitan Books co. pvt. Ltd. Delhi.
4) S.R.Majumda,r “Oil Hydraulic System”, Tata McGraw Hill.
5) S.R.Majumdar, “Pneumatic System”, Tata McGraw Hill.
6) Agrawal,” Fluid Mechanics and Machinery” , Tata McGraw Hill
7) Hicks,” Pump Operation and maintenance”, Tata McGraw Hill
8) E.D. Shaughnessy, “Introduction to Fluid Mechanics”, Oxford University Press, New Delhi.

B.E. (MECHANICAL ENGINEERING): FIRST TERM
PROJECT I
(Common with Production Engineering and Automobile Engineering)

Teaching scheme
Practical: 2 hrs / week

Examination scheme
Oral: 25 Marks
Term Work: 25 Marks

1. Every student individually or in a group (group size is of 4 students. However, if project complexity demands a maximum group size of 5 students, the committee should be convinced about such complexity and scope of the work.) Shall take a project in the beginning of the (B.E. first Term) seventh term in consultation with the guide and the project must be completed in the (B.E. Second Term) eighth term.

2. The project proposal must be submitted in the institute in the beginning of the (B.E. first Term) seventh term. While submitting project proposal care is to be taken that project will be completed within the available time of two term i.e. 2 Hrs per week for (B.E. first Term) seventh term and 4 Hrs per week for (B.E. Second Term) eighth semester (total time become 12*2 + 12*4 = 72 Hrs per project partner). The final title of the project work should be submitted at the beginning of the (B.E. Second Term) eighth semester.

3. Project title should be precise and clear. Selection and approval of topic:

Topic should be related to real life application in the field of MECHANICAL, AUTOMOBILE AND PRODUCTION ENGINEERING

OR

Investigation of the latest development in a specific field of MECHANICAL, AUTOMOBILE AND PRODUCTION ENGINEERING

OR

The investigation of practical problem in manufacture and / or testing of MECHANICAL, AUTOMOBILE AND PRODUCTION ENGINEERING equipments

OR

The MECHANICAL, AUTOMOBILE AND PRODUCTION ENGINEERING based applications project is preferable.

OR

Software development project related to MECHANICAL, AUTOMOBILE AND PRODUCTION ENGINEERING and Agriculture Engineering with the justification for techniques used / implemented is accepted.

OR

Interdisciplinary projects should be encouraged. The examination will be conducted independently in respective departments.

4. The group should maintain a logbook of activities. It should have entries related to the work done, problems faced, solution evolved etc., duly signed by guide.

5. The group is expected to complete details system design, layout etc. in (B.E. first Term) seventh term, as a part of term work in the form of a joint report. Project report must be submitted in the prescribed format only. No variation in the format will be accepted.

6. One guide will be assigned at the most three project groups.

7. The guides should regularly monitor the progress of the project work.

8. Assessment of the project for award of TW marks shall be done by the guide and a departmental committee (consisting of minimum two teachers with experience more than three years) as per the guidelines given in the following table.

A) ASSESSMENT OF PROJECT I TERMWORK B.E. FIRST TERM

NAME OF THE PROJECT _____

NAME OF THE GUIDE: _____

Sr No	Exam Seat No	Name Of Student Marks	Assessment by guide (70%)					Assessment by Departmental committee (30%)			Grand Total	Out of 25 Marks
			Literature survey	Topic Selection	Documentation	Attendance	Total	Evaluation (10%)	Presntaion (20%)	Total		
			10	05	15	05	35	05	10	15	50	25

Sign of Guide Sign. of Committee Members Sign. Of H. O. D.

9. The guide should be internal examiner for oral examination (If experience is greater than three years).

10. The external examiner should be from the related area of the concerned project. He should have minimum of five Years of experience at degree level / industry.

11 .The evaluations at final oral examination should be done jointly by the internal and external examiners.

B.E. (MECHANICAL ENGINEERING): FIRST TERM
SEMINAR
(Common with Production Engineering and Automobile Engineering)

Teaching scheme:
Practical: 2 hrs / week

Examination scheme:
Term Work : 25 Marks

1. **For seminar every student will individually study a topic assigned to him / her and submit a report and shall deliver a short lecture / Seminar on the topic at the end of term.**
2. **Selection of topic should be done by students in consultation with concerned guide**
    a. Topic should be related to branch but it should be extended part of the branch (latest and advance topic).
    b. The topic should be such that the student can gain latest knowledge. Student should preferably refer at least one research paper

3. **Seminar topic should not be repeated in the department and registration of the same should be done on first come first served basis**
4. **Seminar report should be submitted in paper bound copy prepared with computer typing**
    a. Size of report depends on advancement of topic.
    b. Student should preferably refer minimum 5 reference books / magazines.
    c. Format of content
        i. Introduction.
        ii. Literature survey.
        iii. Theory 1) Implementation 2) Methodology
        3) Application 4) Advantages, Disadvantages.
        iv. Future scope.
        v. Conclusion.

5 ASSESSMENT OF SEMINAR for TERM WORK
Title of seminar: _____
Name of guide: _____

Sr. No.	Exam Seat No.	Name of Student	Assessment by examiners					Grand Total
			Topic Selection	Literature Survey	Report Writing	Depth of understanding	Presentation	
			5	5	5	5	5	25

6. Assessment of Literature survey will be based on
    a. Collection of material regarding history of the topic.
    b. Implementation.
    c. Recent applications.

7. Assessment of Depth of understanding will be based on
    a. Questioning by examiners.
    b. Questioning by students.
    c. What the student understands i.e. conclusion regarding seminar.

8. Assessment of presentation will be based on;
    a. Presentation time (10 minutes)
    b. Presentation covered (full or partial)
    c. Way of presentation
    d. Questioning and answering (5 minutes)

9. Examiners should be a panel of two one of them must be guide. Examiner must have experience at least 3 years. Examiners will be appointed by HOD in consultation with Principal.

B.E. (MECHANICAL ENGINEERING): SECOND TERM
FINITE ELEMENT ANALYSIS AND SIMULATION

Teaching Scheme
Lectures : 4 Hours/week
Practical : 4 Hours/week

Examination Scheme
Theory Paper : 100 Marks
Term Work : 25 Marks
Oral : 25 Marks
Paper Duration : 4 Hours

UNIT - I **10 Hours (20 Marks)**

CONVENTIONAL NUMERICAL METHODS
Finite difference method ,method of least square, ritz method, boundary value problems, displacement methods, equilibrium method, mix method of solid mechanics, fe formulation, variational element,Introduction to FEM ,Discritization going from part to whole approach, Physical problem, mathematical models and finite element solution, FEA as a integral part of CAD.
FINITE ELEMENTS TYPES:One dimensional element such as two nodded & three nodded Spar or truss element. Two and three dimensional elements, triangular, rectangular quadrilateral, sector curved, iso parametric, sub parametric elements, etc.

UNIT - II **10 Hours (20 Marks)**

GENERAL PROCEDURE OF FEM
Discritation, element shape, interpolation function, shape function, element stiffness matrix, global stiffness matrix, application of boundary,FEM Softwares - Preprocessing, processing and post processing
Finite element analysis of 1D problem, bending of beams.Introduction, FEM direct approach elements stiffness, potential energy approach, treatment of boundary conditions, temperature effects.
Torsion of circular shaft, thin valve tubes steady state heat conduction, laminar pipe flow.
TRUSSES:Introduction plane trusses, space trusses.

UNIT - III **10 Hours (20 Marks)**

Finite element analysis for two dimensional problem, single variable problems, mesh generation and imposition, egine value and time dependent problems.
Application of heat transfer, fluid mechanics, solid mechanics, plane elasticity and analysis of structural vibration.
Finite element formation of beams.

UNIT - IV **10 Hours (20 Marks)**

Application of FEA to free vibration of thin plate cylindrical shell, transient heat conduction, shaft , motion of fluid in flexible container, flow of idle fluids, viscous fluids, shape structure.

UNIT - V **10 Hours (20 Marks)**

SIMULATION THEORY AND APPLICATION
System models and studies:- concepts of a system, system environment, stochastic activities, continuous and discrete systems, system modeling, types of models, principles used in modeling, types of system studies.
System simulation:-The techniques of simulation, Monte Carlo method, comparison of simulation and analytical methods, analog computers and methods, hybrid computer, simulators, continuous system simulation languages, system dynamics, growth models, logistic curves, multi segments models, probability concepts in simulation, system simulation, events, representation of time, arrival pattern.

TERM WORK

Any Five practical and three assignments based on above syllabus using analysis software.

Note: Oral will be based on the prescribed term-work presented in the form of certified journal.

RECOMMENDED BOOKS

1) J.N. Reddy, An Introduction to Nonlinear Finite Element Analysis, OUP.
2)C.S.Krishnamoorthy.,Finite element analysis TMH
3) J.N.Reddy, Finite element methods,Mc graw hill publition ltd.
4) Robert Cook ,Concept an application of Finite element analysis
5) Klaus-Jurgen Bhate, finite element analysis , PHI
6) C.S. Desai and J.F.Abel.,Introduction to finite element methods ,CBS
7) Tirapati R. Chandrupatla ,Finite element analysis by, PHI.
8) Geoffery Gordon ,System simulation
9) Narsingh Deo ,System simulation with digital computers
10) Kenneth Lt. Huebner, " The FEM for Engineers ",Wiley India Pvt.Ltd. New Delhi

B.E. (MECHANICAL ENGINEERING): SECOND TERM
MECHANICAL VIBRATION

Teaching Scheme
Lectures : 4 Hours/week
Practical : 2 Hours/week

Examination Scheme
Theory Paper : 100 Marks
Term Work : 25 Marks
Oral : 25 Marks
Paper Duration : 3 Hours

UNIT - I **10 Hours (20 Marks)**

FUNDAMENTAL OF VIBRATIONS
Introduction, Definitions, Vector method of representing harmonic motions, Addition of two simple harmonic motions of the same frequency, Beat phenomenon, Complex method of representing harmonic vibrations, Work done by a harmonic force on a harmonic motion, Fourier series and harmonic analysis.
UNDAMPED FREE VIBRATIONS OF SINGLE DEGREE OF FREEDOM SYSTEMS
Introduction, Derivation of differential equation, Solution of differential equation, Torsional vibrations, Equivalent stiffness of spring combinations, Energy method.

UNIT – II **10 Hours (20 Marks)**

DAMPED FREE VIBRATIONS OF SINGLE DEGREE OF FREEDOM SYSTEMS
Introduction, Different types of dampings, Free vibrations with viscous damping, Logarithmic decrement, Viscous dampers, Dry friction or coulomb damping, Solid or structural damping, Slip or interfacial damping.
FORCED VIBRATIONS OF SINGLE DEGREE OF FREEDOM SYSTEMS
Introduction, Forced vibrations with constant harmonic excitation, Forced vibrations with rotating and reciprocating unbalance, Forced vibrations due to excitation of support, Energy dissipated by damping, Forced vibrations with coulomb damping, Forced vibrations with structural damping, Determination of equivalent viscous damping from frequency response curve, Forced vibrations of a system having non-harmonic excitation, Vibration isolation and transmissibility, Vibration measuring instruments.

UNIT - III **10 Hours (20 Marks)**

TWO DEGREE OF FREEDOM SYSTEMS
Introduction, Principal modes of vibration, Other cases of simple two degree of freedom systems, Combined rectilinear and angular modes, System with damping, Undamped forced vibrations with harmonic excitation, Vibration absorbers.
CRITICAL SPEED OF SHAFT:
Introduction, Critical speed of a light shaft having a single disc without damping, Critical speed of a light shaft having a single disc with damping, Critical speed of a shaft having multiple discs, Secondary critical speed, Critical speed of a light cantilever shaft with a large heavy disc at its end.

UNIT - IV **10 Hours (20 Marks)**

MULTI DEGREE OF FREEDOM SYSTEMS EXACT ANALYSIS
Introduction, Free vibrations equations of motion, Influence coefficients, Generalized coordinates and coordinate coupling, Natural frequencies and mode shapes, Orthogonal properties of normal modes, Model analysis, Forced vibrations by matrix inversion, Torsion vibrations of multi-rotor systems.
MULTI DEGREE OF FREEDOM SYSTEMS NUMERICAL METHODS
Introduction, Rayleigh's method, Dunkerley's method, Stodola's method, Rayleigh-Ritz method, Method of matrix itrrations, Holzer's method.

UNIT - V **10 Hours (20 Marks)**

CONTINUOUS SYSTEMS
Vibrations of strings, Longitudinal vibrations of bars, Torsional vibrations of circular shafts, Lateral vibrations of beams.
TRANSIENT VIBRATIONS
Introduction, Laplace transformation, Response to an impulsive input, Response to a step input, Response to a pulse input, phase plane method, shock spectrum.
NON-LINEAR VIBRATIONS: Introduction, Examples of non-linear systems, Phase plane, Undamped free vibration with non-linear spring forces, Pertubation method, Forced vibration with non-linear spring forces, Self excited vibrations.

TERM WORK

Term work shall consist of any five experiments out of the following and three assignments based above syllabus.

1) To study the torsional vibrations of single rotor system.
2) To study the torsional vibrations of two rotor system.
3) To study damped torsional vibrations of single rotor system.
4) To study undamped free vibrations of a spring.
5) To study the natural vibrations of a spring mass system.
6) To study forced damped vibrations of a spring mass system.
7) To study the forced damped vibrations of simply supported beam.
8) To determine critical speed of a single rotor system.

Note: Oral will be based on the prescribed term-work presented in the form of certified journal.

REFERENCE BOOKS

1) Dilip Kumar Adhwarjee "Theory and Applications of Mechanical Vibrations"Laxmi Puyblications (p) Ltd., New Delhi
2) G.K.Grover "Mechanical Vibrations"New Chand & Bros Roorkee (U.P.)
3) Leonard Meirovitch " Element of Vibration Analysis" Tata McGraw-Hill Publishing Company Limited, New Delhi
4) Singiresu S. Rao " Mechanical Vibrations " Pearson Education Ptd. Ltd., Delhi
5) S. Graham Kelly " Schaum's Out lines Mechanical Vibrations " Tata McGraw-Hill Publishing Company Limited, New Delhi
6) Thompson," Theory of Vibration with Application", Pearson Education
7) V.P.Singh " Mechanical Vibrations " Dhanpat Rai & Co. (P) Ltd., Delhi
8)B.H.Tongue," Principles of Vibration", 2/ed. Oxford University Press, New Delhi.

B.E. (MECHANICAL ENGINEERING): SECOND TERM
TRIBOLOGY

Teaching Scheme
Lectures : 4 Hours/week
Practical : 2 Hours/week

Examination Scheme
Theory Paper : 100 Marks
Term Work : 25 Marks
Oral : 25 Marks
Paper Duration : 3 Hours

UNIT - I **10 Hours (20 Marks)**

Tribology: Introduction, Tribology in design, Tribology in Industry, Economic considerations.
Friction: Introduction, Laws of friction, Kinds of friction, Causes of friction, Friction measurement, stick slip oscillations & its elimination,Wear: Theory of wear, Types of wear, Various factors affecting wear, measurement of wear, wear between solids and flowing liquids, theory of wear.

UNIT - II **10 Hours (20 Marks)**

Lubricants and Lubrication: Lubricant properties – physical and chemical. Lubrication – introduction, basic modes of lubrication. Flow of viscous fluid through rectangular slot.
Hydrostatic bearings: Basic concept, operations, advantages and limitations. Hydrostatic conical and spherical bearings, load carrying capacity and flow of lubricants. Bearing power and film thickness, bearing temperature and power. Compensators and their action. Optimum design step bearing.

UNIT - III **10 Hours (20 Marks)**

Hydrodynamic bearing: Theory of hydrodynamic lubrication, Mechanism of pressure development in oil film. Two Dimensional Reynolds equation, Infinite tapered shoe slider bearings and infinite long journal bearing. Short bearing theory applied to journal bearing.

UNIT - IV **10 Hours (20 Marks)**

Hydrodynamic thrust bearing: Introduction, flat plate thrust bearing, step thrust bearing, tapered land thrust bearing, tilting pad thrust bearing, spring mounted thrust bearing, hydrodynamic pocket thrust bearing.
Friction and power losses in journal bearings: Evaluation of friction loss in concentric & eccentric journal bearing & quantity of oil flow with circumferential groove and hole.

UNIT - V **10 Hours (20 Marks)**

Hydrostatic squeeze film, circular & rectangular plates, impact conditions between lubricated solids, applications to journal bearing,Air lubricated bearings: Tilting pad bearings, magnetic recording disk with flying heads, hydrostatic & hydrodynamic thrust bearing with air lubrications. Lubrication practice, quality control & management – characteristics of lubricating methods, lubricating devices & systems, organizing application charts.

TERMWORK

Assignments Problems on -
Problem in hydrostatic bearing
Problem in hydrodynamic bearing
Reynolds equation
Derivation of squeeze film lubrication on rectangular plate and
Practical On (Any FOUR)
Journal Bearing apparatus.
Tilting pad thrust bearing apparatus
Friction in journal bearing
Break line friction test rig.
Coefficient of friction using pin on disc test rig.

Note: Oral will be based on the prescribed term-work presented in the form of certified journal.

REFERENCE BOOKS

1) B. C. Majumdar “Introduction Tribology and Bearings”, H. Wheeler and Company Pvt. Ltd.
2) Cameron A. “Basic Lubrication Theory , Wiley Eastern Ltd.
3) Fuller D. D., “Theory and Practice of Lubrication for Engineers”. John Wiley and Sons.
4) Halling J. “Principles of Tribology”, McMillan Press Ltd.
5) Hrassan & Powel , “Gas Bearing”.
6) Neale M. J. “Tribology Hand Book”, Butterworths.

B.E. (MECHANICAL ENGINEERING): SECOND TERM
POWER PLANT ENGINEERING
ELECTIVE - II

Teaching Scheme
Lectures : 4 Hours/week

Examination Scheme
Theory Paper : 100 Marks
Term Work : 25 Marks
Paper Duration : 3 Hours

UNIT - I **10 Hours (20 Marks)**

THERMAL POWER PLANT
Introduction, general layout of modern thermal power plant, working of thermal power plant, coal classification, coal handling, coal blending, coal desulphanization, Indian coals, selection of coal for TPP., coal handling, storage, preparation and feeding, ash handling and dust collection, fluidized bed combustion systems, steam turbines, condensers, cooling pond and cooling tower, necessity of feed water treatment, high pressure boilers and importance of water purity, thermodynamic cycles.

UNIT - II **10 Hours (20 Marks)**

HYDROELECTRIC POWER PLANT
Hydrograph, flow duration curve, site selection, classification of HPP, and their field of use, capacity calculation for hydro power, dam, head water control, penstock, water turbines, specific speeds, governors, hydro electric plant auxiliaries, plant layout, automatic and pumped storage , project coasty of hydroelectric plant. advantages of HPP

UNIT - III **10 Hours (20 Marks)**

NUCLEAR AND DIESEL POWER PLANT
Elements of nuclear power plant, nuclear reactor and its types, fuels moderators , coolants, control rod, classification of nuclear power plants, waste disposal, diesel power plant diesel engine performance and operation , plant layout, log sheet, application, selection of engine size

UNIT - IV **10 Hours (20 Marks)**

GAS TURBINE PLANT
Plant layout, method of improving output and performance, fuel and fuel systems, method of testing open and closed cycle plants, operating characteristics, applications, free piston engine plant, limitation and application , combined cycle plants, advantages , need of generation power plant in power systems based load station and peak load station.

UNIT - V **10 Hours (20 Marks)**

MAJOR ELECTRICAL EQUIPMENT IN POWER STATION
Generator and exciters, earthling of power system, power and unit transformer, circuit breakers, protective equipments, control board equipment, elements of instrumentation, plant layout, switch gear for power station auxiliaries, recent developments in methods of power generation, introduction to magneto hydrodynamic, fuel cells , geothermal, solar power, tidal power.

TERM WORK

Term work shall consist minimum eight assignments based on above syllabus.

REFERENCE BOOKS

1) Domkundwar and Arora " Power Plant Engineering", Dhanpat Rai & Sons, New Delhi
2) E.I. Wakil, "Power Plant Engineering", Publications, New Delhi
3) P.K.Nag,"Power Plant Engineering", Tata McGraw Hill, New Delhi
4) R.K.Rajput," Power Plant Engineering", Laxmi Publications, New Delhi

B.E. (MECHANICAL ENGINEERING): SECOND TERM
PROCESS EQUIPMENT DESIGN
ELECTIVE - II

Teaching Scheme
Lectures : 4 Hours/week

Examination Scheme
Theory Paper : 100 Marks
Term Work : 25 Marks
Paper Duration : 3 Hours

UNIT - I **10 Hours (20 Marks)**

PRESSURE VESSELS : Introduction, Operating conditions, Pressure vessel code, Selection of material, Vessel opening at low temperatures, Vessel opening at elevated temperatures, Design conditions and stresses, Design of shell and its components, Supports for vessels, Bracket supports, Leg supports, Skirt supports, Saddle supports, Stress from local loads and thermal gradient, Thermal stresses in cylindrical shell, Fabrication, Inspection and tests.

UNIT - II **10 Hours (20 Marks)**

HIGH PRESSURE VESSELS : Introduction, Constructional features, Material for high pressure vessels, Solid walled vessel, Multi-shell construction, vessel closures, jacket for vessels, STORAGE VESSELS: Introduction, Storage of Fluids, Storage of non-volatile liquids, Storage of volatile liquids, Storage of gases, Design of rectangular tanks, Design of tanks, Nozzles and mountings, Large capacity storage tanks.

UNIT - III **10 Hours (20 Marks)**

REACTION VESSELS : Introduction, Material of construction, Agitators, Types of agitators, Baffling, Power requirements for agitation, Design of agitators system components, Drive for agitators, Classification of reaction vessels, Heating systems, Design considerations,Heat Exchangers: Introduction, Types of heat exchangers, Design of shell and tube heat exchangers.

UNIT - IV **10 Hours (20 Marks)**

EVAPORATORS AND CRYSTALLISERS : Evaporators, Types of evaporators, Entrainment separators, Material of construction, Design considerations, Crystallisers,Distillation And Absorption Towers / Columns:Introduction, Basic features of Towers / Columns, Process engineering data, Towers / columns internals, stresses in columns shell, Determination of shell thickness, Elastic stability under compressive stresses, Allowable deflection, Design and construction features of column internals, Supports for column.

UNIT - V **10 Hours (20 Marks)**

AUXILIARY PROCESS VESSELS
Introduction, Reflux drum, Compressors knock-out drum, Liquid-liquid separators, Vapour/gas liquid separators, Wire mesh mist eliminators, Process Hazard And Safety Measures in Equipment Design:Introduction, Hazards in process industries, Analysis of hazards, Safety measures, Safety measures in equipment design, Pressure relief devices.

TERM WORK

Term work shall consist minimum eight assignments based on above syllabus.

REFERENCE BOOKS

1) B.C. Bhattacharyya ," Chemical Equipment Design", CBS Publishers and Distributors, Delhi
2) E.E. Ludwig"Applied Process Design for Chemical and petrochemical Plants", Gulf Publishing Co.
3) E.E. Ludwig "Applied Process Design for Chemical Plants", Gulf Publishing Co.
4) J.H. Perry ,"Chemical Engineering Handbook"
5) L.E. Brownell ," Process Equipment Design", John Wiley and Sons
6) M.V. Joshi ," Process Equipment Design", Macmillan India Ltd, New Delhi
7) S. D. Dawande ,"Process Equipment Design", Central Techno Publication
8) Babu," Process Plant Simulation", Oxford University Press, New Delhi.

B.E. (MECHANICAL ENGINEERING): SECOND TERM
INTRODUCTION TO ROBOTICS
ELECTIVE - II

Teaching Scheme
Lectures : 4 Hours/week

Examination Scheme
Theory Paper : 100 Marks
Term Work : 25 Marks
Paper Duration : 3 Hours

UNIT - I **10 Hours (20 Marks)**

PLANNER MECHANICS: Advanced synthesis of planner mechanics for ISP and FSP burmester theories and analytical techniques, applications.
MECHANICS DYNAMICS: Newtonian lagrangian techniques, energy methods, spatial mechanisms, axodes, and kinematics of open and closed loop mechanism.

UNIT - II **10 Hours (20 Marks)**

BASIC CONCEPT IN ROBOTICS: automation and robotics, robot anatomy, basic structure of robotics, resolution, accuracy and repeatability, classification and structure of robotics system, point to point and continuous past system, control loop of robotics system.

UNIT - III **10 Hours (20 Marks)**

DRIVES AND CONTROL SYSTEM: Hydraulic, DC servomotors, basic control system, concept and models, control system analysis, robot activation and feedback component, positional and velocity sensors, actuators, power transmission system, robot joint control design. Application of robot in manufacturing.

UNIT - IV **10 Hours (20 Marks)**

END EFFECTORS, SENSORS AND VISION SYSTEMS:
End Effectors Types of end effectors, mechanical grippers, vacuum / magnetic / adhesive grippers, tools as end effectors, Gripper selection and design.
Introduction to Sensors: Need of sensors in a robotic system, selection of sensors, photo sensors, limit switches. Range sensors, proximity sensors, touch / sensors.
VISION SYSTEMS: concept of low level and high-level vision in a robotic system.

UNIT - V **10 Hours (20 Marks)**

ROBOT PROGRAMMING: Methods of robot programming, lead through programming methods, a robot program as a path in space, motion interpolation WAIT, SIGNAL, AND DELAY commands.
ROBOT LANGUAGES: The textural robot languages, generation of robot programming languages, robot language structure, constant, variables and other data objects, motion commands, end effector and sensor commands.

TERM WORK

Term work shall consist minimum eight assignments based on above syllabus.

RECOMMENDED BOOKS

1) Groover," Industrial Robotics", McGraw Hill Publication Co.Ltd..
2) John J. Craig, "Introduction to Robotics Mechanics and Control", Pearson Education Inc.,
3) M.P.Groover,"Industrial Robotics - Technology, Programming and Applications"
4) Niku,"Introduction to Robotics : Analysis System and Application", Pearson Education
5) POVOV , Robotics", Mir Publication Co.Ltd.
6) Robot J.Schilling, " Fundamental of Robotics", Pearson Education
7)Mark W Sping," Robot Modelling And Control ",Wiley India Pvt.Ltd. New Delhi

B.E. (MECHANICAL ENGINEERING): SECOND TERM
ADVANCED WELDING TECHNOLOGY
ELECTIVE-II

Teaching Scheme
Lectures : 4 Hours/week

Examination Scheme
Theory Paper : 100 Marks
Term Work : 25 Marks
Paper Duration : 3 Hours

UNIT - I **10 Hours (20 Marks)**

SOLDERING AND BRAZING
Welding characteristics capillary attraction bond formation, metallurgy of solders, foreign materials in the solders alloy. Designing solder joint. Soldering iron, special soldering technique, thermal free solder, low temperature soldering, high temperature soldering, expanding type solders.
Metallurgical aspects of brazing, Design of joint, brazing fluxes, Method of heating – touch brazing, furnace brazing, induction brazing, Resistance brazing, disphasing, Salt bath brazing, brazing solders, silver solders.

UNIT - II **10 Hours (20 Marks)**

SPECIAL WELDING PROCESSES:
Electron beam welding, plasma arc welding, laser welding, bronze welding, under water welding. Ultrasonic, Diffusion welding, Friction and inertia welding, Forge welding, Expolsive welding, Thermit welding, Atomic hydrogen welding

UNIT - III **10 Hours (20 Marks)**

WELDABILITY OF STEELS:
Plain carbon steels-mild steel, medium carbon steel, high carbon steel, tool steels, low alloy and high alloy steels, stainless steels, Austenitic manganese steels.
WELDABILITY OF ALUMINIUM AND ITS ALLOY:
metallurgical behavior during welding, choice of methods, welding rods, fixtures, methods of welding.
WELDABILITY OF CAST IRON AND CASTING:
Gray cast iron, malleable cast iron spheriodal graphite cast iron, selection of cast iron, electrodes and welding rods-methods of welding.
WELDABILITY OF COPPER AND COPPER ALLOY:
Copper brasses, bronzes, Phospher bronze, aluminium bronze, welding of dissimilar metal joints on copper and copper alloys, methods of welding.

UNIT - IV **10 Hours (20 Marks)**

METULLURGICAL CONCEPT OF WELDABILITY:
Temperature changes in welding concepts of weldability carbon equivalent, cracking of welds, weldability testing, welding metallurgical of dissimilar metals, heat treatments of welds.
HARD FACING:
Types of wear, hard facing metallurgy, preparing hard facing, basic hard facing procedure, spray hard facing, basic treatment weld.

UNIT - V **10 Hours (20 Marks)**

DESIGN AND FABRICATION:
Designing for welding types of joints welds and stress distribution, layer sequences, deposition rates, expansion, contraction and residual stresses in weld structure.
Indian standards for welding electrodes, fluxes and properties, electrode selection.

TERM WORK

Term work shall consist minimum eight assignments based on above syllabus.

REFERENCE BOOKS

1) M. Lal , “Fabrication Technology”
2) O. P. Khanna , “Welding Technology”, Dhanpat Rai Publications
3) P.C. Sharma ,” Production Engineering”
4) P. N. Rao , “Manufacturing Tech”. Vol I & II
5) R. K. Jain , “Production Technology”

B.E. (MECHANICAL ENGINEERING): SECOND TERM
ENERGY ENGINEERING
ELECTIVE- II

Teaching Scheme
Lectures : 4 Hours/week

Examination Scheme
Theory Paper : 100 Marks
Term Work : 25 Marks
Paper Duration : 3 Hours

UNIT – I **10 Hours (20 Marks)**

INTRODUCTION:Global primary energy reserves, energy needs of growing economy, Indian energy scenario, energy pricing in India, energy conservation and its importance, energy conservation act-2001 and its features, energy management strategy, energy audit: types and methodology, energy audit reporting format

UNIT - II **10 Hours (20 Marks)**

SOLAR ENERGYsolar radiation, measurement of solar radiation, energy potential of sun, simple flat plate collector, design of liquid flat plate collector, application of liquid flat plate collector, performance analysis, testing procedure of liquid, air, water, FPC.Concentrating Collectors: types, material of construction parameters characterizing, the concentrators, thermodynamic limits on concentration, tracking, performance analysis of cylindrical parabolic & dish collector. Comparison with FPC.

UNIT - III **10 Hours (20 Marks)**

APPLICATION OF SOLAR SYSTEMS AND ECONOMICS ANALYSIS:
Solar ponds, solar distillatory, solar satellite power system, solar cooker, solar air & water heaters, solar dryers, photovoltaic direct energy conversion, solar cells, solar thermal power system, Solar passive heating, solar air-conditioning, solar energy storage's. Economics analysis of solar systems, net present value concept, calculation of pay back periods for solar system.

UNIT - IV **10 Hours (20 Marks)**

WIND ENERGY:Nature of wind, wind machines, classification & description, wind data and its representation, energy in wind, wind mill site characteristic , performance calculations, recent development.
BIOMASS ENERGY:Various forms of biomass energy as a potential energy source, various species of plants suitable for India, bio-fuel production processes, bio-gas plants gasifiers principle, bio-gas & plants, types of gober gas plants.

UNIT - V **10 Hours (20 Marks)**

OCEAN ENERGY:Types of ocean energy sources, ocean temperature difference, OTEC cycle (open and closed) comparison with normal vapor cycle.Ocean Waves: Wave motion energy, power from wave, wave energy conversion devices.Geothermal Energy:History, Future origin, types of geothermal energy, dry rock & hot aquifer analysis, vapour dominated geothermal systems, operational & environmental problems.

TERM WORK
Term work shall consist minimum eight assignments based on above syllabus.

RECOMMENDED BOOKS

1) B.S.Magal, "Solar Power Engineering"
2) G.D. Rai.,Non Conventional Energy Sources
3) Garg H.P.,Treatise on solar Energy Vol. I, II, III
4) John W. Twidell and Anthony D. Weir ,Renewable Energy Resources, ELBS Publication
5) J.A. Duffy, W.A. Beckman- John Willy, Solar Energy of Thermal Processes-
6) Krieth, Krieder ,Principles of solar Engineering ,Mc Graw Hill Pub. Co.
7) S.Rao & B.B.Parulekar, Energy Technology, TMT, New Delhi
8) S.P. Sukhatme ,Solar Energy, Principles of collection and storages , Tata McHill Publication, New Delhi
9) W.C. Turner.,Energy Management Hand Book
10) S.N. Bhadra, Wind Electrical Systems, Oxford University Press, New Delhi.

B.E. (MECHANICAL ENGINEERING): SECOND TERM
INDUSTRIAL FLUID POWER
ELECTIVE- II

Teaching Scheme
Lectures : 4 Hours/week

Examination Scheme
Theory Paper : 100 Marks
Term Work : 25 Marks
Paper Duration : 3 Hours

UNIT - I **10 Hours (20 Marks)**

Fluid power system: Component advantages, application in the field of machine tool, material handling. Hydraulic pressing, mobile and stationary machine clamping, devices etc. Transmission of power at static and dynamic states.
Laws of fluid flow, type of flow,Types of hydraulic fluids, petroleum base, synthetic, and water based. Properties of fluid, selection of fluids, additives, effect of temperature and pressure on hydraulic fluid.

UNIT - II **10 Hours (20 Marks)**

Seals, seating material, compatibility of seal with fluid, Types of pipes, hoses, material, quick acting couplings, presser drop in hosses/pipes, Fluid conditioning through filters, strainers, source of contamination, and contamination control, heat exchangers,Pumps - Types, classification, principal of working, power calculations, efficiency calculation, characteristic curves, selection of pump for hydraulic power transmission form vane pump, gear pump, redial and axial plunger pumps, screw pumps.

UNIT - III **10 Hours (20 Marks)**

Manually operated, solenoid operated, pilot operated. Directional control valve , check valve, Modular construction of valve.
Control of fluid power,Necessity of fluid control through pressure control, direction, control, flow control valves,Principle of pressure control valves, direct operated, pitol operated, relief valves, pressure reducing valve, sequence valve, quick exhaust valve,Principle of flow control valve- Pressure compensated, temperature compensated flow control valve, meter in circuit, meter out circuit, flow through restrictor, Types of direction control valves: Two way two position, four way three position, four way two piston valves, Open center, close center, Tandem center, position of valve

UNIT - IV **10 Hours (20 Marks)**

Actuators - linear and rotary, Symbols of hydraulic circuits, Hydraulic motors gear type vane type piston type radial piston type methods of control of acceleration and deceleration, Types of cylinder mountings, Calculation of piston velocity and thrust under static and dynamic application considering friction inertia loads, Design consideration for cylinders, Selection of components and design of hydraulic circuits for linear circuits regeneration circuits sequencing circuits with the use of electrical control, Laden diagram, Maintenance trouble shooting safety precaution of hydraulic circuits

UNIT – V **10 Hours (20 Marks)**

JIC symbols/ISO pneumatic symbol, Principle of pneumatic, Laws of compression , types of compression, selection of compression, Comparison of pneumatic with hydraulic power transmission, Types of filters regulators , lubrication, mufflers, driers, Pressure regulating valve, Direction control valve two-way three way four way valve solenoid operated valve push button level control valve,Speed regulating methods in pneumatic, Pneumatic actuators, rotary and reciprocating,Air motors radial piston vane type axial piston type,Basic pneumatic circuits, Selection of components for linear circuits sequencing circuits

TERM WORK

Term work shall consist minimum eight assignments based on above syllabus.

RECOMMENDED BOOKS

1) A.Esposito"Fluid Power with Application" Prencice Hall.
2) B. Lall ,"Oil Hydraulics"International Literature Association
3) D.A. Pease ," Basic fluid power " Prentice Hall
4) Godwin ," Power Hydraulics " Cleaver Hume.

5) H.L. Stewart ," Hydraulics and Pneumatics" Industrial Press
6) J.J. Pippenger ,"Industrial Hydraulics "McGraw Hill Co.
7) Vickers' manual on Industrial Hydraulics.
8) Yeaple ,"Fluid Power Design Handbook."
9)E.J.Shaughnessy, "Introduction to Fluid Mechanics" (SI Adoption),OUP, New Delhi.

B.E. (MECHANICAL ENGINEERING): FIRST TERM
PROJECT II
(Common with Production Engineering and Automobile Engineering)

Teaching scheme:
Practical : 4 hrs / week

Examination scheme:
Oral : 50 Marks
Term Work : 100 Marks

1. The Project group in (B.E. first Term) seventh term will continue the project work in (B.E. Second Term) eighth term and complete project in all respect (assembly, testing, fabrication, tabulation, test result etc.)
2. The group should maintain a logbook of activities. It should have entries related to the work done, problems faced, solution evolved etc., duly signed by guide.
3. The guides should regularly monitor the progress of the project work.
4. The project work along with project report should be submitted as part of term work in (B.E. Second Term) eighth term on or before the last day of the (B.E. Second Term) eighth term
5. Project report must be submitted in the prescribed format only. No variation in the format will be accepted.
6. Assessment of the project for award of TW marks shall be done by the guide and a departmental committee (consisting of minimum two teachers with experience more than three years) as per the guidelines given in the following table.

B) ASSESSMENT OF PROJECT II TERMWORK (B.E. SECOND TERM)

NAME OF THE PROJECT: _____

NAME OF THE GUIDE: _____

Sr. No	Exam. Seat No	Name Of Students	Assessment by guide (70%)						Assessment by department (30%)			Grand Total
			Fabrication /software / actual work	Execution of project	Project report	Scope/ Cost / Utility	Attende-nece	Total	Evaluation (10%)	Prese-ntaion (20%)	Total	
		Marks	20	10	20	10	10	70	10	20	30	100

Sign of Guide Sign. of Committee Members Sign. of H. O. D.

7. The guide should be internal examiner for oral examination (If experience is greater than three years).
8. The external examiner should be from the related area of the concerned project. He should have minimum of five years of experience at degree level / industry.
9. The evaluation at final oral examination should be done jointly by the internal and external examiners.

NORTH MAHARASHTRA UNIVERSITY JALGAON

B.E. (Common Automobile Engineering and Production Engineering)

W.E.F : 2008- 09

TERM - II

INDUSTRIAL VISIT / CASE STUDY

Teaching scheme: **Examination scheme:**

NIL **Term Work : 25 Marks**

EDUCATION TOUR / TECHNICAL VISITS / CASE STUDY AND ITS EVALUATION

1. During (B.E. First Term / Second Term) seventh and / or eighth terms or during vacation between (B.E. First Term / Second Term) seventh and eighth terms, every student; shall visit minimum two industries, factories arranged by colleges and accompanied by teachers. There shall be at least one teacher for a group of 20 students and at least one non-teaching staff accompanied with the students.

2. The colleges should obtain appropriate certificates of visit from the concerned organizations just after the visits.

3. Students should submit written report about the visits individually at the end of (B.E. Second Term) eighth term.

4. The report should contain information about the following points:

   (a) The organization - activities of organization and administrative setup technical personnel and their main duties.
   (b) The project / industry brief description with sketches and salient technical information.
   (c) The work / processes observed with specification of materials, products, equipments etc. and role of engineers in that organization.
   (d) Suggestions (if any) for improvement in the working of those organizations.

5. The evaluation of the report of technical visits will be made by panel of two teachers appointed by principal based on following points:

   (a) Coverage aspect: All above points should be covered.
   (b) Detailed observations: System / Process / Product explained with data, diagram specifications.
   (c) Quality of presentation: Report should be very objective and should consist of clear and systematic organization of topics and information.
   (d) Viva - voce: A viva -voce shall be conducted on the technical visit report by the teachers to assess the specific knowledge gained by the students for technical applications.

6. The case study should include the study problem in Mechanical Engineering, Automobile Engineering and Production branch.

NORTH MAHARASHTRA UNIVERSITY, JALGAON
ENGINEERING AND TECHNOLOGY FACULTY
Equivalent Subjects of B.E. Mechanical Engineering

FIRST TERM

S.N.	Old Subjects	S.N.	Equivalent Subjects	Year
1	Machine Design –III	1	--	--
2	Refrigeration And Air Conditioning	2	Refrigeration And Air Conditioning	B.E.Mech (New)
3	Project and Financial Management	3	--	--
4	Elective – I	4	Elective – I	
	1. Non-conventional Energy Sources		1. --	--
	2. Machine Tool Design		2. Machine Tool Design	B.E.Mech – Elective-I (New)
	3. Operation Research		3. --	--
	4. Robotics		4. --	--
	5. Automobile Engineering-I		5. --	--
	6. Mechanical Estimation and Costing		6. --	--
	7. Reliability Engineering		7. --	--

SECOND TERM

S.N.	Old Subjects	S.N.	Equivalent Subjects	Year
1	CAD/CAM	1	--	--
2	Tribology	2	Tribology	B.E.Mech (New)
3	Mechanical Vibration	3	Mechanical Vibration	B.E.Mech (New)
4	Elective - II	4	Elective - II	
	1. Power Plant Engineering		1. Power Plant Engineering	B.E.Mech – Elective-II (New)
	2. Management Information system		2. --	--
	3. Materials Management		3. --	--
	4. Energy Conservation and Management		4. --	--
	5. Automobile Engineering-II		5. --	--
	6. Production Planning and Control		6. --	--
	7. Analysis and Synthesis of Mechanism		7. --	--

2011

North Maharashtra University, Jalgaon

FACULTY OF COMMERCE & MANAGEMENT

Syllabus of Master in Business Administration (MBA)

SEMESTER: I

W.E.From 2011

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

STRUCTURE OF MASTER IN BUSINESS ADMINISTRATION (M.B.A.)

Semester-I and II			
Paper	**Semester-I**	**Paper**	**Semester-II**
101	Management Science	201	Management Practices
102	Accountancy For Managers	202	Business Research Methods
103	Managerial Economics	203	Global Economic Scenario
104	Information Technology For Managers	204	Management Information System and ERP
105	Introduction To Operations Management	205	Financial Management
106	Organizational Behavior	206	Human Resource Management
107	Corporate Social Responsibility	207	Marketing Management
108	Corporate Communication Skills	208	Quantitative Techniques

Semester-III and IV			
Paper	**Semester-III**	**Paper**	**Semester-IV**
301	Strategic Management	401	e-Commerce & Excellence Management
302	Entrepreneurship & Project Management	402	Family Business Management
303	Legal Aspects Of Business	403	Indian Commercial Laws
304	Specialization-I (Major)*	404	Specialization-V (Major)*
305	Specialization-II (Major)*	405	Specialization-VI (Major)*
306	Specialization-III (Major)*	406	Specialization-VII (Major)*
307	Specialization-IV (Major)*	407	Project Report & Viva-Voce*
308	Specialization (Minor-I)**	408	Specialization (Minor-II)**

*Specialization In Major Subjects (Any One)		**Specialization In Minor Subjects (Any One)	
A	Financial Management	A	Financial Management
B	Marketing Management	B	Marketing Management
C	Human Resource Management	C	Human Resource Management
D	Operations Management	D	Operations Management
E	International Business Management	E	International Business Management
F	Agro Business Management	F	Agro Business Management
G	Systems Management	G	Systems Management

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

STRUCTURE OF MASTER IN BUSINESS ADMINISTRATION (M.B.A.)

Semester-I and II

Paper	Semester-I	Maximum marks			Paper	Semester-II	Maximum marks		
		Int.	Ext.	Total			Int.	Ext.	Total
101	Management Science	40	60	100	201	Management Practices	40	60	100
102	Accountancy For Managers	40	60	100	202	Business Research Methods	40	60	100
103	Managerial Economics	40	60	100	203	Global Economic Scenario	40	60	100
104	Information Technology For Managers	40	60	100	204	Management Information System and ERP	40	60	100
105	Introduction To Operations Management	40	60	100	205	Financial Management	40	60	100
106	Organizational Behavior	40	60	100	206	Human Resource Management	40	60	100
107	Corporate Social Responsibility	40	60	100	207	Marketing Management	40	60	100
108	Corporate Communication Skills	40	60	100	208	Quantitative Techniques	40	60	100
Total Maximum Marks		**320**	**480**	**800**	**Total Maximum Marks**		**320**	**480**	**800**

Semester-III and IV

Paper	Semester-III	Maximum marks			Paper	Semester-IV	Maximum marks		
		Int.	Ext.	Total			Int.	Ext.	Total
301	Strategic Management	40	60	100	401	e-Commerce & Excellence Management	40	60	100
302	Entrepreneurship & Project Management	40	60	100	402	Family Business Management	40	60	100
303	Legal Aspects Of Business	40	60	100	403	Indian Commercial Laws	40	60	100
304	Specialization-I (Major)*	40	60	100	404	Specialization-V (Major)*	40	60	100
305	Specialization-II (Major)*	40	60	100	405	Specialization-VI (Major)*	40	60	100
306	Specialization-III (Major)*	40	60	100	406	Specialization-VII (Major)*	40	60	100
307	Specialization-IV (Major)*	40	60	100	407	Project Report & Viva-Voce*	40	60	100
308	Specialization (Minor-I)**	40	60	100	408	Specialization (Minor-II)**	40	60	100
Total Maximum Marks		**320**	**480**	**800**	**Total Maximum Marks**		**320**	**480**	**800**

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

STRUCTURE OF MASTER IN BUSINESS ADMINISTRATION (M.B.A.)

1. TITLE OF THE DEGREE

This degree shall be titled as Master in Business Administration (MBA) with the mention of Major Specialization in the bracket as "MBA (Major specialization)". This new curricula shall be effective from July 2009.

2. DURATION

The regular Full Time Course shall be of 2 Years duration; comprising of 4 Semesters through Theory papers, Sessional, Practical, Project report, Viva-voce, and such other Continuous Evaluation Systems as may be prescribed, in this respect, from time to time.

3. ELIGIBILITY FOR ADMISSION

As per admission rule framed by the Directorate of Technical Education, Government of Maharashtra.

4. PATTERN

3.1. The suggested curriculum comprises 32 papers. Similarly there shall be 10 functional elective papers as below :

Major specialization: 8 papers of Major functional elective, of which for 1 paper the student has to undergo Summer Internship Project for minimum period of 7 weeks.

Minor specialization: 2 papers as a Minor specialization from the list other than opted for Major specialization.

The student has to opt for one specialization as Major specialization comprising 8 papers and another specialization (other than the Major Specialization subject selected) as Minor specialization, comprising 2 papers, from the specified list of subjects for Major / Minor specialization, for IIIrd and IVth semester.

3.2. Each semester will have 8 papers of 100 marks each, thus comprising 3200 marks for the Degree.

3.3. The external assessment shall be based on external written examination to be conducted by the university at the end of the each semester.

3.4. The student shall not be allowed to appear for the semester examination unless the Head/Director of the University Department/Institution certifies completion of internal work, regularity, practical etc. The institution / University Department shall submit alongwith this certificate Internal marks to the COE of the University.

3.5. CGPA system as devised by the University shall be applicable.

3.6. Continuous evaluation of the students shall comprise the 60+40 pattern; where every paper of 100 marks, shall be divided as External evaluation of 60 marks and Internal continuous assessment of 40 marks.

3.7. Continuous Internal assessment may comprises-

3.5.1. Two Class tests of 10 Marks each – Total 20 Marks

3.5.2. 15 Marks for Classroom Paper Presentation, Research Paper Presentations at State Seminars, Research Paper Presentations at National Seminars, Publications in Journals, Practicals (Computer related courses), Presentations of Case Study, Group Discussions, Book Review, Survey etc. in related subjects (atleast THREE activities have to be completed by the student per semester per paper to be supervised and guided by the concerned teacher).

3.5.3. 5 Marks for Active participation in Event Management, Industrial Visit, Placement Activities, Institutional Branding Activities.

5. PASSING STANDARDS

5.1. In order to pass the examination the candidate has to obtain 50% marks in aggregate & at least 40% marks for each head separately, that is 24 marks out of 60 (External) & 16 marks out of 40 marks (Internal) for all courses.

5.2. The student shall be allowed to keep the terms of the next year as per the University rules.

6. GUIDELINES FOR TEACHING

6.1. There shall be atleast 50 lecture hours per semester per course. The duration of the lectures shall be 60 minutes each. There shall be atleast 14-16 weeks of teaching before commencement of examination of respective semester.

6.2. There shall be 4 lectures / week / paper.

6.3. The semester workload is balanced with 8 full papers of 100 marks each / semester. Thus 400 lectures hours are considered for teaching sessions and 50 lecture / sessions shall be used for continuous assessment.

6.4. Self study shall be natural requirement beside the time table. The Faculty will have to exert a little extra for cultivating reading habits amongst the students.

6.5. The teaching method shall comprise a mix of Lectures, Seminars, Group discussions, Brain storming, Game playing, Interactions with Executives etc. so as to prepare the students to face the global challenges as business executive for this Audio-visual aids and Practical field work should be a major source of acquiring knowledge.

6.6. Case study method preferably shall be used wherever possible for the better understanding of the students.

6.7. Each institute shall issue annual souvenir as well as a placement brochure separately to each student and a copy of the same shall be submitted to the university before the end of the year.

7. PRACTICAL TRAINING AND SUMMER INTERNSHIP PROJECT

7.1. Each student shall have to undergo a practical training for a period of not less than 7 weeks during vacation falling after the end of first year.

7.2. In the Fourth semester examination student were to do "Project Work" individually on the basis of Major specialization. No group work is allowed in this. The topic should be decided with consultation and guidance of internal teacher of the Institute at the end of the first year, so that the student can take up the training during the vacations. The Project should be necessarily Research oriented, Innovative and Problem solving. No teacher shall be entrusted with more than 15 students for guidance and supervision.

7.3. The departments / institute shall submit the detailed list of candidate with Project Titles, name of the organization, internal guide & functional elective to the university on or before 31st July of the second year.

7.4. The student has to write a report based on the actual training undergone during the vacations at the specific selected business enterprise, get it certified by the concerned teacher that the Project report has been satisfactorily completed and submit Two typed copies of the same to the Head / Director of the institute.

7.5. Student may use SPSS software if required.

7.6. The student shall submit Synopsis of Project duly signed by Project guide to concerned head. The Head has to forward the Synopsis by e-mail only to external supervisor appointed by University.

7.7. Project details should be displayed on institutes websites

7.8. Project viva shall be conducted at the beginning of Semester IV

7.9. One of the reports submitted by the student shall be forwarded to the University by the Institute before 31st December.

7.10. Viva Voce for one student shall be of minimum 20 minutes. The Student has to prepare PowerPoint presentation based on Project work to be presented at the time of Viva voce.

7.11. 10 % of the projects May be given by institute to the students for summer training as basic research projects.

7.12. The project work will carry maximum 100 marks, of which internal teacher shall award marks out of maximum 40 marks on the basis of project work done by the student as a continuous assessment. Remaining marks shall be awarded out of maximum 60 marks by examining the student during Viva-voce, by the panel of the external examiners to be appointed by the University.

7.13. No students will be permitted to appear for Viva-voce and Semester IV examinations, unless and until (s) he submits the project report before the stipulated time.

8. ADDITIONAL MAJOR SPECIALIZATION

8.1. The student who has passed MBA of this University with a specific Major specialization may be allowed to appear for MBA examination again, with other Major specialization by keeping term for the IIIrd and IVth semester for the so opted 8 papers of additional Major specialization. He has to appear for 8 papers including Project report of the additional Major specialization so opted.

8.2. He shall be given exemption for all other papers including Minor specialization.

8.3. The student has to pay only Tuition fees for one year as may be prescribed from time to time for this purpose.

8.4. The student is not entitled to receive separate Degree Certificate or Class for this additional Major specialization.

9. STRUCTURE OF THE QUESTION PAPER

9.1. Each question paper shall be of 60 marks and of 3 hours duration.

9.2. **For Theory papers** there will be 2 Sections. In section I a candidate shall be required to answer 3 questions out of 5 questions & in section II (s)he shall be required to answer 2 questions out of 3 questions. All questions shall carry equal marks i.e. 12 marks each.

9.3. **For Composite papers (theory and practical / problems)** there will be 2 sections. In section I (practical/problem) a student shall be required to answer 3 questions out of 5 questions & in section II (Theory) (s)he shall be required to answer 2 questions out of 3 questions. All questions shall carry equal marks i.e. 12 marks each.

9.4. **For papers including case studies** there shall be 2 Sections. In Section I (Theory) a student shall be required to answer 3 questions out of 5 questions & in Section II (Case studies) 2 case Studies out of 3 case studies to be attempted by the students. All questions shall carry equal marks i.e. 12 marks each.

9.5. **For case studies (Specialization)** out of 5 cases 3 cases should be attempted by the student. Each case shall carry 20 marks.

10. ELIGIBILITY OF THE FACULTY

As per norms fixed by AICTE and North Maharashtra University.

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

EQUIVALENCE OF OLD AND NEW COURCES FOR MASTER IN BUSINESS ADMINISTRATION (M.B.A.)

Old Paper	Old courses (w.e.f.- July 1998)	New Paper	New courses (w.e.f.- July 2009-10)
Semester-I			
			Credit Courses : Semester-I
101	Management Science-I	101	Management Science
102	Management Accounting -I	102	Accounting for Managers
103	Managerial Economic Analysis -I	103	Managerial Economics
105	Computer Applications -I	104	Information Technology for Managers
205	Operations & Material Management	105	Introduction To Operations Management
107	Organizational Behavior-I	106	Organizational Behavior
207	Organizational Behavior-II	107	Corporate Social Responsibility
104	Communication Skills	108	Corporate Communication Skills
Semester - II			
			Credit Courses : Semester-II
201	Management Science-II	201	Management Practices
204	Research Methodology Business Ethics & Professional Values	202	Business Research Methods
203	Managerial Economic Analysis -II	203	Global Economic Scenario
302	Information System for Management	204	Management Information System and ERP
202	Management Accounting -II	205	Financial Management
304	Human Resource Management	206	Human Resource Management
206	Marketing Management	207	Marketing Management
106	Quantitative Techniques for Management	208	Quantitative Techniques
Semester - III			
402	Corporate Planning & Strategic Management	301	Strategic Management
301	Computer Application -II	302	e-Commerce & Excellence Management
303	Business Regulatory System-I	303	Legal Aspects of Business
305	Specialization-I	304	Specialization-I (Major)*
306	Specialization-II	305	Specialization-II (Major)*
307	Specialization-III	306	Specialization-III (Major)*
405	Specialization-IV	307	Specialization-IV (Major)*
		308	Specialization (Minor-I)**
Semester - IV			
404	International Business Environment	401	Family Business Management
401	Business & Government	402	Entrepreneurship & Project Management
403	Business Regulatory System-II	403	Indian Commercial Laws
406	Functional Elective -V	404	Specialization-V (Major)*
		405	Specialization-VI (Major)*
		406	Specialization-VII (Major)*
407	Project Report & Viva-Voce	407	Project Report & Viva-Voce*
		408	Specialization (Minor-II)**

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: I

Paper: 101: Management Science

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1. **Nature & Development of Management** (6)
    a. Management : Concept, Nature, Importance
    b. Management : Art and Science & as a Profession, Management Vs Administration
    c. Evolution of Management: Introduction to Scientific Management by Taylor, Administrative Management by Fayol, Contribution of Peter Drucker, Decision Theory Approach, Contingency Approach, Human behavior Approach,
2. **Functions of Management –I** (8)
    a. Functions of Management, Levels of Management & their respective Functions, Managerial Skills & roles, Managerial Functions in MNC's
    b. Planning: Nature, Scope, Objective and Significances of Planning, Key factors to planning, Types of Plans, Process of Planning, Effective planning-Principles, Barriers & How to overcome barriers, Planning Premises and Forecasting.
    c. Decision Making – Types of Decision , decision making processes, Individual Vs Group decision making, Information Technology & Decision Making (attributes of useful information, information sharing)
3. **Management Functions - II** (7)
    a. Organizing: Concept, Organization Theories, Designing Organization Structure, Forms of Organizational Structure, Departmentation- need, importance & bases of Departmentation, Span of Control - Determination of factors affecting Span of Control, Delegation of Authority, Authority & Responsibility, Line & Staff, and Formal & Informal Organization.
    b. Staffing: Concept, Manpower Planning.
    c. Directing: Concept, Direction and Supervision, Importance of Directing, Principles of Directing.
4. **Management Functions - III** (7)
    a. Coordination – Need & Importance, Coordination & Cooperation, Techniques of Effective coordination.
    b. Controlling : Concept, Types of control, Method : Pre-control - Concurrent control - Post control, an Integrated Control System, Concept of Quality, Factors affecting Quality, Developing a Quality Control system - Pre-control of inputs, Concurrent control of operations, Post control of outputs.

5. **Re-engineering Organizations and Teams** (4)
    a. Re-inventing the organization -Meaning and Concept, Intrapreneurship.
    b. Making Teams Effective- focusing on performance, focusing on team basis, Uncommon sense finding about teams
    c. The new organizational paradigm
6. **Management Audit** (4)
    a. Meaning and Definitions, Objectives, Scope and Importance.
    b. Advantages and Disadvantages of Management Audit.
    c. Qualification and duties of the Management Auditor.
    d. Difference between Management Audit and Statutory Audit.
    e. Drafting reports for Managerial effectiveness.
7. **Case Study** (14)
    - A real word situation facing a manager should be considered for analysis & discussion

REFERENCE BOOKS:

1. Koontz – Principles Of Management (Tata Mc Graw Hill, 1st Edition 2008)
2. Stoner , Freeman & Gilbert Jr – Management (Prentice Hall Of India ,6th Edition)
3. Robbins & Coulter – Management (Prentice Hall Of India,8th Edition)
4. Ghuman & Ashwathapa – Management - Tata Mc Graw Hill
5. Robbins S.P And Decenzo David A. – Fundamentals Of Management : Essential Concept And Applications (Pearson Education ,5th Edition)
6. L.M.Prasad – Principals Of Management (Himalaya Publications)
7. Sherlekar & Sherlekar – Modern Business & Organization (Himalaya Publications)
8. Adhikari-Global Business Management-Macmillan
9. Dr. Manmohan Prasad – Management – Concepts & Practices (Himalaya Publications)
10. Hiller Frederick S. And Hiller Mark S. – Introduction To Management Science : A Modeling and Case Studies Approach With Spreadsheets (Tata Mc Graw Hill, 2nd Edition 2008)
11. Weihrich Heinz And Koontz Harold – Management : A Global And Entrepreneurial Perspective (McGraw Hill 12th Edition 2008)
12. Thomas N. Duening , John M.Ivancevich : Management (Biztantra-Dreamtech Press, New Delhi.)
13. T Ramasamy : Principles Of Management – (Himalaya Publications)
14. R.N.Gupta :Principles Of Management , (S. Chand)
15. Griffin, Ricky W. :Management Principles & Application (Cenage Learning/Thomson Press)

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A. .

SEMESTER: I

Paper: 102: Accounting for Managers

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1) Introduction to Concepts & Conventions of Accounting (7)

a) Financial Accounting, Management Accounting & Cost Accounting:

b) Basic Concepts in Financial Accounting & Cost Accounting

c) Preparation of Cost sheet

d) Accounting Concepts & Conventions

e) Accounting Standards: AS-1, AS-2, AS-3,AS-5,AS-6,AS-9, AS-10, AS-20,AS-22

2) **Accounting for Planning & control**

a) **Budget & Budgetary Control** (10)

i) Concept, Objectives, & Limitations

ii) Classification of Budgets – Operating, Financial & Capital Budget

iii) Cash Budget, Flexible budget, Production Budget, Sales Budget

b) **Standard Costing** (7)

i) Concept, Essentials of an effective system of standard costing

ii) Material & labour Variances

iii) Causes & Disposition of the above variances

3) **Accounting For Managerial Decision Making**

a) **Preparation, Analysis & Interpretation of Financial Statements** (12)

i) Introduction & Limitations of Financial Statements

ii) Techniques of financial Statement Analysis**:** Comparative Financial Statements, Common Size Statement, Trend Analysis.

iii) Ratio analysis : Liquidity Ratios, Activity Ratios, Profitability Ratios, Solvency Ratios

iv) Limitations of Ratio Analysis

v) Funds flow & Cash Flow Analysis : Concept of Funds, Funds flow statement, & Cash flow statement (Refer AS-3)

b) **Marginal Costing & Break Even Analysis** (8)

i) Concept of Marginal Cost: Contribution, Variable Cost, Fixed Cost, Semi-Variable Cost, Margin of Safety, PV Ratio

ii) Assumptions of Break Even Analysis & Calculations of Break Even Point

4) **Management of Working Capital** (6)

a) Concepts: Gross and Net, Permanent & Temporary, Operating Cycle

b) Disadvantages of insufficient Working Capital

c) Financing Of Working Capital, Maximum Permissible Bank finance

d) Factors Determining Working Capital Requirement

e) Estimation of Working Capital Requirement

References:

1. Management Accounting: Khan & Jain , Tata Mc-Graw Hill
2. Management Accounting: I. M. Pandey, Vikas Publication
3. ; Accounting for Managers - Vijaykumar - Tata Mc-Graw Hill
4. Management Accounting: James Jimbalvo, Willy India
5. Management Accounting: Dr. Jawaharlal, Himalay Publications
6. Management Accounting: Dr. S.N. Maheshwari & Dr. S.K. Maheshwari, Vikas Publications
7. Principles of Management Accounting: Manmohan & S. N. Goyal
8. Accounting Standards: D. S. Rawat ,
9. Accounting for Managers: Thukaram Rao , new age
10. Management Accounting: Ravi Kishore, Taxmann Publications
11. Corporate Accounting : Ashok & Deepak Sefgal
12. Management Accounting: Prasanna Chandra, Prentice Hall
13. Cost Accounting: RSN Pillai & V. Bagavathi
14. Students guide to Cost & Management Accounting: Ravi Kishore, Taxmann Publications
15. Management Accounting-Concepts and Applications-Kothari -Macmillan
16. Management Accounting: Dr. J. Madegowada, Himalaya

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: I

Paper: 103: Managerial Economics

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50hours

1) Basic Of Managerial Economics (10)

a) Nature & Scope Of Managerial Economics
b) Managerial Decisions In Competitive Markets
c) Industry And Firms
   i) Definitional Problems
   ii) Standard Industrial Classification
   iii) Industrial Structure In India
d) Measuring & Maximizing Economic Profit
e) Maximizing The Value Of A Firm
f) Demand: Determinants, Elasticity And Forecasting Methods
g) Supply : Determinants And Its Elasticity
h) Competition And Market Power
i) Meaning ,Measurement And Determinants Of Market Power

2) Different Market Structures And Equilibrium Of Firm In Product & Input Markets (18)

a) Traditional Theory Of Firm : Profit Maximizing Theory
b) Managerial Decisions for Firms and Industry In Perfect Competition & Imperfect Competition
   i) Demand Curves, Average And Marginal Revenue Curves & Costs Curves
   ii) Profit Maximization Output & Pricing Decisions In The Short Run & In The Long Run
   iii) Profit Maximizing Input Usage
      (1) Marginal Revenue Product & Hiring Decisions
      (2) Average Revenue Product &The Shutdown Decision
c) Oligopoly Markets
   i) Strategic Decision Making In Oligopoly Markets
   ii) Importance Of Entry Barriers
d) Modern Theory Of Firm :Alternative Maximizing Theory
   i) The Separation Of Ownership From Control
   ii) Principal-Agent Theory
   iii) Sales Maximizing Theory
   iv) Importance Of Non Maximizing Theories
e) Pricing Practices
   i) Price Discrimination
   ii) Full Cost Pricing
   iii) Product Life Cycle Pricing
   iv) Transfer Pricing

3) Economics Of Regulation (10)

a) The Need For Government Intervention And Social Control Over Industries
b) The Ways & Means For Government Regulation Of Industries
   i) Property Right Regulation
   ii) Patents
   iii) Subsidy Policy

iv) Tax Policy

c) Cost Of Regulation & Government Intervention

d) Competition & The Role Of The Government

i) Government Failures

ii) Deregulation And Privatization

iii) Regulatory Reforms For Promoting Competition

4) Economics Of Corporate Growth, Merger, Diversification & Innovation (12)

a) Corporate Growth

i) The Need For Growth

ii) Growth ,Profitability & Size

b) Diversification And Collusion

i) Meaning ,Extent & Types

ii) Reasons For Diversification and Collusion

c) Merger

i) Meaning And Reasons For Merger

ii) Difference Between Merger &Takeovers

iii) The Effect Of Merger

References

1) An Introduction To Industrial Economics: P.J. Devine, N.Lee, R.M. Jones &W.J. Tyson (4th Edition) (Anmol Publication, New Delhi)
2) Managerial Economics – Gupta – Tata McGraw Hill
3) Industrial Economics: R.R.Barthwal, Wiley Eastern Ltd
4) Managerial Economics: Concept & Application: Christopher R. Thomas & S.Charles Maurice, Mc-Graw Hill, 8th Ed.
5) Managerial Economics - Samuelsion – Tata McGraw Hill
6) Managerial Economics: H.Craig Peterson,W.Cris Lewis,Prentice- Hall Of India,3rd Ed.
7) Economics:Principles &Policy: W.J.Baumal & Alan S Blinder,Harcourt Brace Jovanovich, Publishers
8) Principles Of Economics: Lipsey + Chrystal,Oxford
9) Managerial Economics: Mark Hirschey , Thomson 10ed.
10) Industrial Organization: Luis M.B.Cabral, Jaico Publishing House
11) Managerial Economics - Pal-Macmillan
12) Managerial Economics : Mankiv, Cenage Thompson Press

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A. .

SEMESTER: I

Paper: 104: Information Technology For Managers

60 + 40 Pattern: External Marks 60 +Internal Marks 40 (Test Marks 20 + Practical Marks 20) = Maximum Total Marks: 100

Required Lectures: 50hours

1) Fundamentals of Information Technology **(03)**

a) Basics Of Computer: I/P, O/P Hardware, System/Application Software

b) What Is Information Technology, Basic Concepts

c) Benefits In Information Technology

2) Introduction To Database **(06)**

a) Business Intelligence

b) Managing Data : File Environment, Data Problems And Difficulties, Solutions, Data Life Cycle, Data Sources, Data Quality

c) Database Management System

d) Logical Data Models

e) Data Warehousing

f) Data Mining – Concept And Application

g) Structured Query Language(SQL)

3) Information & Communication Technology In Organizations **(03)**

a) Impact Of Information Technology On Organizations

b) Improving Business Processes Through ICT

4) IT Oversight And Governance In Organizations **(06)**

a) The Role Of Business Processes

b) The Missing Roles Of IT Governance That Cause Business Failure

c) Modern Roles And Responsibilities Of IT & Business Units

d) IT Governance And Business Vision, Mission, And Objectives

e) Benefits Of Effective IT Governance

5) Strategic Issues Of Information Technology **(03)**

a) Strategic Advantage & Information Technology

b) Information Technology & Corporate Strategy

c) Integrating Technology With Business Environment

6) International Business & Information Technology **(03)**

a) Key Issues In International Environment

b) Managing Information Technology Internationally

c) Transnational Virtual Firms & IT

7) Role Of Government & E- Governance (03)

a) Concept of E-Governance W.R.T. Govt.

b) Need, Benefits Of E-Governance W.R.T. Govt.

c) Areas of E-Governance W.R.T. Govt.

d) E-Governance Initiatives In India

8) Web Revolutions (08)

a) Network Computing: Internet & Web, Intranet & Extranet

b) Internet Software Agents: Search Engines, Directories, Software & Intelligent Agents

c) Portals: Information & Corporate Portals

d) Communication: Web-Based Call Centers, Electronic Chat Rooms, Voice Communications, Blogging

e) Virtual Collaboration, Groupware, Electronic Meeting Systems, Electronic Teleconferencing

f) E-Learning, E-Learning Vs Distance Learning, Benefits Of E-Learning, Virtual Universities, Virtual Work & Telecommuting

9) Mobile And Wireless Technology (03)

a) Broadband (High-Speed Packet-Based Wireless)

b) Voice Over Packet Networks (Vop)

c) General Packet Radio Service (GPRS)

d) Wireless Application Protocol (WAP)

e) Messaging

10) MS Office – 2007 (12)

a) Microsoft Word 2007- Creating Word Documents, Mail Merge, Use Of Advanced Functions

b) Microsoft Access 2007 – Creation Of Database, Queries, Reports, Labels & Forms

c) Microsoft Excel 2007 – Creation And Application Of Spread Sheet, Data Analysis And Management, Use Of Formulas, Functions And Graphs & Charts

d) MS PowerPoint 2007 – Creation, Organization And Presentation

e) Use Of Outlook Express- Mailing Through Outlook And Managing Groups

List Of Practical

1. MS Word – Creation Of Document, Formatting, Editing
2. Organizing Information With Tables And Outlines
3. Mail Merge Application
4. MS-Access – Creating Database, Defining Primary Keys, Designing Query
5. MS-Access – Designing Reports, Labels And Forms
6. Creating And Editing Worksheet
7. Creating And Using Formulae And Functions
8. Sorting And Querying Data, Working With Graphs And Charts
9. MS Power Point Slides, Use Of Templates And Slide Designs

10. Developing A Professional Presentation On Business Plan
11. Internet : Web Search And Surfing For Information
12. Publishing Documents On Web
13. Creating And Managing E-Mail Account
14. Creating And Managing Blog
15. Manipulation Of Data Base Using SQL – Create, Insert, Select, Select All
16. Manipulation Of Data Base Using SQL – Select Query, Cross Tab Query, Make-Table Query, Update Query, Append Query, Delete Query
17. To Design A Query To Access Selected Fields From Table To Generate Knowledge Base

References

1. Information Technology For Management By Henry Lucas,7th Edition, Tata Mc-Graw Hill, New Delhi
2. Information Technology For Management: Transforming Organisations In The Digital Economy By Turban, Mclean, Wetherbe, 4th Edition, Willy India Edition, New-Delhi
3. Business Process Management: Integration In A Web-Enabled Environment By Margaret May, Prentice Hall Financial Times, Pearson Education, New Delhi.
4. Manage IT As A Business: How To Achieve Alignment And Add Value To The Company By Bennet P. Lientz & Lee Larssen, Elsevier Butterworth–Heinemann
5. E-Commerce E-Business By C.S. Rayudu, Himalaya Publication, New Delhi
6. Fundamentals Of Information Technology By Alexis Leon, Leon, Vikas Publications, New Delhi
7. MS-Office 2007 For Dummies By Peter Weverka Willy, New Delhi
8. MS-Office 2007 By Rutkosky, BPB Publication, New Delhi

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A. .

SEMESTER: I

Paper: 105: Introduction To Operations Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50hours

---

1) The System Of Operations Management (12)

a) Production & Operations Management
   i) Meaning & Nature of Operations Management
   ii) Role of Operations Managers
   iii) Operation Management Vis-à-vis other functions in organisations
   iv) Challenges before Operations Management
   v) Product Design
   vi) Process Design
   vii) Automation

b) The Nature Of Business Policy
   i) Formation & Implementation

c) Operations Policy
   i) Competitive Advantage
   ii) Policy Implications & Implementation

d) Management & Services
   i) Characteristic , Classification & Quality Of Services
   ii) Designing Service Processes
   iii) Service Scenario Of India

e) Business Process Outsourcing & Offshoring
   i) Introduction To Outsourcing, Offshoring, Near Shoring & Form Shoring
   ii) Indian Continent: As A Outsourcing Hub

2) Capacity Management (12)

a) Need for Operations Planning & Control

b) Capacity & Capacity Planning
   i) Meaning, Need & Importance Of Capacity
   ii) Types Of Capacity
   iii) Process of Capacity Planning
   iv) Capacity Measurement

c) Capacity Management Strategies
   i) Provision For Variation Or Efficient Adjustment
   ii) Elimination Of The Need For Adjustment
   iii) Capacity expansion strategy

d) Factors Influencing The Choice Of Strategy
   i) Feasibility Factors
   ii) Desirability Factors & Factors W.R.T. Customer Order

3) Facilities Planning (12)

a) Product Selection
b) Process
c) Locational Design(Numerical On Locational Analysis
d) Layout Of Facilities
e) Need & Objectives On Layout Planning
f) Basic Types Of Layouts
g) Layout Planning Procedure
h) Material Handling
i) Factors Affecting Facility Location Planning

4) Materials & Inventory Management (14)

a) Materials Planning & Control
   i) Significance & Benefits Of Material Planning – Material Requirement Planning, Aggregate Planning
   ii) Factors Influencing Material Planning
   iii) Guidelines & Problems On Material Planning
b) Introduction To Material Budgeting,
   i) Material Control
   ii) Records Of Material Control
c) Vendor Development & Rating
   i) Need For Vendor Development
   ii) Vendor Evaluation & Selection Process
   iii) Factors On Vendor Evaluation & Rating
   iv) Vendor Motivation (Records & Punishment)
   v) Numerical On Vendor Rating
      (1) Categorical Plan
      (2) Weighted Point Plan
      (3) Cost Ratio Plan
d) Introduction To Value Analysis & Value Engineering
   i) Historical Perspective
   ii) Types Of Values & Their Function
   iii) Value Tests
   iv) Steps In Value Analysis
   v) Value Engineering & Simplification Analysis
   vi) Benefits Of Value Engineering
e) Inventory Management
   i) Functions & Classifications
   ii) Importance
   iii) Inventory Models (Simple E.O.Q. & E.O.Q. With Discounts)

References

1. Production & Operations Management – Kanishka Bedi – Oxford Press
2. Production & Operations Management – Chunawala & Patel – Himalaya Publishing House

3. Production & Operations Management - N.G. Nair – Tata McGraw Hill
4. Production & Operations Management – K.Ashwathappa & K. Shridhar Bhat - Himalaya
5. Production & Operations Management – Upendra Kachru – Excel Books
6. Operations Management – Ray Wild – Thomson Learning
7. A Modern Approach To Operations Management – Dr Ram Naresh Roy – New Age International
8. Production & Operations Management – S.N. Chary – Tata McGraw Hill
9. Materials Management – K. Shridhat Bhat - Himalaya Publishing House
10. Industrial Engineering & Production Management – M. Mahajan- Dhanpat Rai & Sons
11. Industrial Engineering & Management – O.P Khanna - Dhanpat Rai & Sons
12. Stores Management (2/e) - Menon - Macmillan
13. Operations Management – Evans & Collier – Cenage Publishing
14. Operations Management – Russel & Taylor – Willey India.

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: I

Paper: 106: Organizational Behavior

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50hours

---

1) Introduction **(6)**

a) Definition of O.B,
b) Key elements of O.B.
c) Nature & Scope of O.B.
d) O.B. Process
e) Disciplines contributing to O.B.
f) Organization Culture & Diversity
g) Emerging challenges and opportunities for O.B.
h) International O.B

2) Individual Perspective **(7)**

a) Personality. Concept. Determinants and Types, How Personality influences O.B
b) Attitudes. Types, Components & Functions. Attitudes& O.B.
c) Concept of Job Satisfaction.
d) Perception. Definition, Basic Elements, Factors Influencing Perception, Attribution.
e) Impression Management.
f) Learning. Meaning. Determinants, Principles, Learning & Behavior

3) Interpersonal Relationship **(7)**

a) Developing interpersonal relations
b) Conflict. Meaning, Sources, Types.
c) Intrapersonal Conflict - Role Identity, Role Perception, Role Expectation, Role Conflict.
d) Interpersonal Conflict (Transactional Analysis and Johari Window)
e) Aspects of Conflict (Functional and Dysfunctional)
f) Conflict Management

4) Group Dynamics **(6)**

a) Groups in Organization, Nature, Membership, Process of Group Development, Types of Groups, Group structure
b) Group Norms, Group Conformity, Group Cohesion, Group Size, Group Think, Group Shift.
c) Group dynamics & Inter-group dynamics

5) Motivation **(6)**

a) Meaning
b) Types of Motives
c) Theories of Motivation
   i) Hierarchy of needs Theory
   ii) Theory X and Theory Y
   iii) Motivation-Hygiene Two Factor theory
   iv) ERG theory
   v) Vroom's Expectancy theory
   vi) Mc Cellands Learned Needs Theory
   vii) Goal Setting Theory
   viii) Reinforcement Theory

d) Motivation applied - Financial and non-Financial motivators

6) Leadership (6)

a) Meaning , Functions, Styles, Traits of Leadership
b) Theories of Leadership
c) Likert's System of 4
d) Fielders Leadership Contingency theory
e) Hersey-Blanchards Situational Leadership Theory
f) Path Goal Theory
g) Charismatic Leadership Theory
h) Transformation Leadership Theory
i) Ohio State Leadership Quadrants and Management Grids

7) Change Management and Development (6)

a) Why Organization changes?, Planned Change, Resistance to change, Managing resistance to change
b) Meaning of organization development, Characteristics, Objectives.
c) Work stress : Meaning of Stress, Nature and sources of stress, Consequences of Stress, Stress & Task Performance, Coping Strategies for the Stress

- **Case study:** A real word situation facing a manager should be considered for analysis & discussion **(12)**

References

1. Organization Behavior – Margie- Paraikh- Tata McGraw Hill
2. Organization Behavior – Suja R. Nair, Himalaya Publications
3. Organization Behavior –Stephen P . Robbins, Pearson
4. Organization Behavior –S.S. Khanka – S Chand
5. Organization Behavior – K. Ashwathappa - Himalaya
6. Organization Behavior – Arun Kumar & N. Meenakshi, Vikas Publishers
7. Human Relations and Organisational Behaviour (5/e) - Dwivedi - Macmillan
8. Organization Behavior – Schernerhorn, Hunt, Osborn, Willy India
9. Foundation of OB – Slocum & Hellriegel, Cenage Learning
10. Organization Behavior – Nelson & Quick, Cenage Learning
11. Organization Behavior – Dr. Nirajkumar, Himalaya Publications
12. Management & OB – Jayantee Mukherjee-Saha, Excel Books
13. Organization Behavior –Fred Luthans - TMH
14. Human Behavior at Work –Keith Devis-TMH
15. Organization Behavior – P G Aquinas, Excel books, New Delhi
16. Organization Behavior – M.N. Mishra, Vikas Publications

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: I

Paper: 107: Corporate Social Responsibility

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50hours

---

1) Understanding Social Issues **(10)**

a) Social Issues : Concept, Characteristic and Causes of Social Problems

b) Social Issues *vis-a-vis* corporate environment: Castism, Regionalism, Agitation in Youth, Urbanization, Terrorism, Black money, Corruption, Sexual Harassment at Workplace & their impact on Society

c) Values, norms & beliefs

d) Culture, Cultural différences & Discrimination – Equal opportunities.

e) Business & Society

f) Impact of Technology on the society - Social Cost of Development

2) Business Ethics **(15)**

a) Basic Framework

i) Meaning & Importance & Factors affecting Business Ethics

ii) Morality, Applied Ethics, Moral Standards, Code of Ethics

b) Ethical Mind

i) Basics of Mind Management

ii) Objective & Subjective Mind

iii) Training the Mind

iv) Self Development

v) Stages of Self Development

vi) Effects of Past Tendencies

c) Ethical Decision Making

i) Ethical D/M Process

ii) Transparency as a factor in decision making

iii) Ethical consistency, Ethical enquiry and reasoning

iv) Ethical Dilemma

v) Role & Qualities Of CEO

vi) Business ethics & CEO

3) Corporate Social Responsibility – I **(10)**

a) Understanding CSR

i) Concept & Definition of Corporate Social Responsibility

ii) Scope of Corporate Social Responsibility

iii) Corporate Social Responsibility and the Law

iv) Corporate Social Responsiveness

v) Corporate Social Performance

vi) Corporate Citizenship

vii) Corporations as Stakeholders

viii) Diverging Views on Social Responsibility(Arguments for & against)

ix) Social Responsibility & Indian Corporations

b) A Stakeholder Approach to Socially Responsible and Ethical Behavior

i) Criterion for Determining The Social Responsibility of Business
ii) Areas of Social Responsibility of Business
iii) Social Accounting & Social Audit

4) Corporate Social Responsibility – II **(07)**

a) Ethical issues in Functional Areas
i) Marketing, HRM, Finance
ii) Information Technology
iii) Intellectual Property Rights

b) Unethical Behavior in Organizations
i) Understanding Unethical Behavior
ii) Individual Factors Contributing to Unethical Behavior
iii) Organizational Factors Contributing to Unethical Behavior

5) Corporate Governance **(08)**

Understanding Corporate Governance
i) Concept, Meaning, Principles of Corporate Governance
ii) Issues in Corporate Governance
iii) Parties to Corporate Governance
iv) Professionalization of Corporate Governance
v) 'Good' Corporate Governance
vi) Corporate Governance Practices in India
vii) Corporate Governance Rating

References

1. Ethics and Corporate Social Responsibility: Why Giants Fall by Ronald R. Sims, Greenwood Press, 2003.
2. Corporate Governance: Principal Policies & Practices by Fernando, Pearson Education
3. Corporate Ethics: The Business Code of Conduct for Ethical Employees by Steven R. Barth, Aspatore Books, 2003
4. Business ethics & corporate governance: Mandal – Tata McGraw Hill
5. Business ethics - by Fernando, Pearson Education
6. Business Ethics by Agalgatti, Nirali Publication
7. Ethics in Management & Indian Ethos by Biswanath Ghosh, Vikas Publications
8. Ethical Management: Text cases in BE & CG by Satish Modi, Macmillan
9. Business Ethics Manisha Paliwal, New age International
10. Business Ethics & Values by Senthil Kumar, Himalaya Publications
11. Business Ethics: Concept & Cases by Manuel Velasquez
12. Business Ethics: Text & Cases, by C.S.V. Murthy, Himalaya Publication
13. Social Problems in India by Ram Ahuja, Rawat Publications.
14. Corporate Governance and Business Ethics – Mathur - Macmillan
15. Corporate Social Responsibility by Baxi & Prasad, Excel Books
16. Corporate Governance - Economic Reforms & Development by Reed Darryl & Sanjay Mukherjee, Oxford

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: I

Paper: 108: Corporate Communication Skills

60 + 40 Pattern: External Marks 60 +Internal Marks 40 (Test Marks 20 + Practical Marks 20) = Maximum Total Marks: 100

Required Lectures: 50hours

1) Communication **(6)**

- **a)** Meaning, Objectives, Process & Importance of communication
- **b)** Types of Communication
  - i) Verbal-Non verbal : Kinesics & Proxemics
  - ii) Written-Oral
  - iii) Formal-Informal & Internal-External
- **c)** Means of Communication
- **d)** Barriers & Measures to overcome the barriers to Communication
- **e)** Principles of effective communication

2) Communication Skills **(14)**

- **a)** Reading Skills: Rapid Reading, Comprehension.
- **b)** Speaking Skill: Speech-preparation, Guidelines for Effective speech, Negotiation, Discussion
- **c)** Listening Skill: Importance, Process, and Barriers & Guidelines for Effective Listening.
- **d)** Presentation Skill: Types of Presentations, Propositions about presentations, Types of delivery, Process of Preparing & Delivering.
- **e)** Computer based Power Point presentation
- **f)** Interview : Types, Preparation, Conducting and Appearing for interview
- **g)** Meeting – Planning, Agenda, Layout, Leading the meeting, Drafting Minutes of Meeting & Steps for effective meeting outcomes.

3) Written Communication **(12)**

- **a)** Meaning, Distinction with Oral Communication, Merits & Limitations of Written communication.
- **b)** Letter writing: Layout of Business letter, types of layouts, Essentials of Good Business letters, Attitude in Business writing
- **c)** Purpose of letters: Resume, Application. Writing Direct Messages by Manager – Delivering: Positive, Neutral & Negative Information.
- **d)** Holding Press Conferences & Preparing Press Releases, Media Interviews
- **e)** Report Writing: Meaning & Nature of Report, Formats of Reports – Formal, Informal reports, Writing Reports - Data collection, organizing, presentation of the Report.
- **f)** Drafting Skills: Documents, Policies, Procedures, Rules, Note taking etc.

4) Organizational Communication (8)

a) Meaning & Importance of Organizational Communication

b) Internal communication: Notice, Circular, Memo.

c) External Communication – Enquiries, Quotations, Bank & Financial Institutions

5) Case Study Methods (10)

a) Meaning of the Case study method

b) Types of Cases

c) Analyzing the Case – Case Analysis Approaches

d) Case Analysis Process

e) Discussing & Presenting a Case

f) Writing the Case Report

- **Note for Practical:** Practice sessions for development of skills should be regularly conducted. Continuous assessment based on participation and performance should be evaluated for 20 marks in internal assessment.

References

1. Business Communication for Managers By Penrose / Rasberry / Myers, Cenage Learning.
2. Business Communication by Raman & Singh, Oxford Publication.
3. Basics of Business Communication – Lesikar & Flatley – Tata McGraw Hills
4. Communication Today By Ruben Roy, Himalaya Publication.
5. Business Communication By Sehgal & Khetarpal, Excel Books
6. Business Communication – C.S. Raydu – Himalaya Publishing House
7. Communication For Business – Taylor - Pearson Education
8. Communication Skills – Dr Rao & Dr. Das – Himalaya Publication
9. Contemporary Business Communication – Scot Ober – Biztantra :Dreamtech
10. Business Communication Today – Bovee, Thill, Schatzman – Pearson
11. Business Communication – R.K. Madhukar – Vikas Publication
12. Developing Communication Skills (2/e) Mohan & Banerjee Macmillan
13. eWriting: 21st Century Tools for Effective Communication-Booher Macmillan

2011

NorthMaharashtraUniversity, Jalgaon

FACULTY OF COMMERCE & MANAGEMENT

Syllabus of Master in Business Administration (MBA)

SEMESTER: II

W.E.From 2011

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

STRUCTUREOFMASTER IN BUSINESS ADMINISTRATION (M.B.A.)

Semester-I and II			
Paper	**Semester-I** **A : Credit Courses**	**Paper**	**Semester-II** **A : Credit Courses**
101	Management Science	201	Management Practices
102	Accountancy For Managers	202	Business Research Methods
103	Managerial Economics	203	Global Economic Scenario
104	Information Technology For Managers	204	Management Information System and ERP
105	Introduction To Operations Management	205	Financial Management
106	Organizational Behavior	206	Human Resource Management
107	Corporate Social Responsibility	207	Marketing Management
108	Corporate Communication Skills	208	Quantitative Techniques

Semester-III and IV			
Paper	**Semester-III** **Credit Courses**	**Paper**	**Semester-IV** **Credit Courses**
301	Strategic Management	401	e-Commerce & Excellence Management
302	Entrepreneurship & Project Management	402	Family Business Management
303	Legal Aspects Of Business	403	Indian Commercial Laws
304	Specialization-I (Major)*	404	Specialization-V (Major)*
305	Specialization-II (Major)*	405	Specialization-VI (Major)*
306	Specialization-III (Major)*	406	Specialization-VII (Major)*
307	Specialization-IV (Major)*	407	Project Report & Viva-Voce*
308	Specialization (Minor-I)**	408	Specialization (Minor-II)**

*Specialization In Major Subjects (Any One)		**Specialization In Minor Subjects (Any One)	
A	Financial Management	A	Financial Management
B	Marketing Management	B	Marketing Management
C	Human Resource Management	C	Human Resource Management
D	Operations Management	D	Operations Management
E	International Business Management	E	International Business Management
F	Agro Business Management	F	Agro Business Management
G	Systems	G	Systems

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: II

Paper: 201: Management Practices

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1. Management of Business Practices (21)

1.1. Indian Management Practices (03)

1.1.1.Indian Ethos:Essential Features & insights

1.1.2.Features of Traditional business & Modern business

1.1.3.Indian Transnational Corporations: Features of Indian TNC's

1.1.4.Indian Management Practices

1.2. Japanese ManagementPractices(10)

1.2.1.5-S system: Meaning, Philosophy, Micro level techniques, Advantages, Limitations and Pre-requisites

1.2.2.Kai-Zen : Meaning, Philosophy, Micro level techniques, Advantages, Limitations and Pre-requisites

1.2.3.Poke-Yoke: Meaning, Philosophy, Micro level techniques, Advantages, Limitations and Pre-requisites

1.2.4.Zero Defect Program (ZDP) : Meaning, Philosophy, Micro level techniques, Advantages, Limitations and Pre-requisites

1.2.5.Waste Reduction : Meaning, Philosophy, Micro level techniques, Advantages, Limitations and Pre-requisites

1.3. Global Management Practices (08)

1.3.1.Patterns of Management analysis

1.3.2.TOWS matrix : A modern tool for analysis

1.3.3.Diversity Management

1.3.3.1. Diversity and Multiculturalism : Nature, Dimensions and its Effects

1.3.3.2. How to manage Diversity and Multiculturalism in the Organisation

1.3.4.Managing Growth : Necessity, Need & Objective of Growth

1.3.5.Bench Marking :

1.3.5.1. Definition, Need, Levels & prerequisites,

1.3.5.2. Process : Planning, Analysis, Integration, Action Phase

1.3.5.3. Advantages& limitations of Benchmarking.

2. Services Management (14)

2.1. The pace of growth of Service sector in the GDP of an Economy.

2.2. Service& its business application

2.2.1.Definition

2.2.2.Difference between Goods & Services

2.2.3.Quality dimension: Features, Performance, Reliability-Credibility, Conformance, Durability, Serviceability, Aesthetics, Perceived quality, Courtesy, Consistency, Accuracy, Completeness, Timeliness, Responsiveness & Tangibility of service.

2.3. Return on service quality: Cost of quality and Profit linkage

2.4. Other functional areas of Service management practices

2.4.1.Disaster Management : Introduction, Features & Outcome of Disaster management

2.4.2.Event Management : Features, Problems& Process of Event management

2.4.3.Hospitality Management:

2.4.3.1. Functional Areas of Hospitality

2.4.3.2. Hospitality as a service Industry

2.4.3.3. Housekeeping operations, Waste reduction
2.4.3.4. Hospitality technologyand Risk management in hospitality.
2.4.3.5. Hotel Finance
2.4.4.Business Process Outsourcing:
2.4.4.1. Meaning, Benefits& Growth Drivers
2.4.4.2. Types Of Outsourcing
2.4.4.2.1. Customer Service Outsourcing
2.4.4.2.2. Accountancy Outsourcing
2.4.4.2.3. Internal Audit Of Transactions Outsourcing
2.4.4.2.4. Legal Outsourcing
2.4.4.2.5. Insurance And Banking Outsourcing
2.4.4.3. Business Process Improvement
2.4.4.4. Business Process Management Versus Functional Management
2.4.4.5. Back Office Outsourcing
2.4.4.6. Differences Between Business Process Outsourcing & Outsourcing

3. Knowledge Management (05)

3.1. Knowledge Management
3.1.1.Introduction and Definition
3.1.2.Market value proposition and Prosperity of Knowledge management
3.1.3.Threephases of Life cycle- Acquisition, Enhancement & Retention
3.2. Understanding Customer Value Knowledge Chain
3.3. Phases of Customer Knowledge Cycle

4. Case study (10)

4.1. A real world situation faced by a manager should be considered for analysis and discussion of the cases based on the above topics.

REFERENCE BOOKS:

1. Global Management Solutions: Demystified by Seth- Thompson Learning
2. Management: Task, Responsibilities, Practices by Peter F. Druker – Allied Publishers Pvt. Ltd
3. Indian Ethos - Nandagopal Tata McGraw Hill
4. Knowledge Management – Jawadekar- Tata McGraw Hill
5. Management: Value-Oriented Holistic Approach by S.A. Sherlekar – Himalaya Publishing House
6. Business Organizations&Management by Vasishth, Rajput – KitabMahal
7. Essentials of Business Environment by K. Ashwathappa – Himalaya Publishing House
8. Total Quality Management by K. ShridharBhat – Himalaya Publishing House
9. The Essential Guide to Knowledge Management by AmritTiwana – Pearson Education Asia
10. Business Process Outsourcing – SarikaKulkarni – Jaico Publishing House
11. Management: Principles & Applications by Ricky Griffin – Cengage Learning
12. Management (2008 Edition)– Kreitner, Mohapatra- Biztantra (Willy India Pvt. Ltd.)
13. Management by Stoner, Freeman, Gilbert – Pearson/ Prentice Hall
14. Management – Text & Cases by V.S.P.Rao& V Hari Krishna– Excel Books
15. Total Quality Management – by B. SenthilArasu& J. Pravin Paul – Scitech Publications Pvt. Ltd.
16. Information and Knowledge Management –Kamalavijayan-Macmillan
17. Global Business Management Adhikari Macmillan
18. Introduction to Disaster Management Modh Macmillan

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: II

Paper: 202: Business Research Methods

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

---

1. Research Methodology **(06)**

1.1. Meaning, Objective, Importance & Types of Research

1.2. Research Process

1.3. Features &Criteria of Good Research.

1.4. Research In Functional Area of Management

1.5. Problems encountered by Researchers in India

2. Research Problem **(04)**

2.1. Formulation of Research problem

2.2. Selecting the Problem, necessity of Defining the Problem

2.3. Techniques involve in Defining a problem

2.4. Literature Survey

3. Research Design **(06)**

3.1. Meaning & Need for Research Design

3.2. Feature of Good Research Design

3.3. Important Concept Relating to Research Design

3.4. Types of Research Design : Exploratory/ Formulative, Descriptive/ Diagnostic & Hypothesis Testing/Experimental Research design

3.5. Validity & Reliability In Research

4. Sampling Design **(05)**

4.1. Sampling Terminology, Steps in Sampling Design, Criterion of selecting sampling procedure

4.2. Sampling Methods

4.2.1.Probability Sampling: Simple random, Systematic, Stratified, Cluster, Area, Multi-stage, Proportional, Sequential sampling.

4.2.2.Non-probability Sampling: Convenience, Quota, Snowball, Judgment

5. Data Management **(09)**

5.1. Data Collection

5.1.1.Types & Sources of Data: Primary & Secondary

5.1.2.Methods of Data Collection: Observation, Interview, Questionnaire, Schedule & Survey Method

5.1.3.Guidelines for Constructing Questionnaire/ Schedule, Choice of Questions

5.1.4.Measurement Scales: Nominal, Ordinal, Interval, Ratio

5.1.5.Sources of Error

5.2. Measurement & Scaling Technique

5.2.1.Tests of Sound Measurement: Validity, Reliability, Practicality

5.2.2.Scaling: Meaning, Classification bases.

5.2.3.Scaling Techniques: Rating Scales, Ranking Scales.

6. Testing of Hypotheses (07)

6.1. Hypothesis: Meaning, Sources, Importance & Types of Hypothesis
6.2. Criterion of Good Hypothesis
6.3. Basic Concept Concerning Testing of Hypotheses
6.4. Procedure for Hypotheses Testing
6.5. Flow Diagram for Hypotheses Testing
6.6. Level of Significance

7. Advanced Tools For Hypothesis Testing Using SPSS (08)

7.1. Parametric & Non parametric Tests
7.2. Analysis of Variance (ANOVA) : One way & Two Way
7.3. Multivariate Data Analysis: Factor Analysis, Cluster analysis, Discriminate Analysis, Multidimensional Scaling
7.4. Linear Correlation &Regression

8. Interpretation & Report Writing (05)

8.1. Interpretation: Meaning, Techniques, Precautions
8.2. Organization Report Writing
8.2.1.Writing a good report, Critical element s of a report,
8.2.2.Steps, Layout of the Research Report
8.2.3.Types of Research Reports
8.3. Summer Project Reports
8.3.1.Parameters: Declaration, Certificate, Acknowledgement, Executive Summary, Introduction of the project, Company Profile, Methodology, Collection-Interpretation & Analysis of Data, Findings-Suggestions & Conclusions, Bibliography, Annexure.

REFERENCE BOOKS:

1. Research Methodology (Methods & Techniques) – C.R.Kothari - Wiley Eastern Ltd
2. Business Research Methodology – Shrivastav- Tata McGraw Hill
3. Business Research Methodology – J.K. Sachdeva- Himalaya Publishing House
4. Business Research Methods- 7 ed. – William G. Zikmund – Cengage Learning
5. Research Methodology – A.B. Rao- Excel Books
6. Management Research Methodology – Krishnaswamy, Sivakumar, Mathirajan– PearsonEducation
7. Methodology And Techniques Of Social Research- Wilkinson &Bhandarkar- Himalaya Publishing House
8. Business Research Methods- Murthy, Bhojanna- Excel Books
9. Doing Data Analysis with SPSS by Carver, Nash – BROOKS/COLE Cengage Learning
10. Business Research Methods- Donald R. Cooper, Pamela S. Schindler- 8/e - Tata McGraw-Hill Co. Ltd.
11. A Research Methodology – Smarth&Siriya – S. Chand & Company Ltd.
12. A Handbook of Research Process Ananthanarayanan Macmillan

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: II

Paper:203: Global Economic Scenario

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50hours

1) Basics Of International Trade **(08)**

a) International Trade
b) Importance Of International Trade
c) Distinguish Features Of International Trade
d) Terms Of Trade & Factor Influencing Terms Of Trade
e) Concepts Of Tariffs & Quotas &Its Effects
f) Concept Of Balance Of Trade & Balance Of Payments: Favourable, Unfavourable
g) Free Trade Case For & Against
h) Gains From Trade To Importing ,Exporting Countries & Overall World
i) Factors Influencing Gains & Measurement Of Gains
j) Exchange Rates :Meaning & Types

2) Globalisation Forces **(08)**

a) Meaning Of Globalisation
b) Factor Facilitating Globalisation
c) Steps Towards Globalisation
d) Management Of Change To Globalisation
e) Key Global Issues for Business
f) Requisite For Globalisation
g) Globalisation Model
h) Environmental Adaptation For Globalisation

3) The Changing World **(08)**

a) International Financial Flows
b) International Migration
c) Global Environmental Challenges
d) New Political Tendencies In Developing Countries
e) Emerging Sub National Dynamics
f) Urban Imperatives
g) Implication For Development Policy

4) The World Trading System **(08)**

a) Developing Countries & Global Trading System
b) Role &Functioning Of I.M.F. & W.B., in World Economic & Trade Development
c) Role and functioning of Asian Development Banks
d) W.T.O. Mechanisms for Promoting & Maintaining Liberal Trade Regimes
e) Sustaining the Momentum For Trade Reform
f) International Trade &Development Policy

5) Developing Countries & Global Financial System **(08)**

a) The Gathering Pace Of International Integration
b) Toward A More Robust & Diversified Banking System
c) The Orderly Sequencing Of Capital Account Liberalisation
d) Attracting Foreign Investment
e) Revitalising International Macroeconomic Cooperation

6) Indian Economy In The Global Scenario **(10)**

a) India & The Global Economy
b) Changing Face Of International Trade Of India
c) Banking Sector & Financial Sector Reforms
d) Effects of Globalisation on Indian Economy
e) Global Financial Imbalances & Crises
f) The Global Financial Crisis & Indian Economy

REFERENCE BOOKS:

1. World Development Report:1999-2000 - Oxford University Press,2000
2. India &The Global Financial Crisis : Y.V.Reddy - Orient Blackswan Private Limited,2009
3. International Economics: DrS.S.M.Desai&Dr.MirmalaBhlerao - Himalaya Publishing House:2008
4. International Finance: V.A. Vadhani - Himalaya Publishing House:14th Edition:2000
5. Indain Economy : Datt&K.P.M.Sudharam - S. Chand Pvt. Ltd.
6. Indain Economy : Mishra &Puri – Himalaya Publishing House
7. Corporate Governance: Principles, Policies & Practices: A.C. Fernando - Pearson Education 2006
8. Global Business Management - Adhikari - Macmillan

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: II

Paper: 204: Management Information System and ERP

60 + 40 Pattern: External Marks 60 +Internal Marks 40= Maximum Total Marks: 100

Required Lectures: 50hours

1. Fundamentals of Management Information Systems (08)

1.1. Concepts, Classification & Value of Information

1.2. Information System : Open & Closed

1.3. Management Information System

1.3.1.Definition, Concepts & Meaning

1.3.2.Components & Activities

1.3.3.Types – Operation support system & Management support systems

1.3.4.Control systems – Feedback & Feed forward systems

1.3.5.MIS planning process – Steps in planning

1.3.6.MIS design & Development Process – Phases

1.3.7.Components of MIS

1.4. MIS vis-à-vis Computer, Academics& Users

1.5. MIS vis-à-vis Information Concepts , System Concepts

2. Process of Management Information System (08)

2.1. System Analysis & Design

2.1.1.Introduction & Need for System analysis

2.1.2.System analysis of a new requirement

2.1.3.Structured systems analysis & Design (SSAD)

2.2. Development of MIS

2.2.1.Introduction & Contents of MIS Long range plans

2.2.2.Determining the information Requirement

2.2.3.Management of Quality in the MIS

2.2.4.Factors contributing in the Success & Failure of MIS

3. Application of Management Information System (12)

3.1. Business Processes : Primary, Supportive & Administrative

3.2. MIS in functional area

3.2.1.MIS & Manufacturing sector

3.2.1.1. Operational control & Research Systems

3.2.1.2. Inventory Control System

3.2.1.3. Manufacturing system: CIM, Process control & Machine control

3.2.2.Marketing Information System: Marketing Research, Marketing planning, Sales analysis & Marketing control.

3.2.3.Accounting Information system: Financial, Management & Cost accounting system

3.2.4.Human Resource Development System: HRP system, Human Resource Information System

3.3. Service as a distinctive product

3.4. Transaction Processing System

3.5. Concept of Knowledge Based Expert System

3.6. Concept of Artificial Intelligence

3.7. Managerial Challenges of Information Technology : Success or Failure, Developmental & Ethical

4. Support System (06)

4.1. Decision Support System (DSS): Concept, Philosophy, Characteristic, Classes, Users of DSS

4.2. Executive Support System (ESS) : Introduction, Components & Architecture

4.2.1.Office Information System: Document management & Communication system

5. Enterprise Resource Planning (08)

5.1. Concept/System

5.2. Drivers for implementing ERP

5.3. ERP architecture

5.4. ERP Solution Structure: Business operations, Technology & Implementation

5.5. Benefits of ERP

5.6. ERP Selection: Vendor evaluation, Technology evaluation & Solution evaluation

5.7. ERP Implementation: Customization & Precautions

5.8. Problems encountered with ERP

5.9. Service process optimization: Service processes & its benefits

5.10. ERP in the twenty-first century

6. ERP – Technologies & Application (08)

6.1. Business Process Re-engineering

6.1.1. Meaning, Necessity& Principles

6.1.2. Application of re-engineering

6.1.3. Three R's – Rethink, Redesign & Retool

6.1.4. Reengineering in service industry

6.1.5. Quality & re-engineering

6.1.6. Benefits & Limitations of re-engineering

6.2. Material Requirement Planning (MRP-I)

6.3. Manufacturing Resource Planning (MRP-II)

REFERENCE BOOKS:

1. Management Information System by Jawadekar – Tata McGraw Hill
2. Management Information System by Arora – Excel Books
3. Management Information System by Davis & Gordon - Tata McGraw Hill
4. Management Information System by James O'Brian- Tata McGraw Hill
5. Business Process Reengineering by K Sridhar Bhat – Himalaya Publishing House
6. Management Information System by C S V Murthy – Himalaya Publishing House
7. Management Information Systems (3/e) – Goyal - Macmillan
8. Enterprise Resource Planning by Alex Leon - Tata McGraw Hill
9. Enterprise Resource Planning by Ray - Tata McGraw Hill
10. Enterprise Resource Planning (Concept & Practices) by Garg, Venkitrkrishnan– PHI
11. Enterprise Resource Planning by JyotindraZaveri - Himalaya Publishing House
12. Textbook of Enterprise Resource Planning Jaiswal Macmillan

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A. .

SEMESTER: II

Paper: 205: Financial Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50hours

1. Introduction to Financial Management **(07)**

1.1. Finance Function
- 1.1.1.Finance Concepts
- 1.1.2.Financial Information
- 1.1.3.Finance & other Functions In the Business
- 1.1.4.Factors affecting financial organizations
- 1.1.5.Finance Functions

1.2. Financial Management
- 1.2.1.Nature, Scope, Objectives & Functions
- 1.2.2.Functional Areas of Financial Management
- 1.2.3.Financial Planning
- 1.2.4.Financial Analysis: Value analysis

2. Capital Structure & Leverages **(08)**

2.1. Capital Structure
- 2.1.1.Meaning & Features & Determinants
- 2.1.2.Computation of Capital Structure
- 2.1.3.Patterns & Approaches to Capital Structure
- 2.1.4.Indifference Point
- 2.1.5.Under & Over Capitalisation

2.2. Leverages
- 2.2.1.Meaning & Types
- 2.2.2.Computation of Leverages

3. Raising Finance **(14)**

3.1. Short term Financing
- 3.1.1.Introduction & Characteristics
- 3.1.2.Sources of Short term Finance

3.2. Long Term Financing
- 3.2.1.Need for long term financing
- 3.2.2.Sources of Long Term Finance
- 3.2.3.Risk analysis in Capital Budgeting & Sensitivity analysis

3.3. Primary & Secondary Markets
- 3.3.1.Meaning, Importance & Role
- 3.3.2.Market intermediaries: brokers, dealers, investment bankers
- 3.3.3.Bid, Ask or Offer, bid-ask spread, Bull and bear, blue chips, day trading, stop loss,
- 3.3.4.BSE/ NSE Indices

4. Investment Decisions **(16)**

4.1. Short term Invest Decision

4.2. Long term Investment Decisions
- 4.2.1.Time value of Money
  - 4.2.1.1. An overview & Study of Time lines
  - 4.2.1.2. Theory of interest or computation of Interest
  - 4.2.1.3. Amortization of a loan

4.2.2.Capital Expenditure Planning & control
4.2.2.1. Definition, Importance
4.2.2.2. Computation of Cost of Capital

4.3. Capital Budgeting Techniques:
4.3.1.Payback period Method
4.3.2.Rate of returnMethod
4.3.3.Net Present ValueMethod
4.3.4.Internal rate of Return Method
4.3.5.Profitability Index
4.3.6.Replacement Decision
4.3.7.Capital Rationing

4.4. Venture Capital Finance
4.4.1.Introduction, Meaning Features & Types
4.4.2.Stages of Venture Capital Investment

4.5. Lease & Hire Purchase Finance
4.5.1.Lease
4.5.1.1. Meaning & essential elements of leasing
4.5.1.2. Types of lease & their evaluation
4.5.2.Hire Purchase
4.5.2.1. Evolution & Meaning of Hire Purchase
4.5.2.2. Characteristic , Determinants of Hire Purchase

4.6. Mutual Funds: Concept & Types

4.7. Decision making techniques
4.7.1.Lease or Buy
4.7.2.Make or Buy
4.7.3.Manufacture or Vendor Development
4.7.4.Do or Outsource
4.7.5.Owners Self Outlet or Franchisee appointment

5. Emerging trends Finance (06)

Concepts of

5.1. Corporate Combinations
5.2. Corporate Financial Distress
5.3. Derivatives & Options
5.4. Hybrid Financing: preferred stock, leasing, warrants & convertibles
5.5. Reverse Mortgage
5.6. Credit rating
5.7. Portfolio Management
5.8. International Financial Management

REFERENCE BOOKS:

1. Financial Management by Ravi M. Kishore – Taxman Publication
2. Financial Management by Khan & Jain - Tata McGraw Hill
3. Financial Management tools & Techniques by DrPradip Kumar Sinha – Excel books
4. Financial Management: Principles & Practice by G Sudarsana Reddy- Himalaya Publishing
5. Fundamentals of Financial Management by VyuptakeshSharan – Pearson Education 2nd Edition
6. Financial Management by I M Pandey – Vikas Publishing House
7. Financial Management – P.V. Kulkarni, Satyaprasad - Himalaya Publishing House
8. Financial Management – Principles & Practice by SudhindraBhat– Excel Books
9. Financial Management: Management & Policy By R.M. Srivastava - Himalaya Publishing House
10. Fundamentals of Financial Management by Brigham &Houton - Cengage Learning
11. Financial Management -Mathur - Macmillan

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: II

Paper: 206: Human Resource Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1. Introduction to Human Resource Management (08)

1.1. Concept, Characteristic &Significance of Human Resource

1.2. Definitions, Nature, Scope &Objectives of HRM

1.3. Functions of HRM.

1.4. HRM Vs. Personnel Management

1.5. HRM Vs. HRD

1.6. Challenges before HRM

1.7. Employer-Employee Relationship: concepts, Objectives, Parties, Measures for Improvement

2. Human Resource Management Process (18)

2.1. Human Resource Planning (06)

2.1.1.Concept & Need of HRP

2.1.2.Process of Human Resource Planning

2.1.3.Methods of Demand Forecasting

2.1.4.Prerequisites of HRP

2.2. Process of Procurement (12)

2.2.1.Recruitment

2.2.1.1. Concept, Purpose &Factors Affecting Recruitment

2.2.1.2. Sources of Recruitment

2.2.1.3. Process of Recruitment

2.2.2.Selection

2.2.2.1. Concept Selection process

2.2.2.2. barriers of selection

2.2.3.Placement : Concept & Problems

2.2.4.Induction,

2.2.4.1. Concept, Objective &Steps in Induction

2.2.4.2. Topics of Induction Programme

2.2.4.3. Problems in Induction

3. Human Resource Development (16)

3.1. Performance appraisal (07)

3.1.1.Definitions, Objective & Process of Performance Appraisal

3.1.2.Methods of Performance Appraisal

3.1.2.1. Traditional Methods: Ranking, Paired Comparison, Grading, Critical Incident, Force Choice, Checklist, Graphic Rating, Essay Evaluation, Confidential Reports

3.1.2.2. Modern Methods: MBO, BARS, Assessment Centres, 360 Degree Appraisal System

3.1.3.Problems with Performance Appraisal

3.2. Employee Training (06)

3.2.1.Meaning, Need and Objective of Training

3.2.1.1. Methods of Training : On the Job&Off the Job

3.2.2.Sensitivity Training

3.2.3.Evaluation of Training

3.3. Executive Development (03)

3.3.1.Meaning &Methods of Executive Development

4. Recent Trends in HRM: (08)

Concepts of -

4.1. Human Resource Audit
4.2. Human Resource Information System
4.3. Human Resource Accounting
4.4. Employer branding
4.5. Moonlighting by employees
4.6. Dual career group
4.7. Competency Mapping
4.8. Downsizing & Rightsizing
4.9. HR Matrix
4.10. HR score card
4.11. Talent Management
4.12. Flexi-time & Flexi-work
4.13. e-HRM : e-recruitment, e-training & e-learning.

REFERENCE BOOKS:

1. Human Resource Management, Text & Cases By Dr. V.S.P Rao - Excel Books
2. Human Resource Management By Dr K. Ashwathappa – Tata McGraw Hill
3. Essentials of Human Resource Management By P. SubbaRao – Himalaya Publishing House
4. Human Resource Management By S.S.Khanka – S Chand & Sons
5. Human Resource Management –Sanghi -Macmillan
6. Comprehensive Human Resource Management By P.L.Rao - Excel Books
7. Human Resource Management By Snell, Bohalender Cengage Learning
8. Human Resource Management by A M Sarma – Himalaya Publishing
9. Managing Human Resources By Fisher- Cengage Learning
10. Human Resource Management By Dr. C.B. Gupta – Sultand Chand & Sons
11. Human Resource Management By Dipakkumar Bhattacharya: Excel Books
12. Human Resource Management By GarvyDessler.- Pearson/ Prantice Hall
13. Human Resource Management, Principles & Practice By P. C. Acquinas- Vikas Publishing.

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: II

Paper: 207:Marketing Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50hours

---

1. Introduction to Marketing Management (17)

1.1. Market : Meaning, Definition & Types of market

1.2. Goods : Kinds of goods

1.3. Marketing

- 1.3.1.Definition, Objectives & Functions of marketing
- 1.3.2.Marketing approach : Production, Product, Selling, Marketing & Societal marketing
- 1.3.3.Marketing Process
- 1.3.4.Marketing Environment
- 1.3.5.Indian Marketing Environment
  - 1.3.5.1. Changing Demographic structure & Literacy level
  - 1.3.5.2. Rising Income & Reduction in Income Gap between Rural & Urban population
  - 1.3.5.3. Opportunities in Rural market
  - 1.3.5.4. Emergence of Service sector & Retailing
  - 1.3.5.5. Media explosion

1.4. Marketing Management

- 1.4.1.Definition, Nature & Scope
- 1.4.2.Functions
  - 1.4.2.1. Marketing research & Information
  - 1.4.2.2. Product & Pricing
  - 1.4.2.3. Planning & Control
  - 1.4.2.4. Promotion (Communication)
  - 1.4.2.5. Physical Distribution
- 1.4.3.Forms of Marketing Organization
  - 1.4.3.1. Functional
  - 1.4.3.2. Geographical
  - 1.4.3.3. Product or Brand oriented
  - 1.4.3.4. Customer oriented

1.5. Market segmentation

2. Marketing Mix (15)

2.1. Product

- 2.1.1.Meaning, Classification
- 2.1.2.Product Life Cycle
- 2.1.3.New Product Development
- 2.1.4.Product Related Strategies

2.2. Price

- 2.2.1.Meaning & Objectives of Pricing
- 2.2.2.Factors affecting Pricing decisions&Pricing Strategies

2.3. Place

- 2.3.1.Nature and importance of marketing channels, Channel Design Decisions
- 2.3.2.Logistics Management- Physical Distribution, Warehousing and Transportation
- 2.3.3.Retailing- Types of Retail Formats

2.4. Promotion

- 2.4.1.Promotion mix-Components, AIDA formula
- 2.4.2.Advertizing-Meaning, Importance, Types & Media plan
- 2.4.3.Sales promotion-Tools, Guidelines & Personal Selling

3. Consumer Behavior & Marketing Research (06)

1.1. Consumer behavior: Determinants of consumer behavior

1.2. Consumer decision making process/ Buying Process:

1.2.1.For Normal products: Need recognition, Information search, Evaluation of alternatives, Purchasing decision & post-purchase behavior

1.2.2.For New products: Awareness, Interest, Evaluation , Trial & Adoption

1.3. Organizational buyer decision process: Problem recognition, Product specification, Product & Vendor search, Product & Vendor evaluation, Product & Vendor selection & performance evaluation

1.4. Marketing Research: Meaning, Types & Process

4. Global Marketing (06)

4.1. Need, Importance&Problems in International Marketing

4.2. Levels of Involvement

4.3. Modes of Entry &Entry Strategies

4.4. Opportunity analysis

4.5. Global Brand

5. New trends in Marketing (06)

Concepts of -

5.1. Event Marketing

5.2. Emotional Marketing

5.3. Holistic Marketing

5.4. e-marketing

5.5. Agro Marketing

5.6. Non-Profit Marketing

5.7. Buzz Marketing

5.8. Green Marketing

5.9. Viral Marketing

5.10. Customer Relationship Management (CRM)

5.11. Legal Aspects and Marketing

5.11.1. Consumer Protection: Need, Importance,Consumer Education& Awareness

5.11.2. Act related to Maximum Retail Price: Labeling and Packaging

REFERENCE BOOKS:

1. Marketing Management by RajanSexena - Tata McGraw Hill
2. Principle of Marketing by Kotler& Armstrong – PHI/ Pearson , LPE 9th edition
3. Marketing Management –Arunkumar N. Meenakshi – Vikas Publishing
4. Marketing Management – Global Perspective, Indian Context (4/e) -Ramaswamy&Namakumari - Macmillan
5. Marketing Management – Text & Cases by S H HKazami – Excel Books
6. Marketing Management – Stanton – McGraw Hill
7. Marketing Management – Text & Cases by Tapan Panda – Excel Books
8. Marketing Management by S.A Sherlekar – Himalaya Publishing House
9. Marketing Management (Text & Cases in Indian Context)by Karunakaran– Himalaya Publishing House
10. Marketing: Marketing in 21st Century – Berman – Biztantra (Willy India Pvt. Ltd.)
11. Basics of Marketing Management –R.B. Rudani - S. Chand &Company Ltd.
12. Marketing- Grewal & levy - Tata McGraw Hill

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: II

Paper:208: Quantitative Techniques

60 + 40 Pattern: External Marks 60 +Internal Marks 40 (Test Marks20 + Practical Marks 20) = Maximum Total Marks: 100

Required Lectures: 50hours

Section – I Statistics

1. **Basics of statistics** (03)
   - 1.1. Statistics – Meaning , Utility In Business Management
   - 1.2. Mean, Mode, Median and Their Relationship.
   - 1.3. Standard Deviation
2. **Correlation and Regression** (08)
   - 2.1. Meaning Of Correlation, Multiple Correlation and Partial Correlation.
   - 2.2. Meaning Of Positive, Negative And Perfect Correlation
   - 2.3. Scatter Diagram
   - 2.4. Karl Pearson's Coefficient Of Correlation
   - 2.5. Computation Of Correlation Coefficient For Ungrouped Data
   - 2.6. Meaning Of Regression, Simple Regression, Multiple Regression.
   - 2.7. Statement Of Regression Equations (Simple Regression)
   - 2.8. Meaning Of Regression Coefficients, Statement of Properties of Regression Coefficients.
   - 2.9. Coefficient of Determination.
   - 2.10. Numerical Problems from Real Life Situations.
3. **Probability** (05)
   - 3.1. Random and Non Random Experiments.
   - 3.2. Sample Space, Event, Sure Event, Impossible Event, Complementary Event, Mutually Exclusive Events.
   - 3.3. Classical Definition of a Probability, Computation of Probability.
   - 3.4. Conditional Probability, Computation of Conditional Probability.
   - 3.5. Statement of Addition and Multiplication Theorems of Probability.
   - 3.6. Computation of Probability Using the Theorems of Probability.
4. **Index Numbers** (04)
   - 4.1. Definition, Types, Uses of Index Numbers
   - 4.2. Methods of construction of Price Indexes
     - 4.2.1.Unweighted price Index : Single price index, Aggregate price Index
     - 4.2.2. Weighted Price Index: Weighted Aggregate Price Index -
       - 4.2.2.1. Laspeyre's Method
       - 4.2.2.2. Paasxhe's Method
       - 4.2.2.3. Fisher's Ideal Method
5. **Test of Significance** (08)
   - **5.1. $\chi 2$ –test (Chi-Square test)**
     - **5.1.1.** Chi-square distribution,
     - **5.1.2.** Properties of Chi-square distribution,
     - **5.1.3.** Conditions for Chi-square distribution
     - **5.1.4.** Application of Chi-square distribution,
     - **5.1.5.** Tests of goodness-of-fit
   - **5.2. T-test:** properties, uses, one sample t-test
   - **5.3. One way ANOVA**: meaning, Assumptions, (Simple problems)

Section-II Quantitative Techniques

1. **Quantitative Techniques for management &Co-Ordinate System** (03)
   - 1.1. Meaning, Field of Application
   - 1.2. Role of Quantitative Techniques in Business and Industries.
   - 1.3. Limitation of QT.

2. **Linear Programming Problems** (06)
   - 2.1. Meaning Of Linear Programming Problem, Feasible Solution, Decision Variable, Optimum Solution, And Objective Function.
   - 2.2. Advantages And Assumptions Of LPP
   - 2.3. Formulation Of LPP Problems
   - 2.4. Graphical Method to Solve Linear Programming Problem

3. **Decision Theory.** (08)
   - 3.1. Decision Making Problem
   - 3.2. Different Situations Of Decision Making: - Decision Under Deterministic Situation, Decision under Stochastic Situation, And Decision under Uncertainty.
   - 3.3. Maximax Criterion, Maximin Criterion, Minimax Criterion, Hurwitz Criterion, Laplace Criterion.
   - 3.4. Expected Monetary Value Criterion, Expected Regret Criterion.
   - 3.5. Expected Value Of Perfect Information
   - 3.6. Decision Trees.

4. **PERT and CPM** (05)
   - 4.1. CPM and PERT: Concepts, Advantages and Comparison and Limitations.
   - 4.2. Network Logic Construction Rules and Activity Relationship.
   - 4.3. Determination of Critical Paths.

REFERENCE BOOKS:

1. Business Statistics By S.C. Gupta & Indira Gupta – Himalaya Publishing House
2. Statistical Methods By S.P. Gupta – Sultan Chand & Sons
3. Business Mathematics by Kapoor&Sancheti – Sultan Chand & Sons
4. Business Statistics – Beri - Tata Mcgraw Hill
5. Mathematics & Statistics for Management by –Mittal, Satyaprasad&Rao- Himalaya Publishing House
6. Statistics for Management by - Anderson - Cengage Learning
7. Business Statistics by R S Bhardwaj – Excel Books
8. Statistics for Business and Economics (4/e) – Hooda - Macmillan
9. Quantitative Techniques by Vora – Tata McGraw Hill
10. Quantitative Techniques by L.C. Jhamb - Everest Publishing House
11. Operations Research by V.K Kapoor – Sultan Chand & Sons
12. Operations Research by Heera& Gupta – S.Chand& Sons
13. Quantitative Techniques by C.R. Kothari – Vikas Publishing House
14. Operations Research: Theory and Applications (4/e) J K Sharma Macmillan

2011

North Maharashtra University, Jalgaon

FACULTY OF COMMERCE & MANAGEMENT

Syllabus of Master in Business Administration (MBA)

SEMESTER: III

W.E.From 2011

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

STRUCTURE OF MASTER IN BUSINESS ADMINISTRATION (M.B.A.)

Semester-I and II			
Paper	**Semester-I** **A : Credit Courses**	**Paper**	**Semester-II** **A : Credit Courses**
101	Management Science	201	Management Practices
102	Accountancy For Managers	202	Business Research Methods
103	Managerial Economics	203	Global Economic Scenario
104	Information Technology For Managers	204	Management Information System and ERP
105	Introduction To Operations Management	205	Financial Management
106	Organizational Behavior	206	Human Resource Management
107	Corporate Social Responsibility	207	Marketing Management
108	Corporate Communication Skills	208	Quantitative Techniques

Semester-III and IV			
Paper	**Semester-III** **Credit Courses**	**Paper**	**Semester-IV** **Credit Courses**
301	Strategic Management	401	e-Commerce & Excellence Management
302	Entrepreneurship & Project Management	402	Family Business Management
303	Legal Aspects Of Business	403	Indian Commercial Laws
304	Specialization-I (Major)*	404	Specialization-V (Major)*
305	Specialization-II (Major)*	405	Specialization-VI (Major)*
306	Specialization-III (Major)*	406	Specialization-VII (Major)*
307	Specialization-IV (Major)*	407	Project Report & Viva-Voce*
308	Specialization (Minor-I)**	408	Specialization (Minor-II)**

*Specialization In Major Subjects (Any One)		**Specialization In Minor Subjects (Any One)	
A	Financial Management	A	Financial Management
B	Marketing Management	B	Marketing Management
C	Human Resource Management	C	Human Resource Management
D	Operations Management	D	Operations Management
E	International Business Management	E	International Business Management
F	Agro Business Management	F	Agro Business Management
G	Systems	G	Systems

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

301: Strategic Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1. Strategic Management: Overview **(15)**

a) Business policy- Nature, Importance, Objectives & Classification
b) Strategy: Meaning, Types, Components & Levels of strategy operations.
c) Business strategy: Concept, statement & Development
d) Strategic intent: Vision, Mission, Purpose, Goals and objectives, Values
e) Environmental Appraisal: Concepts and Environmental Scanning
f) Organizational Appraisal: Capability factors, Methods and Techniques
g) Strategic choice – Meaning, Process, Factors and Analysis – Portfolio and SWOT
h) Strategic management: Concept, Features, Risk, Benefits, Levels & Process
i) Strategic Innovation: Concept, Need, Importance & Analysis

2. Competitive Advantage **(06)**

a) Concept and sources of competitive advantage
b) Kinds of competitive advantage : Position and Capability and their inter-relationship
c) Sustainable competitive advantage
d) Cost-Benefit analysis of competitive advantage

3. Strategy Implementation **(10)**

a) Strategy Implementation: Aspects, Project & Procedural Implementation, Resource Allocation,
b) Structural Implementation – Structural Considerations, Structures for Strategy, Organization Design and Change, Organization Systems.
c) Behavioral Implementation – Leadership Implementation, Corporate Culture, Corporate Politics and Use of Power, Social Responsibility and Strategic Management, Personal Value and Ethics.
d) Functional Implementation of Strategies

4. Strategy Evaluation and Control **(07)**

a) Strategic Evaluation: Nature, Importance, participants, Barriers
b) Strategic control and operational controls.
c) Techniques of a strategic evaluation and control.

5. Comprehensive Cases on various strategic situations and at least 10 cases based on application of strategic management must be discussed & solved. **(12)**

REFERENCE BOOKS:

1. Business policy and Strategic Management - Azhar Kazmi-TMH
2. Marketing Strategy & Compitative Positioning by Hooley – Pearson Education
3. Business policy and Strategic Management : Concepts and Applications,- Gupta, Gollakota, Shrinivasan-Prantice Hall India
4. Strategic Management – Hunger, Wheelen – Addison Weesley
5. Strategic Management-P.Subba Rao – Himalaya Pub.
6. Strategic Management – Upendra Kachru- Excel Books
7. Strategic Management-Francis Cherunilam – Himalaya Pub Strategic Management-Saloner, Shepard, Podolny – Willey India
8. Strategic Management – B Hiriyappa – New Age International
9. Strategic Management – V.S.P. Rao, Harikrishna – Excel Books
10. Textbook of Strategic Management Mathur Macmillan

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

302: Entrepreneurship & Project Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1) Entrepreneur and Entrepreneurship (06)

a) Entrepreneur - Concept, Functions, Types, Characteristics, Qualities and Role – Ideal Entrepreneur
b) Entrepreneur vis-à-vis Professional Manager, Intrapreneur, Copreneur
c) Distinction between wage employment, self employment & Entrepreneurship
d) Entrepreneurial Competencies
e) Entrepreneur and Entrepreneurship – Factors, Barriers & Problems and Process of Entrepreneurship
f) Growth of Entrepreneurship in India

2) Entrepreneurship Development (14)

a) Entrepreneurship Development: Concepts, Factors affecting, Development Cycle and Strategy
b) Entrepreneurship Development Program (EDP): Concepts, Objective, Contents, issues, Phases, Evaluation. Institutions conducting EDP's in India
c) Entrepreneurship Development Training: Importance, Objective, Methods
d) Role of Institutions in Entrepreneurship Development - District Industrial Centre (DIC), Small Industries Services Institute (SISI), Entrepreneurship Development Institute of India (EDII), National Institute of Entrepreneurship and Small Business Units Development (NIESBUD), National Entrepreneurship Development Board **(**NEDB)
e) Role of Central and State Government in Entrepreneurship Development

3) Emerging areas in Entrepreneurship (07)

a) Women Entrepreneurship: Types, Challenges, Opportunities, Achievements, Problems, Remedial Measures & supporting Institutions and Role Models of Woman Entrepreneurs in India, Self Help Groups,
b) Rural Entrepreneurship: meaning, need, Problems, Development, Role of NGO's, Entrepreneurship in agriculture, TRYSEM.
c) Social Entrepreneurship: Genesis & Characteristic
d) International Entrepreneurship
e) E- Entrepreneurship: Concept, Purpose and Essence.

4) Project (09)

a) Project : Concept, Classification, Identification, Project Design, Project Appraisal, Project Planning,
b) Formulation of Project Report - Cost Benefit Analysis, Technical Feasibility, Financial Feasibility, Managerial Feasibility, and Market Survey.
c) Financing of the Project – Sources of Finance
d) Role of Financial Institutions – Commercial Banks, IDBI, ICICI, SIDBI, SFC's, IFCI, NABARD, Venture Capital.

5) Project Management (14)

a) Project Management Life Cycle: Project Initiation, Planning, Execution, Closure
b) Project Monitoring and Control – Parameters, Process
c) Monitoring and Control of group of Projects
d) Techniques of Project Monitoring and Control – PERT, CPM, Network technique
e) Computer based Project Management
f) Integrated Project Management – Management of Project Finances, Materials – Production – Marketing – Personnel Management.
g) Project Audit

302: Entrepreneurship & Project Management

REFERENCE BOOKS:

Entrepreneurship

1. Dynamics of Entrepreneurship Development and Management – Vasant Desai, Himalaya
2. Entrepreneurship Development small business Enterprises – Poornima Charantimath - Pearson
3. Entrepreneurship, Robert D. Hisrich, Michal P. Peters, Tata McGraw-Hill Edition
4. Entrepreneurship by lall and Sahai, Excel Books
5. Entrepreneurship Development and Project Management by Neeta Baporikar, Hiimalaya
6. Entrepreneurship Development in India by Gupta, Srinivasan – Sultan Chand & Sons
7. Entrepreneurship Management by Aruna Kaulgud - Thomson
8. Entrepreneurship Development by S.S. Khanka – S. Chand
9. Patterns of Entrepreneurship by Jack M. Kaplan, Willey Publications
10. Entrepreneurship Development by Cynthia L. Greene, Cenage Learning

Project Management

1. Project Management by Gray, Larson – Tata McGraw Hill
2. Project Management by Vasant Desai- Himalaya
3. Textbook of Project Management Gopalakrishnan Macmillan
4. Project Management by Maylor - Pearson
5. Projects - Prasanna Chandra – CFM TMH Professional Series -Tata McGraw Hill
6. Project Management : Managerial Approach by Jack R. Mereditts and Samuel J. Mantel Jr., Willey Publications
7. Contemporary Project Management by Timothy J. Kloppenborg, Cenage Learning
8. Project Management and Control by Narendra Singh, Himalaya Publishing House
9. Project Management by Panneerselvam, Senthilkumar – PHI
10. Project Management by Nagarajan – New Age International

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

Paper: 303: Legal Aspects Of Business

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1) Law of Contract – **"Indian Contract Act, 1872"** **(6)**
   a) Introduction, Meaning, Definitions & Essentials of Contract
   b) Classification of Contract
      (i) Void, Voidable & Valid Contract
      (ii) Wagering Agreement, Contingent Contacts & Quasi-contracts
   c) Discharge of Contract
   d) Breach of Contract & Remedies
   e) Specific Contracts
      i) Indemnity & Guarantee
      ii) Agency
      iii) Bailment & Pledge

2) Law of Sale of Goods – **"Sale of Goods Act, 1930"** **(9)**
   a) Contract of Sale of Goods
      i) Its essentials & types of Goods
      ii) Distinction between 'Sale & Agreement to Sale'
   b) Condition & Warranties
      i) Difference between Condition & Warranty
      ii) Express & Implied conditions & warranties
      iii) Doctrine of Caveat Emptor
   c) Transfer of Property
      i) Rules regarding Transfer of Property
      ii) Transfer of Title & Transfer of Title by Non-owners
   d) Performance of Contract of Sale - Delivery, modes, rules etc.
   e) Unpaid seller & his rights
   f) Buyer's right against Seller
   g) Concept of Auction Sale

3) Law of Partnership – **"Partnership Act, 1932"** **(5)**
   a) Definition & Nature of Partnership - Partners, Firm & Firm Name
   b) Difference between Partnership & Company
   c) Kinds of Partnerships
   d) Rights & Duties of Partner
   e) Relations & Liabilities of a Partner as well as Firm to Third parties
   f) Dissolution
      i) Methods of Dissolution
      ii) Dissolution of Firm & Dissolution of Partnership

4) Law of Negotiable Instruments – **"Negotiable Instrument Act, 1881"** **(4)**
   a) Introduction, Definition & Characteristics
   b) Parties to Negotiable Instruments
   c) Specimen & its Essentials - Promissory Note & Bill of Exchange
   d) Cheque - Bearer & Crossed, Types of Crossing
   e) Holder & Holder in due course
   f) Rights/Privileges of Holder in Due course

5) Law of Environment Protection – **"Environment Protection Act, 1986"** **(4)**
   a) Scope & Object
   b) Pollution control -Air, Water & Environment
   c) Environmental Audit – Methodology

6) Intellectual Property Law – Patent, Copyright & Trade mark **(12)**
   a) **"The Patents Act, 2002"** **(4)**
      i) Application for Patent
      ii) Grant of Patent
      iii) Rights of Patentee
      iv) What inventions are not Patentable?
      v) Revocation of Patents

   b) **"Copyright Act, 1957"** **(4)**
      i) Introduction
      ii) Duration of Copyright protection
      iii) Registration of Copyright
      iv) Infringement of Copyright – Exceptions

   c) **"The Trade Marks Act, 1999"** **(4)**
      i) Introduction
      ii) Classification of Goods & Services
      iii) Procedure for registration of Trade Marks
      iv) Grounds for refusal of registration

7) Case studies in Legal Aspects of Business – Typical cases based on the above topics only. **(10)**

REFERENCE BOOKS:

1. Legal Aspects of Business by Akhileshwar Pathak – Tata McGraw Hill
2. Legal Aspects of Business by R.R.Ramtirthkar – Himalaya Publishing House
3. Mercantile Law by S.S. Gulshan – Excel Books
4. Mercantile & Commercial Law by Rohini Aggrawal – Taxman Publication

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

304 A – Management of Banks & Financial Services

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

Section – I Management of Banks

1) Introduction to Banking **(08)**

a) Banking System in India
b) Commercial banking Structure: Meaning, Role & Functions of the Banks
c) Liabilities & assets of the Banks
d) New Concepts in Banking: Retail Banking, Microfinance, Credit/ debit cards, ATM's, Online banking, Mobile Banking
e) Non-banking Financial Corporations: Role & Growth, Types of NBFC's, Regulations & RBI's control
f) Opportunities in banking
g) Quality of Customer services in commercial Banks
h) Latest in Banking
   i) Autonomy packages in Banks
   ii) Banking Cash transaction tax
   iii) Service tax on Financial Services
   iv) Dividend policy for Banks
   v) Corporate Debt Restructuring (CDR)
   vi) Depository systems – NSDL, Dematerialization

2) Co-operative Banking **(03)**

a) Meaning, Nature and Types
b) Governance & reforms in co-operative banking
c) State Co-op agriculture & Rural Development banks

3) Bank Management **(04)**

a) Objectives, Evolution, Scope & functional areas of bank Management
b) Functional areas: Deposit Mobilization, credit planning & Management, Asset Management, Liability Management, Liquidity Management, Investment Management, management legal department, office management,

4) Credit planning & Management **(10)**

a) Objective, Need, Importance
b) Maintaining Ratio as per RBI Directories
c) Credit Culture
   i) Financial Analysis Credit rating, Inter-firm Comparison, Project Appraisal,
   ii) Consortium Lending, loan Syndication,
   iii) Documentation, Disbursement
d) Priority Sector Lending as per the RBI directives
e) NPA management:
   i) Meaning, Impact, Identification
   ii) Recovery mechanism and management
   iii) Compromise proposals as per RBI directives
   iv) Securitization and other measures available
   v) Debt Recovery Tribunal (DRT) and Legal recourse
   vi) Provisioning required as per RBI directives

Section II – Financial Services

1) Financial Services : (03)

a) Meaning Significance, functions, features, constituents, problems,
b) Evolution of financial services in India

2) Insurance (03)

a) Insurance: Meaning, Principles & Roles
b) Types of insurance – Life (normal & health), General, Agricultural & Bancassurance, Re-insurance, Group insurance & micro-insurance. ,
c) Types of Policies
d) Regulatory framework in India, Claims

3) Mutual Funds (05)

a) Mutual funds: Meaning, Evolution, Performance & its measures, Advantages, Growth in India
b) Types of mutual funds Schemes, Regulatory aspects ,Financial risk
c) Open v/s Closed, Debt v/s Equity
d) Tax implications & transparency in MFs
e) Introduction to Hedge funds & Participatory notes

4) Merchant banking services (03)

a) merchant banking; Meaning, Scope, Functions
b) Set-up of merchant banking in India: Registration, issue Manager,
c) Merchant banking in India & its Future prospects.

5) Credit Rating (04)

a) Meaning, Evolution, Importance, Scope, Need, benefits & criticism of Credit rating
b) Credit rating process & framework
c) IPO rating
d) Credit rating agencies in India & its regulations

6) Capital markets (05)

a) Capital markets: functions, Structure: Primary & Secondary Market
b) Types Of Securities Traded, Stock Market In India
c) Investment in stocks
d) Various intermediaries in capital markets
e) Essential formalities in investing in Capital markets
f) Role of FIIs in capital markets

7) Regulatory framework (02)

Regulatory framework/governing guidelines of governing authorities in relation to the above mentioned financial services

REFERENCE BOOKS:

1) Introduction to Banking: Vijayaragavan Iyengar – Excel Books
2) Banking Theory & Practice (19th Ed.): K.C. & Lekshy Shekhar, Vikas Publication
3) Management of Banking & Financial System by Paul - Pearson
4) Merchant Banking & Financial Services – Dr. K Ravichandran - Himalaya
5) Indian Financial System' Dr. G. Ramesh Bapu, Himalaya Publishing House
6) E-Banking & Development Of Banks' Verma, Gupta, & Sharma, Deep &Deep
7) Indian Economy: Datta & Sunderam, (2009),S.Chand &Company
8) Indian Economy: Mishra &Puri (2009), Himalaya Publishing House
9) Banking and Economics Growth.- B. M L. Nigam
10) Law and Practice of Banking. - S.R. Davar

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

305 A –Tax Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1) Direct Taxes-I (25)

a) Introduction to The Finance Act

b) Basic concepts from The Income Tax Act 1961: Agricultural income, Assesses, Assessment year, Income, Person, Gross total income, Previous year, Capital and Revenue Receipts, Capital and Revenue Expenditure, Exempted Incomes, Residential Status.

c) Heads of Income

i) Income from Salary: Salary, Allowances, perquisites and retirement benefits, deductions, computation of salary income, Practical problems on computation of salary income, Deduction of tax at source.

ii) Income from Business: Depreciation and other permissible deductions, Disallowable expenses, income and expenses of illegal business, computation of Business income, Deduction of tax at source.

iii) Income from other sources: Specific income, deductions, grossing-up, computation of income from other sources, practical problems, Deduction of tax at source.

d) Deductions from Gross total incomes - Deductions available to individual under sections 80C, 80CCC, 80CCE, 80D, 80DD, 80E, 80G, 80GG, computation of total income. Practical problems.

e) Submission of return through Tax Return Prepares, Filing of Return in Electronic form, PAN, Self-assessment, Summary Assessment.

f) Tax Deducted at Source – Introduction, Provisions pertaining to TDS from Salaries, Interest on Securities, Interest other than Interest on Securities, Payment to Contractors and Sub-contractors, Commission and brokerage, Rent and Fees for Professional and Technical Services.

g) Duty of a person deducting tax, consequences of failure to deduct tax, TDS certificate, Furnishing statement of tax deducted and return. Tax Deduction Account Number.

h) Advance Payment of tax: Introduction, Liability for payment of Advance tax, computation, installments of advance tax and due dates, Interest for default.

2) Direct Tax-II (07)

a) Wealth Tax Act 1957 – Charge of Wealth Tax – Valuation Date – Location of Assets -Assets –Deemed Assets – Exempted Assets – Net Wealth – Computation of Net Wealth (Including Problems), Valuation of Assets - Return of Wealth

3) Central Excise (08)

a) Central Excise Act, 1944 and the related Rules, Central Excise Tariff Act, 1985

b) Nature of Excise duty, Basic concepts – Assessee, Goods and Excisable Goods, Classification of Goods, Factory, Manufacture & Production, Deemed Manufacture, Manufacturer, Sale & Purchase, Wholesale Dealer- Central Excise Tariff - Principles of Classification - Valuation of Excisable goods - Specific duty vs. Ad valorem duty - Maximum Retail Sale Price - CENVAT Credit - Registration Procedure, Computation of Duty payable, Payment of Duty, Interest on delayed payment of duty.

4) Service Tax (04)

a) Service Tax : Basic concepts, Exemptions and threshold limits, Valuation of Taxable Services, Payment of Service tax, Registration - Valuation – Furnishing of Return, An overview of taxable services

5) Sales Tax (06)

a) Central Sales Tax Act 1956 –

b) Important Terms and Definitions - Inter State Sale, Inter State Sale by Transfer of Documents, – Sale outside the State, Goods, Dealer, Sale, Sale in the course of Import, Sale in the course of Export, State

relevant to Dealer, Determination of Taxable Turnover - Registration - Declared Goods - Rates of Central Sales Tax, Various forms used - On-line application for these CST forms. Assessment and Returns under CST Act .

Note – The Academic Year of the examination shall be the Assessment Year for study of different provisions of the Act

REFERENCE BOOKS:

(Note – Latest editions of the books containing provisions relevant to the Assessment Year under study be referred.)

1. Students' Guide to Income Tax, Vinod K. Singhania Kapil Singhania - Taxmann Publications, New Delhi.
2. Income Tax: Law and Practice - N Hariharan – Tata Mcgraw Hill
3. Income Tax Law & Accounts, Mehrotra : Sahitya Bhavan, Agra.
4. Law and Practice of Income in India Bhagavati Prasad :, New Age International Publishers, New Delhi.
5. Direct Taxes - Dr. Girish Ahuja & Ravi Gupta Bharat Publications
6. Direct Taxes - T. N. Manoharan , Snow White Publications.
7. Indirect Taxes : V. K. SAREEN and MAYA SHARMA, Kalyani Publishers.
8. Indirect Taxes : V. S. DATEY – Taxmann Publications.
9. Central Sales Tax , Law and Practice – V. S. Datey - Taxmann Publications.
10. Students' Guide to Indirect Taxes : Yogendra Bangar, Vandana Bangar, and Vineet Sodhani – Aadhya Prakashan Pvt Ltd., Jaipur
11. Systematic Approach to Indirect Taxes – Dr Sanjiv Kumar – Bharat Law House Pvt. Ltd., New Delhi.
12. Service Tax : Law, Practice & Procedure – C. Parthasarathy, Sanjiv Agrawal – Snow White Publications Pvt. Ltd., Mumbai
13. A handbook on Service Tax (Law, Practice & Procedure) by C. Parthsarathy, Dr. Sanjeev Agrawal & Raja Chelliah
14. Government of India- Income Tax Manual
15. Income Tax Act and Latest Finance Act

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

306 A –Strategic Financial Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1) Management in Public Sector Undertaking: (04)

a) Role of Financial Advisor,
b) Financial Objectives,
c) Capital budgeting, Disinvestment,
d) Financial Reporting : Efficiency Audit, Propriety Audit

2) Financial Strategy and Planning (10)

a) Strategic Planning: Meaning , Process, Necessity
b) Strategic Financial Management: Meaning, Need,
c) Financial Planning Analyzing Financial Performance
d) Approaches to Financial Planning
e) Short – Term Financial Planning.
f) Strategic Decision Making Framework,
g) Interface of Financial Policy & Strategic Management ,
h) Balancing Financial Goals vis-à-vis Sustainable Growth

3) Turnaround Management (14)

a) Corporate Sickness:
   i) Definition, Causes & Symptoms of sickness,
   ii) The Magnitude
   iii) Different Interpretation of Sickness
   iv) Financial Management in Sick Units
   v) Prediction of Sickness, Revival of Sick Units.

b) Turnaround
   i) Types of Turnaround
   ii) Basic Approaches
   iii) Surgical vs. Humane
   iv) Phases in Turnaround Management.

c) Merger and Acquisition:
   i) Mergers & Acquisitions: Kinds, Motives, Reasons, Stages & Mechanics
   ii) Cost Benefits of Merger, Terms of Merger & Major Causes of M & A failures
   iii) Financial Frame Work
   iv) Merger as a Capital Budgeting Decision
   v) Legal and Tax Aspects
   vi) Post-Merger Integration Issue.

d) Takeovers,
   i) Kinds of Takeovers,
   ii) Joint ventures, Managing and acquisition,
   iii) Acquisition Vs. Take over
   iv) Codes and Procedures – Techniques, Defensive Strategies – Cross Boarder Deals.

4) Corporate Restructuring (10)

a) Corporate Restructuring : Meaning, Need, Areas, Implications, Techniques
b) Financial Restructuring : Steps, Financial Reconstruction
c) Portfolio Restructuring
d) Ownership Restructuring
e) Distress Restructuring
f) Strategic Alliances
g) Divestiture
h) Leveraged Buyouts
i) Sell Offs
j) Leveraged Recapitalizations

5) Strategic Cost Management (12)

a) Causes and Symptoms of Broken Cost System – Remedies
b) Importance of Cost Systems
c) Objectives of Cost Management Systems
d) Value Chain analysis
e) Strategy and Cost Management
f) Strategy Formulation and Cost System Design
g) Alternate Strategies
h) Cost of Quality and Long – Term Profitability
i) Activity Based Costing Principles
j) Activity Based Management – Target Costing & Strategic Control systems

REFERENCE BOOKS:

1. Strategic financial Management , Ravi M. Kishore, Taxmann Publication
2. Strategic financial Management, A. N. Sridhar , Shroff Publishers & Distributors Pvt. Ltd
3. Strategic Management' Sharplin McGraw Hill
4. Managerial Finance Weston J.Fred & E.F.Brigham; Drydon Press
5. Financial Management - Prasanna Chandra- Tata McGraw Hill
6. Financial Management and Policy' James. C. Van Horne - Pearson
7. Strategic financial Management, ICFAI Publication
8. Financial Services– 3rd Edition. M. Y. Khan, Tata McGraw Hill
9. Principles of Corporate Finance' Richard A. Brealey and Stewat C. Myers, Tata McGraw Hill.
10. Innovative Corporate Turnarounds' Pradip M. Khandwalla,, Saga Publications, New Delhi.
11. The fourth Eye', Pradip M. Khandwalla, Saga Publications, New Delhi.
12. Company Resource: How to Manage a Business Turnaround'- Khar baunder O.P. and Stallworthy E.A, ' (Heinemann, London).
13. Financial Management and Policy- Bhalla V. K.- Himalaya
14. Financial Management- I. M. Pandey – Vikas
15. Financial Management by Berk – Pearson
16. Principles of Financial Management-R. P. Rustagi.-
17. Financial Management Simplified – Prasun Rakshit – Elegant Books Pvt. Ltd., Kolkata

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

307 A – Financial Derivatives

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1) Introduction to Financial Derivatives **(08)**

a) Financial Derivatives: Meaning, need, Features, Types, Uses, Critiques
b) Derivative markets – participants & functions
c) Growth of Financial Derivatives in India
d) The regulatory framework of Derivatives trading in India

2) Futures & Forwards **(12)**

a) Financial Futures: Contracts & Types
b) Future Market: Functions & Operators
c) Forward contracts: Concept, Features & Classifications
d) Future Vs Forwards
e) Pricing of Future and Forwards
f) Hedging strategies – hedging with Stock Index Futures, types of members & margining System in India
g) Futures trading on BSE & NSE

3) Options Market & Pricing **(12)**

a) Options: Meaning, Need, Terminology, Valuation
b) Options v/s Futures
c) Types of Options contracts – Call & Put options, Covered & Uncovered options
d) Trading Strategies involving Options – basic Option Positions – margins – Options on stock indices
e) Option markets in India on BSE & NSE
f) Intrinsic value & Time value, Pricing at Expiration
g) Factors affecting Options pricing, Put-Call Parity Pricing Relationship
h) Pricing models – Introduction to Binomial Pricing model, Black Scholes Option Pricing model

4) Swaps **(08)**

a) Swaps: Concepts, Nature, Evolution, Features & Structure of Swaps
b) Types – Interest-rate Swaps, Currency Swaps, Commodity Swaps, Equity Swaps
c) Swap variant, Swap Dealer Role
d) Economic Functions of Swap transactions.

5) Hedging & Credit Derivatives **(10)**

a) Concept
b) Fixed Hedging with options - concepts
c) Naked & covered Positions
d) Strategies
e) Hedging option Portfolio
f) Credit Derivatives: Concept, feature, growth, Benefits & Credit derivatives in India

307 A – Financial Derivatives

REFERENCE BOOKS:

1. Financial Derivatives: Theory concepts & problems – S.L.Gupta – Prantice Hall India
2. Options, Futures & Other Derivatives - Hull C John – Pearson Educations Publishers
3. Derivatives And Risk Management - Jayanth Verma- Tata Mcgraw Hill
4. Futures Markets: theory & practice" – Sunil K Parmeswaran – Tata McGraw Hill.
5. Financial Derivatives – Bishnupriya Mishra ,Swaroop – Excel Books
6. Risk Management: insurance & derivatives – Kotreshwar - Himalaya
7. Derivatives Valuation & Risk Management – David Thomas, Dubofsky Miller - Oxford Publication
8. Financial Derivatives – An introduction to Futures, Forwards, & Options – Read Head – Prentice Hall of India
9. Derivatives – T.V.Somnathan - Tata McGraw Hill.
10. Financial Derivative & Risk Management – O.P.Agrawal – Himalaya Publication
11. Risk Management & Insurance Arunajatesan Macmillan

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

304 B – Marketing Research

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1) Introduction (07)

a) Marketing research: Meaning, Scope, Purpose, Uses, Limitations and Threats to Marketing Research
b) Marketing Research and Marketing Management
c) Business research and its application vis-à-vis marketing
d) Marketing research process
e) Marketing Intelligence system:
   i) Concept, Components, Scope, Significance
   ii) MIS and Marketing Decision Support System (MDSS)
f) Ethics in Marketing Research

2) Data Collection (06)

a) Primary Vs Secondary data
b) Use of internet for primary data
c) Uses, Advantages and Disadvantages of Secondary Data
d) Locating and Evaluating Secondary data
e) Sources of Secondary data: e-sources and other

3) Market Survey as a method of Data Collection (12)

a) Market survey: Nature, Meaning and Objectives of Market survey
b) Types of Market survey
c) Field work: Designing a Questionnaire / Conducting a Survey
d) Conducting Consumer Perception survey
e) Conducting Consumer Satisfaction survey
f) Conducting Concept Testing survey
g) Preparation of Report based on the conducted survey

4) Data Analysis Techniques and Interpretation (12)

a) Regression Analysis,
b) Factor Analysis,
c) Cluster Analysis,
d) Discriminant Analysis,
e) Conjoint Analysis,
f) Multi-Dimensional Analysis
g) The Interrelationship between Analysis and Interpretation
   i) Improper interpretation
   ii) Improper Analysis
h) The interpretative process

5) Specific Research Applications (13)

a) Continuous Marketing Research Techniques
b) Test Marketing
c) Advertisement Research: Promotion Research, Brand Equity Research, Brand Name testing
d) Industrial Marketing Research
e) Export Marketing Research
f) Sales Analysis forecasting
g) Pricing Research
h) Consumer Behavior Research
i) Rural Marketing

REFERENCE BOOKS:

1. Market research - G.C. Beri – Tata McGraw Hill
2. Marketing Research – Naresh Malhotra – Pearson
3. Marketing Research-Rajendra Nargundkar – Tata McGraw Hill
4. Marketing Research by S L Gupta – Excel Books
5. Marketing Research – Suja Nair - Himalaya
6. Marketing Research – Burns and Bush – Pearson
7. Marketing Research – Luck and Rubin – Prentice Hall Publications
8. Marketing Research, Concept & Cases – Cooper Schindler. – Tata McGraw Hill
9. Research for Marketing Decisions – Paul Green, Donald Tull, Gerald Albaurn - Prentice Hall Publications
10. Marketing Research by Ramanuj Majumdar –New age International
11. Marketing Research by D.M. Sarawte – Everest
12. Marketing Research Shajahan Macmillan

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

305 B – Promotion Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1. Introduction to Promotion (08)

a. Basic concept of Promotion & Communication
b. Integrated Marketing Communication: Concept and Process, Marketing Communication mix; The value of IMC plans
c. Relationship Between study of consumer's behavior and IMC plan
d. Promotion and Marketing Mix
e. Branding: Brand Name, positioning and Brand equity
f. Promotion by NGOs.
g. Direct Marketing: Techniques, Utility and Limitations

2. Advertising (12)

a. Meaning, Features, Objectives, Importance, Limitations and Types
b. Difference between Advertising and Personal Selling
c. Audience selection
d. Advertising- Objectives, AIDA & DAGMAR,
e. Functions & Perspective
f. Classification of advertising
g. Creativity in advertising: Concept of Copy Theme & Appeal
h. Copywriting, Art direction and Production
i. Evaluation of Advertizing effectiveness
j. Advertising Budget:
    i. Meaning, Responsibility of Preparation, Process,
    ii. Factors influencing advertising budget
    iii. Methods of advertising budget

3. Other Promotional Media (08)

a. Media Decision: Types, Media Mix, Media selection Planning & Strategy & Factors to be considered
b. Print Media, Electronic Media, Outdoor & Transit supplementary Media
c. Other Media:
    i. Shop signs and Window display
    ii. Point of Purchase material
    iii. Sponsorship and Event marketing
d. Speciality advertizing and Co-marketing programs
e. Advertising Agency: Types, Functions, Advantages, Remuneration methods, Client Relationship

4. Promotion Management (09)

a. Promotion: Meaning, Capabilities and Limitations, Managing Promos, Strategic Use of Promos, Below-the-line activities
b. Sales Promotion:
    i. Meaning, Important, Target, Tools and Techniques of Promotion
    ii. Relationship between sales promotion and advertising
    iii. Development & Evaluation of the Sales Promotion program
c. Trade Promotion: Meaning, Objective and Utility
d. Consumer Promotion: Meaning, Schemes – Consumer premium, Conditional consumer Premium, Limitation Direct premium, and Evaluation
e. Dealer Promotion: Meaning, Schemes and Importance

5. Salesmanship (08)

a. Salesmanship: Definition, Prospecting and Problems
b. Selling process and skills for effective salesmanship, sales leads, sales presentations
c. Types of calls, effective selling techniques,
d. Role of relationship marketing in personal selling, tools for personal selling, value added selling.
e. Sales force management: Recruiting, Training, Evaluation, Motivation & Compensation

6. Public Relations (05)

a. Public relation and Advertizing
b. Types of PR activities
c. Public Relations tools
d. Corporate identity
e. Decision making in Public Relations

REFERENCE BOOKS:

1. Advertising – Sales & Promotion Management – S.A. Chunawala – Himalaya Publishing House
2. Advertising Management (Concept & Cases) – Manandra Mohan – Tata McGraw Hill
3. Advertising – Murthy Bhojana – Excel Books
4. Advertising and sales Promotion by Kazami, Batra –Excel Books
5. Marketing management- Philip Kotler – Pearson/PHI
6. Marketing management – Sherlekar - Himalaya Publishing House
7. Advertizing – Principles and Practice – Wells, Burnett, Moriarty – Pearson
8. Sales Management : Decision, Strategy and Cases – Still, Cundiff & Govoni – Pearson
9. Advertising & Personal Selling – Rajput & Vasishth – Himalaya Publishing House
10. Advertising & Promotion (An IMC approach) – Shimp – Cengage Learning
11. Fundamental of Advertising- Theory and Practice. S.A.Chunawala, K.C.Seth -Himalaya Publishing House

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

306 B – Services Marketing

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1) Introduction to Services (06)

a) Service: Concept, Characteristics, Components, classification & Packages
b) Service facility design & Layout, Product Vs Services
c) Service marketing: Concept, features, importance
d) Global & Indian trends emerging in service sector.

2) The seven P's of Service Marketing Mix (12)

a) Product Decision , Product-service Continuum
b) Pricing: Strategies & tactics, Capacity planning, Measures to respond to changes in demand, Reshaping demand using effective pricing.
c) Promotion: Setting Communication objective, Implication for communication strategies.
d) Physical Distribution:-Strategies for services, challenges in distribution, Role of Internet in distribution.
e) People: The key Role of Service employee, Service Marketing Training Strategies for Training & Develop.
f) Physical Evidence: Nature, Importance, Tangibilizing of Physical Evidence, and Self Service Technologies.
g) Process: Service as a process & as a system, Different aspects & management challenges, Strategies for managing inconsistency.

3) Strategic Marketing Management for Services (08)

a) Matching Demand & supply through capacity planning and segmentation –
b) Internal Marketing of services
c) External versus Internal orientation of services strategy Strategies for Reducing customer Defections,
d) C.R.M

4) Delivering Quality Services & Customer Satisfaction (08)

a) Service Quality: Meaning, Measurement, Total Service Quality Management, Managing people & technologies, Perceived quality, controlling quality
b) Causes of services quality gaps
c) The customers Expectation versus perceived service gap;
d) The customer Expectation versus perceived service gap;
e) Factors & technique to Resolve this gap- Gap; in services.
f) Service Quality Models
   (1) Palsuraman-Zeithamal-Bitner(PZB) Gap Model
   (2) SERVQUAL and SERVPERF
   (3) Gronzoos Model
g) The services performance gap
h) Strategies for S.P.G. promise versus Delivery Gap.

5) Services Marketing Practices **(16)**

Concept, Classification & Implications of

a) Financial Services: Banking & Insurance
b) Healthcare Services
c) Hospitality Services
d) Travel & Tourism: Medical tourism
e) Professional Services
f) Public Utility Services
g) Education & Extension Services
h) IT & Communication Services: telecom, Courier
i) Media & Entertainment Service

REFERENCE BOOKS:

1) Services Marketing 2nd Ed- Rajendra Nargundkar,-Tata Mc Graw Hill companies
2) Services Marketing – S.M. Jha – Himalaya Publishing House
3) Services Marketing: People, Technology, Strategy- Christopher Lovelock - Pearson Education Asia
4) Services Marketing – Govind Apte - Oxford
5) Service Marketing: concept planning & Implementation – C Bhattacharya –Excel Books
6) Service Marketing- Raghu & Vasanthi Venugopal- Himalaya
7) Services Marketing – Ravi Shankar – Excel Books
8) Delivering Quality Services" The Free Press, Macmillam – Zeithaml, Parasuraman & Bery.
9) The Service Edge- Ron Zemke & Dick Schaaf
10) Thomas J Delong & Ashish Nanda: Managing Professional Services- Text and Cases, McGraw- Hill International, 2006.
11) Valerie Zeithaml & Mary Jo Bitner- Services Marketing- McGraw Hill

1) Introduction to International Marketing (12)

a) International Market: Meaning, Expansion, Growing Attractiveness
b) International Marketing: Meaning, Need, significance, Participants, Motives, Problems, Complexities, Decisions & Future
c) International Orientation & Stages
d) Scope of Marketing Indian Products Abroad
e) International market orientation- EPRG framework; International market entry strategies.
f) International Marketing Environment:
   i) Internal**,** External, Domestic, Economic, Social, Cultural, Demographic, Technological, Political and Legal
   ii) International Trading Environment
   iii) Trading Blocs & Growing Intra-Regional Trade
g) International Market Entry Strategies & Mode, Entry Strategies of Indian Firms

2) International Marketing Mix (30)

a) International Product Strategy:
   i) Levels & Hierarchy of product, Product-line analysis, Product design Strategy
   ii) Product Life Cycle Management,
   iii) New Product Development, Product Positioning & Product Adoption, Repositioning Strategies
   iv) Product planning Matrix, Dimensions of Product Strategies
   v) Product planning for global markets;
   vi) Standardization v/s Product adaptation;
   vii) Management of international brands: Brand Drivers
   viii) Packaging and labeling

b) International Pricing
   i) Role of Pricing, Objectives, Factors affecting Pricing, Pricing decisions
   ii) Pricing Methods, Pricing Strategies, Cost based pricing, Transfer pricing, Dumping, Export price structure, Skimming Pricing, Penetration Pricing, Price discounts, Discriminating Pricing
   iii) Price-Market relationship, Price Escalation: cost of exporting, Taxes, tariffs & Administrative costs, Exchange rate
   iv) Price control: Approaches to lessening price escalation, Leasing in international markets

c) International Promotions
   i) Promotion Decisions: Complexities and issues; International advertising
   ii) Marketing Environment & Promotional Strategies
   iii) Role of Export Promotion Organizations, Trade fairs and Exhibitions
   iv) International Marketing Communication: Major Decisions, Communication Mix, Problems in International Marketing Communication
   v) International Personal selling, Sales promotion and public relations.

d) International Distribution
   i) Distribution Channels: Policy, issues, Functions & types of channels;
   ii) International Channel conflict & Channel Decision
   iii) Functional Excellence in Distribution Planning
   iv) International logistics decisions & Management, Developing logistic Strategy

3) Export Management **(08)**

a) Managing Export Decisions
b) Export Contract: cost descriptions, risk coverage
c) Export procedure & Documentation, Modes of payment
d) Exit policy

REFERENCE BOOKS:

1. International Marketing: Text & Cases – Francis Cherunilam – Himalaya
2. International Marketing – Cateora, Graham, Salwan – Tata McGraw Hill
3. Global Marketing Management by Keegan - Pearson
4. International Marketing: Text And Cases - Justin Paul & Ramneek Kapoor – Tata Mcgraw Hill
5. International Marketing – Rajgopal – Vikas Publications
6. International Marketing – Rajendra Nargundkar – Excel Books
7. International Marketing – R Shrinivasan – Prantice Hall
8. Global Marketing: Foreign Entry, Local Marketing & Global Mgmt. – Johansson - Tata Mcgraw Hill
9. International Marketing & Export Management By Albaum - Pearson
10. International Marketing - Jain S.C. - CBS Publications, New Delhi
11. Marketing Management – Global Perspective, Indian Context (4/e) Ramaswamy & Namakumari Macmillan

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

304 C - Industrial Relations & Trade Union

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1) Industrial Relations- **(05)**

a) Concept, scope objectives, importance**;**
b) Developing sound industrial relations; industrial relations in India
c) Measures to Improve Industrial Relation

2) Industrial Discipline **(07)**

a) Concept, Objectives, Importance, Principles, Aspects, & Approaches of Discipline
b) The Red Hot Stove Rule
c) Procedure of Disciplinary Action (as per Industrial Employment (Standing order)act 1946)

3) Industrial Disputes- **(08)**

a) Concept, Manifestation of Conflict, Forms of Industrial Dispute
b) Causes & Consequences of Industrial Dispute
c) Dispute Settlement Machinery
d) Industrial Disputes in India
e) Prevention of Industrial Disputes

4) Grievance Procedure- **(10)**

a) Employee Grievance: Meaning, Nature, & Causes
b) Steps in grievance settlement; grievance machinery.
c) Mediation- Types and essentials of mediation
d) Conciliation-
   i) Types; preliminary steps towards conciliation;
   ii) Conciliation Officer- Qualities of a conciliator, role of conciliator
   iii) Conciliation procedure.
e) Arbitration- Types, Procedure.
f) Adjudication- Types, three tire system of adjudication.

5) Collective Bargaining & Negotiation **(08)**

a) Objectives & importance
b) Bargaining Strategies
c) Bargaining Process
d) Essentials of Collective Bargaining.
e) Importance of negotiation
f) Qualities of a good negotiator.

6) Trade Unionism- **(12)**

a) Types, role & importance
b) Recognition of Trade Union
c) Trade Union Movement in India
d) Problem of trade unions in India.
e) Measures for strengthening T U
f) White Collar & Managerial Trade Unions: Growth, Need & Nature of Managerial TU
g) The Trade Union Act 1926: Definitions, Registration, Duties, Rights & Liabilities of Trade Union

304 C - Industrial Relations & Trade Union

REFERENCE BOOKS:

1) Industrial Relations Trade Union & Labour Legislations by PRN Sinha & Shekher – Pearson
2) Industrial Relations & Labour Laws by B.D.Singh- Excel books
3) Industrial Relations by Arun Monappa – Tata McGraw Hill
4) Dynamics of Industrial Relations by C.B.Mamoria; Himalaya Publishing House
5) Industrial Relations of Developing Economy by Bishwanath Ghosh- Himalaya
6) Essentials of HRM & IR by P Subba Rao – Himalaya
7) Industrial Relations in India 2/e Sen Macmillan
8) Human Resource Management by S.S.Khanka; S. Chand & Co. Ltd. New Delhi.
9) Human Resource Management by K.Ashwathappa – Tata McGraw Hill

305-C: Labour Welfare and Administration

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100
Required Lectures: 50 hours

1) **Introduction** **(08)**
   a) Meaning, importance and objective of labour welfare.
   b) Types of welfare services
   c) Necessity and scope of labour welfare in India
   d) Agencies of labour welfare
   e) Qualification and role of labour officer

2) Social Security **(06)**
   a) Concept, scope, Objective, need.
   b) Types of social security
   c) Social security measures in India

3) Workers Participation in Management, **(08)**
   a) WPM-Definition, meaning and objective
   b) Forms of WPM
   c) Causes and failure of WPM
   d) Making worker participation effective
   e) WPM in India

4) Empowerment- **(08)**
   a) Meaning, coordination.
   b) Approaches of empowerment
   c) Characteristics of empowered organization.
   d) Forms of empowerment.
   e) Empowerment process.
   f) Barriers to empowerment.

5) Industrial hygiene **(06)**
   a) Working Condition.
   b) Lighting, temperature, humidity, noise, duel firms and radiations etc.
   c) Work behavior
      i) Industrial accidents and fatigue
      ii) Causes of accidents
      iii) Fatigue and effect of fatigue
      iv) Safety Programmer

6) Labour Costing **(08)**
   a) Labour cost, computations and controls.
   b) Absenteeism and labour turn over-Cost, causes and determination.
   c) Labour productivity: Labours study and times study
   d) Treatment of overtime. Ideal time. Night shift, allowances, leaves pay.

7) India & International Labour Organization **(06)**
   a) Objectives, Structure of ILO
   b) Impact of ILO on India Labour
   c) Recommendations of ILO

305-C: Labour Welfare and Administration

Reference Books:

1. Human Resource Management by Ashwathapa – Tata McGraw Hill
2. Labour Welfare Trade Union & Industrial Relations by Punekar, Deodhar & Sankaran - Himalaya Publications
3. Human Resource Management by S.S.Khanka – S. chand & Sons
4. Essential of HRM and Industrial Relations by P.Subha Rao – Himalaya Publications
5. Human Resource Management by Gary Dessler – Pearson
6. Human Resource Management by C.B.Gupta – Sultan Chand & Sons
7. Human Resource Management by Chhabra – Dhanpat Rai & Sons
8. Industrial Relations by Arun Monappa – Tata McGraw Hill
9. Human Resource Management by A.M Sharma – Himalaya Publications
10. Human Resource Management by V.S.P Rao – Excel Books
11. Human Resource Management by Snell Bohlander - Cengage
12. Human Resource Management by Mondy - Pearson

306-C: Strategic and e-Human Resource Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100
Required Lectures: 50 hours

1) **Effective Management of People** **(07)**
   a) System of HR & Organization's Performance
   b) Managerial approach vis-à-vis Change agent
   c) Strategic HR Vs Traditional HR
   d) Role of HR during
      i) Organizational growth
      ii) Retrenchment
      iii) Organizational Turnaround

2) **Strategic Human Resource Management** **(09)**
   a) Introduction, Meaning, Definition of SHRM
   b) Importance & Steps in SHRM
   c) Barriers to Strategic HR
      i) HR & Organizational Strategies
      ii) HR & Corporate Strategy
      iii) HR & Business Strategy
      iv) HR Strategy Framework
   d) Strategic Procurement, Strategic Recruitment & Strategic Staffing

3) **Strategic Job Analysis, Job design & Redesigning of Work System** **(12)**
   a) Concept, Process & Method of Job Analysis
   b) Meaning, Issues & Concept of - Job Description, Job Specification & Job Analysis
   c) Modern Management Techniques
   d) Designing of work Systems
   e) Organizational Design Process & Factors affecting Design Process
   f) Emerging issues in Organizational Design
   g) Goal Setting
      i) Meaning of Goal Setting
      ii) Requisites of Goal setting & its relationship with Vision & Mission
      iii) Approaches, Process & Characteristic of Goal setting

4) Strategic Performance Management **(08)**
   a) Ethical Issues in Strategic HRM
      i) Core Concepts & Ethics at Work place
      ii) Ethical Issues in Labour Management relations & Conflict of Interest
   b) Strategic Dimensions of Performance Appraisal
   c) A Shift from Appraisal to Performance Management
      i) Balance Score Cards & Its Importance
      ii) Economic Value Added

5) Developing HR as Strategic Value addition Function **(07)**
   a) Gaining competitive Advantage through HR
   b) HR as a Strategic Business Partner
   c) The VRIO Framework
   d) Changing role & Future Challenges of HR

6) Strategic HR & Information Technology **(07)**

a) Technologies Affecting HRM
b) HR Innovations
c) Conventional HRM to Web Based HRM
d) Various Application Software for HR Practices

REFERENCE BOOKS:

1. Strategic Human Resource Management by Jeffrey Mello.- Cengage Learning
2. Strategic Human Resource Management by Rajeesh Viswanathan – Himalaya
3. Strategic Human Resource Management by Greer - Pearson
4. Strategic Human Resource Management by Armstrong – Kogan Page
5. Strategic Human Resource Management by Rajib Dhar – Excel Books
6. Strategic Human Resources Management Prasad Macmillan
7. Human Resource Strategy by Dreher & Dougherty – Tata Mcgraw Hill
8. Human Resource Management, 10/e by Mondy Wayne – Pearson Education
9. Managing Human Resources By Fisher- Cengage Learning

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

307 C – HR Legislations

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1) Factories Act, 1948 **(06)**

a) Object & Definitions
b) Health Provisions
c) Safety Provisions
d) Welfare Provisions
e) Obligations of Worker & Occupier
f) Offences & Penalties

2) Apprentice Act, 1961 **(04)**

a) Object & Definitions
b) Obligation of employers,
c) Obligations & Rights of apprentices.
d) Contract of Apprenticeship

3) Minimum wages Act, 1948 **(05)**

a) Object, Applicability & definitions
b) fixation of minimum rate of wages
c) Procedure for fixing and revising minimum wage,
d) Offences & Penalties
e) Obligations of Employers

4) Payment of wages Act, 1926 **(05)**

a) Object, Applicability & definitions
b) Time of payment of Wages.
c) Deductions from wages.
d) Obligations of Employers & Employees.
e) Offences & Penalties

5) Payment of Bonus Act 1965 **(06)**

a) Object, Applicability & definitions
b) Calculation of Bonus,
c) Time limit for payment
d) Eligibility for Bonus
e) Amount of Bonus , Claim for Bonus, exemption
f) Calculation of allocable surplus,
g) Set-on and set-off of allocable surplus

6) Workmen's Compensation Act, 1923. **(05)**

a) Object, Scope & definitions
b) Liability of employers
c) Amount of Compensation
d) Obligations of Workmen & Employer
e) Distribution of Compensation
f) Occupational diseases
g) Penalties

7) Contract Labour (Regulation & Abolition) Act, 1970. **(05)**

a) Object, Applicability & definitions
b) Prohibition of Contract Labour
c) Registration & Licensing of contractors
d) Welfare of Contract Labour
e) Obligations of principal employer & contractor

8) Employees state insurance Act, 1948 **(04)**

a) Object, Scope & definitions
b) Obligations of Employers & Employees.
c) Contribution
d) Benefits to employees

9) Maternity Benefit Act 1961 **(06)**

a) Object, Applicability & definitions
b) Right to payment of maternity benefit
c) Forfeiture of maternity benefit
d) Payment of maternity benefit in case of death of a woman
e) Payment of medical bonus
f) Leave for miscarriage
g) Leave for illness arising out of pregnancy, delivery, premature birth of child, or miscarriage
h) Nursing breaks

10) The Child Labour (Prohibition & Regulation) Act 1986 **(04)**

a) Object, Applicability & definitions
b) Prohibition of Child Labour
c) Regulation of Conditions of Child
d) Offences & Penalties

REFERENCE BOOKS:

1. Labour Laws by B.D.Singh – Excel Books
2. Industrial Jurisprudence and Labour Legislation by A.M.Sharma – Himalaya Publications
3. Elements of Merchantile Law by N.D.Kapoor – Sultan Chand & Sons
4. Industrial Relations, Trade Unions & Labour Legislation by PRN Sinha, Indu Sinha, Seema Shekhar – Pearson
5. Labour Laws – Bare Acts

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

304 D – World Class Manufacturing & Process Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1) Manufacturing Management **(04)**

a) Manufacturing activity scheduling
b) Manufacturing resource planning
c) Current Trends in Manufacturing in India

2) World Class Manufacturing **(08)**

a) Characteristic of Re-engineered process.
b) Managerial responsibility in globalization :
c) Software in use, Problems of implementation on the system.
d) Optimized Production Technology (OPT),
e) Automation in Design and manufacturing, Role of Robotics etc.
f) State of International Business – Managerial Attitude and Challenges.
g) Environment Pollution – Factors, Effect and Control.

3) Innovative Manufacturing System **(10)**

a) Lean Manufacturing: Concept, Tools & Techniques, Advantages And Disadvantages
b) Flexible Manufacturing System: Different production system of FMS & its Configuration
c) Group Technology: Concept & applications of GT
d) Cellular Manufacturing System: Concept
e) Agile Manufacturing: Concept
f) Computer Integrated Manufacturing (CIM) : Concept

4) Process Management **(10)**

a) Processes: Meaning, Types & Scope
b) Process planning and selection
c) Process design: Scope, Factors affecting and operation design
d) Major process decisions
e) Process analysis and process flow charts
f) Process Improvement: Methods – Kaizen Umbrella, Process Management tools
g) Process Management tools & Techniques: Design of Experiments (DOE), Taguchi Method, Quality Function Deployment (QFD), Single Minute Exchange of Die (SMED), Visual Control (VC)
h) Product Design Concepts: Design for manufacture (DFM), Design for Assembly (DFA), Design for Operations (DFO)

5) Maintenance Management **(08)**

a) Maintenance Function and Strategies
b) Maintenance economics
c) Spare Parts Management: Types of Spares & Inventory Planning for Spare Parts
d) Measurement of Maintenance performance:
   i) Total Productive Maintenance
   ii) Concept of Reliability, Reliability Improvement
   iii) Concept of Maintainability, Maintainability Improvement.

6) Management of Industrial Safety **(06)**

a) Safety Analysis
b) Safety programs and organization
c) Safety and productivity
d) Causes, problems and sources of industrial accidents
e) Theory of accident occurrences
f) Accident prevention and control
g) Investigation and Analysis of accident
h) Duties of plant supervisor and safety inspector
i) Welfare and safety

7) Technology Transfer **(04)**

a) Definition and Classifications
b) Channels of technology Flow
c) International Technology Transfer
d) Intra-firm Technology Transfer

REFERENCE BOOKS:

1. Production and Operations Management by N.G. Nair – Tata McGraw Hill
2. Production & Operations Management by Upendra Kacharu – Excel Books
3. World Class Manufacturing Sahay Macmillan
4. Operations Management by B Mahadevan – Pearson
5. Global Management Solutions-Demystified – Seth, Rastogi – Thomson Press
6. Total Quality Management: Text & Cases – K Shridhara Bhat - Himalaya
7. Production and Materials Management by K. Shridhar Bhat –Himalaya
8. Management of Technology by Tarek Khalil - TMH
9. Production and Operation Management by Kanishka Bedi – Oxford
10. Operation management by Ray wild – Thomson
11. Production and Operation Management by Chunnawala Patel - Himalaya
12. Materials and Purchasing Management by S.A. Chunawala – Himalaya

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

305 D – MANAGEMENT OF TECHNOLOGY

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1. **Introduction to Technology Management:** **(08)**
   a) Concept and meaning of technology,
   b) Evolution and growth of technology,
   c) role and significance of management of technology,
   d) Impact of technology on society and business,
   e) Forms of technology: process technology and product technology.

2. **Competitive advantages through new technologies:** **(08)**
   a) Product development – from scientific breakthrough to marketable product –
   b) Role of Government in Technology Development.
   c) Linkage between technology, development and competition,
   d) Managing research and development (R&D),
   e) Managing Intellectual Property.

2) **Technological Forecasting:** **(08)**
   a) Exploratory: Intuitive, Extrapolation, Growth Curves,
   b) Technology Monitoring, Normative: Relevance Tree, Morphological Analysis, Mission Flow Diagram

3) **Technology Assessment:** **(08)**
   a) Technology Choice, Technological Leadership and Follower ship,
   b) Technology Acquisition. Meaning of Innovation and creativity,
   c) innovation management

4) **Technology strategy**: **(06)**
   a) concept, types, key principles, framework for formulating technology strategy,
   b) Technology forecasting: techniques and application.

5) **Technology diffusion and absorption**: **(06)**
   a) Rate of Diffusion; Innovation Time and Innovation Cost,
   b) Speed of Diffusion.
   c) Project management in adoption and implementation of new technologies.

6) **Technology Transfer Management**: **(06)**
   a) Technology transfer-process;
   b) outsourcing strategic issues; joint ventures,
   c) Technology sourcing.

7) **Human Aspects in Technology Management:** **(05)**
   a) Integration of People and Technology,
   b) Organizational and Psychological Factors,
   c) Organizational Structure.

8) **Social Issues in Technology Management:** **(05)**
   a) Technological Change and Industrial Relations,
   b) Technology Assessment and Environmental Impact Analysis.

305 D – MANAGEMENT OF TECHNOLOGY

REFERENCE BOOKS:

1) Management of Technology - Tarek Khalli - McGraw-Hill.
2) Managing Technology and Innovation for Competitive Advantage - V K Narayanan - Pearson Education Asia
3) Strategic Technology Management - Betz. F. - McGraw-Hill.
4) Strategic Management of Technological Innovation - Schilling - McGraw-Hill, 2nd ed.
5) Strategic Management of Technology & Innovation - Burgelman, R.A., M.A. Madique, and S.C. Wheelwright -. Irwin.
6) Handbook Of Technology Management - Gaynor - Mcgraw Hill
7) Managing New Technology Development - Souder, W.C. and C.M. Crawford - McGraw-Hill.
8) Managing Technological Innovation - Twiss, B. -. Pitman.
9) Bringing New technology To Market - Kathleen R Allen - Prentice Hall India
10) Management Of New Technologies For Global Competitiveness — Christian N Madu - Jaico Publishing House

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

306 D –Logistic & Supply Chain Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1) Supply Chain Management **(16)**

a) Concept, Supply Chain Linkage
b) Mapping the supply chain
c) E-Business solution for supply chain
d) Supply chain Flows
e) Cycle View of Supply Chain
f) Process cycle time
g) Supply Chain Relationships: Supplier-Buyer relationship
h) Functional Strategies that impact SCM performance
i) Parameters for SCM Design
j) Information Functionality of Supply Chain
k) Principles of Supply chain Information
l) Information System activity
m) Technology Used in SCM

2) Logistic Management **(06)**

a) Definition, Objective Functions & Scope
b) Customer value chain
c) Logistical competence, competitiveness and competitive advances
d) Logistic for business excellence
e) Logistic solution
f) Role of Logistic in Supply Chain

3) Customer Service And Demand Management **(06)**

a) Relationship between customer and demand management
b) Customer service for competitiveness
c) Customer service phase
d) Service attributes
e) Customer service strategy
f) Value added logistical service

4) Logistic Planning And Strategy **(06)**

a) Hierarchy of planning
b) Relationship between logistic strategy and corporate strategy
c) The strategic logistic plan and audit
d) Logistic mission and objectives
e) Logistic Strategies & Formulation
f) Designing Logistical system

5) Logistic Mix **(16)**

a) Warehousing
   i) Concept & Functions
   ii) Warehouse Options
   iii) Warehouse Site Selection & Layout Design
   iv) Warehouse Costing
   v) Warehousing Strategies
   vi) Warehousing in India

b) Material Handling Systems
   i) Role of Material Handling
   ii) Material Handling Guidelines

c) Material Storage Systems
   i) Concept
   ii) Storage Principles
   iii) Benefits of Storage Design
   iv) Storage Methods

d) Transportation
   i) Transportation Infrastructure
   ii) Freight Management
   iii) Factors influencing Freight cost
   iv) Transportation Network
   v) Route Planning
   vi) Containerisation

e) Logistical Packaging
   i) Consumer Vs Logistic Packaging
   ii) Packaging as Unitisation
   iii) Design Considerations
   iv) Packaging Materials
   v) Returnable Logistic Packaging
   vi) Packaging Cost

f) Logistic Information system (LIS)
   i) Logistic Information Needs
   ii) Designing Logistic Information system
   iii) Desired Characteristic of LIS

REFERENCE BOOKS:

1. Logistic Management by V.V.Sople- Pearson
2. Logistic & Supply chain management by K.Shridhara Bhat – Himalaya
3. Exploring the supply chain by Upendra kachru – Excel books
4. Supply Chain Logistics Management - Donald Bowersox , David Closs, M. Bixby Cooper – Tata McGraw Hill
5. Supply chain management by Janat Shah - Pearson
6. Logistical Management by Donald Bowersox , David Closs – Tata McGraw Hill
7. Supply chain management Concept and cases by Rahul V. Altekar - PHI
8. Operations Management along the Supply chain by Russell & Taylor - WILEY-INDIA
9. Supply Chain Management - Text, Cases and Best Practices by Agrawal -Macmillan

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

307 D –Operations Research

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1) Introduction to Operations Research **(05)**

a) Definitions, characteristic & Scope of Operations Research
b) Role of Operations Research in Managerial D/M
c) Role of Computers in OR
d) Limitations of OR

2) Transportation Model **(06)**

a) Formulation of Transportation Problem.
b) Methods of Finding Initial Solution.
   i) North-West corner rule
   ii) Row Minima Method
   iii) Column Minima Method
   iv) Least Cost Method
   v) Vogel's Approximation Method

3) Assignment Model **(05)**

a) Comparison with Transportation Model
b) Formulation of Assignment Model
c) Hungarian or reduced Matrix Method

4) Theory of Games **(10)**

a) Competitive Games
b) Terminology
c) Rules for games theory
d) 2X2 Games, 2X3 Games, 3X3 Games

5) Sequencing Problem **(06)**

a) Processing n jobs through two machines
b) Processing n jobs through three machines
c) Processing Two jobs through m machines

6) Replacement Decisions **(05)**

a) Replacement of Item Deteriorates with time
b) Replacement of Item Whose Maintenance cost Increase with Time and value of Money

7) Investment Analysis **(08)**

a) Break even analysis
b) Payback Period Method
c) Average Rate of Return Method
d) Discounted Cash Flow Method

8) Simulations **(04)**

a) Meaning of Simulation
b) Reasons for using Simulation
c) Advantages & Limitations of Simulation
d) Monte Carlo Method of Simulation(Theory only)

REFERENCE BOOKS:

1. Operations Research: Theory and Applications (4/e) Sharma Macmillan
2. Operations Research by V.K.Kapoor - Sultan Chand & Sons
3. Operations Research by D.S Heera & P.K.Gupta - S.Chand & Sons
4. Quantitative Techniques in Management by Vohra - Tata McGraw Hill Company
5. Operations Research by Natarajan - Pearson
6. Quantitative Techniques in Management by Jaishankar – Excel Books

Specialization – E – International Business Management

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

304 E – International Business

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1) Introduction to International Business (IB) (06)

a) Concept of International Business
b) International Vs Domestic Business
c) Evolution, Development & Factors leading to Growth of IB
d) International Orientation
e) Globalization of Business Structure

2) Modes of International Business (06)

a) Determinants of Entry Mode
   i) country-specific,
   ii) Industry-specific,
   iii) Firm-specific,
   iv) Project-specific
b) Entry Mode Selection & Choices
   i) Trade Related
   ii) Contractual
   iii) Investment Based

3) Theories of International Trade (06)

a) Mercantilism
b) Theory of Absolute cost Advantage
c) Comparative cost Advantage Theory
d) Comparative cost Advantage Theory with Money
e) Country Similarity Theory
f) Global Strategic Rivalry Theory
g) Factor Proportions Theory
h) Product life Cycle Theory
i) Porter's National Competitive advantage Theory

4) International Business Environment (09)

a) Meaning of IB Environment, IB Environmental Factors
b) Socio-cultural & Ethical Environment
c) Economic Environment
d) Political Environment
e) Technological Environment

5) International Business Strategies (12)

a) Strategy: Role & Choices
b) Strategy formulation: Approaches, Spectrum, Levels

c) Planning, Organization & Control
d) International Marketing Strategy
e) International Investment & Financing Strategy
f) International HRM Strategies

6) Global Trade & Investment (11)

a) World Trade Organization
   i) Establishment of WTO
   ii) Organization Structure of WTO
   iii) Anti Dumping Measures
   iv) Dispute settlement Mechanism
   v) TRIMS & TRIPS
   vi) WTO & India
b) Conflict & Negotiations in IB
   i) Factors causing Conflict
   ii) Host Country Vs Transnational Corporations
   iii) International Negotiations
   iv) Role of International agencies in Conflict resolution
c) Foreign Direct Investment (FDI)
   i) Concept, Reasons & Trends in FDI
   ii) Costs, Benefits & Determinants in FDI
   iii) Theories of FDI
      (1) Industrial Organisation Theory
      (2) Product Cycle Theory
      (3) MacDougall-Kemp Hypothesis
      (4) Location-specific Theory
   iv) Foreign Direct Investment In India

REFERENCE BOOKS:

1) International Business: concept Env. & Strategies – Vyuptakesh Sharan – Pearson

2) International Business: K. Ashwathappa - Tata McGraw Hill

3) International Business – Hill & Jain – Tata McGraw Hill

4) International Business: Text & Cases – P. Subba Rao – Himalaya

5) International Business: concept Env. & Strategies – Sumati Varma – Ane Books

6) International Business – Shajahan - Macmillan

7) International Business – Shyam Shukla – Excel Books

8) International Business Environemt & Management: V.K. Bhalla – Anmol Publications

9) International Business- O.P.Agrawal - Himalaya

10) International Business – Justine Paul – Prantice Hall

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

305 E – International Finance

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1) Fundamental of International Finance **(06)**

a) Nature, Scope, Dimension & Importance of International Finance
b) Domestic Vs International Finance
c) Recent changes in Global Financial markets.
d) Globalization & international Financial Management
e) Emerging challenges & Responsibilities of finance Manager

2) International Monetary system **(09)**

a) Evolution of International Monetary System
b) Alternative Exchange Rate Regime
c) International Monitory Fund (IMF) classification for exchange Rate Regime
d) Selection & management of exchange Rate Regime
e) Monetary Policy & exchange Rate policy
f) Emergence of Euro
g) Exchange rate of Indian Rupee
h) Convert ability & Currency
i) Sterilization

3) Balance of Payment **(05)**

a) Structure of Balance of Payment
b) Function, Principles & Accounting of Balance of Payment
c) Equilibrium & Disequilibrium
d) Adjustment & Approaches to Adjustment
e) Balance of Payment and Exchange Rate
f) India's Balance of Payment

4) International Parity **(07)**

a) Exchange Rate Determination
b) Factor Affecting Exchange Rate
c) Purchasing Power Parity (PPP) theory of Exchange.
d) Real Exchange Rate & Real Effective Exchange Rate
e) Interest Rate & Exchange Rate
f) Covered Interest Rate & Interest Rate Parity, Forward Rate Parity
g) The Fischer Effect
h) Exchange Rate Forecasting

5) The Foreign Exchange Market **(10)**

a) Structure of foreign Exchange Market
b) Market Participant & market makers
c) Market segment

d) Markets for Currency Options & Futures
e) Foreign Exchange Rate
f) Arbitrage- Two Point & Triangular Arbitrage
g) Forward & future spot rate
h) International Transaction Mechanism – Nostro, Vostro and Loro Account, SWIFT, CHIP, CHAP, Telegraphic Transaction (IT)
i) The Indian Foreign Exchange Market.

6) Financial Decisions of Multinational Corporations (08)

a) Generalised trade theory
b) MNCs: Definition, rationale, Merits & Demerits, Role & impact
c) Cost of Capital: Meaning & Factors, Difference between Cost of capital for MNCs & Domestic firm
d) Capital structure decisions
e) Operational Strategies of MNCs: Change Strategy, technology adaption, quality improvement & control, Mergers & Acquisition
f) Sources of Funds for MNCs: long term & short term

7) International Financial Institutions (05)

a) International Bank for Reconstruction and Development
b) International Development Association
c) International Finance Corporation
d) Asian Development Bank
e) International Monetary Fund

REFERENCE BOOKS:

1) International Finance Management by Thumuluri Siddaiah (IFM) - Pearson
2) International Finance Management by P. G. Apte - Tata McGraw Hill
3) International Finance Management by vyuplesh saran – Prentice Hall
4) International Finance by Maurice D. Levi - Routledge
5) International Finance Management by V.A. Avadhani – Himalaya Publishing House
6) International Finance Management by V.K Bhalla - Anmol Publications
7) International Finance Management by O.P.Agrawal - Himalaya Publishing House
8) International Finance Management by Cheol S. Eun & Bruce G Resnick , Tale McGraw Hill
9) International finance Marketing by N. R. Machiraju – Himalaya Publication
10) International Finance Management by K. Aswasthapa- Tata McGraw Hill

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

306 E –International Logistic & Supply Chain Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1) Supply Chain Management **(16)**

a) Concept, Supply Chain Linkage
b) Mapping the supply chain
c) E-Business solution for supply chain
d) Supply chain Flows
e) Cycle View of Supply Chain
f) Process cycle time
g) Supply Chain Relationships: Supplier-Buyer relationship
h) Functional Strategies that impact SCM performance
i) Parameters for SCM Design
j) Information Functionality of Supply Chain
k) Principles of Supply chain Information
l) Information System activity
m) Technology Used in SCM

2) Logistic Management **(06)**

a) Definition, Objective Functions & Scope
b) Customer value chain
c) Logistical competence, competitiveness and competitive advances
d) Logistic for business excellence
e) Logistic solution
f) Role of Logistic in Supply Chain

3) Customer Service And Demand Management **(06)**

a) Relationship between customer and demand management
b) Customer service for competitiveness
c) Customer service phase
d) Service attributes
e) Customer service strategy
f) Value added logistical service

4) Logistic Planning And Strategy **(06)**

a) Hierarchy of planning
b) Relationship between logistic strategy and corporate strategy
c) The strategic logistic plan and audit
d) Logistic mission and objectives
e) Logistic Strategies & Formulation
f) Designing Logistical system

5) Logistic Mix **(16)**

a) Warehousing
   i) Concept & Functions
   ii) Warehouse Options
   iii) Warehouse Site Selection & Layout Design
   iv) Warehouse Costing
   v) Warehousing Strategies
   vi) Warehousing in India

b) Material Handling Systems
   i) Role of Material Handling
   ii) Material Handling Guidelines

c) Material Storage Systems
   i) Concept
   ii) Storage Principles
   iii) Benefits of Storage Design
   iv) Storage Methods

d) Transportation
   i) Transportation Infrastructure
   ii) Freight Management
   iii) Factors influencing Freight cost
   iv) Transportation Network
   v) Route Planning
   vi) Containerisation

e) Logistical Packaging
   i) Consumer Vs Logistic Packaging
   ii) Packaging as Unitisation
   iii) Design Considerations
   iv) Packaging Materials
   v) Returnable Logistic Packaging
   vi) Packaging Cost

f) Logistic Information system (LIS)
   i) Logistic Information Needs
   ii) Designing Logistic Information system
   iii) Desired Characteristic of LIS

REFERENCE BOOKS:

1. Logistical Management by Donald Bowersox , David Closs – Tata McGraw Hill
2. Logistic Management by V.V.Sople- Pearson
3. Supply Chain Logistics Management - Donald Bowersox , David Closs, M. Bixby Cooper – Tata McGraw Hill
4. Logistic & Supply chain management by K.Shridhara Bhat – Himalaya
5. Exploring the supply chain by Upendra kachru – Excel books
6. Supply chain management by Janat Shah - Pearson
7. Supply chain management Concept and cases by Rahul V. Altekar - PHI
8. Operations Management along the Supply chain by Russell & Taylor - WILEY-INDIA

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

307 E – International Marketing Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

---

1) Introduction to International Marketing (12)

a) International Market: Meaning, Expansion, Growing Attractiveness

b) International Marketing: Meaning, Need, significance, Participants, Motives, Problems, Complexities, Decisions & Future

c) International Orientation & Stages

d) Scope of Marketing Indian Products Abroad

e) International market orientation- EPRG framework; International market entry strategies.

f) International Marketing Environment:

i) Internal**,** External, Domestic, Economic, Social, Cultural, Demographic, Technological, Political and Legal

ii) International Trading Environment

iii) Trading Blocs & Growing Intra-Regional Trade

g) International Market Entry Strategies & Mode, Entry Strategies of Indian Firms

2) International Marketing Mix (30)

a) International Product Strategy:

i) Levels & Hierarchy of product, Product-line analysis, Product design Strategy

ii) Product Life Cycle Management,

iii) New Product Development, Product Positioning & Product Adoption, Repositioning Strategies

iv) Product planning Matrix, Dimensions of Product Strategies

v) Product planning for global markets;

vi) Standardization v/s Product adaptation;

vii) Management of international brands: Brand Drivers

viii) Packaging and labeling

b) International Pricing

i) Role of Pricing, Objectives, Factors affecting Pricing, Pricing decisions

ii) Pricing Methods, Pricing Strategies, Cost based pricing, Transfer pricing, Dumping, Export price structure, Skimming Pricing, Penetration Pricing, Price discounts, Discriminating Pricing

iii) Price-Market relationship, Price Escalation: cost of exporting, Taxes, tariffs & Administrative costs, Exchange rate

iv) Price control: Approaches to lessening price escalation, Leasing in international markets

c) International Promotions

i) Promotion Decisions: Complexities and issues; International advertising

ii) Marketing Environment & Promotional Strategies

iii) Role of Export Promotion Organizations, Trade fairs and Exhibitions

iv) International Marketing Communication: Major Decisions, Communication Mix, Problems in International Marketing Communication

v) International Personal selling, Sales promotion and public relations.

d) International Distribution
   i) Distribution Channels: Policy, issues, Functions & types of channels;
   ii) International Channel conflict & Channel Decision
   iii) Functional Excellence in Distribution Planning
   iv) International logistics decisions & Management, Developing logistic Strategy

3) Export Management **(08)**

a) Managing Export Decisions
b) Export Contract: cost descriptions, risk coverage
c) Export procedure & Documentation, Modes of payment
d) Exit policy

REFERENCE BOOKS:

1. International Marketing:Text & Cases – Francis Cherunilam – Himalaya
2. International Marketing – R Shrinivasan – Prantice Hall
3. International Marketing – Rajgopal – Vikas Publications
4. International Marketing – Rajendra Nargundkar – Excel Books
5. International Marketing – Cateora,Graham – Tata McGraw Hill
6. International Marketing - Jain S.C. - CBS Publications, New Delhi

Specialisation – F: Agri- Business Management

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

304 F – Agri Business Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1) Introduction to ABM **(06)**

a) Meaning, definition, history, Importance and scope of agri-business
b) Changing dimension of agricultural business
c) Agri-business Management-distinctive features, nature and components
d) Five Years Plans and agri-business, characteristics of plan

2) Farm Management **(14)**

a) Organization and operation of farm business
b) Tools of farm business organization and operation
c) Steps in farm business organization
d) Evaluation of available resources in Forming & its optimum Utilization
e) Appraisal and goals of farm business
f) Approach to reorganization of the farm business
g) Farm adjustment program under uncertainty
h) Job of proficient farm planner, farm accountancy
i) Constraints in agri-business management infrastructure, technological, social & cultural. Analysis of farm records, Farm inventories

3) Agro-Processing Management **(16)**

a) Role of agro-processing industries in the Indian economy
b) Status and potential of Indian agro-processing industries.-- Food grains, commercial crops
c) Policy environment of agro-processing industries-Development, management structure and communication.
d) Work performance efficiency, public contact and public participation in agro-processing industries
e) Decision making process and entrepreneurial efficiency
f) Government policies relating to agro processing unit
g) Interdependence of agro-processing industries
h) Problem of agro-processing units
i) Guideline for financing of agro-processing industries in India

4) HRM In Agri Business Management **(06)**

a) Development of Human Resource in Agricultural Training
b) Importance of Human Resource in Agricultural
c) H. R. M. development program for Agribusiness

5) Emerging Trends In ABM **(08)**

a) Agro Tourism
b) Organic Farming
c) Contract Farming
d) Herbal Farming

REFERENCE BOOKS:

1. Dhondyal, S.P. Farm Management: An Economics Analysis. Friends Publications, 90, Krishnapur, Meerut - 250002
2. Johl, S.S. and T.R. Kapur. Fundamentals of Farm Business Management. Kalyani Publishers, 11 Rajendra Nagar, Ludhiana – 114008,P-475
3. Kahlon, A.S. and Karan Singh. Economics and Farm Management in India: Theory and Practice. Allied Publishers Pvt. Ltd. 15 JN Heredia Marg, Ballard Estate Mumbai-400038
4. Singh I.J. Elements of Farm Management Economics. Affiliated East West Press, Pvt. Ltd. New Delhi.
5. Srivastava, U.K. Vathsala. Agro-processing Strategy for Acceleration and Exports Oxford University Press YMCA, Library Building, Jai Singh Road, New Delhi – 110001.
6. Rajagopal. Organizing Rural Business Policy Planning and Management. Sage Publication, New Delhi.
7. Pandey, Mukesh and Deepak Tiwari. Rural and Agricultural Marketing International Book Distribution Co. New Delhi.
8. Diwase, Smita. Agri-Business Management. Everest Publishing House, Everest Lane, 536, Shaniwar Peth, Appa Balwant Chowk, Pune – 4110030
9. Siva Rama, K., K. Ramesh and M. Gangadhar. Human Resource Management in AGRICULTURE. Disscovery Publication, New Delhi.
10. Talwar, Prakash, Travel and Tourism Management, Gyan Books Pvt. Ltd., Main Ansari Road, Darya Ganj, New Delhi- 110 002
11. Bagri, S.C. Trends in Tourism Promotion 2003. International Books Distributors, 9/3, Rajpur Road, Dehradun-248 001 Uttarakhand (India)

1) Animal Production Management (10)

a. Scope of livestock in Indian economy
b. Livestock census and trend of livestock production
c. Terminology used in livestock care, poultry care and management of livestock and poultry i.e. calf, heifer, milking animal, dry animal, pregnant animal, draft animal and breeding bull
d. Stress management. Housing of different livestock and poultry
e. Routine farm management. Preparation of animal for different purposes
f. Various breeds of cattle, sheep, goat, buffalo and poultry
g. Nutrient requirement of livestock and poultry
h. Maintenance of records on livestock dairy and poultry farms
i. Animal health cover, structure of udder and letting down of milk, clean and hygienic milk production
j. Reproductive systems of male and female, estrus cycle, pregnancy and parturition. Systems of breeding, artificial insemination

2) Value Addition in Animal Products (10)

a. Present status of dairy, poultry, meat, wool and hide industries in WTO regime. Milk composition of different species
b. Production, packing , marketing of milk, meat and their products
c. Import, export of animal and poultry products
d. Price regulation in animal products. Factors influencing price
e. Trends in marketing and utilization of animal products
f. Importance of hides and bones, quality standards and storage
g. Market standards and regulation of animal products

3) Post – Harvest Technology of Horticultural Crops (14)

a. Importance and present status of post harvest technology in horticultural crops in India and Maharashtra. Maturity, harvesting and handling in relation to extended shelf-life and storage quality of fruits, vegetables and flowers
b. Maturity and harvesting indices of fruits, vegetables and flowers
c. Factors responsible for maturity, ripening and deterioration of horticultural produce
d. Methods of pre-cooling, grading, packaging, storage and transport of fruits, vegetables and flowers
e. Importance and scope of fruits and vegetable preservation
f. Selection of site for fruit and vegetable preservation unit. Principles and methods of preservation
g. Preparation of jams, jellies, marmalades, squashes, juices, syrups, preserves, crystallized fruits, chutney, pickle and ketchups
h. Spoilage of processed products. Post harvest management of cut flowers. Control of post harvest diseases of important fruits and vegetables

4) **Bio-fertilizers and Mushroom Production (06)**

a. Bio-fertilizers: Introduction, importance and definition
b. Type of bio-fertilizers, Economics of bio-fertilizer production
c. Mushroom: Introduction, importance and types of mushrooms. Requirements for mushrooms cultivation: different tools, equipments, substrates and chemicals required for commercial cultivation of mushroom

5) Information Technology in Agri-Business (10)

a. Information Technology: meaning, role and importance in Agri business and Agriculture marketing
b. Importance of Common Service Centers (CSC), Common issues of CSCs, Expert decision support system in Agriculture
c. Information Technology for Agriculture Marketing
d. Online market information, online market status in India
e. Website on Agriculture marketing and export
f. Role of private companies in online marketing – eChaupal, HLL Shakti

REFERENCE BOOKS:

1. Banerjee, G.C. Text Book of Animal Husbandry. Oxford and IBM Publishers, New Delhi.
2. Sashry, N.S.R.C.K. Thomas and R.A. Singh. Farm Animal Management and Poultry Production. NSR, Vikas Publishing House Pvt. Ltd. Delhi.
3. Hand Book of Animal Husbandry, ICAR, New Delhi.
4. Panda, B. and etal. Feeding Poultry. ICAR, Publication, New Delhi
5. Singh, R.A. Poultry Production. Publishers, New Delhi.
6. Maske, O Norton. Commercial Chicken Production. Manuel AVI Publishers, INC West Port.
7. Ling. E.R. Text Book and Dairy Chemistry. Chapman Hall Ltd., London
8. Devendra, C and G. B.McElroy. Goat and Sheep Production in Tropics-Long man Group Ltd., London.
9. Pantastico, E.R.,B. Post Harvest Technology, Handling, Utilization of Tropical and Sub-tropical Fruits and Vegetables. The AVI Publishing Co., West-Post, Connecticut, USA.
10. Salunke, D.K. and Desai, B.B.Past Harvest Biotechnology of Vegetables. II CRC Press, Boca Raton, Florida.
11. Varma, L.R. and V.K.Joshi. Post Harvest Technology of Fruits and Vegetables, Vol. II. Indus Publishing Company, New Delhi-110027
12. Dixon, R.O.D. and C.T. Wheeler, Nitrogen Fixation in plants. Blackie USA, Chapman and Hall, New York.
13. Motsara I.M.R., P. Bhattacharyya and Beena Srivastava, Biofertilizer Technology, Marketing and Usage- A source Book – cum glossary, FDCO, New Delhi.
14. Bahl, N. Handbook on Mushrooms. Oxford and IBH Pub. Co.Pvt, Ltd, New Delhi.
15. Kapoor, J.N. Mushroom Cultivation. Sterling Pub. Co., New Delhi-16.
16. Paul McConnell. Measuring the impact of information on development. IDRC, 1995
17. Recciuti, M.Database vendors hawk wares on Internet. Info World, 17-2, Jan 9,10.
18. Melone, T, Yates, J and Benjamin, R. Electronic Markets and Hiersrchies. CACM 485.
19. Shah Jignesh. Commodity Future- Benefits start flowing in The Hindu Survey of Indian Industry.

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

306 F – Agricultural Economics

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1) Introduction to Agricultural Economics (08)

a. Meaning, concepts, definitions scope and importance of Agricultural in National Economy
b. Land: Concept Land use classification, Land ownership and distribution of land, Management of Land
c. Agricultural labor and capital
d. Farm Mechanization and its scope and effects on Agriculture

2) Structure & Dynamics of Indian Agricultural (08)

a. Place of agricultural in National economy
b. Special characteristics of agriculture in Indian economy
c. Pattern of agricultural holdings
d. Agricultural productivity: Trends, causes and consequences of low productivity in India
e. Green revolution: New strategy in development of Indian agriculture

3) Indian Agricultural Policies (16)

a. Meaning, types and importance
b. Evolution of agricultural policy
c. Famine Commission Report
d. Royal Commission on Agriculture: Recommendations
e. Drought Prone Area Programme (DPAP)
f. Land Reform Policy
g. National Insurance Policy
h. Nature and objectives of land reforms
i. Tenancy reforms, Crash Scheme for Rural Development
j. Major agricultural input policies including seed, fertilizer, pesticides, credit and irrigation
k. National Rural Employment Assurance Programme & other recent Agricultural Development Programs
l. New Agricultural Export Polices for different commodities

4) Financial Management in Agri-Business (18)

a. Nature and scope, importance of agricultural finance
b. Agricultural finance as a part of public finance
c. Source of capitals: Meaning and concept of agriculture credit
d. Classification and forms of credit, 3 R's, 5C's and 5 P's of credit
e. Credit creation and credit control
f. Credit rationing and planning
g. Legal aspects of credit
h. Supervised credit, Credit demand and supply
i. Credit institution, credit policy and needed changes
j. Portfolio management
k. Financial ratio analysis , Break-even analysis and Investment analysis
l. Capital Market

306 F – Agricultural Economics

REFERENCE BOOKS:

1. Agrawal, A.N. - Indian Agriculture: Problems, Progress and Prospects. Vikas Publishing House Pvt. Ltd., Delhi.
2. Mamoria, C.B. - Agricultural Problems of India.- Kitab Mahal, Allahabad
3. Owen Oliver, - Natural Resources Conservation and Ecological Approach.- MacMillan Co.866, Third Avenue, New York-10022.
4. Mamoria, C.B. - Agricultural Problems of India.- Kitab Mahal, Allahabad.
5. Bansil, P.C. - Agricultural Problems of India- Vikas Publishing House Pvt. Ltd., Delhi.
6. Jain, S.C. - Agricultural Policy in India.- Allied Publishers Pvt.Ltd. Mumbai, Kolkatta, New Delhi.
7. James P.G.- Agricultural Policy in wealthy Countries.- Ague and Robertson Publishers, Sydeny.
8. Karla, O.P.- Agricultural Policy in India.- Bombay Popular Prakashan, Mumbai.
9. Datta, K.K. and K.P.M. Sundaram. - Indian Economy.- Latest Edition, S. Chand and Co., Ltd., 7361, Ram Nagar, Qutab Road, New Delhi-110055.
10. Banerjee, G.C.- Text Book of Animal Husbandry.- Oxford and IBH Publishers, New Delhi.
11. Mahanta, K.C. - Animal Husbandry in India.
12. Patnkar, S.V.- Financial Management.- Everest Publishing House Everest, Parshuram Apartment, 12, Sankalp Society, Paud Phata Road, Opp. Jog Hospital, Pune-411038
13. Jain, S.C. - Management in Agricultural Finance.- Vora and Company. Publishers Pvt. Ltd.
14. Prasanna Chandra. - Financial Management. - Tata Mcgraw Hill Publishing Co. Ltd., New Delhi.
15. Kahlon, A.S and Karam Singh. - Managing Agricultural Finance: Theory and Practice. - Allied Publisher Pvt. Lt.,165 , J.N. Heredia Marg, Ballard Estate, Mumbai-400 038.

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

307 F – Agricultural Marketing

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1) Introduction to Agricultural Marketing (06)

a. Scope, concepts & objectives
b. Differences in Agricultural & consumer Marketing
c. Constraints in Agricultural marketing
d. Problems of Agri. Marketing : Traditional agro. Marketing and present status, suggestion for improvements
e. Present status & problem in various marketing function
f. Standardization and Grading

2) Problems of Agricultural Marketing (12)

a. Defects in traditional agri. marketing system and suggestions for improvement
b. Standardization: Standards and standardization, aims of standardization, significance of standardization, demerits of standardization. Basis of standards
c. Grading: A marketing function, Importance of grading in agriculture grading in India
d. Channels of Marketing: Meaning, definition, marketing costs, margin, price spread, factors affecting the cost of marketing, reasons for higher marketing costs of farm commodities, ways of reducing marketing cost
e. Study of Market Intelligence and Market Integration : Meaning, definition, types of market integration, market function, AGMARK, price trends, market information. Co-operative agricultural marketing and public agencies involved in agricultural marketing viz. FCI, NAFED, STC, etc. Functions of price mechanism, interrelationship between prices of inputs and output. Nature and supply of agricultural products, marketable and marketed surplus. Types and reasons for price movements and their effect on agricultural price stabilization and price support polices.
f. Warehousing: State and Central Warehousing Corporations, objectives, functions, advantages, speculation, future trading and hedging
g. Hedging: Meaning, chief features of hedging, kinds, purpose, benefits and limitations of Hedging
h. Future Trading: Characteristics of future trading, organized trade in futures

3) Retail Marketing (12)

a. Concept, types of retailers, supermarkets, factory outlets, hypermarkets
b. Non store retailing. Retailer- marketing decisions. Direct selling, one to one selling, multiple selling, direct marketing and multiple marketing
c. Major types of retail organization, co-operative chain stores, voluntary chain, retailers and consumer cooperatives
d. Retail Chain Management by Corporate Houses
e. Procurement decision, Price, promotion and place decision
f. Packaging and Market Segmentation in Retail Marketing
g. Store Management: Retail location, merchandising, using price to stimulate market sale
h. Branding Strategy**:** Manufacturer's brand, private label, brand for a sale
i. Trends in retailing. Retailing strategies
j. Impact of retailing on economy and society

4) Supply Chain Management / Sales & Distribution (05)

a. Understanding Supply Chain
b. Decision phases in Supply Chain
c. Drivers of Supply Chain performance
d. The Role of Transportation in a Supply Chain, Factors affecting transportation Decisions, Tailored Transportation
e. Managing Supply, Managing Demand in Supply Chain

5) Promotion of Agri Products (05)

a. Basic Concept of Promotion
b. Fundamental of Advertising
c. Market Analysis for Agri Products segmentation & Targeting
d. Direct Marketing
e. Sales Management, Personal Selling & Salesmanship
f. Sales Related Marketing Policies

6) Trading of Agricultural Marketing (10)

a. Importance of agricultural commodities in agricultural marketing
b. Marketing of cereals rice, wheat and jowar
c. Marketing of pulses-mango, tur, gram, udid etc
d. Average cost of processing wheat into wheat flour, paddy to rice, whole pulses in to split pulses, comparison of different rice milling methods
e. Study on price spread of important crops and producer's share in consumer rupee
f. Marketing of mango, citrus and grapes
g. Marketing of vegetables
h. Improving efficiency in commodity marketing
i. Role of co-operative and regulated market in commodity marketing
j. Marketing of commercial crops with special reference to all functions and price analysis
k. Commercial commodity Trading- cotton, sugarcane, onion, grapes, banana, citrus, mango, cut flowers – roses, gerbera, gladiolus, etc. vegetables – cauliflower, cabbage, tomato, potato, onion, ladies, finger, brinjal
l. Existing levels of processing and future potential. Export and export potential

REFERENCE BOOKS:

1. Acharya, S.S. and N.L. Agrawal. -Agricultural Marketing in India.- Oxford and IBM Publishing Company Pvt. Ltd., 66 Janpath, New Delhi-110001.
2. Gupta, A.P. - Marketing of Agricultural Produce in India. - Vora and Company Publishers Pvt, Ltd., 3, Round Building, Kalbadevi, Mumbai-400002
3. Mamoria C.B. and R.L. Joshi.- Principles and Practice of Marketing in India. -Kitab Mahal, 15, Thorn hill Road, Allahabad.
4. Philip Kotler.- Marketing Management.- Pearson Education Publishers, New Delhi.
5. Panvar, J.S.Beyond - Consumer Marketing. - Response Books, Sage Publications, New Delhi.
6. Pandey, Mukesh and Deepak Tiwari.- Rural and Agricultural Marketing.- International Book Distribution Co., New Delhi.
7. Swapna Pradhan.- Retail Management – Tata McGraw Hill
8. Acharya, S.S. and N.L. Agrawal. - Agricultural Marketing in India. - Oxford and IBH Publishing Company Pvt., Ltd., 66, Janpath, New Delhi 110001
9. Mamoria, C.B. and R.L. Joshi. - Principles and practice of Marketing in India. - Kitab Mahal,15, Thorn hill Road, Allahbad.
10. Sunil Chopra, Peter Meindl,- Supply Chain Management.- Prentice Hall Publication
11. Panvar, J.S. Beyond - Consumer Marketing. - Response Books Sage Publications, New Delhi.
12. S. A. Chunawala,-Advertising, Sales and Promotion Management- Himalaya Publishing House

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

aper: 304G: EMERGING TRENDS IN INFORMATION TECHNOLOGY

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1. **Overview of an E – Commerce**
   Internet, Intranet, Extranet, Definition, Goals of E- Commerce
   Difference between E-Commerce and E- Business
   Models of E- Commerce
   Limitations and Advantages of E-Commerce (**4**)
2. **E-Banking**:
   Transactions: Inter Banking, Intra Banking, Electronic Payments, (Payment – Gateway Example)
   Securities in E-banking (SSL, Digital Signatures – Examples)
   Services Provided: ATM, Smart Card
   ECS (Electronic Clearing System) e.g. Telephone, Electricity Bills (**8**)
3. **E- Security**
   Firewalls, Electronic Market / e- shop
   Introduction to security, Types of Securities
   Security Tools, Network Security (**8**)
4. **CRM:**
   Sales, Marketing and Service Management, What is BPO/BCP, Why it is required, Guidelines, Merits/De-Merits, Call Center – brief perspective technology wise, Functioning, Ethics, Disaster Recovery Management, Case Study (**8**)
5. **Content Management and Disseminations:**
   E-learning – Models WBT, CBT, Virtual Campus, LMS & LCMS, Video Conferencing, Chatting Bulleting, Building Online Community, Asynchronous/ Synchronous Learning, Case Study **(8)**
6. **E – Logistics**:
   Logistics & Supplier Chain Management, Warehousing Management, Transportation/Distribution Management (**4**)
7. **E – Governance**:
   E –Governance Models: (G2B, G2C, C2G, G2G), Challenges to E – Governance, Strategies and tactics for implementation of E – Governance
   Case Study **(6)**
8. **Knowledge management**:
   What is KM? (Components and Type of Knowledge), Knowledge Building Models, KM Cycle & KM architecture, KM tools, KM approaches **(2)**
9. **GIS/GPS**:
   What is GIS?, Nature of Geographic data, Spatial Objects & Data Models, Getting map on Computers, GIS standards & Standardization Process of GIS development, Implementation and Deployment phases **(2)**

REFERENCE BOOKS:

1. Management Information System: Jawadekar- TMH
2. Management Information System: Laudon & Laudon
3. The Essential Guide to Knowledge management: Amrit Tiwana
4. The GIS Book: George B. Karte.
5. Internet (Use of Search Engines Google & yahoo etc)
6. E – Commerce: Milind Oka
7. E – Commerce: Bhaskar
8. Fire Wall and Internet Security: William Cheswick, Stevens, Aviel Rubin
9. E-Governance Case Studies – Ashok Agarwal

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

Paper: 305G: RELATIONAL DATABASE MANAGEMENT SYSTEMS

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1. Introduction

1.1 History: Advantages and limitations of RDBMS; Users of RDBMS

1.2 Software Modules in RDBMS; Architecture of RDBMS. **(4)**

2. Modeling Techniques

2.1 Different Types of Models, Introduction to ERD. **(6)**

3. Hierarchical Database (2)

4. Network Database (2)

5. Relational Database

Introduction; Codd's Rules; Concept of Domain, Tuple, Cardinality; Comparison between HDB-NDB-RDB **(6)**

6. Normalization

Advantages and disadvantages of Normalization; 1NF-2NF-3NFrules with examples; Anomalies. **(10)**

7. SQL commands.

Basic Structure, Set Operations, Aggregate Functions, Null Values, Nested Sub queries, Views, Complex Queries, Modification of the Database, Joined Relations, Data-Definition Language, Embedded SQL, Dynamic SQL, Exercises. **(10)**

8. Introduction to object oriented database

Concept, Object binding in Oracle - Class, Attribute, Methods, Object type, Definition, Declaring and initializing, Methods, Alter and Drop type. **(10)**

REFERENCE BOOKS:

1. DATABASE System Concepts, Silberschatz , Korth, Sudarshan

2. SQL by Scott Urman

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

Paper: 306G: VISUAL BASIC AND ORACLE

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1. Introduction to Visual Basic

Event-driven Programming, Starting and Exiting VB, Understand VB Environment, Project Explorer, Properties Window, Toolbox, Form Layout Window, Property Pages, Getting Help, Saving Project, Printing Project, Running Applications. **(3)**

2. Adding Code and Events

Code Window, Naming Conventions, Variables (all data types) - Byte, Boolean, Integer, Long (long integer), Single (single-precision floating point), Double (double precision floating point), Currency (scaled integer), Decimal, Date, Object, String (variable length), String (fixed-length), Variant (with numbers), Variant (with characters), User defined (using type), Scope (Global, Local, Static), Constants. **(3)**

3. Visual Basic Controls

Label and Textbox Controls, Command Button Controls, Frame, Checkbox and Option Button Controls, List Box and Combo Box Controls, Drive List Box, Directory List Box and File List Box Controls, Formatting Controls, Control Arrays, Tab Order. **(5)**

4. Working with functions

String Functions, Mathematical Functions, Date Functions, Data type Conversion Functions. **(3)**

5. Control Statement

IF and IIF Statement, Select Case Statement, Do Statement, For Statement Exit Statement. **(2)**

6. Dialog Boxes

Msgbox, Inputbox, Common Dialog Box (Microsoft Common Dialog Control 6.0) **(2)**

7. Menus

Creating Menus, Adding Code to Menus, Toolbars, Other Common Controls (Microsoft Windows Common Controls 6.0, Microsoft Windows Common Controls-3 6.0) **(3)**

8. Accessing data

Reading and Writing Files, Data Form Wizard, Data Control, Data Grid Control, DBCombo Box and DB-List Box, SQL Queries in VB, Jet DAO,ADO (with controls and code), Error Handling. **(5)**

9. Objects and Classes (Only Basic Definition)

OLE Control, Programming with objects (Creating objects of a user defined class and using them on the form). **(2)**

10. Windows API

Defining Windows API, DLLs, Declare Statement, Calling API routine **(1)**

11. Crystal Reports (8.5) – Overview **(1)**

ORACLE

1. Introduction to Oracle Architecture **(1)**

2. Queries

a. Select with all options, Operators, Arithmetic, Comparison,
b. Logical (in, between, like, all, %, _, any, exists, is null, and ,or, not, Distinct)
c. Order by clause **(2)**

3. SQL Functions

a. Date

Sys_date , next_day, Add_months, last_day, months_between,

b. Numeric

Round, trunc, abs, ceil, cos, exp, floor

c. Character
Initcap, lower, upper, ltrim, rtrim, translate, length, lpad, rpad, replace
d. Conversion
to_char, to_date, to_number
e. Miscellaneous
Uid, User, nvl, vsize, decode, rownum
f. Group function
avg, max, min, sum, count, with Group by and Having Clause
g. N**ested functions** **(7)**

4. Joins
Simple join
Equi join
Non equi join
Self join
Outer join
Set operators (Union, union all, intersect, minus)
Sub queries and Correlated query
DML statements (Insert, Update, Delete with where clause)
TCL (Commit, Rollback, Savepoint)
Locks in Oracle
DDL Statements **(4)**

5. Data types
Character
Char, Varchar/varchar2, Long
Number
Number (p) - fixed point, Number (p s) - floating point
Date
Raw
Long raw
Introduction to LOB datatypes (CLOB, BLOB, BFILE) **(4)**

6. Table
Create, Alter, Drop, Truncate, Rename
Constraints (Primary key, Foreign Key, Unique Key, Check, Default, Not Null, On delete, Cascade)
Column level and Table level constraints
Oracle Objects
Views, Sequences, Synonyms, Index (Define, Alter and Drop) **(4)**

7. Database Triggers
Types of Triggers
Enabling, disabling
Predicates- inserting, updating, deleting **(4)**

8. Procedures and Functions
Definition, Implementation and Execution **(4)**

REFERENCE BOOKS:

1. Visual Basic 6.0 Programming - Holzner Steven
2. Visual Basic 6.0 in 21 days - Perpy Greg
3. Peter Norton's Guide to Visual Basic 6.0 - Peter Norton
4. Visual Basic 6.0 - Peter Wright
5. Visual Basic 6.0 – Corhell
6. Oracle8- William G Page Jr. and Nathan Hughes

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

Paper: 307G: SOFTWARE ENGINEERING

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1. System Concept
Definitions, Integrated Systems, Sub-systems, Modules **(4)**

2. Role of Software Engineer / Analysts / Users in the various phases of Systems Development Life Cycle **(2)**

3. General phases of Systems Development Life Cycle
Feasibility Study, Requirements Capture, Detailed Systems Analysis, Systems Design, Testing, On-site Implementation and Maintenance **(12)**

4. Fact Finding Methods (2)

5. Different Approaches to Software Development
Waterfall Model, Spiral Model, Prototyping, RAD, Object Oriented, 4GL **(10)**

6. Structured Analysis and Design Method and Software Engineering Techniques (10)
Tools and Methodologies in Systems Development
Application Systems Modeling;
Process Modeling - Data Flow Diagrams; Concept of Object Oriented Modeling
Temporal Modeling - State Transition Diagrams; Database Design Methods
Data Modeling - Entity Relationship Method; Mapping E-R Model to arrive at the Database Design; Normalization Technique for Database Design; Controlled De-normalization
System Documentation Techniques- System Flow Charts; Functional Decomposition Diagrams; Structure Charts; Structured Flow Charts (N-S Diagrams)
Logic Representation **Techniques**
Decision Trees; Decision Tables; Pseudo code and Structured English

7. Users Interface Design
Menu, Screen and Report Layout Designing
The Mode/Style of interaction between the system and the user **(4)**

8. Codes Designing for field values - Designing Code-less system (2)

9. Introduction to Computer Aided Software Engineering (CASE) (2)

10. Types of Data Processing - Batch, On-line and Real Time Processing (2)

REFERENCE BOOKS:

1. Analysis and Design of Information System 2nd Ed. - Senn
2. Software Engineering Practitioner's Approach - Roger Pressman
3. Introduction to Systems Analysis and Design - Hawryszkiwycz
4. Systems Analysis and Design - Elias Awad
5. Introducing Systems Analysis and Design - Lee
6. Systems Analysis and Design - Perry Edwards
7. Software Engineering Concepts – Fairley

2011

North Maharashtra University, Jalgaon

FACULTY OF COMMERCE & MANAGEMENT

Syllabus of Master in Business Administration (MBA)

SEMESTER: IV

W.E.From 2011

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

STRUCTUREOFMASTER IN BUSINESS ADMINISTRATION (M.B.A.)

Semester-I and II			
Paper	**Semester-I** **A : Credit Courses**	**Paper**	**Semester-II** **A : Credit Courses**
101	Management Science	201	Management Practices
102	Accountancy For Managers	202	Business Research Methods
103	Managerial Economics	203	Global Economic Scenario
104	Information Technology For Managers	204	Management Information System and ERP
105	Introduction To Operations Management	205	Financial Management
106	Organizational Behavior	206	Human Resource Management
107	Corporate Social Responsibility	207	Marketing Management
108	Corporate Communication Skills	208	Quantitative Techniques

Semester-III and IV			
Paper	**Semester-III** **Credit Courses**	**Paper**	**Semester-IV** **Credit Courses**
301	Strategic Management	401	e-Commerce & Excellence Management
302	Entrepreneurship & Project Management	402	Family Business Management
303	Legal Aspects Of Business	403	Indian Commercial Laws
304	Specialization-I (Major)*	404	Specialization-V (Major)*
305	Specialization-II (Major)*	405	Specialization-VI (Major)*
306	Specialization-III (Major)*	406	Specialization-VII (Major)*
307	Specialization-IV (Major)*	407	Project Report & Viva-Voce*
308	Specialization (Minor-I)**	408	Specialization (Minor-II)**

*Specialization In Major Subjects (Any One)		**Specialization In Minor Subjects (Any One)	
A	Financial Management	A	Financial Management
B	Marketing Management	B	Marketing Management
C	Human Resource Management	C	Human Resource Management
D	Operations Management	D	Operations Management
E	International Business Management	E	International Business Management
F	Agro Business Management	F	Agro Business Management
G	Systems	G	Systems

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

M.B.A.

SEMESTER: IV

401 – E-commerce and Excellence Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1. Introduction to E-Commerce **(08)**

a. Traditional vs. e-commerce transactions
b. E-Commerce: Concepts, Definitions, Benefits &Impact
c. Classification of e-commerce: B2B, B2C, C2C, B2G,B2E
d. Applications of ecommerce
   i. Electronic Catalogs&Auctions
   ii. Electronic Banking
   iii. Electronic Searching
   iv. Education & Learning
   v. Electronic Marketing
   vi. Electronic Supply Chain Management
   vii. e-Customer relationship management
   e. financial services
   i. Electronic Trading
   ii. Call Center & BPO's etc.
f. Internet and E-commerce
g. Hardware and software requirements

2. E-commerce Models **(06)**

a. Native Content Based Models
b. Native Transaction Models
c. Transplanted Content based Models
d. Transplanted Transaction based Models

3. Framework of e-commerce architecture

a. Network Infrastructure (04)
   i. LAN, MAN, WAN
   ii. VPN
   iii. TCP/IP Reference Model
   iv. Domain Name Systems

b. Information & Distribution Technology (04)
   i. FTP Applications
   ii. Electronic Mail
   iii. WWW Server
   iv. HTTP

c. Networked Multimedia content Publishing Technology (03)
   i. Information Publishing
   ii. Web Browsers
   iii. Multimedia Content

d. Security & Encryption (08)
   i. Computer Crime
   ii. Importance of Security
   iii. Sources of Technical Vulnerabilities
   iv. Security Policy, Procedure & Practices
   v. Site Security, Service Security, Transaction Security
   vi. Firewalls
   vii. Transaction Security
   viii. Cryptography (Digital Signature): Public Key & Private Key
   ix. Electronic Mail Security
   x. Security Protocol for Web Commerce
e. Payment Services (04)
   i. Concept of Payment System
   ii. Third Party in e-commerce payment
   iii. Online Payment System: Pre-paid & Post-Paid Systems
f. Business Services Infracture (01)
g. Public Policy & Legal Infrastructure (01)
h. Electronic Data Interchange (EDI) (03)
   i. EDI:Development, Standards, Components & Role
   ii. Web enabled EDI.

4. Business Excellence (08)

a. ConceptExcellence
b. Core Themes of Excellence
c. Measuring Business Excellence
d. Quality awards & Excellence
e. Overview & Development of Self Assessment Process
f. Achieving organizational Excellence
g. Excellence Maturity Model

REFERENCE BOOKS:

1. E-commerce: Framework, Technologies & Applications– Bharat Bhaskar – Tata McGraw Hill 3rd Edn
2. Electronic Commerce: a Managers Guide – Ravi Kalakota - pearson
3. E-commerce - C.S.V. Murthy – Himalaya Publications
4. E-Commerce -Greenstein and Feinman – Tata McGraw Hill
5. Electronic Commerce–Awad - Pearson
6. E-Commerce: The Cutting Edge of Business -Bajaj & Nag - TMH
7. E-Commerce-Mishra- Macmillan
8. Assessing Business Excellence – L.J.Porter& S.J Tanner – ElsevierButterworth Heinemann
9. Measuring Business Excellence - by Gopal K. Kanji – Routledge

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

402 – Family Business Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1) The purview of family business **(10)**

a) Family as a business system-
   i) Driving the Values, Vision and Mission of the Family
   ii) Problems with Valuation in Ownership Succession
   iii) The Needs of the Older Generation

b) Family Dynamics –
   i) Family – a culture, Evolution
   ii) The Role of Marriage as Bonding
   iii) The family building – Parents & Children, Brothers & Sisters,
   iv) The family vessel Concept - Parenting Styles & their wars, Scapegoating
   v) The personality differences in the family which affects the family structure – Members, Uniqueness in the family traits, and the rings of influences

c) Family Business:
   i) Working Definition
   ii) What Makes It Unique?
   iii) Comparative Advantages of Family Business
   iv) History, Importance and Types of Family business
   v) Family Business Theory
   vi) Contribution of Family Business in Economy and Society

2) The construct of Family Business- **(10)**

a) The Roles, Responsibilities and Rights of Family shareholders
b) Strategies to develop the capabilities of the stakeholders
c) Roadblocks of Family business –
   i) Inability to separate family's interest from the business,
   ii) Lack of focus on strategy,
   iii) Insensitivity towards customers,
   iv) A short term gain approach and Seasonal nature of the business,
   v) Nepotism in the family structure
d) Family business vis-à-vis Management Development Plan –
   i) Succession and Continuity planning
   ii) Training the Next Generation - Value Creation and Next Generation
   iii) Dimensions of Personality w.r.t. Family Business
   iv) Sibling Team and Cousin Consortium
   v) How to Promote Trust Among Family Members
   vi) Family reunion

3) Family Wars and Conflicts **(12)**

a) Meaning and Nature of the Family Wars and Conflicts
b) Families at War –
   i) Gender, Aging and Family Size factors
   ii) Analysis of Families, Concept of Selfish family
c) Family wars – The nature and the TWO faces of family business

d) The root causes of Conflicts –Ingredients, &personal conflicts,
e) Conflicts as Process & Relationship
f) Consequences of family wars-Rewards, Fairness and Cheating,
g) Warning signs of Family wars
h) Conflict Resolution
i) Family Risk Factors & Remedies
j) Conflict as a source of Progress

4) Family Business Governance (06)

a) Uniqueness of Family Business Governance
b) Family Members and Outsiders
c) Family business - Board of Directors in Family Business&Makeup and Recruiting the Board
d) Family Councils and Family Assembly
e) Dual System of Corporate Governance and Family Governance

5) Case studies in Family Conflicts and War from Gordon and Nicholson (12)

a) Brothers at Arms –The Reliance Story, The Dassler family
b) Fighting for Crown – Bata story, IBM
c) Schism : The House Divided – The Pathak family, The LA Times Group and the Chandlers

REFERENCE BOOKS:

1. Family Wars – Classic conflicts in family business by Grant Gordon and Nigel Nicholson : Kogan Page
2. Entrepreneurship Development small business Enterprises – PoornimaCharantimath - Pearson
3. The Family Business Management Handbookby Editor Mark Fischetti
4. Strategic Planning for the Family Business:by Randel S. Carlock, John Ward
5. Culturally-Sensitive Models of Family Business by Gupta, V., Levenburg, N., Moore, L., Motwani, J., & Schwarz, T. (Eds.). (2008). The Collection. Hyderabad, India: ICFAI Press
6. The Family Firm Institute Fellows Summer Reading List: The Inaugural Edition
7. Hoy, F., & Sharma, P. (2009). Entrepreneurial Family Firms. Upper Saddle River, NJ: Prentice Hall
8. Leach, P. (2007). Family Businesses: The Essentials. London: Profile Books
9. Handbook of Family Business and Family Business Consultation: A Global Perspective, edited by Florence Kaslow. International Business Press, Binghamton, NY, 13904, 464 pages. Paperback. ISBN 0-7890-2777-1

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

M.B.A.

SEMESTER: IV

403 – Indian Commercial Laws

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

---

1) Consumer Protection – **"Consumer Protection Act, 1986"** **(07)**

a) Definition of – a Consumer, a Person, Goods, Service, Trader & Manufacturer

b) Meaning of - Consumer disputes, Consumer complaints, Unfair & Restrictive Trade Practices

c) Consumer Protection –

i) Meaning & Need - Reality or Taboo

ii) Consumer Education, Guidance

iii) Consumer rights

iv) Consumer Protection methodology – Education, Regulation and Legislation

v) Consumer Protection Councils

vi) CDRAs

2) Company Law – **"Companies Act, 1956"** **(08)**

a) Definition, Characteristics & Types of Companies

b) Promotion, Capital subscription & Pre-incorporation contracts

c) MoA&AoA - Meaning, Contents & Distinction

d) Doctrine of Indoor Management & Doctrine of Constructive Notice

e) Doctrine of Ultra-Virus

f) Management of Company

i) Meaning of - Director, Managing Director, Manager

ii) Distinction between Managing Director & Manager

3) Cyber Laws – **"Information Technology Act, 2000"** **(10)**

a) Rationale, Objective & Scheme of the IT Act, 2000

b) Digital Signature

i) Meaning

ii) Authentication of Electronic records – Asymmetric Crypto system, Electronic records, Key pair, Private key, Public key, Subscriber & Verification

c) Electronic Governance

i) Legal recognition of Electronic Records & Digital Signature

ii) Use of Electronic Records & Digital Signatures in Government & its agencies

iii) Retention of Electronic Records

iv) Powers to make rules by Central Government in respect of Digital Signature

v) Definitions of – Information, Electronic Form, Accessibility, Computer, Computer Network, Computer Resource, Computer system, Data & Functions.

d) Meaning of Certifying authority under the Act

4) Information Revolution – **"Right To Information Act, 2005"** **(05)**

a) Important theme w.r.t. Citizen, Information & Public authority

b) Enforcement & Penalty under the Act

c) Right of Third Party

5) Arbitration **(08)**

a) Meaning & concept
b) Arbitration & Interim measures
c) Appointments of Arbitrators
d) Arbitration Procedure
e) Impartiality of Arbitrators
f) Foreign Awards

6) Case studies in Indian Commercial Laws – Typical cases based on the above topics only. **(12)**

REFERENCE BOOKS:

1. Legal Aspects of Business by AkhileshwarPathak – McGraw Hill
2. Legal Aspects of Business by R.R.Ramtirthkar – Himalaya Publishing House
3. Mercantile Law by S.S.Gulshan – Excell Books
4. Mercantile & Commercial Laws by RohiniAggrawal – Taxman Publication
5. Elements of Merchantile Laws by N.D. Kapoor – Sultan Chand & Sons
6. Business law – Bulchandani - Himalaya

Specialization – A – Financial Management

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

M.B.A.

SEMESTER: IV

404 A – Investment & Portfolio Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1) Investment: (04)

a) Saving & Investment,Investment: Concept, characteristics,Opportunities, Investment Decision &Process
b) Factors favorable for Investment, Investment & Gambling, Investment Vs Speculation, Financial Vs Physical Investment
c) Investment Attributes.
d) Concept of Investment & Tax Planning.

2) Investment Avenues (12)

a) Non Marketable fixed Income avenues- Bank Deposit, Corporate Fixed Deposit Provident Fund including PPF, National Saving Certificate
b) Marketable Avenues: Equity Shares, Preference Shares, Fully Convertible Debentures, Non-Convertible Debentures, Bonds, RBI's Tax Free Bonds, Gilt Edged Securities, Private Equity & Venture Capital,
c) Other Avenues: Units of Mutual fund, Life Insurance, Non-Security Forms of Investment, Real Estate, Money Market Instruments.

3) Investment Management Framework: (12)

a) Review of Investment Avenues, Specification of Investment Objectives,
b) Formulation of Investment strategy, Selection of Securities or assets,
c) Factors to be considered in Evaluation of Performance, Tax Implications.
d) PrepareInvestment Plans for Individuals at:
   i) Young Unmarried stage
   ii) Young Married stage :
      (1) Where both partners work
      (2) Where one of the 2 partners work
   iii) Young Married , with children stage
   iv) Married , with older children stage
   v) Pre-retirement Stage
   vi) Retirement Stage

4) Security Analysis (12)

a) Concept of Security& Security analysis
b) Economic Analysis: Current State of economy, Inflation Adjustment, Significance & Interpretations of economic Indicators.
c) Industry Analysis: Concept & Growth Cycle of Industry, Competitive position & Investment classification of Industry, Impact of Government Policies.
d) Company Analysis: concept, market, accounting policies, profitability, dividend policy, capital structure, financial analysis, operating efficiency, managerial skills & efficiency
e) Technical Analysis:Technical Assumption, Technical Vs Fundamental analysis, Tools &Efficient Market Theory

5) Portfolio Analysis & Management (10)

a) Meaning, Elements & Measurement of Risk, Systematic Risk & Unsystematic risk,
b) Optimal Portfolio, Selecting the Best portfolio,Markowitz Model of Portfolio Selection
c) Portfolio revision: Meaning, Need, Strategies & Constraints
d) Performance Evaluation of Portfolios – (Theoryonly)
e) Portfolio Management: Meaning, Phases, Strategies, Asset Allocation, Building Investment Portfolio

REFERENCE BOOKS

1. Investment Management by V. A. Avdhani , Himalaya Publishing House
2. Fundamentals of Investment Management - Geoffrey Hirt, Stanley Block –Tata Mcgraw Hill
3. Investment Analysis &PorfolioManagement by Ranganathan - Pearson
4. Investment Management:Security analysis and portfolio Management by V. K. Bhalla - S. Chand
5. Investments – Bodie, Kane, Marcus, Mohanty – Tata McGraw Hill
6. Investment Management & Security Analysis: Text and Cases 2/e Khatri Macmillan
7. Investments Analysis & Management Charles P. Jones, Wiley India Edition
8. Investment Management by Preeti Singh - Himalaya Publishing House
9. Security analysis and portfolio Management by SudhindraBhat – Excel Books
10. Security analysis and portfolio Management by V.A.Avadhani - Himalaya
11. Security analysis and portfolio Management by Rohini Sing – Excel Books

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

Paper: 405-AInternational Financial Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1) Fundamental of International Management **(05)**

a) International finance: Importance, goals,features, Nature & Scope
b) DomesticVsInternational finance
c) Emerging challenges & Responsibilities of finance Manager
d) Recent changes in Global Financial markets.
e) Globalization & international Financial Management

2) Foreign Exchange Market **(23)**

a) Structure/ Features of Foreign Exchange Market. (01)
b) Exchange Rate, (08)
   i) Forex reserves
   ii) Exchange rate theories
   iii) Currency future quotes
   iv) Speculations
   v) Hedging
   vi) International Parity
      (1) Exchange Rate Determination
      (2) Factor Affecting Exchange Rate
      (3) Balance of Payment & Purchasing Power Parity (PPP) theory of Exchange.
      (4) Real Exchange Rate & Real Effective Exchange Rate
      (5) Interest Rate & Exchange Rate
      (6) Covered Interest Rate & Interest Rate Parity, Forward Rate Parity
      (7) The Fischer Effect
      (8) Exchange Rate Forecasting
c) Global Markets (08)
   i) International Swap Market
      (1) Currency Swap
      (2) Fixed rate Currency Swap
      (3) Swap Risk
   ii) Global Financial Derivatives Market
      (1) Structure of Derivatives Market
      (2) Credit Default Swap
      (3) VaR methodology and Analysis
   iii) Financial Integration
   iv) Multinational's risk minimizing financing policy
   v) Monetary policy Globalization
d) Foreign Exchange Market in India (01)
e) Arbitrage- Two Point & Triangular Arbitrage (02)
f) Forward & future spot rate (01)
g) International Transaction Mechanism (02)
   i) Nostro, Vostro and Loro Account,
   ii) SWIFT, CHIP, CHAP, Telegraphic Transaction (IT)

3) International Working Capital Management (06)

a) Working capital policy
b) Managing Liquid asset
c) Inventory Management
d) Financing of foreign trade
   i) Documentation
   ii) Modes of Payment
   iii) Methods of Financing
   iv) EXIM Bank

4) International Accounting (05)

a) Concept
b) Consolidation of Financial Statements & its analysis
c) Foreign Currency Accounting
d) Accounting of Inflationary trends
e) Transfer pricing

5) International Monetary system (05)

a) International Monitory Fund (IMF)
   i) Constitution, Role & Responsibilityof IMF
   ii) Funding facilities, International liquidity
   iii) Special Drawing Rights (SDR)
   iv) Role in Post Bretton Woodsworld
b) Convertibility& Currency

6) Balance of Payment (06)

a) India's Balance of Payment
b) Importance, Functions, Principles& Componentsof Balance of Payment
c) Accounting of Balance of Payment: Deficit & Surplus
d) Elasticity approach Vs Absorption Approach
e) General Equilibrium approach
f) Balance of Payment Vs Exchange Rate
g) Balance of Payment and Money Supply

REFERENCE BOOKS:

1. International Financial Management by V.K. Bhalla – Anmol Publications
2. International Financial Management by P. G. Apte, Tata McGrawHill
3. International Financial Management by ThumuluriSiddaiah (IFM) Pearson
4. International finance Marketing by V.A Avadhani – Himalaya Publication
5. International Finance Management by vyuplesh saran – Prentice Hall
6. International Finance Management by Cheol S. Eun& Bruce G Resnick , Tata McGraw Hill
7. International Finance Management by MadhuVij – Excel Books
8. International Financial Management Jain Macmillan

The student has to Select and discuss the case studies related to paper no. 102, 205, and respective specialization papers no. 304, 305, 306, 307, 404, 405 those will have impact on business decision making in each paper.

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

Paper: 404 B – Supply Chain Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1) Fundamentals of Supply Chain Management (SCM) **(08)**

a) Meaning & Importance of SCM
b) Supply Chain Linkage
c) Decision Phases in Supply chain
d) Mapping the supply chain
e) Supply chain Flows
f) Cycle View of Supply Chain
g) Supply Chain Relationships: Supplier-Buyer relationship
h) Factors affecting SCM performance
i) Enablers of Supply Chain Performance
j) Supply chain Performance in India

2) Logistic Management **(06)**

a) Definition, Objective Functions & Scope
b) Customer value chain
c) Logistical competence, competitiveness and competitive advances
d) Logistic for business excellence
e) Logistic solution
f) Role of Logistic in Supply Chain

3) Customer Service And Demand Management **(06)**

a) Relationship between customer and demand management
b) Customer service for competitiveness
c) Customer service phase
d) Service attributes
e) Customer service strategy
f) Value added logistical service

4) Supply Chain Management Mix **(16)**

a) Warehousing
   i) Concept & Functions
   ii) Warehouse Options
   iii) Warehouse Site Selection & Layout Design
   iv) Warehouse Costing
   v) Warehousing Strategies
   vi) Warehousing in India

b) Transportation
   i) Role of transportation in supply chain
   ii) Transportation Infrastructure
   iii) Factors affecting transportation in supply chain
   iv) Freight Management
   v) Factors influencing Freight cost
   vi) Transportation Network
   vii) Route Planning
   viii) Containerization
c) Logistical Packaging
   i) Consumer Vs Logistic Packaging
   ii) Packaging as Unitization
   iii) Design Considerations
   iv) Packaging Materials
   v) Returnable Logistic Packaging
   vi) Packaging Cost
d) Distribution
   i) Role of distribution in supply chain
   ii) Factors influencing distribution network design
   iii) Framework for Network design decisions
   iv) Evaluating Network design decisions using decision trees

5) Agile Supply Chain **(06)**

a) Supply chain for high demand uncertainty Environment
b) Responsive supply chain & its Approaches
c) Sources of supply chain disruption & its impact on business
d) Methods for handling Disruptions

6) IT & Supply chain **(08)**

a) Role of IT in supply Chain
b) IT in Supply Chain Transaction Execution
c) IT in Supply Chain Collabration& Coordination
d) IT in Supply Chain Decision Support
e) IT in Supply Chain Measurement & Reporting
f) Supply chain IT framework
g) Supply chain Management Applicaton Marketplace

REFERENCE BOOKS:

1. Supply Chain Logistics Management - Donald Bowersox , David Closs, M. Bixby Cooper – Tata McGraw Hill
2. Supply chain management by Janat Shah - Pearson
3. Logistic Management by V.V.Sople- Pearson
4. Logistic &Supply chain management by K.ShridharaBhat – Himalaya
5. Exploring the supply chain by Upendrakachru – Excel books
6. Logistical Management by Donald Bowersox , David Closs – Tata McGraw Hill
7. Supply chain management Concept and cases by Rahul V. Altekar - PHI
8. Supply Chain Management by Sunil Chopra, Peter Meindl - PHI Publications

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

Paper: 405 B – Retail Management & Consumer Behavior

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

---

1) Retailing Industry **(12)**

a) Retailing:
   i) Concepts of Retail, Retailing& Retail Management
   ii) Types and functions of Retailers
   iii) Characteristics, Role, Importance, functionsand Principlesof Retailing
   iv) Evolution of retailing in India- Growth, Reasons for growth,
   v) Emerging trends in retailing - New approaches in Retailing
   i) Global retailing trends - Opportunities & Threats in Global Retailing.

b) Retailing Formats
   i) Store-based
      (1) By Ownership
      (2) On the basis of Merchandise : Food-based & General Merchandise-based
   ii) Non Store-based : Traditional & Non-Traditional
   iii) Organized vs Un-organized Retailing

c) Drivers of Retail Change

d) Size of Retail in India &Challenges to Retail in India

e) Concept of Life cycle in Retail

2) Retailing Strategy **(08)**

a) Meaning of Retail Market Strategy, Specifics for Gaining sustainable competitive advantage,

b) Rural Retailing, The Strategic Retail Planning Process, Shopping trendsin Indian Retail Market, Consumerism & Ethics in Retailing

c) Retail Franchising: Concept, Evolution, Types, Advantages & Disadvantages

3) Merchandise Management **(15)**

a) Basics of Retail Merchandising: Meaning, Evolution
   i) Factors affecting buying functions
   ii) Roles & Responsibilities of Merchandiser & Buyer
   iii) Buying for a single store, chain store & Non store retailers
   iv) Lifestyle merchandising

b) Merchandising Planning : Concept
   i) Process of Merchandising Planning
      (1) Developing Sales forecast
      (2) Determining Merchandising requirements
      (3) Merchandising Control & Assortment planning

c) Retail Pricing : concepts & elements
   i) Determining price
   ii) Retail Pricing policies/ Strategies
   iii) Evaluation of Merchandise performance

d) Private label
   i) Concept: Store, Umbrella & Individual Brands
   ii) Need, & Evolution of Private label
   iii) Process of Private label creation
e) Category Management
   i) Concept
   ii) Reasons for emergence of category Management
   iii) Components of Category Management
   iv) Category Management business process
   v) Role of category captain
   vi) Drawbacks of category management

4) Retail Management Information System (05)

a) Need of technology & Product identification in retail
b) Importance of IT in retail
c) Factors affecting the use of IT in Retail
d) Radio frequency Identification (RFID)
e) Internet Retailing

5) Consumer Behavior (10)

a) Culture: Value & Norms, Regional & Religious influences on consumer behavior,
b) Reference Group & Social Influence, Age & Gender, Household influences on Consumer Behavior
c) Types of Family: Functions of Family, Family decision making, Family Life Cycle.
d) Consumer Behavior Outcome
   i) Diffusion of Innovation, Diffusion Process, Adoption Process,
   ii) Profile of Consumer Innovator.
e) Consumer Decision making & branding strategies
f) Diffusion of innovation
   i) Acceptance of New Product & Brand
   ii) Dimensions of Brand Diffusion
   iii) Why do brands fail
g) Retailing and consumer behavior

REFERENCE BOOKS:

1) Retail Management: Swapna Pradhan – Tata Mcgraw Hill
2) Retail Management by Berman& Evans - Pearson
3) Retail Management: Suja Nair, First Edition 2006
4) Retail Management : A global Perspective : Dr. Harjeet Singh – S. Chand & Sons
5) Retailing- Cox &Brittain – Pearson
6) Principles of retail Management – Rosemerry&Mohd. Raffik – Palgrave
7) Consumer Behaviour& Branding: Conepts readings & Cases by Kumar - Pearson
8) Consumer Behavior: SatishBatra& SHH Kazmi, Excel Books
9) Consumer Behavior: Schiffman&Kanuk- Pearson
10) Consumer Behavior (SIE): Building marketing strategy by Hawkins, Best, Coney, Mookerjee – Tata McGraw Hill

The student has to Select and discuss the case studies related to paper no. 207, and respective specialization papers no. 304, 305, 306, 307, 404, 405 those will have impact on business decision making in each paper.

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

404 C – Performance & Compensation Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1. Performance Management **(08)**

a. Meaning, Definition & Purpose
b. Standards of Performance
c. Guidelines for setting Performance Standards
d. Checklist for performance standard
e. Determinants of Performance
f. Factors influencing Determinants of Performance
g. Performance Dimensions
h. Approaches to measuring performance
i. Characteristic of an Ideal PM System
j. Disadvantages of poorly implemented PM System

2. Performance Management Process **(06)**

a. Prerequisites
b. Performance planning,
c. Performance execution,
d. Performance Assessment
e. Performance Review
f. Renewal & Re-contracting

3. Employee Development **(06)**

a. Personal Development Plans
b. Direct supervisors role
c. 360 Degree feedback system
d. Characteristic of a good system
e. Coaching process
f. Performance review Meetings

4. Managing Team Performance (TPM) **(05)**

a. Definition & Importance of teams
b. Types of teams
c. Purposes & Challenges of TPM
d. Rewarding Team Performance

5. Compensation Management **(06)**

a. Meaning, Concept, &Objectives Of Compensation
b. Compensation Management Process
c. Types Of Compensation
d. Job Valuation
e. Methods Of Job Valuation
f. Dimensions of Compensation System
g. Components of Wage Structure in India
h. Managerial Compensation

6. Wage & Salary Administration **(05)**

a. Minimum Wage, Fair wage & Living Wage
b. Objectives of Sound Wage Policy
c. Principles of Wage & Salary Administration
d. Wage Determination
e. Wage Boards
f. Methods of Wage Payments
g. Wage/Salary Differentials

7. Incentives **(06)**

a. Meaning Of Incentives
b. Need Of Incentives
c. Classification Of Incentives
d. Merits Of Incentives
e. Problems Arising Out Of Incentives
f. Time Based Individual Incentive Plan
g. Out Based Individual Incentive Plan
h. Group Incentive Plan

8. Fringe Benefits **(04)**

a. Meaning Of Fringe Benefit
b. Need Of Fringe Benefit
c. Objectives Of Fringe Benefit
d. Types Of Fringe Benefits
e. Advantages Of Fringe Benefits
f. Disadvantages Of Fringe Benefits

9. International Pay & Rewards **(04)**

a. Cross national Variation in Rewards structure
b. The space for International Reward Strategy
c. Best Practices in International Rewards

REFERENCE BOOKS:

1. Performance Management by Herman Aguinis.- Pearson
2. Compensation by Milkovich, Newman, VenkataRatnam – Tata McGraw Hill (SiE)
3. Managing Human Resources By Fisher, Schoenfeldt, Shaw- Cengage Learning
4. International Human Resource Management by Tony Edwards & Chris Rees.- Pearson
5. Human Resource Management by D.K Bhattacharya – Excel Books
6. Compensation Management in a Knowledge-based world by Henderson - Pearson
7. Human Resource Management, Text & Cases By Dr. V.S.P Rao - Excel Books
8. Essentials of Human Resource Management By P. SubbaRao – Himalaya Publishing
9. Human Resource Management By Snell, BohalenderCengage Learning
10. Performance Management Chadha Macmillan
11. Human Resource Management by S S Khanka – S. Chand & Sons

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

405 C – International Human Resource Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1. Introduction To (IHRM) International Human Resource Management (10)

a. IHRM: Definition,
b. Internationalization & HRM
c. Domestic Vs International HRM
d. Growing interest in IHRM
e. Functional positioning of IHRM
f. Organizational context of IHRM
g. Building Strategic IHRM Capabilities
h. Role of economic Development in IHRM
i. Factors affecting an MNE's IHRM Policies & Practices
j. International Division of Labour
k. Barriers to effective Global HRM

2. Social and Cultural Context of IHRM (08)

a. Culture & Cultural Sensitivity
b. Social Environment
c. Religions and Economic Implications
d. Multiculturalism
e. Cultural Predisposition
f. Cultural Dimensions
g. Managing across culture

3. International Joint Ventures (08)

a. Concept & Nature of International Joint Venture
b. Motives & Extent of Merger & Acquisitions
c. HRM factors in IJV
d. Role & impact of Culture in International Joint Venture
e. Methods of Overcoming Cultural &other Problems in IJV

4. Human Resource Practices in International environment (10)

a. Global HR Planning
b. Recruitment and Selection in International Context
    i. Company Motive
    ii. Individual Motive
    iii. Recruitment Methods
    iv. Selection Criterion & Techniques
c. Emerging trends in training for competitive advantage
d. Developing staff through International assignment
e. Women Expatriates -The Glass Ceiling Phenomenon

5. International Industrial Relations **(07)**

a. Key Issues in International IR
b. Trade Union & International IR
c. IR policy of MNC's
d. MNC's Characteristic in Neutralizing the power of Labour Unions
e. MNC's Strategy towards International IR

6. Repatriation **(07)**

a. Concept of Repatriation
b. Benefits from returnees
c. Challenges of Re-entry
    i. Individual Perspective
    ii. Organisational Perspective
d. Repatriation Process
e. Managing repatriation

REFERENCE BOOKS:

1. International Human Resource Management by K. Ashwathappa – Tata McGraw Hill
2. International Human Resource Management by Tony Edwards & Chris Rees.- Pearson
3. International Human Resource Management by Peter Dowling &Denice Welch – Cengage Learning
4. International Human Resource Management by Sengupta, Bhattacharya – Excel Books
5. International Human Resource Management By P. SubbaRao – Himalaya Publication
6. International Human Resource Management by P L Rao – Excel Books
7. International Human Resource Management (2/e) by Gupta -Macmillan

1. The student has to Select and discuss the case studies related to paper no. 106, 206, and respective specialization papers no. 304, 305, 306, 307, 404, 405 those will have impact on business decision making in each paper.

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

404 D –Industrial & Productivity Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1) Introduction to Industrial Engineering and Management (06)

a) Indian Industry
b) Stages of Scientific & Technological Revolution
c) Growth of Indian Manufacturing Industry
d) New Industrial Policy
e) Major Areas of Indian Industry
f) Globalization of Indian industry

2) Work Study (08)

a) Definition, concept, need and advantages of Work Study
b) Objectives of Method Study
c) Procedure/steps of Method Study
d) Recording Techniques
e) Micro-motion study and Therbligs
f) SIMO Chart
g) Principles of motion economy

3) Work Measurement (09)

a) Concepts of Work measurement and its objectives
b) Techniques and uses of work measurement
c) Time Study and Methods of timing
d) Work Sampling
e) Predetermined motion time & Systems (PMTS)
f) Method Time Measurement (MTM)
g) Work factor
h) Use of Motion Time Tables
i) Ergonomics

4) Productivity (09)

a) Concept, Importance & Benefits of Productivity
b) Productivity & Production
c) Measurement of productivity
d) Productivity Index
e) Means of increasing productivity
f) Productivity improvement procedure
g) Six lines of Attack to improve Productivity
h) Productivity & Standard of Living

5) Waste Scrap & Disposal Management (08)

a) Types & Cost of wastages
b) Causes and Remedies of wastage
c) Wastage of resources and preventive steps
d) Wastage control Programme and Salvage operation
e) Scrap Disposal and Surplus

6) Constraint Management (12)

a) Managing constraints across the organization
b) Theory of Constraints (TOC)
   i) Measuring capacity, utilization & Performance
   ii) Principles of TOC
c) Identification & Management of Bottleneck
d) Product mix decisions using bottlenecks
e) Economies of scale
f) Capacity timing & Sizing strategies
g) Procedure for long term capacity Decisions
   i) Estimate capacity Requirement
   ii) Identify Gaps
   iii) Develop Alternatives
   iv) Evaluate alternatives

REFERENCE BOOKS:

1) Industrial Engineering and Production Management by M. Mahajan, DhanpatRai and Sons.
2) Operations Management by Krajewski, Ritzman, Malhotra - Pearson
3) Industrial Engineering and Management by O.P. Khanna, DhanpatRai and Sons.
4) Industrial and Business Management by MartandTelsang, S. Chand
5) Purchasing and Supply Management- Donald Dobler and David Burt-Tata McGraw Hill
6) Materials Management by P Gopalkrishnan and M Sundaresan- Tata McGraw Hill
7) Materials Management – Rajendra Mishra – Excel Bookss
8) Purchasing and Materials Management-NK Nair-Vikas
9) Operations &Materials Management by K. ShridharBhat –HPH
10) Production and Operations Management – Chary - Tata McGraw Hill

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

Paper: 405 D – International Quality Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1) Foundations of Quality Management (10)

a) Quality: Meaning, Definition, Importance, Dimension, Types, Benefits
   i) Five views of Quality
   ii) Quality & Competitive advantage
   iii) Quality & Profitability
   iv) Quality as a source of value

b) Quality Management:Principles,
   i) Traditional Vs. Modern Quality Management
   ii) Strategic Quality Management

c) Total Quality Management (TQM) : Meaning, Scope & Elements
   i) TQM Vs. Traditional Management Practices

d) Deming's Quality Principles

2) Administrative systems for Quality Management (10)

a. The Fork model for quality management- The Handle
b. The Fork model for quality management- The Neck
c. The Fork model for quality management- Daily Management
d. The Fork model for quality management- Cross-functional Management
e. The Fork model for quality management- Policy Management
f. Resource requirements of the detailed fork model

3) ISO series of Standards (08)

a. ISO 9000-2000 system
b. ISO 9001-2000 system
c. ISO 9004-2000 system
d. ISO 14000 Series
e. QS 9000 Series

4) Total Quality Management (06)

a. TQMEX model
b. Japanese 5-S practice
c. Quality control circles
d. Business process Re-engineering

5) Six Sigma Management (08)

a. Concept, Six Sigma Terminology
b. DMAIC Model
c. Benefits and Costs of Six Sigma Management
d. Six Sigma Roles and Responsibilities

6) Kaizen **(08)**

a. Concept
b. Kaizen versus innovation
c. Kaizen and Management
d. Companywide Quality control
e. Characteristics of Companywide Quality control
f. Kaizen Strategy and Practice

REFERENCE BOOKS:

1) Quality Management by Howard Gitlow, Alan J, Rosa O, David Levine, Mcgraw-Hill, 3rd Edition
2) Total Quality Management- PoornimaCharantimath, Pearson Education
3) Total Quality Management - ShridharBhat - Himalaya Publishing House
4) Total Quality Management- Besterfield, Pearson Education
5) Total Quality Management- S.D. Bagade, Himalaya Publishing House
6) Total Quality Management – Shailendra Nigam – Excel Books
7) Total Quality Management - ShridharBhat- Himalaya Publishing House

The student has to Select and discuss the case studies related to paper no. 105 and respective specialization papers no. 304, 305, 306, 307, 404, 405 those will have impact on business decision making in each paper.

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

404-408 E International Business Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1. Study of following economic parameters in Countries: (40)

Countries

- United Kingdom
- United States of America
- China
- Russia
- Brazil
- Japan
- South Africa
- Australia

Parameters

a) National Income
b) Natural Resources
c) Population
d) Currency
e) Trade and Industry
f) Taxation System
g) Opportunities to Indians

2. Integration among the countries (Objectives & Functioning only) (10)
   a) SAARC
   b) ASEAN
   c) BRIC
   d) OPEC
   e) G8 and G20
   f) OECD
   g) United Nations (UNO)
   h) NAFTA
   i) European Union

References

1. China's Economy by Christopher Rowe – Granada Publishing, New York
2. Austrilian Economy by peter Kriesler –Allen &Unwin Publishing
3. Japan in the world economy by Béla A. Balassa, Marcus Noland– Institute for International Economics
4. The US Economy by Debra A Miller - Greenhaven, 2010
5. The UK Economy by Malcolm C. Sawyer -Oxford University Press
6. Everyone's guide to the South African economy by André Roux – Zebra Press
7. Political economy of Brazil: recent economic performance by PhilipArestis, Alfredo Saad-Filho - Palgrave Macmillan
8. The Russian economy: from Lenin to Putin By Steven Rosefielde – Blackwell publishing
9. www.wikipedia.org
10. www.oecd.org
11. www.saarc-sec.org
12. www.aseansec.org

7. Introduction To (IHRM) International Human Resource Management (10)

a. IHRM: Definition,
b. Internationalization & HRM
c. Domestic Vs International HRM
d. Growing interest in IHRM
e. Functional positioning of IHRM
f. Organizational context of IHRM
g. Building Strategic IHRM Capabilities
h. Factors affecting an MNE's IHRM Policies & Practices
i. International Division of Labour
j. Barriers to effective Global HRM

8. Social and Cultural Context of IHRM (08)

a. Culture & Cultural Sensitivity
b. Social Environment
c. Religions and Economic Implications
d. Multiculturalism
e. Cultural Predisposition
f. Cultural Dimensions
g. Managing across culture

9. International Joint Ventures (08)

a. Concept & Nature of International Joint Venture
b. Motives & Extent of Merger & Acquisitions
c. HRM factors in IJV
d. Role & impact of Culture in International Joint Venture
e. Methods of Overcoming Cultural & other Problems in IJV

10. Human Resource Practices in International environment (10)

a. Global HR Planning
b. Recruitment and Selection in International Context
    i. Company Motive
    ii. Individual Motive
    iii. Recruitment Methods
    iv. Selection Criterion & Techniques
c. Emerging trends in training for competitive advantage
d. Developing staff through International assignment
e. Women Expatriates - The Glass Ceiling Phenomenon

11. International Industrial Relations (07)

a. Key Issues in International IR
b. Trade Union & International IR
c. IR policy of MNC's

d. MNC's Characteristic in Neutralizing the power of Labour Unions
e. MNC's Strategy towards International IR

12. Repatriation **(07)**

a. Concept of Repatriation
b. Benefits from returnees
c. Challenges of Re-entry
    i. Individual Perspective
    ii. Organisational Perspective
d. Repatriation Process
e. Managing repatriation

REFERENCE BOOKS:

1. International Human Resource Management by K. Ashwathappa – Tata McGraw Hill
2. International Human Resource Management by Tony Edwards & Chris Rees.- Pearson
3. International Human Resource Management by Peter Dowling &Denice Welch – Cengage Learning
4. International Human Resource Management by Sengupta, Bhattacharya – Excel Books
5. International Human Resource Management By P. SubbaRao – Himalaya Publication
6. International Human Resource Management by P L Rao – Excel Books

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

Paper: 406 E – Cases in International Business Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

The student has to Select and discuss the case studies related to respective specialization papers no. 304 E, 305 E, 306 E, 307 E, 404 E, and 405 E those will have impact on business decision making in each paper.

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

Paper: 404 F – Rural Development

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1. **Rural Development**
   a. Nature & Scope of Rural Development
   b. Importance of Rural Development
   c. Objectives of Rural Development

2. **Approaches to Rural Development**
   a. Community Development Programme
   b. Intensive Agricultural District Programme
   c. Growth Center Strategy
   d. Concept of Integration
   e. Micro level planning

3. **Special Schemes for Rural Development**
   a. Stress on special schemes
   b. Limitations of special schemes
   c. Strengthening special schemes

4. **Employment Generation Programs**
   a. Crash scheme for Rural Development
   b. Pilot Intensive Rural Employment projects
   c. Antyodaya
   d. Employment Guarantee scheme
   e. Food for work programme
   f. National Rural Employment Generation Guarantee
   g. Rural Landless employment Guarantee programme
   h. JawaharRojgaryojana
   i. Jawahar Gram samridhiyojana

5. **Role of Banking in Rural Development**
   a. Growth of Cooperative Banking in Rural sector
   b. Role of Commercial Bankings in Rural sector
   c. NABARD, its Schemes & Patterns

6. **Integrated Rural Development Programme**
   a. Sailent features of IRDP
   b. Targets & Achievements of IRDP
   c. Major problems in IRDP
   d. Strengthening IRDP
   e. Swarnajayanti Gram Swarojgaryojana (SHSY)

7. Rural Development Administration and Panchayati Raj Institution

a. Functions of Panchayati Raj System
b. Merits & demerits of Panchayati Raj System
c. Strengthening the Panchayati Raj System
d. Rural Development Administration

REFERENCE BOOKS:

1. Rural Development by – Dr. I. SatyaSundaram
2. Rural Development and Planning in India – Devendra Thakur, Deep & Deep Publications, New Delhi
3. Rural Industrilisation in India – Shrinivas Thakur – StrelingPublishess, New Delhi
4. Dynamics of Rural Development Powar Structure – S.N. Chandhary – Amar Prakashan, New Delhi.
5. Integrated Rural Development Programme in India : Policy & Administration – A.K. Shrivastva – Deep & Deep Publications, New Delhi.
6. Integrated Rural Development – R.C. Arora – S. Chand Sons, New Delhi.

Paper: 405 F – Management of Agri Business Projects

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1. **Introduction to Project Management**
   a. Search for a Business Idea, Concepts of Project
   b. Project Identification, Project Formulation
   c. Project Analysis, Project Risk
   d. Project Planning, Project Design and Network Analysis
   e. Project Report, Project Appraisal
   f. Location of an Enterprise, Factory Design and Layout
2. **Financial Analysis**
   a. Financial Analysis, Funds flow analysis
   b. Ratio Analysis, Investment process
   c. Break Even Analysis, Profitability analysis
   d. Social Cost- Benefit Analysis, Budget and planning Process, Benchmarking
3. **Project Finance**
   a. Source of Development of Finance, Project Financing
   b. Institutional Finance to Entrepreneurs, Financial Institutions, Working Capital Management, Incentives and Subsidies
4. **Policies**
   a. Policies Governing Entrepreneurship, Applicability of the Factories act, Role of Consultancy Organisation
   b. Role of Various Government Institutions for Promoting Agricultural Projects
5. **Project Reports**

   Preparation of Project Reports for-
   a. Dry Grains
   b. Fertilizer / Pesticides
   c. Live Stocks
   d. Floriculture&Horticulture
   e. Milk & Milk Products
   f. Medicinal Plants
   g. Agro Tourism
   h. Irrigation
   i. Extraction of Plants and Grains

REFERENCE BOOKS:

1. Project Management- Vasant Desai- Himalaya Publication
2. Jain, S.C. - Management in Agricultural Finance.- Vora and Company. Publishers Pvt. Ltd.
3. Karla O.P.- Agricultural Policy in India – Bombay Popular Prakashan Mumbai
4. Banerjee, G.C. – Text Book of Animal Husbandry – Oxford & IBH Publisher New Delhi.
5. Rajagopal- Organizing Rural Business Policy Planning and Management- Sage Publication, New Delhi.
6. Pandey, Mukesh and Deepak Tiwari-Rural and Agricultural Marketing -International Book Distribution Co. New Delhi.
7. Iwase- Smita. - Agri-Business Management- Everest Publishing House

The student has to Select and discuss the case studies related to respective specialization papers no. 304, 305, 306, 307, 404, and 405 those will have impact on business decision making in each paper.

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

Paper: 404G: INFORMATION SYSTEMS AUDIT

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1. Overview of Information Systems Auditing – Need for Control and Audit of Computers, Effect of Computers on Internal Controls, Effect of Computers on Auditing, Foundations of IS Auditing **(5)**
2. Conducting an Information Systems Audit – Introduction, The Nature of Controls, Dealing with Complexity, Audit Risks, Types of Audit Procedures, Steps in Audit, Auditing Around or Through the Computer, introduction to Security Standards – ISO 27001 **(6)**
3. Top Management Controls and Systems Development Controls – Evaluation of Planning, Organizing, leading and Controlling functions, Approaches to Auditing Systems Development, Models for Systems Development, Evaluating Major Phases in Systems Development Process **(6)**
4. Programming Management Controls – Program Development Life Cycle, Programming team organization, Managing the Programming Group **(5)**
5. Data Management Controls – Functions and motivations of DA and DBA roles, Organizational Issues, Data Repository Systems, Control over DA and DBA **(6)**
6. Security Management Controls – Introduction, Conducting a Security Program, Major Security Threats and remedial measures, Controls of last resort – DRP, Insurance **(5)**
7. Input / Output and Operational Controls – Data preparation and entry, Production control, Library, Documentation and Program Library, Help desk and Technical Support, Capacity Planning and Performance Monitoring, Managing Outsourced operations, Check Digits, Batch Controls, Audit Trail Controls, Exposures in Communication subsystem, Controls over the Subversive Threats, OS Integrity Checking, Built in validation checks in Software, Online output Production and Distribution Controls **(11)**
8. BCP and Cyber Crimes – Difference between BCP and DRP, Social Engineering, Data Diddling, Denial of Service attack, Sniffing, Man in Middle attack, Identity Theft and spoofing – Phishing, Pharming, SQL Injection, Zeroth Day Attacks. **(6)**

REFERENCE BOOKS:

1. Information System Control and Audit – Ron Weber – Pearson Education
2. Information System Audit and Assurance – D.P. Dube and V.P. Gulati – Tata McGraw Hill
3. ISACAs IT Audit standards

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

Paper: 405G: INTERNET TECHNOLOGY

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

1. **HTML**

A.HTML Basics

Introduction to HTML
WWW
Web Publishing **(2)**

B. Designing

Contents – Blocks, Text, Form Elements
Links – To a page, Within Page, To a Site.
Links And Images – Image Mapping-
Server Side, Client Side
Layout – List (OL, UL, DL) - Tables- Frames (Nested, I Frame)
Head Elements – Base Font, Meta Tags, Scripts, Styles **(5)**

C. CSS

Inline
Embedded
Sep. /External
Transaction Effect
Client Pull **(3)**

D. Introduction To XML **(3)**

E. ASP

A. Getting started with active server
Pages
What are ASPs?
Understanding Client – Server Model
ASP versus Client side Scripting
Setting PWs and/or IIS
ASP tools like Visual Interdev or Font Page **(3)**

B. Dissecting your First ASP Script.
Understanding ASP Script.
ASP Browser
ASP Process
Concept of File Inclusion. **(3)**

C. Working with variables
Definition and Naming rules
Data Types
Constant, Arrays
Operators **(3)**

D. Understanding VB Script Control
Structures
Conditional
Looping
Branching **(2)**

E. Using VB Script Built-in Function
Typecasting Variables
Math, Date, String, Formatting -Functions. **(2)**

F. Using Database
Reading From a Database Using ASP
Inserting, Updating, and Deleting Database records

REFERENCE BOOKS:

1. The Complete Reference to HTML - Thomas Powell
2. Dynamic HTML for Dummies – Michael Hyman
3. ASP Developers Guide – Greg Vuczek
4. ASP in 21 Days – Scott Mitchell and James Atkinson
5. ASP 3.0 – A Beginner's Guide – Mercer
6. HTML - Beginner's Guide - Willart
7. Microsoft Office 2003 Front page Inside Outside

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

Paper: 406G: INFORMATION TECHNOLOGY AND SOFTWARE PROJECT MANAGEMENT

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

I. Software Project Management

Overview of COCOMO Model, PERT/CPM, Reileigh Curve
Project Organization
Risk Management
Project Finance
Procurement Management
Project Scheduling
Project Quality Management
Communication Management **(10)**

II. Software Project Management

Resources Planning and Estimation
- Different Methods of estimation in brief
- Function Point Analysis in some details

Use of CASE Tools
Introduction to MS Projects
Design and Development
- Schedule
- Resource Allocation
- Progress Review
- Review - Design and Walkthroughs

Testing
- Overview of
- Test Plan
- Generation of Test Cases, Test Data
- Types of Testing
- Quality Concepts - ISO, CMM

Production / Implementation
- User Acceptance Tests
- Parallel Runs
- Change Management

Maintenance
- Types - Adaptive, Corrective, Preventive
- Version Control and Configuration Management

Documentation Methods for all these topics
Aspects specific to Generic Product Development vis-à-vis user specific application development **(20)**

III. IT Management

Acquisition Process - Hardware, Software, Network, Infrastructure
- Requirement Planning
- Sizing
- Selection Methodology including Benchmarking
- Documents involved

IT HRM
- Selection
- Retention
- Training
- Career Path Planning

IT Operations
- Scheduling
- Roles and Responsibilities
- Procedures

Performance Evaluation
- Broad methods for Hardware, Software and Personnel **(20)**

REFERENCE BOOKS:

1. Software Project Management - Edwin Bennetan
2. Software Engineering - Roger S. Pressman
3. Software Engineering - Martin L. Shooman
4. TQM for Computer Software - Dunn and Ulman
5. Management of Information Technology - Pravin Muley
6. Software Project Management Goyal Macmillan

North Maharashtra University, Jalgaon

First year term I
ME Civil Engineering (Environmental Engineering)
Examination scheme and structure with effect from year 2010 – 11
First Year Term – I

Sr. No.	Subject	Teaching Scheme per week		Examination Scheme				
		L	P	Paper Hr.	Paper	TW	PR	OR
1	Environmental Engineering Microbiology	3	--	3	100	--	--	--
2	Design operation and maintenance of water supply and sewerage system	3	--	3	100	--	--	--
3	Air pollution	3	--	3	100	--	--	--
4	Environmental Engineering Chemistry	3	--	3	100	--	--	--
5	Elective-I	3	--	3	100	--	--	--
6	Laboratory Practice-I	--	6	--	--	100	--	50
7	Seminar-I	--	4	--	--	100	--	--
Total		15	10		500	200		50
Grand Total		**25**		**750**				

Elective-I

1) Environmental Sanitation
2) Remote Sensing GIS and its environmental application
3) Rural water supply and sanitation

ME Civil Engineering (Environmental Engineering)
First Year Term – II

Sr. No.	Subject	Teaching Scheme per week		Examination Scheme				
		L	P	Paper Hr.	Paper	TW	PR	OR
1	Advanced Water Treatment Technology	3	--	3	100	--	--	--
2	Advanced Waste Water treatment Technology	3	--	3	100	--	--	--
3	Industrial water and waste water Management	3	--	3	100	--	--	--
4	Water shed management	3	--	3	100	--	--	--
5	Elective-II	3	--	3	100	--	--	--
	Laboratory Practice-II	--	6	--	--	100	--	50
	Seminar-II	--	4	--	--	100	--	--
Total		15	10	--	500	200		50
Grand Total		**25**		**750**				

Elective II

1) Design of Water Supply and Waste Water structure
2) Environmental impact Assessment
3) Solid Waste and Management

ME Civil Engineering (Environmental Engineering)
Second Year Term I

Sr. No.	Subject	Teaching Scheme per week		Examination Scheme				
		L	P	Paper Hr.	Paper	TW	PR	OR
1	Seminar – III	--	4	--	--	50	--	50
2	Project Stage – I	--	18	--	--	100	--	--
Total		--	22	--	--	150	--	50
Grand Total		**22**		**200**				

ME Civil Engineering (Environmental Engineering)
Second Year Term II

Sr. No.	Subject	Teaching Scheme per week		Examination Scheme				
		L	P	Paper Hr.	Paper	TW	PR	OR
1	Progress Seminar	--	--	--	--	50	--	---
2	Project Stage - II	--	18	--	--	150	---	100
Total		--	18	--	--	200	--	100
Grand Total		**18**		**300**				

North Maharashtra University, Jalgaon

ME Civil Engineering (Environmental Engineering)

Examination scheme and structure with effect from year 2010 – 11

First year term I

1) ENVIRONMENTAL ENGINEERING MICROBIOLOGY

Lectures – 03 Hours / Week	Theory 100 marks
Tutorial - 01Hours/week	Min passing 40 marks
Term work 50 marks	Duration - 03Hours

Role of microorganisms in environmental engineering. Microorganism classification, bacteria, Algae, Fungi, Protozoa, Crustacea, Rolifers, Oligochaeta, Parasites. Observation of microbes. Biochemical reactions. Metabolic activities. Role of enzymes. Pure and mix culture. Biodegradibilty. Factors affecting biodegradability, ph, temperature, nutrition, salt concentration, toxicity, osmotic pressure etc. Optimum conditions for growth, oxygen requirement.

Bacterial metabolism- oxidation of carbohydrates Protein and fats under aerobic and anaerobic conditions, Carbon, Nitrogen and Sulfur cycles in nature.

Role and micro-organisms in the treatment of sewage and industrial wastes by different methods.

Synthesis, growth and death of microorganisms, population dynamics.

Role and significance of bacteria and viruses in potable water, occurrence of water borne diseases and their prevention, Bacterial indicators of pollution.

M. P. N. techniques and bacterial colony counting, M. F. technique – principle, procedure, limitation of test, Interpretation of analytical results. Bacteriological standards for raw and treated waters.

Applied microbiology of domestic sewage and industrial wastewater. Anaerobic and aerobic metabolic pathways.

Microbial inner look into various wastewater treatment systems including trickling filter, activated sludge process, oxidation ponds, anaerobic digesters.

Role of microorganisms in solid waste disposal, pathogenic aspects of landfilling and composting, microbiological factors affecting performance of landfills and composting plants.

Effect of radioactivity on microorganisms. Milk and food sanitation. Air born disease, spread and control of air born diseases. Biological indicators of pollution. Control of Algae and other Biological growth in water supplies.

Term work:

1. Determination of MPN index of a given sample of water.
2. Study of optical microscope and its setting.
3. Preparation of culture media.
4. Acclimatization of bio mass and its concentration under aerobic conditions.
5. Determination of B Coli count of water by membrane filtration method.
6. Study of microbes under microscope and staining of microorganisms.
7. Study of heavy metals on microorganisms.
8. Five Assignments based upon above syllabus.

Books:

1. Microbiology for sanitary engineer by McKinney.
2. Sanitary microbiology by Gauddy and Gauddy.
3. Microbiology by Pelzar.

2. ENVIRONMENTAL ENGINEERING CHEMISTRY

Lectures – 03 Hours / Week
Tutorial - 01Hours/week
term work 50 marks

Theory 100 marks
min passing 40 marks
Duration - 03Hours

Basic concepts from general chemistry- elements, atomic weights, gram atomic weights, compounds, mole, avagadro's number, valancy, oxidation state, nomenclature, chemical equations and weight relationship, oxidation-reduction, gas laws, solutions, Le Chatelier's principal, , ionization, common ion effect,
shifting chemical equillibria, amphotermic substances.

Basic concepts from physical chemistry- thermodynamic aspects, energy, enthalpy, entropy, Gibb's free energy, vapor pressure, surface tension, solution of solids in liquids, osmosis, dialysis, solvent extraction, electrochemistry, chemical kinetics, catalysis, adsorption,.

Basic concepts from organic chemistry- carbon atom, isomerism, hydrocarbons, alcohols, aldehydes, ketones, acids, esters, ethers, alkyl halides, amines, amides, cyclic aliphatic compounds, aromatic compounds, phenols, heterocyclic compounds, dyes, common foods, trace organics, detergents, pesticides.

Basic concepts from equilibrium chemistry- limitations of equlibrium calculations, ion activity coefficients, acids and bases, buffers, solubility, complex formation, oxidation-reduction, preliminary numerical treatment with these topics.

Basic concepts from colloid chemistry- colloid, methods of formation, dispersion of colloids in liquids, dispersion in air.

Basic concepts from biochemistry chemistry- enzymes, cofactors, temperature dependence, pH, trace elements, biochemistry of protines, biochemistry of fats, biochemistry of carbohydrates, energetics and bacterial growth.

Standard methods of examination of waters and wastewaters, standard solutions, primary and secondary standards, colorimetry.

LIST OF PRACTICALS:

1. Preparation of standard solutions.
2. Determination of conductivity
3. Kijedahl Nitrogen determination.
4. Calcium, magnesium and total hardness.
5. Determination of Iron using spectro photometry
6. Determination of chromium using spectro photometry
7. Determination of fluoride using spectro photometry
8. Residual chlorine determination..
9. Determination of Dissolved oxygen of a given sample of water.
10. Determination of Biochemical oxygen demand of a given sample of wastewater using acclimatized bio mass..
11. Determination of TOC of a given sample of wastewater.
12. Determination of IOD of a given sample of wastewater.

Any ten experiments out of the twelve experiments given above must be performed.

Books:

1. Chemistry for environmental engineering: Sawyer and McCarty, TMC Publication N Delhi.
2. Physical chemical and organic chemistry by Bahal and Tuli, Khanna publication New Delhi.

3. DESIGN OPERATION AND MAINTENANCE OF WATER SUPPLY AND SEWERAGE SYSTEM.

Lectures – 03 Hours / Week
Tutorial - 01Hours/week
term work 50 marks

Theory 100 marks
min passing 40 marks
Duration - 03Hours

Importance of sewerage system. General History of water supply and sewerage system in India. Development in different five year plans, Future scope.
Estimation of water requirements and flow into sewers.

Sources of water, Surface and underground sources. Intake structures, construction and maintenances of wells and infiltration galleries. design of intake structures.

Transmission of water, Types and materials of conduits, Hydraulic characteristics, Water hammer appurtenances, Pumping of water, types, design and selection.
Types of pumps, Economics of pumps and rising main.
Distribution of water, Pressure and capacity requirement of systems. Field and office analysis of distribution network, Service reservoir. Maintenance of distribution system. Emergency disinfections of mains.

Sewerage System : Patterns of sewerage systems, kinds of sewer.

Design of sewerage systems : Hydraulics of sewers. Flow at sewer transitions. Length of side weirs and capacity of street inlets, Estimates of sewage flow. Storm water runoff. Design and layouts of sanitary and combined sewerage systems. Maintenances of sewers.

Sewer Appurtenance : Manholes, flushing tanks. Inverted siphons, Regulators., design and working principal

Pumping of sewage: Necessity, Types and characteristics of pumps. Typical problems in sewage pumping.

Plumbing requirements of tall buildings: design of water supply and sewerage for houses, numerical treatment.

Term work: term work shall be based upon ten assignments based upon the above mentioned syllabus. The assignments should base upon following topics:

a. Significance of sewerage and eater supply systems and their history. (one assignment)

b. Design of intake structure. (one assignment)

c. Design of pressure mains (one assignment)

d. Materials, layout and maintenance of pipes network. (two assignments)

e. Design of pipe network. (two assignments)

f. Estimation of run off and sewerage (one assignment)

g. Design of sewer (two assignments)

h Lay out and maintenance of sewers (one assignments).

Books:-

1. Water & Wastewater Technology:- Mark J. Hammer
2. Pumping and collection of wastewater, Meclaf and eddy Inc.
3. Water supply & Wastewater engineering :-B.S.N. Raju
4. Water supply engineering :-Dr. P. N. Modi.

4. AIR POLLUTION

Lectures – 03 Hours / Week
Tutorial - 01Hours/week
term work 50 marks

Theory 100 marks
min passing 40 marks
Duration - 03Hours

Definitions, energy environment relationship.

Importance of air pollution studies in modern world, elements of air pollution, sources of air pollution, effects of air pollution on human beings, plant, animals, property. Economic effects of air pollution. Global and local effects of air pollution. Case studies of India and world. Permissible air pollution. Ambient and effluent standards.

Nature's cleaning mechanism. Point source. Atmospheric conditions and dispersion of air pollution, various types of plume behaviors, Guassian dispersion equations, their limitations, numerical treatment. Estimation of dispersion of air pollution from a given height of stack under given atmospheric conditions, plume rise estimation, estimation of maximum concentration under given conditions, calculation of required height for permissible concentration. Concept of line source.

Air pollution from thermal power plant, their characteristics and control.

Air sampling methods and equipments. Analytical methods for air pollution studies, smoke survey, planning an air pollution survey.

Particulate matter and its control by equipments. Working principal, advantages,

Disadvantages, design and applications of various types of particulate control devices. Concept of bio filters.

Automobile air pollution, types, control methods, effect of A/F ratio.

Photochemical smog formation, bad effects, control.

Control of air pollution : strategy, effect of town planning, road conditions, vehicle condition etc. history of air pollution legislation in India. Life style and air pollution.

Glance over present day global and Indian scenario of air pollution.

Term work:

1. Ten assignments based upon above syllabus.

The assignments shall be based upon following topics:

a. Automobile air pollution and its control (one assignment)
b. Meteorological factors and their influence on air pollution dispersion, plume behavior (two assignments)
c. Life style and air pollution control (one assignment)
d. Energy utilization and environmental degradation (one assignment)
e. Estimation of effective height of stack (one assignment)
f. Estimation of required height of stack for pollution control under given environmental conditions (two assignments)
g. Global environmental phenomenon (two assignments).

2. Visit to a site where air pollution control device is working.
3. Practical:
    a. Air pollution sampling using high volume sampler.
    b. Automobile air pollution sampling using auto exhaust analyzer.
    c. Study of functioning of air pollution control devices installed at sites.

Books:-

1. Air pollution:- A C Stern.
2. Air pollution :-M N Rao & H V N Rao
3. Air pollution engineering by Perkins.
4. Air pollution control technology: Wark and Warner.

5. *ELLECTIVE-I*

1. ENVIRONMENTAL SANITATION

Lectures – 03 Hours / Week
Tutorial - 01Hours/week
term work 50 marks

Theory 100 marks
min passing 40 marks
Duration - 03Hours

Definitions, environment and its effect on public health, global environmental sanitation history, problem of environmental sanitation in India.

Refuse Collection And Disposal: generation, storage and Composition of refuse, quantity, house treatment, Administration of collection and disposal. Socio economic and cultural aspect associated with refuse management problem.

House sanitation: importance of house sanitation, indoor pollution, importance of sun light, Heating, cooling, ventilation, air conditioning, lighting. Noise-hazards of noise, protection against noise, fly and mosquito control. Architectural aspects for house sanitation.

Communicable Disease: Disease and immunity, communicable, diseases source, Mode of transfer, Control of communicable diseases

Sanitation of public places: Problems of sanitation of the following public places and their solutions : Swimming pools and bathing places, Bus and railway station, Hospitals, Cinema houses, Campus, fairs and festival.
Milk Food Sanitation: Essentials of dairy farm and cattle shed sanitation. Tests for milk and dairy products. Food epidemics, food poisoning, Botulism.

Parasitology: Tropical health, Health problems of under develop countries. Disease due to parasite infestation. Physiological effects, specific examples of region. Engineering control.

Term work: Ten assignments based upon above syllabus as on following topics:

a. Importance of environmental sanitation and historical back ground (one assignment)
b. Traditional Indian practices for environmental sanitation and health protection. (one assignment)
c. Refuse problem and its cultural aspects (two assignment)
d. Refuse collection and socio economic aspects.(two assignment)
e. Disease transmission and its prevention, role of individual and community (two assignments)
f. Sanitation of public places (two assignment)

In addition to above, students must do a minor project based upon above syllabus the project must be a case study of field.

Books:-

1. Municipal & Rural Sanitation:- Ehlens &Steel
2. Environmental Management:- G.N. Pandey
3. Environmental Sanitation:- B.S. Kapoor

2. REMOTE SENSING, GIS AND ITS ENVIRONMENTAL APPLICATIONS

Lectures – 03 Hours / Week	Theory 100 marks
Tutorial - 01Hours/week	min passing 40 marks
term work 50 marks	Duration - 03Hours

Fundamental principals of remote sensing, electromagnetic energy and its atmospheric interactions, remote sensing systems.

Elements of remote sensing systems, Indian remote sensing program.

Principles of Ariel survey, ariel photography, scale, types of photographs, over lapping, drift and drag, air photo interpretation, equation of parallex, stereoscopic vision, air base distance, areil points.

Satellite imageries, stationary and geo-stationary satellites, global positioning system and its application in environmental engineering. Indian satellite program.

Geographical information system, fundamentals, applications, characteristics. Different types of sensors, data interpretation.

Integrated application of remote sensing and GIS in environmental engineering, resource management, monitoring and evaluation, modeling.

Term work:

1. Practice with GIS software.
2. Minor project using GIS
3. Study of areil photographs and satellite imageries.
4. Five assignments based upon above syllabus. The assignments should include following topics:
    a. Principles of remote sensing (one assignments)
    b. GIS, its scope and applications (Two assignments).
    c. History and development of GIS (one assignment)
    d. Digital data interpretation (one assignment).

Books:

1. Remote sensing, principles and interpretation by W H & Freeman & Co. NY.
2. Remote sensing by Gupta R P.
3. Introductory digital image processories by Jensen J R, Pentice Hall, NZ.

3. Rural Water Supply and Sanitation

Lectures – 03 Hours / Week
Tutorial - 01Hours/week
term work 50 marks

Theory 100 marks
min passing 40 marks
Duration - 03Hours

Importance of village community in India , conditions of Indian villages with special regard to economic ,social and health aspect. Quality of water needed for village community. Sources of water for village water supplies. Types of wells of sanitary aspects in well construction. Disinfections of wells. Different types of pumps used for village wells. Treatment of water. Hydrological aspects of source and its impact on water quality. Strengthening of source.

Engineering project and role of engineer. Steps in project development report. Feasibility of the project both technical and financial. Alternative project construction. Cost comparison, scientific management and relationship , Rationalization, Qualities of good manager , office organization. Organization and management of stores. Present worth annuities, sinking funds, capitalized cost, annual expense, depreciation salvage value Rate structure, sources of money. General principles of financing, capital improvements and operating water works. Benefit cost ratio analysis, life of scheme, history, development and management of water supply and sanitary engineering projects in India.

Design of rural water supply scheme. Cost estimation of rural water supply scheme.

Term work: Five assignments based upon above-mentioned syllabus. The above assignments shall include following topics:

a. Importance, history and economic aspect of rural water supply in India. Five year development plans (one assignment).
b. Project management techniques applied to rural water supply engineering (two assignments)
c. Automation of small water supply schemes and limitation (two assignments)

In addition to above, the candidate must do a minor project based upon rural water supply schemes. It may be a case study or a design.

Books:-

1. Water supply Engineering:- S.K. Garg
2. Management of water projects:- Oxford &IBH publishing Co.
3. Pumping and Collection of water by MetCalf and Eddy TMC publications.

Laboratory Practice I

All assignments are compulsory

1. Assignment No I – Environmental Engineering Microbiology
2. Assignment No 2 – Design operation and maintenance of water supply and sewerage system
3. Assignment No 3 – Air pollution
4. Assignment No 4 – Elective I

Experiment (Minimum Four)

1. Determination of Microbial quality of water by standard Plate count
2. Determination of coli form density by MPN method
3. Membrane Filter Test
4. Determination of NO_x/SO_x
5. Determination of chloride content
6. Determination of C O D
7. Determination of Oil and Grease

ME Civil Engineering (Environmental Engineering)

TERM II

1. ADVANCED WATER TREATMENT TECHNOLOGY

Lectures – 03 Hours / Week
Tutorial - 01Hours/week
term work 50 marks

Theory 100 marks
min passing 40 marks
Duration - 03Hours

Quality of water: Standards of raw and treated waters. Sources of water and their natural quality. Protection of sources. Effects of water quality. Water ecology, water demand, fluctuation, water supplies.

Water treatment: Requirements of water treatment facilities. Process design and hydraulic design.
Unit operations and process, kinetic theory of reactors, plug flow and completely mixed reactor, dye tracing, efficiency of reactors, reactors in series, partially mixed reactors.
Sedimentation and flotation: General equation for settling or rising of discrete particles. Hindered settling. Effect of temperature, viscosity. Efficiency of an ideal settling basin, Reduction in efficiency due to various causes. Sludge, Storage and removal. Design criteria of settling tanks.

Coagulation: theories of chemical coagulation, coagulation aids. Mixing arrangement design of mechanical flocculator. Mean velocity gradient, effect of temperature.

Filtration: Theory of filtration. Size & shape characteristics of filter media. Preparation of filter sand. Hydraulics of filtration through homogenous and stratified media. Hydraulics of filter washing. Design of filter elements. Filter appurtenances, multimedia filters.

Disinfection: importance of disinfections, Methods of disinfections. Factors affecting disinfections. Destruction of bacteria, virus. Methods of dosing. Safety measures. Bad effect of chlorination.

Aeration: Principles of aeration methods.

Softening of water: types of hardness, effects, permissible limits, Langelier index, Methods of softening.

Miscellaneous water purification processes: Removal of Iron and manganese, Removal of taste and odor. Removal of Fluorides. Treatment of saline water.

Corrosion: Theory and principles of corrosion, Factors influencing corrosion. Methods of protection.

Latest methods of water treatment.

Complete design of water treatment plant as per prevailing Indian standard codes of practice with cost estimation.

Term work:

1. Five assignments based upon above-mentioned syllabus. The assignments should include following topics:
    a. Design of primary settling tank with all components
    b. Design of secondary settling tank with all components
    c. Design of coagulation units with all components
    d. Design of Filtration unit with all components
    e. Design of disinfection unit with all components.

2. Visit to a water treatment plant and its report.
3. Complete design of water treatment plant with all details, drawings and cost estimation.

Books:-

1. Water supply and sanitary engineering: E W Steel.
2. Water treatment technology: Walter J Weber
3. Water treatment manual by CPHEEO

2. ADVANCED WASTEWATER TREATMENT TECHNOLOGY

Lectures – 03 Hours / Week
Tutorial - 01Hours/week
term work 50 marks

Theory 100 marks
min passing 40 marks
Duration - 03Hours

Sewage characteristics: Characteristics of domestic sewage, storm and combined sewage. Constituents of Sewage. Sampling and storage of sewage. Decomposition of organic materials. Biodegradability. Biochemical oxygen demand. BOD satisfaction rate constant. Population equivalent. Chemical oxygen demand.
Monod's equation for substrate utilization. Kinetic coefficients of microbial decomposition of wastewater under aerobic and anaerobic conditions. Determination of kinetic coefficients. Mathematic relationship between coefficients. Kinetic theory applied to aerobic and anaerobic suspended growth mixed biological reactor, Kinetic theory applied to aerobic and anaerobic attached growth biological reactor.

Sewage disposal: Disposal methods. Self Purification of natural bodies of water. Oxygen balance and oxygen sag. Critical time and critical distance, mathematical treatment. Sewage farming.

Sewage treatment: Object of sewage treatment. Process design and hydraulic design. Screening and Grit Removal: Design and operation of screens. Disposal of screening. Principles of sedimentation applied to grit chamber. Velocity control. Disposal of grit.

Oil and grease separation: Sedimentation Primary , intermediate and final clarification. Design of tanks. Removal of sludge and scum . Sedimentation aided by chemical. Principle and theory of biological methods of treatment. Design of facilities for biological treatment of wastewater, activated sludge process, trickling filters, anaerobic and aerobic lagoons, oxidation ditch, oxidation ponds, septic tanks.
Sludge production, removal, handling, disposal methods, bio gas generation, design of bio gas reactor, sludge drying beds and their design. Aerobic digesters.

Miscellaneous Treatment: Disinfections of sewage. Coagulation of sewage.
Non biodegradable organics, their occurrence, bad effects, conventional removal methods introduction to photocatalysis theory for non biodegradable organics.

Complete design of wastewater treatment plant with all components, details, drawings and cost estimation.

Term work:

1. Five assignments based upon above-mentioned syllabus. The assignmenst should include following topics:
    a. Design of preliminary treatment system.
    b. Design of primary treatment system.
    c. Design of Biological treatment system
    d. Design of tertiary treatment system
    e. Design of advance wastewater treatment methodology.
2. Visit to a wastewater treatment plant and visit report.
3. Complete design of wastewater treatment plant with all components, details, drawings and cost estimation.

Books:-

1. Wastewater treatment, disposal and reuse: Metcalf & Eddy Inc.
2. Wastewater treatment technology by S J Arceiwala.
3. Wastewater treatment system by Hammer.
4. Wastewater treatment manual by CPHEEO

3. INDUSTRIAL WATER AND WASTEWATER MANAGEMENT

Lectures – 03 Hours / Week
Tutorial - 01Hours/week
term work 50 marks

Theory 100 marks
min passing 40 marks
Duration - 03Hours

Special problems of Industrial wastewater, water quality index and its application for industrial wastewater recalculation and reuse, industrial ecology, integrated approach for industrial water and wastewater management.
Water requirements of various industries. General idea of manufacturing process in various industries. Sources of wastewaters.

Legal aspects of industrial wastewater management, Regulatory agencies, Standards for treatment.

Reuse and recovery of bye products from industrial wastewaters. Volume reduction and waste reduction approach for pollution control, concept of end of pipe and cleaner technology.
Combine effluent treatment plants, combined domestic and industrial wastewater treatment plants.
Acclimatization of bio mass for industrial wastewater treatment, addition of nutrients.
Case studies of various industries including textile industry, distilleries, sugar industry, paper and pulp mills, oil and petroleum, dairy, food processing industries.

Books:-

1. Liquid waste of industry- theory practice and treatment: Nelson J Nemerow
2. Industrial water pollution control: W W Eekenfelder
3. Industrial wastewater management by R Mahajan TMC publication
4. Manual of Industrial wastewater by NEERI

Term work:

Five assignments based upon above syllabus. The assignments shall include following topics:

a. Characteristics of wastewater of major industries in India.
b. Pollution impact of major industries on wet land and soil.
c. Integrated water and wastewater management of major industries.
d. Typical problems with wastewater treatment of major industries.
e. Advance treatment methodology for major industrial wastewaters.

In addition to above, students should visit to at least three industrial wastewater treatment plants and submit a report.

4. WATERSHED MANAGEMENT

Lectures – 03 Hours / Week
Tutorial - 01Hours/week
term work 50 marks

Theory 100 marks
min passing 40 marks
Duration - 03Hours

Introduction: scope, objectives significance.

Water in the atmosphere: global distribution and availability of water, precipitation and evaporation, factors affecting them.

Hydrology and water resources development: analysis of runoff and rain fall, storage and regulation of run off, safe yield of streams, estimation of storage requirements. Pollution monitoring in watershed and its control, watershed hygiene.

Hydrology of ground water: common aquifers, exploration of ground water, hydraulics of ground water, measurement of permeability. Design construction and maintenance of wells and infiltration galleries. Salt water infiltration and prevention, ground water recharge.

Watershed development and management: definitions, need, scope, characteristics of watershed criteria survey, basic data collection and interpretation, establishment of watershed resource evaluation and management. Urban watershed management strategy and its necessity in present time. Town planning aspect for watershed management.

Irrigation technology: integrated farming system, prospects of watershed management, methodology for modifying water resource environment, watershed management and large scale changes.

Practice of watershed management: rehabilitation, protection and enhancement.

Rain water harvesting: necessity, methods of rainwater harvesting, community participation, role of NGOs, municipal corporation, Government. Limitations. Quality assurance of storage water. Traditional water harvesting techniques and their relevance.

Design of structures for watershed management including small bandhara, percolation tanks, minor dam.

Term work: Seven assignments based upon above-mentioned syllabus. Site visit to an existing rainwater harvesting site. The assignments should be based upon following topics:

a. Water in the atmosphere
b. Hydrology and water resources development
c. Hydrology of ground water
d. Watershed development and management
e. Irrigation technology
f. Practice of watershed management
g. Rain water harvesting
h. Design of structures for watershed management

In addition to above the candidate should do a case study or design of a watershed management scheme.

Books:

1. Watershed hydrology: Peter E Black.
2. Water resources systems: planning and management: R N Chaturvedi.
3. Watershed Management strategy by S P Shah TM C publication.

ME Civil Engineering (Environmental Engineering)

ELLECTIVE II

1 DESIGN OF WATER SUPPLY AND WASTEWATER STRUCTURES.

Lectures – 03 Hours / Week
Tutorial - 01Hours/week
term work 50 marks

Theory 100 marks
min passing 40 marks
Duration - 03Hours

Introduction to IS codes for practice for steel and concrete tanks and pipes.

Conduits: Stresses in pipes, strength of conduits, Design of concrete and steel pipe for internal and external loads. Anchor blocks.

Tanks: Design of various types of underground tanks, safety analysis, retaining wall and floor junction. Surface resting rectangular and circular tanks in R.C.C. and steel. Over head rectangular and circular tanks in R.C.C. and steel. Intze tanks. Steel and concrete staging.

Treatment Units: Design clarifiers, flocculators, filter house, Hopper bottom tanks. Digesters.

Books:

1. Design of steel structures:- S. Ramamurtham
2. Design of concrete structures: S Ramamrtham
3. Design of concrete structures: Syal and Goel

Term work:

1. Design and detailing with drawings of circular water tank on surface.
2. Design and detailing with drawings of rectangular water tank on surface.
3. Design and detailing with drawings of bracings for overhead water tank.
4. Design and detailing with drawings of Intze type water tank.
5. Design and detailing with drawings of rectangular water tank under ground.
6. Design and detailing with drawings of flocculation unit.
7. Design and detailing with drawings of filtration unit.

Any five assignments of above.

2 ENVIRONMENTAL IMPACT ASSESMENT

Lectures – 03 Hours / Week
Tutorial - 01Hours/week
term work 50 marks

Theory 100 marks
min passing 40 marks
Duration - 03Hours

Development and environment, need for environmental impact assessment, concept of EIA, elements of EIA, environmental attributes, nature of impacts- primary, secondary, tertiary, short term and long term, local and regional, reversible and irreversible impacts.

Overview of impacts- directly and indirectly measurable impacts with respect to air, noise, water, land, biological and socio economic environment.

Screening and scooping in EIA: terms of reference for conducting EIA, methodologies of EIA- check list, matrices, overlays, cost benefit analysis adaptive environment and management network.

Frame work of EIA: scope of EIA, base line data collection, prediction of impacts, evaluation of impacts, Battelle environmental evaluation system, environmental management plan, green belt development, environmental quality monitoring, budgetary provisions for implementing control measures.

Environmental appraisal of project, MOEF questionnaire for environmental clearance, elements of public participation and hearing, case study on EIA of industrial, mining, highway and water resources projects, critical environmental issues and formulation of strategies for EMP for this project.

Environmental legislation- basic concepts, critical issues, civil liabilities, various enactments and their provisions- water act (1974, 1978), forest conservation act (1980), air pollution control act (1981, 1988), water (cess) act 1977, environmental protection act 1986, public liability and insurance act.

Environmental audit- definition, concept of EA, types of environmental audits, benefits of EA, scope and objectives, environmental statement, procedural aspects of conducting EA pre-audit phase, onsite audit phase and post audit phase, water audit,

energy audit, raw material audit and health & safety audit. Conservation of energy and water, waste minimization, economic benefits of EA.

Sustainable development and environmental management: concept of carrying capacity, assimilative and supportive capacity, carrying capacity based developmental planning process, regional EIA and preparation of regional EMP, , development of action plan for critical environmental areas, training needs in EM and Environmental Educational Programs. Environmental management in India.

Resource management: types of resources, terrestrial (soil) resource, mineral plants and animal (biotic) resources, marine fresh water, air and bio energy resources, resource utilization, renewable and non-renewable resources. Optimal use of resources. Depletion of resources, causes and effects.

Human resources: importance of socio economic studies in development projects.

Books:

1. Environmental Impact Assessment by Rau and Woofes.
2. Environmental Impact Assessment by W F Canter, TMC publication.
3. Hand books of pollution control act, central pollution control board, New Delhi.
4. The new environmental age by R K Sapra, S Bhardwaj, Ashish publication house New Delhi.

Term Work:

Five assignments based upon above syllabus. Assignments shall include following topics:

1. Development and environment
2. Overview of impacts
3. Frame work of EIA:
4. Environmental appraisal of project
5. Environmental legislation

In addition to this the candidate must do a minor project of EIA of any industry or any other development project.

3. SOLID WASTE AND MANAGEMENT

Lectures – 03 Hours / Week
Tutorial - 01Hours/week
term work 50 marks

Theory 100 marks
min passing 40 marks
Duration - 03Hours

General: Importance of solid waste, historical background. Over view of solid waste management

Generation of solid waste, quantity of solid waste, sampling of solid waste, characterization of solid waste, characteristics of solid waste, three phase diagram.

Storage systems, multi-bin storage system, levying on solid waste weight, climatic factors, cultural factors, removal of solid waste.

Transportation of solid waste, route optimization, numericals on route optimization and optimum number of transportation facility..

Recovery and reuse of solid waste, waste minimization. Numericals on chemical characteristics of SW.

Disposal methods of solid waste: land filling site selection, advantages and disadvantages of land filling, leachets control, fly and mosquito control at land fill side.

Composting of solid waste, Indore and Banglore methods, future of composting, limitations of composting method.

Vermicomposting: introduction and significance.

Incineration of solid waste: application, design of incinerator.

Dumping of solid waste in sea, grinding and dumping into sewers, hog feeding.

Hazardous wastes.

Socio economic and cultural aspects in solid waste management.

Management of thermal power plant waste, reuse of flyash, economic considerations.

Biomedical waste management, safety precautions, standards, disposal methods.

Term work: ten assignments based upon above syllabus. Visit to a solid waste site.

Books:-

1. Handbook of solid waste management:- Frank Kreith
2. Management of solid waste in developing countries:- Frank Flintoff
3. Solid waste management:- D. Joseph Hagerty, Joseph L.Pavoni

Laboratory Practice II

All assignments are compulsory

1. Assignment No I – Advanced Water Treatment Technology
2. Assignment No 2 – Advanced Waste Water treatment Technology
3. Assignment No 3 – Industrial water and waste water Management
4. Assignment No 4 – Water shed management
5. Assignment No 5- Elective II

Experiments (Minimum Three)

1. Estimation of Hardness
2. Estimation of Ammonia/Nitrogen
3. Estimation of Phosphate
4. Estimation of Heavy metal
5. Estimation of pesticide residue

North Maharashtra University

CIVIL ENGINEERING DEPARTMENT

MASTERS OF ENGINEERING

CIVIL ENGINEERING

(ENIVIRONMENT ENGINEERING)

With effect from Academic year 2010 -2011

North Maharashtra University, Jalgaon
M.E. (Computer Science and Engineering)
Syllabus with effect from Year 2009-10
First Year Term I

Sr. No.	Subject	Teaching Scheme per Week		Examination Scheme				
		L	P	Paper Hr.	Paper	TW	PR	OR
1	Advanced Software Engineering	3	-	3	100	-	-	-
2	Distributed Systems	3	-	3	100	-	-	-
3	Net-Centric Computing	3	-	3	100	-	-	-
4	Applied Algorithms	3	-	3	100	-	-	-
5	Elective- I	3	-	3	100	-	-	-
6	Laboratory Practice-I	-	6	-	-	100	-	50
7	Seminar-I	-	4	-	-	100	-	-
	Total	15	10		500	200		50
	Grand Total	**25**		**750**				

Elective I

1) Embedded Software Design
2) Digital Image & Video Processing
3) Mathematical Foundations of Computer Science
4) Software Project Management

First Year Term II

Sr. No.	Subject	Teaching Scheme per Week		Examination Scheme				
		L	P	Paper Hr.	Paper	TW	PR	OR
1	Advanced Database Management Systems	3	-	3	100	-	-	-
2	Web Engineering	3	-	3	100	-	-	-
3	Parallel Computing	3	-	3	100	-	-	-
4	Soft Computing	3	-	3	100	-	-	-
5	Elective- II	3	-	3	100	-	-	-
6	Laboratory Practice-II	-	6	-	-	100	-	50
7	Seminar-II	-	4	-	-	100	-	-
	Total	15	10		500	200		50
	Grand Total	**25**		**750**				

Elective II

1) Software Testing And Quality Assurance
2) Cryptography and Network Security
3) Pattern Recognition
4) Mobile Computing

Second Year Term I

Sr. No.	Subject	Teaching Scheme per Week		Examination Scheme				
		L	P	Paper Hr.	Paper	TW	PR	OR
1	Seminar-III	-	4	-	-	50	-	50
2	Project Stage –I	-	18	-	-	100	-	-
	Total	-	22	-	-	150		50
	Grand Total	**22**		**200**				

Second Year Term II

Sr. No.	Subject	Teaching Scheme per Week		Examination Scheme				
		L	P	Paper Hr.	Paper	TW	PR	OR
1	Progress Seminar	-	-	-	-	50	-	-
2	Project Stage –II	-	18	-	-	150	-	100
	Total	-	18	-	-	200	-	100
	Grand Total	**18**		**300**				

Rules and Regulations for M.E. in Computer Science & Engineering

1. The post graduate degree in engineering consisting of 2 years (4 terms) shall be designated as Master of Engineering in Computer Science & Engineering.

2. A candidate may be permitted to register him/her self for the M.E. degree in Computer Science and Engineering under the faculty of engineering & technology of North Maharashtra University Jalgaon ,only if the candidate holds a bachelor's degree in Engineering & technology of North Maharashtra University , Jalgaon or its equivalent in Computer Engineering / Computer Science & Engineering / Computer Technology /Information Technology/ Electronics/ Electronics and Telecommunication /Electrical recognized by AICTE & North Maharashtra University , Jalgaon.

3. The student shall be admitted to First Year Term II if his/her Term I is granted.

4. The student shall be admitted to the Second Year when ever he/she clears all the theory papers of First Year. The student in any case should not be allowed to start project work before passing all the subjects of first year. The student will have to work on his/her project for minimum one year after passing first year subjects. He/she will not be allowed to submit his/her thesis/dissertation before that.

5. Every student will be required to produce a record of laboratory work in the form of journal, duly certified for satisfactory completion of the term work by the concerned teacher & head of the department.

6. A student whose term is not granted on account of less attendance (Minimum 80%) or non-submission of term work is required to repeat the term.

7. Any approved guide will not be allowed guide more than 5 students in a particular batch.

8. Each student is required to present Seminar-I in the First Year Term I on any related state of the art topic of his own choice approved by the department.

9. The term-work & presentation of the Seminar-I will be evaluated by departmental committee consisting of guide and two faculty members of the department appointed by Director/Principal of the college as per the recommendation of the Head of the Department.

10. Each student is required to present Seminar-II in the First Year Term II on any related state of the art topic of his own choice approved by the department.

11. The term-work & presentation of the Seminar-II will be evaluated by departmental committee consisting of guide and two faculty members of the department appointed by Director/Principal of the college as per the recommendation of the Head of the Department.

12. Each student is required to present Seminar-III in the Second Year Term I on special topic. The topic should be on any of the area not included in the regular curriculum. The report should include detailed study of specific concept (i.e. analysis, design & implementation.). This can be a theoretical study or practical implementation approved by the department/guide.

13. Guidelines for the Seminar-III in Second Year Term I:

1. Seminar-III should be conducted at the end of Second Year Term I.
2. The term-work of the Seminar-III will be evaluated by departmental committee consisting of guide and two faculty members of the department appointed by Director/Principal of the college as per the recommendation of the Head of the Department.
3. The Seminar-III presentation will be evaluated by examiners appointed by University, one of which should be the guide.
4. Student must submit the Seminar Report in the form of soft bound copy
5. The marks of Seminar-III should be submitted at the end of Second Year Term I to the University.

14. Guidelines for the Progress Seminar in Second Year Term II:

- Progress Seminar should be conducted in the middle of Second Year Term II.
- The Progress Seminar Term-Work will be evaluated by departmental committee consisting of guide and two faculty members of the department appointed by Director/Principal of the college as per the recommendation of the Head of the Department.
- Student must submit the progress report in the form of soft bound copy.
- The marks of progress seminar should be submitted along with the marks of Project Stage-II.

15. Minimum passing marks for all Theory shall be 40% and for Term work and Oral shall be 50%.

16.He/she has to present/publish atleast one paper in reputed National/International Journal/Conference on his/her Project work before submission of his/her Thesis/Dissertation.

17. The Term Work of Project Stage –II will be assessed jointly by the pair of Internal and External examiner along with oral examination of the same.

18. The class will be awarded on the basis of aggregate marks of all four terms, giving equal weightage to all terms as shown below:

a) Less than 50%	: Fail
b) 50% to less than 60%	: Second Class
a) 60% to less than 70%	: First Class
b) 70% & above	: First Class with Distinction.

19. Each student is required to complete his/her master's degree within **Five** academic years from the date of admission, failing which he/she will be required to take fresh admission in first year.

M.E. COMPUTER SCIENCE & ENGINEERING
FIRST YEAR TERM I

SUBJECT: ADVANCED SOFTWARE ENGINEERING

Lectures: 3 Hrs per week	**Theory: 100 Marks**

Objective:
After successfully completing the module student should be apply the systematic approach towards the effective software development, also able to demonstrate knowledge of software design, development and processes using software engineering approaches and practices.

Pre-requisites:
Knowledge of Software Engineering.

DETAILED SYLLABUS

1. Introduction to Software Engineering: Software Engineering Processes, Project Management concept, Project Effort estimation, LOC and function point based estimates, Requirement Analysis and Specifications, Formal Requirements, Specifications, Socio-technical Systems, Dependability, Critical Systems Specification, Formal Specification. Analysis Modeling, Elements of Analysis Model.
2. Design Concepts and Principles: Fundamental issues in Software Design, Effective Modular Design, cohesion and coupling. Architectural Design, Distributed Systems Architecture, Application Architectures, Real-time Systems, User Interface Design, Component Level Design, Modeling Language(UML)
3. Software Development Methodologies: Iterative Software Development, Software Reuse, CBSE, Critical Systems Development Software Evolution. Verification and Validation, Software Testing, Software Testing Principles, Alternative Paradigms: Extreme Programming, Agile Software Engineering, Principles behind Agile method, Agile method and Project Management.
4. Object Oriented Software Engineering: Software Process Improvement, Software Economics, Software Quality, Software Metrics, Software Maintenance, Risk management, Requirement Engineering, Object oriented concepts and principles, OO Analysis, OO Design, OO Testing,
5. Advanced Software Engineering Process: Formal Methods, Basic concepts, Mathematical Preliminaries, Clean room Software Engineering, Component Based Software Engineering, Client/Server Software Engineering, Web Engineering, Reengineering

BOOKS

Text Books:

1. K.K Aggarwal & Yogesh Singh," Software Engineering", 3rd Edition, New Age International, 2007

References:

1. Ian Somerville,"Software Engineering", 8th Edition, Addison-Wesley,2006,
2. Roger S Pressman,"Software Engineering: A Practitioner's Approach" 6th Edition, McGraw Hill,2005.
3. Fenton and Pfleeger "Software Metrics:- A Rigorous and Practical Approach" , 2nd Edition , Tomson Learning
4. Grady Booch, Rumbaugh, Jacoboson,"Unified Modeling Language User Guide", Addison Wesley.

M.E. COMPUTER SCIENCE & ENGINEERING
FIRST YEAR TERM I

SUBJECT: Distributed Systems

Lectures: 3 Hrs per week	**Theory: 100 Marks**

Objective:
This course aims to build concepts regarding the fundamental principles of distributed systems. The design issues and distributed operating system concepts are covered.

Pre-requisites: Operating Systems and Computer Networks

DETAILED SYLLABUS

1. INTRODUCTION: Definition of a Distributed system, Goal, Types of distributed system

2 .ARCHITECTURES : Architectural styles, System Architectures, Architectures versus Middleware, Self management in distributed systems

3. PROCESSES: Threads, Virtualization, Clients, Servers, Code migration.

4 .COMMUNICATION: Fundamentals, Remote Procedure Call, Message Oriented Communication, Stream oriented communication, Multicast communication.

5. NAMING: Names, Identifiers and Addresses, Flat, Naming, Structured Naming, Attribute based Naming, LDAP

6. SYNCHRONIZATION: Clock Synchronization, Logical Clocks, Mutual Exclusion Global Positioning of nodes, Election Algorithms.

7. CONSISTENCY AND REPLICATION: Introductions, Data Centric Consistency Models, Client Centric Consistency Models, Replica Management, Consistency Protocols.

8. FAULT TOLERANCE: Introduction to fault tolerance, Process resilience, Reliable Client Server Communication, Reliable group, Recovery

9. DISTRIBUTED FILE SYSTEMS: Architecture, Process Communication, Naming, Synchronization, Consistency and Replication, Fault tolerance, Security.

10 DISTRIBUTED COORDINATION-BASED SYSTEMS: Introduction to coordination models- Architectures, Processes communication, Synchronization, Consistency and Replication, Fault tolerance, Security.

BOOKS

Text Books:

1. Andrew S. Tanenbaum, Maarten Van Steen, "Distributed System: Principals and Paradigms", 2/E, PHI.

References:

1. George Coulouris, Jean Dollimore and Tim Kindberg,"Distributed Systems Concepts and Design", Fourth Edition, Pearson Education, 2005**.**
2. Pradeep K. Sinha, "Distributed Operating Systems Concepts and Design" , PHI.
3. Galli D.L., "Distributed Operating Systems: Concepts and Practice", Prentice-Hall,2000

M.E. COMPUTER SCIENCE & ENGINEERING
FIRST YEAR TERM I

SUBJECT: NET-CENTRIC COMPUTING

Lectures: 3 Hrs per week	**Theory: 100 Marks**

Objective:
After successfully completing the module student should be :
Familiar with different network technologies, Different Network performance, Modeling and estimation measures, Function and responsibilities of Network Administration, Different Network Design Techniques, Knowledge of High Speed Network, Issues regarding Network Security, Knowledge of IP Telephony, Storage Network and Compression Techniques.

Pre-requisites:
Knowledge of Data Communication and Computer Networks.

DETAILED SYLLABUS

1. Network Technology :
   Introduction, Media Issues, Data Link Protocols, The OSI Model, Networking topologies, Types of Networks, protocols capabilities, NetBIOS, IPX,TCP/IP,CSMA/CD, token passing, frame relay, networking devices, Repeaters, Bridges, Routers, switches, gateways, Network design issues, Data in support of Network Design, Network design tools, protocols and architecture.
2. Network Performance, Modeling and Estimation :
   Issues related with optimizing network performance, probability, stochastic processes, modeling and performance evaluation. Queuing theory, queuing models, estimating model parameters, throughput utilization, modeling network as graph external and internal representation, complexity issues, network traffic controls.
3. Network Administration :
   Function and responsibilities, network issues:-planning, implementation, fault diagnosis and recovery.
4. Network Design :
   Problem definition, multipoint line layout heuristics, CMST algorithms, ESAU-William's algorithm, Sharma's algorithm, unified algorithm, Bin packing algorithm, Terminal assignments and concentrator location.
5. High Speed Networks :
   Need, characteristics, challenges, applications, frame relay, ATM, ISDN, High speed LANs: Ethernet, fiber channel, DQDB, SMDS, B_ISDN, STM, DSL, and DWDM, Architecture Transport, Switching and Routing in optical domain, optical network management, Internetworking.
6. Network security :
   Basic cryptographic techniques, security in OSI architecture, internet and networked computing, Kerberos, firewalls, proxy, etc. Security applications in commerce and banking.
7. IP Telephony :
   VOIP system architecture, protocol hierarchy, structure of a voice endpoint,

Protocols for the transport of voice media over IP networks, Providing IP quality of service for voice, signaling protocols for VOIP,PSTN gateways, VOIP applications.

8. Storage Networks :
   Introduction, challenges, SCSI protocols and architecture: RAID, Backup and mirroring, Fiber channel attached storage. Network attached storage including NFS, CIFS, and DAFS, Management of network storage architectures. New storage protocols, architectures and enabling technologies.
9. Compression :
   Overview of Information Theory, Lossless Compression: Run-Length Encoding, Facsimile compression, String Matching algorithms. Lossy compression: DCT, Wavelet compression.

BOOKS

References:

1. Stallings. W.-"High Speed Networks and Internets: Performance and Quality of service",Pretice Hall 2002
2. Kershenbaum A.-"Telecommunications Network Design Algorithms" Tata McGraw Hill.
3. Ramaswami R. ,Shivrajan K-"Optical Networks", Morgan Kaufmann.
4. Douskalis B.-"IP Telephony: The Integration of Robust VOIP service",Perason Education Asia.
5. Douglas E.Comer-"Computer NetWorks and Internet", Pearson Education Asia.
6. Stallings W.-"High Speed Networks :TCP/IP and ATM Design principles", Prentice Hall,1998.
7. Andrew Tanenbaum- "Computer Network", PHI.

M.E. COMPUTER SCIENCE & ENGINEERING
FIRST YEAR TERM I

SUBJECT: APPLIED ALGORITHMS

Lectures: 3 Hrs per week	**Theory: 100 Marks**

Objective:
Algorithm design and analysis is a fundamental and important part of computer science. This course introduces students to advanced techniques for the design and analysis of algorithms, and explores a variety of applications.

Pre-requisites:
Knowledge of Algorithms, Discrete structure and graph theory.

DETAILED SYLLABUS

1. **Introduction**: The role of algorithms in computing, analyzing algorithms, designing algorithms, growth of functions- asymptotic notation,standard notations and common functions, recurrences- the substitution method, the recursion tree method, the master method.
2. **Advanced data structures** Red - black trees- properties of red-black trees, rotations, insertion, deletion, B-trees-definition of B-Tree, basic operations on B-Tree, deleting a key from B-Tree, Binomial heaps- binolial trees and binomial heaps, operations on binomial heaps, Fibonacci heaps- structure of Fibonacci heaps, mergeable heap operations, decreasing a key and deleting a node, bounding the maximum degree.
3. **Advanced Design and Analysis Techniques** Dynamic Programming- assembly line scheduling, matrix chain multiplication, elements of dynamic programming, longest common subsequence, optimal binary search trees, Greedy Algorithms- an activity selection problem, elements of greedy strategy, Huffman codes, Amortized Analysis- aggregate analysis, the accounting method, the potential method.
4. **Graph algorithms** Minimum Spanning Trees- growing a minimum spanning tree, the algorithms of Kruskal and Prim, Single-source shortest paths- the Bellman-Ford algorithm, Single-source shortest path in directed acyclic graphs, Dijkstra's algorithm, all pair shortest paths- shortest path and matrix multiplication, the Floyd-Warshall algorithm, Johnson's algorithm for sparse graphs.
5. **Sorting networks** Comparision networks, the zero-one principle, a bitonic sorting networks, a merging network, a sorting network

BOOKS

Text Books:

1. Corman, Leiserson, Rivest, Stein,"Introduction To Algorithms", PHI, 2nd Edition.
2. Horowitz, Sahni, Rajasekaran,"Fundamentals of Computer Algorithms", Universities Press, 2nd Edition.

References:

1. Aho,"Design and Analysis of Algorithms", Pearson, LPE
2. A V Aho, J. D. Ullman, "Design and analysis of algorithms", Pearson LPE.
3. Bressard, Bratly, "Fundamentals of Algorithms", Pearson LPE/PHI

M.E. COMPUTER SCIENCE & ENGINEERING
FIRST YEAR TERM I

SUBJECT: EMBEDDED SOFTWARE DESIGN
(ELECTIVE-I)

Lectures: 3 Hrs per week	**Theory: 100 Marks**

Objective:

After successfully completing the module student should be :
Capable of actively participating or successfully managing a embedded software development project by applying design life cycle concepts, able to demonstrate knowledge of real time constraint with concepts of RTOS as well as porting of any RTOS

Pre-requisites:

Knowledge of Microprocessors and Microcontrollers and their interfacing

DETAILED SYLLABUS

1. Embedded Design Life Cycle: Introduction Product Specification ,Hardware/Software partitioning , Iteration and Implementation, Detailed hardware and software Design, Hardware/Software Integration ,Product Testing and Release, Maintaining and upgrading existing products.

2. Selection Process & Development Environment: RTOS availability, Tool Chain availability, The Execution Environment, On chip Peripherals ,Debugging & Testing : BDM, JTAG, NEXUS & ICE
3. Advanced Embedded Processors: ARM Embedded Systems, ARM Processor Fundamentals, Introduction to the ARM ,Instruction Set, Introduction to the Thumb Instruction Set ,Efficient C Programming Writing and Optimizing ARM Assembly Code, Digital Signal Processing, Exception and Interrupt Handling, Firmware
4. Writing Software for Embedded Systems: The Compilation Process, Native Vs Cross-Compilers, and Runtime Libraries, Writing a Library, Using Alternative Libraries, using a standard library, porting Kernels extensions for embedded systems, Downloading, Emulation and Debugging techniques.
5. RTOS - µC/OS-II: RTOS Services in Contrast to Traditional O.S. Sample Code, Real-Time Systems Concepts, Kernel Structure, Task Management, Time Management, Inter task Communication and Synchronization, , Memory Management, Porting µC/OS -II
6. Understanding Linux Kernel: Introduction, Memory Addressing , Processes , Interrupts and Exceptions, Timing Measurements, Memory Management, Process Address Space, System Calls ,Signals, Process Scheduling, Kernel Synchronization, The Virtual File system, Managing I/O Devices , Disk Caches , Accessing Regular Files, Swapping: Methods for Freeing Memory, The Ext2 Files system, Process Communication , Program Execution, Porting of Linux Kernel
7. Understanding Windows Embedded CE Kernel: Introduction to Windows Embedded CE Kernel , Boot process, Memory Management, Files Database and Registry, Process and Threads, Communications , Porting of Linux Kernel

BOOKS

Text Books:

1. Embedded Systems Design – Introduction to Processes, Tools, Techniques, Arnold S Burger, CMP books
2. Embedded Systems Design by Steave Heath, Newnes.
3. "ARM Systems Developers Guide Designing and Optimizing System Software" By Andrew N Sloss, Dominic Symes & Cheris Wright ELSEVIER Publication.
4. Understanding the Linux Kernel Daniel P. Bovet Marco Cesati Publisher: O'Reilly First Edition October 2000 ISBN: 0-596-00002-2, 702 pages
5. Building Embedded Linux Systems by Karim Yaghmour
6. Inside Microsoft Windows CE By John Murray

References:

1. ARM System on chip architecture by Steve Furbur
2. µC/OS-II by Jean Labrossewww.uCOS-II.com
3. Programming Microsoft Windows Embedded CE

M.E. COMPUTER SCIENCE & ENGINEERING
FIRST YEAR TERM I

SUBJECT: DIGITAL IMAGE and VIDEO PROCESSING (ELECTIVE-I)

Lectures: 3 Hrs per week	**Theory: 100 Marks**

Objective: Digital Image Processing is a rapidly evolving field with growing applications in science and engineering. Image processing holds the possibility of developing the ultimate machine that could perform the visual functions of all living beings. There is an abundance of image processing applications that can serve mankind with the available and anticipated technology in the near future.

Pre-requisites: Digital Signal Processing, & Computer Graphics

DETAILED SYLLABUS

1. **Digital Image Processing Systems:** Introduction, Structure of human eye, Image formation in the human eye, Brightness adaptation and discrimination, Image sensing and acquisition, Storage, Processing, Communication, Display. Image sampling and quantization, Basic relationships between pixels
2. **Image Transforms (Implementation):** Introduction to Fourier transform, DFT and 2-D DFT, Properties of 2-D DFT, FFT, IFFT, Walsh transform, Hadamard transform, Discrete cosine transform, Slant transform, Optimum transform: Karhunen - Loeve (Hotelling) transform.
3. **Image Enhancement in the Spatial Domain:** Gray level transformations, Histogram processing, Arithmetic and logic operations, Spatial filtering: Introduction, Smoothing and sharpening filters
4. **Image Enhancement in the Frequency Domain:** Frequency domain filters: Smoothing and Sharpening filters, Homomorphic filtering
5. **Wavelets and Multiresolution Processing:** Image pyramids, Subband coding, Haar transform, Series expansion, Scaling functions, Wavelet functions, Discrete wavelet transforms in one dimensions, Fast wavelet transform, Wavelet transforms in two dimensions
6. **Image Data Compression:** Fundamentals, Redundancies: Coding, Interpixel, Psycho-visual, Fidelity criteria, Image compression models, Error free compression, Lossy compression, Image compression standards: Binary image and Continuous tone still image compression standards, Video compression standards.
7. **Morphological Image Processing:** Introduction, Dilation, Erosion, Opening, Closing, Hit-or-Miss transformation, Morphological algorithm operations on binary images, Morphological algorithm operations on gray-scale images
8. **Image Segmentation:** Detection of discontinuities, Edge linking and Boundary detection, Thresholding, Region based segmentation
9. **Image Representation and Description:** Representation schemes, Boundary descriptors, Regional descriptors
10. **Introduction to Video Processing:** Spatio-temporal sampling, inter frame and intraframe coding, motion estimation techniques, video compression standards.

BOOKS

Text Books:

1. R.C.Gonsales R.E.Woods**, "**Digital Image Processing", Second Edition, Pearson Education
2. Anil K.Jain, "Fundamentals of Image Processing", PHI
3. K. R rao and J.J. Hawang, "Techniques and Standards for Video and Audio Coding", Prentice Hall PTR

References:

1. William Pratt, "Digital Image Processing", John Wiley
2. Milan Sonka,Vaclav Hlavac, Roger Boyle, "Image Processing, Analysis, and Machine Vision" Thomson Learning
3. N Ahmed & K.R. Rao, "Orthogonal Transforms for Digital Signal Processing" Springer
4. B. Chanda, D. Dutta Majumder, "Digital Image Processing and Analysis", PHI.

M.E. COMPUTER SCIENCE & ENGINEERING
FIRST YEAR TERM I

SUBJECT: MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE (ELECTIVE-I)

Lectures: 3 Hrs per week	**Theory: 100 Marks**

Objective:
The purpose of this course is to develop mathematical foundations for computer science and computer engineering. In addition, applications of mathematical principles to computer science and engineering are presented.

Pre-requisites:
Knowledge of Theory of Computer Science, Discrete Structure and Graph Theory.

DETAILED SYLLABUS

1. Probability and Information Theory.
Introduction. Basic Concept of Probability. Properties. Basic Calculation. Random Variables and their Probability Distributions. Birthday Paradox. Information Theory. Redundancy in Natural Languages.

2. Computational Complexity.
Introduction. Turing Machines. Deterministic Polynomial Time. Probabilistic Polynomial Time. Non-deterministic Polynomial Time. Non-Polynomial Bounds. Polynomial-time Indistinguishability.

3. Algebraic Foundations.
Introduction. Groups. Rings and Fields. The Structure of Finite Fields. Group Constructed Using Points on an Elliptic Curve.

4. Number Theory.
Introduction. Congruences and Residue Classes. Euler's Phi Function. The Theorems of Fermat, Euler and Lagrange. Quadratic Residues. Square Roots Modulo Integer. Blum Integers.

5. Fuzzy Logic
Operations of fuzzy sets, fuzzy arithmetic & relations, fuzzy relations equations, MATLAB introduction, programming in MATLAB scripts, functions and their Applications
Case study: Development of fruit sorting system using fuzzy logic in MATLAB

BOOKS

Text Books:

1. Modern Cryptography: Theory and Practice by Wenbo Mao, Low Price Edition, Pearson Education

References:

1. Fuzzy logic in engineering by T. J. Ross, Willey Publications
2. Fuzzy sets theory and its applications, H.J. Zimmermann, Kluwer Academic Publications, 4th edition.
3. Elements of Discrete Mathematics, C.L.Liu, TMH, 2nd edition

M.E. COMPUTER SCIENCE & ENGINEERING
FIRST YEAR TERM I

SUBJECT: SOFTWARE PROJECT MANAGEMENT
(ELECTIVE-I)

Lectures: 3 Hrs per week	**Theory: 100 Marks**

Objective:

After successfully completing the module student should be :
Capable of actively participating or successfully managing a software development project by applying project management concepts, able to demonstrate knowledge of project management terms and techniques

Pre-requisites:

Knowledge of Software Engineering.

DETAILED SYLLABUS

1. Introduction to Project Management: Importance of software project management, stages and stakeholders of a software project, elements of software project, Importance of software project management, Stages of Project, The Stakeholder of Project, Project Management Framework, Software Tools for Project Management.
2. Project Planning: Integration Management, Scope Management, Stepwise Project Planning, Use of Software (Microsoft Project) to Assist in Project Planning Activities.
3. Project Scheduling: Time Management, Project Network Diagrams, Use of Software (Microsoft Project) to Assist in Project Scheduling.
4. Project Cost Management: Importance and Principles of Project Cost Management, Resource Planning, Cost Estimating, Cost Control, Use of Software (Microsoft Project) to assist in Cost Management.
5. Project Quality Management: Quality of Information Technology Projects, Stages of Software Quality Management, Quality Standards, Tools and Techniques For Quality Control.
6. Project Human Resources Management: Human Resources Management, Keys to Managing People, Organizational Planning, Issues in Project Staff Acquisition and Team Development, Using Software to Assist in Human Resource Management.
7. Project Communication Management: Communications Planning, Information Distribution, Performance Reporting, Administrative Closure, Suggestions for Improving Project Communications, Using Software to Assist in Project Communications.
8. Project Risk Management: The Importance of Project Risk Management, Common Sources of Risk in IT projects, Risk Identification, Risk Quantification, Risk Response Development and Control, Using Software to Assist in Project Risk Management.
9. Project Procurement Management: Importance of Project Procurement Management, Procurement Planning, Solicitation, Source Selection, Contract Administration, Contract Close-out.

10. Project Management Process Groups: Introduction to Project Management Process Groups, Project Initiation, Project Planning, Project Executing, Project Controlling and Configuration Management, Project Closing.

BOOKS

Text Books:

1.Kathy Schwalbe, "Information Technology Project Management", International Student Edition, THOMSON Course Technology
2.Bob Hughes and Mike Cotterell, "Software Project Management" Third Ed., Tata McGraw-Hill
3.Elaine Marmel, "Microsoft Office Project 2003 Bible", Wiley Publishing Inc.

References:

1.Basics of Software Project Management, NIIT, Prentice-Hall India
2.Pankaj Jalote, "Software Project Management in Practice", Pearson Education
3.S.A. Kelkar, "Software Project Management", A Concise Study, Revised Edition,PHI

M.E. COMPUTER SCIENCE & ENGINEERING
FIRST YEAR TERM I

SUBJECT: Laboratory Practice-I

Practical: 6 Hrs per week	**Term Work: 100 Marks** **Oral: 50 marks**

DETAILED SYLLABUS

Experiments/Assignments based on

1. Advanced Software Engineering
2. Net-Centric Computing
3. Elective- I

The concerned subject in-charge should frame minimum of six laboratory assignments, two from each subject.

M.E. COMPUTER SCIENCE & ENGINEERING
FIRST YEAR TERM I

SUBJECT: Seminar-I

Practical: 4 Hrs per week	**Term Work: 100 Marks**

DETAILED SYLLABUS

Seminar on related state of the art topic of student's own choice approved by the department.

TERM WORK

1.The term-work & presentation of the Seminar-I will be evaluated by departmental committee consisting of guide and two faculty members of the department appointed by Director/Principal of the college as per the recommendation of the Head of the Department.

M.E. COMPUTER SCIENCE & ENGINEERING
FIRST YEAR TERM II

SUBJECT: ADVANCED DATABASE MANAGEMENT SYSTEMS

Lectures: 3 Hrs per week	**Theory: 100 Marks**

Objective: The course gives an overview of motivation and background of the new developments, and is intended as an introduction to the most important advances with respect to the classical relational database systems.

Pre-requisites:
Knowledge of Database Management System, Operating System.

DETAILED SYLLABUS

1. **The Extended Entity Relationship Model and Object Model**
(a) The ER model revisited
(b) Motivation for complex data types
(c) User defined abstract data types and structured types
(d) Subclasses
(e) Superclasses
(f) Inheritance
(g) Specialization and generalization
(h) Relationship types of degree higher than two

2. **Object–Oriented Databases**
(a) Overview of object–oriented concepts
(b) Object identity
(c) Object structure and type constructors
(d) Encapsulation of operations
(e) Methods and persistence
(f) Type hierarchies and inheritance
(g) Type extents and persistent programming languages
(h) OODBMS architecture and storage issues
(i) Transactions and concurrency control
(j) Examples of ODBMS

3. **Object Relational and Extended Relational Databases**
(a) Database design for an ORDBMS
(b) Nested relations and collections
(c) Storage and access methods
(d) Query processing and optimization
(e) An overview of SQL3
(f) Implementation issues for extended type
(g) Systems comparison of RDBMS
(h) OODBMS
(i) ORDBMS

4. **Paralled and Distributed Databases and Client–Server Architecture**
(a) Architectures for parallel databases
(b) Parallel query evaluation
(c) Parallelizing individual operations
(d) Sorting Joins
(e) Distributed database concepts
(f) Data fragmentation
(g) Replication and allocation techniques for distributed database design
(h) Query processing in distributed databases
(i) Concurrency control and recovery in distributed databases
(j) An overview of client–server architecture

5**. Enhanced Data Models for Advanced Applications**
(a) Active database concepts
(b) Temporal database concepts
(c) Spatial databases: concept and architecture
(d) Deductive databases and query processing
(e) Mobile databases
(f) Geographic information systems

BOOKS

Text Books:

1.Elmsari and Navathe, Fundamentals of Database Systems
2.Ramakrishnan and Gehrke, Database Management Systems.

References:

1. Korth, Silberschatz, Sudarshan, Database System Concepts
2. Rob and Coronel, Database Systems: Design, Implementation and Management
3. Date and Longman, Introduction to Database Systems

M.E. COMPUTER SCIENCE & ENGINEERING
FIRST YEAR TERM II

SUBJECT: WEB ENGINEERING

Lectures: 3 Hrs per week	**Theory: 100 Marks**

Objective:
Provides an introduction to the discipline of Web Engineering. This course aims to introduce the methods and techniques used in Web-based system development. In contrast to traditional Software Engineering efforts, Web Engineering methods and techniques incorporate unique aspects of the problem domain such as: document oriented delivery, fine-grained lifecycles, user-centric development, client-server legacy system integration and diverse end user skill levels.

Pre-requisites:
Knowledge of both Internet communication concepts and an introductory programming knowledge (Java & Javascript).

DETAILED SYLLABUS

1. **An Introduction to Web Engineering:** Categories of Web Applications, Characteristics of Web
2. **Requirements Engineering for Web Applications:** Requirements, Engineering Activities, RE Specifics in Web Engineering, Principles for RE of Web, Adapting RE Methods to Web Application Development, Requirement Types.
3. **Modeling Web Applications:** Modeling Specifics in Web Engineering, Levels, Aspects, Phases,
4. Customization, Modeling Requirements, Content Modeling, Hypertext Modeling, Presentation Modeling, Customization Modeling, Methods and Tools.
5. **Web Application Architectures:** Fundamentals, Specifics of Web Application Architectures, Components of a Generic Web Application Architecture, Layered Architectures, Data-aspect Architectures.
6. **Technology-aware Web Application Design:** Web Design from an Evolutionary Perspective, Presentation Design, Interaction Design, Functional Design, Context-aware Applications, Device-independent Applications, Reusability.
7. **Technologies for Web Applications:** Client/Server Communication on the Web, Client-side Technologies, Document-specific Technologies, Server-side Technologies.
8. **Testing Web Applications:** Fundamentals, Test Specifics in Web Engineering, Test Approaches, Test Scheme, Test Methods and Techniques, Test Automation.
9. **Operation and Maintenance of Web Applications:** Challenges Following the Launch of a Web Application, Promoting a Web Application, Content Management, Usage Analysis, From Software Project Management to Web Project Management.
10. **Web Project Management:** Challenges in Web Project Management, Managing Web Teams, Managing the Development Process of a Web Application.

11. **The Web Application Development Process:** Requirements for a Web Application Development Process, Analysis of the Rational Unified Process, Analysis of Extreme Programming.
12. **Usability of Web Applications:** Design Guidelines, Web Usability Engineering Methods, Web Usability Engineering Trends.
13. **Performance of Web Applications:** System Definition and Indicators, Characterizing the Workload, Representing and Interpreting Results, Performance Optimization Methods.
14. **Security for Web Applications:** Aspects of Security, Encryption, Digital Signatures and Certificates, Secure Client/Server-Interaction, Client Security Issues, Service Provider Security Issues.
15. **The Semantic Web – The Network of Meanings in the Network of Documents:** Fundamentals of the Semantic Web, Technological Concepts, Specifics of Semantic Web Applications.

BOOKS

Text Books:

1. Gerti Kappel, Birgit Pr ¨ oll, Siegfried Reich, Werner Retschitzegger, "Web Engineering: The Discipline of Systematic Development of Web Applications", John Wiley
2. Pressman, Roger S. and Lowe, David, "Web Engineering: A Practioner's Approach",McGraw-Hill Higher Education

References:

1. Mishra, "Web Engineering And Applications", Macmillan Publishers India
2. Emilia Mendes, and Nile Mosley, "Web Engineering", Springer

M.E. COMPUTER SCIENCE & ENGINEERING
FIRST YEAR TERM II

SUBJECT: Parallel Computing

Lectures: 3 Hrs per week	**Theory: 100 Marks**

Objective:

Upon completion of this course students will be able to understand and employ the fundamental concepts and mechanisms which form the basis of the design of parallel computation models and algorithms, recognize problems and limitations to parallel systems, as well as possible solutions

Pre-requisites:

Computer architecture, Data structures.

DETAILED SYLLABUS

1.Introduction:
Need, Models of computation, SISD, MISD,SIMD-Shared Memory SIMD, Interconnection network SIMD, MIMD, Programming MIMD, Special Purpose Architecture, Analysis of algorithm, Running time, No of processors, Cost, Other Measures-Area, Length, Period, Expressing Algorithm.

2.Parallel processing:
parallel computer structure, designing of parallel algorithms, analyzing algorithms, general principles of parallel computing.

3. Parallel sorting algorithms
Batcher's bitonic sort, Bitonic sort using the perfect Shuffle, parallel bubble sort, Odd- even transpose sort, Tree sort.

4. Quick Sort:
Parallel Quick sort for CRCW PRAM, Parallel formulation for practical architectures,Shared Address space parallel formulation, message passing parallel formulation, pivot selection.

5. Sorting:
Sorting on the CRCW, CRFW, EREW models, searching a sorted sequence, CREW,CRCW & EREW searching, searching on a random sequence EREW, ERCW, CREW & CRCW searching on SIMD computers, searching on a Tree, mesh, A Network for merging, merging on the CRFW, ERFW models

6. Computing Fourier Transforms:
Computing the DFT in parallel, a parallel FFT algorithm.

BOOKS

References:

1. Design & Analysis of Parallel Algorithm by Salim & Akil, PHI.

2. Design Efficient Algorithm for Parallel Computers by Michel J. Quinn, TMH.

M.E. COMPUTER SCIENCE & ENGINEERING
FIRST YEAR TERM II

SUBJECT: SOFT COMPUTING

Lectures: 3 Hrs per week	**Theory: 100 Marks**

Objective:

By the end of the course a student is expected to become able to apply Genetic Algorithms, Fuzzy Logic and Artificial Neural Networks as computational tools to solve a variety of problems in their area of interest ranging from Optimization problems to Pattern recognition and control tasks.

Pre-requisites:

The prerequisite for this course is a basic understanding of problem solving, design and analysis of algorithms and computer programming. A prior course in Artificial Intelligence will be an advantage.

DETAILED SYLLABUS

1. Introduction to soft computing, Biological Neuron, Artificial Neuron, Characteristics of Neural Network, Neural Network Architectures, Learning in Neural Networks, Various learning Methods and Learning Rules, Single layer Perceptron, training and classification, Linear Separable classification, Applications of Neural Networks for Pattern Recognition, Classification and Clustering.
2. Introduction to Multilayer Perceptron, various activation functions, Delta and Generalized Delta Learning rule, Error Back Propagation training and algorithm, Counter Propagation Network, Boltzman Machine.
3. Recurrent Network, configuration, stability, Associative Memory: Concepts, performance analysis, BAM, ART.
4. Self-organizing Networks: Unsupervised Learning, Self-organized Map.
5. Introduction to fuzzy sets and fuzzy logic systems, Fuzzy set definitions, operations, Fuzzy rules, Fuzzy reasoning. Fuzzy inference systems, Fuzzy models.
6. Introduction to Genetic Algorithms, Biological Inspiration, The Genetic Algorithm, Genetic Operators, Genetic Algorithm through example, Sample problems, Genetic Algorithm Implementation, Tweaking the Parameters and Process, Various Problems with Genetic Algorithm.
7. Applications of Neural Network, Fuzzy Logic, Genetic Algorithms: Signal Processing, Image Processing, Pattern Recognitions, communication systems, Biological Sequence Alignment and Drug Design, Robotics and Sensors, Information Retrieval Systems, Share Market Analysis, Natural Language Processing.

BOOKS

Text Books:

1. J.M.Zurda, "Introduction to Artificial Neural Networks", Jaico Publishing House.
2. D. E. Goldberg, "Genetic Algorithms in Search and Optimization, and Machine Learning", Addison-Wesley, 1989.

3. Jang, Sun, & Mizutani, "Neuro-Fuzzy and Soft Computing", PHI.
4. M. Mitchell, "An Introduction to Genetic Algorithms", Prentice-Hall, 1998.

References:

1. S. Haykin, "Neural Networks", Pearson Education, 2nd Ed., 2001.
2. Klir & Yuan, "Fuzzy Sets and Fuzzy Logic", PHI, 1997.
3. Chin-Teng Lin & C. S. George Lee, "Neural Fuzzy Systems", Prentice Hall PTR.
4. S. Rajasekaran & G. A. V. Pai, "Neural Networks, Fuzzy logic, and Genetic Algorithms", PHI.
5. V. Kecman, "Learning and Soft Computing", MIT Press, 2001.
6. S. N. Sivanandam & S. N. Deepa, Principles of Soft Computing, Wiley - India, 2007
7. D. E. Goldberg, Genetic Algorithms in Search, Optimization, and Machine Learning, Addison-Wesley, 1989.

M.E. COMPUTER SCIENCE & ENGINEERING
FIRST YEAR TERM II

SUBJECT: SOFTWARE TESTING AND QUALITY ASSURANCE (ELECTIVE-II)

Lectures: 3 Hrs per week	**Theory: 100 Marks**

Objective:
After successfully completing the module student should be apply the testing fundamentals and testing skill to validate and verify the software system, also able to demonstrate knowledge of testing strategies by applying the different testing tools.

Pre-requisites:
Knowledge of Software Engineering.

DETAILED SYLLABUS

1. Software Testing Background: Infamous Software Error Case Studies, What Is a Bug? Why Do Bugs Occur? The Cost of Bugs, What Exactly Does a Software Tester Do? What Makes a Good Software Tester? The Software Development Process, Product Components, Software Project Staff, Software Development Lifecycle, Models, The Realities of Software Testing, Testing Axioms, Software Testing Terms and Definitions.
2. Testing Fundamentals : Examining the Specification, Performing a High-Level Review of the Specification, Low-Level Specification, Test Techniques, Black-Box Testing, Test-to-Pass and Test-to-Fail, Equivalence Partitioning, Data Testing, State Testing, Other Black-Box Test Techniques, Examining the Code, Static White-Box Testing: Examining the Design and Code, Formal Reviews, Coding Standards and Guidelines, Generic Code Review, Checklist, Testing the Software with X-Ray Glasses, Dynamic White-Box Testing, Dynamic White-Box Testing Versus Debugging, Testing the Pieces, Data Coverage, Code Coverage
3. Applying Testing Skills: Configuration Testing, An Overview of Configuration Testing, Approaching the Task, Obtaining the Hardware, Identifying Hardware Standards, Configuration Testing Other Hardware, Compatibility Testing, Compatibility Testing Overview, Platform and Application Versions, Standards and Guidelines, Data Sharing Compatibility, Foreign-Language Testing, Making the Words and Pictures Make Sense, Translation Issues, Localization Issues, Configuration and Compatibility Issues, How Much Should You Test? Usability Testing, User Interface Testing, ,What Makes a Good UI?, Testing for the Disabled: Accessibility Testing,
4. Testing the Documentation: Types of Software Documentation, The Importance of Documentation Testing, What to Look for When Reviewing Documentation, The Realities of Documentation Testing, Testing for Software Security, War Games the Movie, Understanding the Motivation, Threat Modeling, Is Software Security a Feature? Is Security Vulnerability a Bug? Understanding the Buffer Overrun, Using Safe String Functions, Computer Forensics, Website Testing, Web Page Fundamentals, Black-Box Testing, Gray-Box Testing, White-Box Testing, Configuration and Compatibility Testing, Usability Testing, Introducing Automation.

5. Supplementing Testing: Automated Testing and Test Tools ,The Benefits of Automation and Tools, Test Tools, Software Test Automation, Random Testing, Realities of Using Test Tools and Automation, Bug Bashes and Beta Testing, Having Other People Test Your Software, Test Sharing, Beta Testing, Outsourcing Your Testing
6. Working with Test Documentation: Planning Your Test Effort, The Goal of Test Planning, Test Planning, Writing and Tracking Test Cases, The Goals of Test Case Planning, Test Case Planning Overview, Test Case Organization and Tracking, Reporting What You Find, Getting Your Bugs Fixed, Isolating and Reproducing Bugs, Not All Bugs Are Created Equal, A Bug's Life Cycle, Bug-Tracking Systems , Measuring Your Success, Using the Information in the Bug Tracking Database
7. The Future: Software Quality Assurance, Quality Is Free, Testing and Quality Assurance in the Workplace, Test Management and Organizational Structures, Capability Maturity Model (CMM),ISO 9000, Software Quality and Software Metrics.

BOOKS

References:

1.Ron Patton, "Software Testing", Pearson publication.

2.Roger S Pressman, **"**Software Engineering: A Practitioner's Approach" 6th Edition, McGraw Hill,2005.

3.Marine Hutcheson, "Software Testing Fundamentals: Methods and Metrics", John Wiley Publication,2003.

M.E. COMPUTER SCIENCE & ENGINEERING
FIRST YEAR TERM II

SUBJECT: CRYPTOGRAPHY AND NETWORK SECURITY
(ELECTIVE-II)

Lectures: 3 Hrs per week	**Theory: 100 Marks**

Objective:

The course introduces the principles of number theory and the practice of network security and cryptographic algorithms. At the end of the course the student will understand: Data Encryption Standard and algorithms, IP and Web Security, Protocols for secure electronic commerce, Concepts of Digital Watermarking and Steganography.

Pre-requisites:

Probability theory and Discrete Mathematics

DETAILED SYLLABUS

1. Foundations of Cryptography and Security Ciphers and Secret Messages, Security Attacks and Services
2. Mathematical Tools for Cryptography Substitutions and Permutations, Modular Arithmetic, Euclid!s Algorithm, Finite Fields, Polynomial Arithmetic, Discrete Logarithms
3. Conventional Symmetric Encryption Algorithms Theory of Block Cipher Design Feistel Cipher Network Structures, DES and Triple DES, Modes of Operation (ECB,CBC, OFB,CFB), Strength (or Not) of DES
4. Modern Symmetric Encryption Algorithms IDEA, CAST, Blowfish, Twofish, RC2, RC5, Rijndael (AES) Key Distribution
5. Stream Ciphers and Pseudo Random Numbers, Pseudo random sequences, Linear Congruential Generators, Cryptographic Generators, Design of Stream Cipher, One Time Pad
6. Public Key Cryptography, Prime Numbers and Testing for Primality, Factoring Large Numbers, RSA, Diffie-Hellman, ElGamal, Key Exchange Algorithms, Public-Key Cryptography Standards
7. Hashes and Message Digests Message Authentication, MD5, SHA, RIPEMD, HMAC
8. Digital Signatures, Certificates, User Authentication, Digital Signature Standard (DSS and DSA), Security Handshake Pitfalls, Elliptic Curve Cryptosystems
9. Authentication of Systems Kerberos V4 and V5, X.509 Authentication Service
10. Electronic Mail Security Pretty Good Privacy (PGP), S/MIME, X.400
11. 12 3/28 IP and Web Security Protocols IPSec and Virtual Private Networks, Secure Sockets and Transport Layer (SSL and TLS)
12. Electronic Commerce Security, Electronic Payment Systems, Secure Electronic Transaction (SET), CyberCash, iKey Protocols, Ecash (DigiCash)
13. Intrusion detection – password management – Viruses and related Threats – Virus Counter measures – Firewall Design Principles – Trusted Systems
14. Digital Watermarking and Steganography, Biometrics for security- signature verification, figure print recognition, voice recognition, Iris recognition system.

BOOKS

Text Books:

1. William Stalling, "Cryptography and Network Security, Principles and Practice", Pearson/PHI Publication
2. B A Forouzan, "Cryptography and Network Security", TMH

References:

1. Bruce Schneier, "Applied Cryptography", John Wiley & Sons Inc
2. Charles B. Pfleeger, Shari Lawrence Pfleeger, "Security in Computing", Pearson Education
3. D Denning, "Cryptography and Data Security", Addision-Welesly

M.E. COMPUTER SCIENCE & ENGINEERING
FIRST YEAR TERM II

SUBJECT: PATTERN RECOGNITION
(ELECTIVE-II)

Lectures: 3 Hrs per week	**Theory: 100 Marks**

Objective: This course teaches the fundamentals of techniques for classifying multi-dimensional data, to be utilized for problem-solving in a wide variety of applications, such as engineering system design, manufacturing, technical and medical diagnostics, image processing, economics, and psychology.

Pre-requisite: Linear Algebra, Probability and Statistics

DETAILED SYLLABUS

1. **Introduction:** Machine perception, Pattern recognition systems, Design cycle, Learning and Adaptation
2. **Bayesian Decision Theory:** Bayesian decision theory: Continuous features, Minimum-error rate classification, classification, Classifiers, Discriminant functions and Decision surfaces, Normal density, Discriminant functions for normal density, Bayes Decision theory: discrete features
3. **Maximum-Likelihood and Bayesian Parameter Estimation:** Maximum likelihood estimation, Bayesian estimation, Bayesian parameter estimation: Gaussian caseand General theory, Prolems of dimentionality, Hidden Markov Model
4. **Nonparametric Techniques:** Density estimation, Parzen windows, k_n-Nearest-Neighbor estimation, Nearest-Neighbor rule, Matrics and Nearest-Neighbor classification
5. **Linear Discriminants Functions:** Linear discriminant functions and decision surfaces, Generalised linear discriminant functions, 2-Category linearly separable case, Minimising the Perceptron criterion function, Relaxation procedure, Non-separable behavior, Minimum squared error procedure, Ho-Kashyap procedures, Multicategory generalizations
6. **Nonmetric Methods:** Decision tree, CART, ID3, C4.5, Gramatical methods, Gramatical interfaces
7. **Algorithm Independent Machine Learning:** Lack of inherent superiority of any classifier, Bias and Variance, Resampling for estimating statistic, Resampling for classifier design, Estimating and comparing classifiers, Combining classifiers
8. **Unsupervised Learning and Clustering:** Mixture densities and Identifiability, Maximum-Likelihood estimations, Application to normal mixtures, Unsupervised Bayesian learning, Data description and clustering criterion function for clustering, Hierarchical clustering
9. **Applications of Pattern Recognition**

BOOKS

Text Books:

1. Duda, Hart, and Stock, "*Pattern Classification*", John Wiley and Sons.
2. Gose, Johnsonbaugh and Jost, "*Pattern Recognition and Image analysis*", PHI

M.E. COMPUTER SCIENCE & ENGINEERING
FIRST YEAR TERM II

SUBJECT: Mobile Computing
(ELECTIVE-II)

Lectures: Hrs per week	**Theory: 100 Marks**

Objective:
After successful completion of the course student should get knowledge about: Mobile Computing Architecture, mobile technologies: GSM, Bluetooth, GPRS, CDMA and should be capable to develop mobile computing applications.

Pre-requisites:
Knowledge of Computer Networks.

DETAILED SYLLABUS

1.Introduction: Mobile Computing, Dialogue Control, Networks, Middleware and Gateways, Application and Services, Developing Mobile Computing Applications, Security in Mobile Computing.

2.Mobile Computing Architecture: Internet – The Ubiquitous Network, Architecture for Mobile Computing, Three-Tier Architecture, Design considerations for Mobile Computing, Mobile Computing through Internet, Making Existing Applications Mobile-Enabled.

3.Emerging Technologies: Introduction, Bluetooth, Radio Frequency Identification, Wireless Broadband, Mobile IP, IPV6, Java card.

4 Mobile Transport Layer: Traditional TCP - Congestion Control, Slow Start, Fast Retransmit/Fast Recovery, Implications on Mobility, Classical TCP Improvements - Indirect TCP, Snooping TCP, Mobile TCP, Fast Retransmit/Fast Recovery, Transmission/Time-Out Freezing, Selective Retransmission, Transaction Oriented TCP.

5.Support for Mobility: File Systems – Consistency, Coda, Little work, Ficus, Mio-NFS, Rover, World Wide Web - Hypertext Transfer Protocol, Hypertext Markup Language, Some Approaches that Might Help Wireless Access, System Architectures, Wireless Application Protocol - Architecture, Wireless Datagram Protocol, Wireless Transport Layer Security, Wireless Transaction Protocol, Wireless Session Protocol, Wireless Application Environment, Wireless Markup Language, WML script, Wireless Telephony Application, Push Architecture, Push/Pull Services.

6.Global System for Mobile Communications (GSM): Global System for Mobile Communications, GSM Architecture, GSM Entities, Call Routing in GSM, PLMN Interfaces, GSM Addresses and Identifiers, Network Aspects in GSM, GSM Frequency Allocation, Authentication and Security.

7.General Packet Radio Service (GPRS): Introduction, GPRS and Packet Data Network, GPRS Network Architecture, GPRS Network Operations, Data Services in GPRS, Applications for GPRS, Limitations of GPRS, Billing and Charging in GPRS.

8.CDMA and 3G: Introduction, Spread-Spectrum Technology, Is-95, CDMA versus GSM, Wireless Data, Third Generation Networks, Applications on 3G.

9.Security Issues in Mobile Computing: Introduction, Information

Security, Security Techniques and Algorithms, Security Protocols, Public Key Infrastructure, Trust, Security Models, Security Frameworks for Mobile Environment.
BOOKS
Text Books:
1. Talukder Asoke K. and Yavagal Roopa R ," Mobile Computing (Technology, Applications and Service Creation) ",Tata Mcgraw-Hill. 2. Jochen Schiller, Addison-Wesley, "Mobile Communications ",2nd Edition.

M.E. COMPUTER SCIENCE & ENGINEERING
FIRST YEAR TERM II

SUBJECT: LABORATORY PRACTICE-II

Practical: 6 Hrs per week	**Term Work: 100 Marks** **Oral: 50 marks**

DETAILED SYLLABUS

Experiments/Assignments based on

1. Advanced Database Management Systems
2. Soft Computing
3. Elective- II

The concerned subject in-charge should frame minimum of six laboratory assignments, two from each subject.

M.E. COMPUTER SCIENCE & ENGINEERING
FIRST YEAR TERM II

SUBJECT: SEMINAR-II

Practical: 4 Hrs per week	**Term Work: 100 Marks**

DETAILED SYLLABUS

Seminar on related state of the art topic of student's own choice approved by the department.

TERM WORK

1. The term-work & presentation of the Seminar-II will be evaluated by departmental committee consisting of guide and two faculty members of the department appointed by Director/Principal of the college as per the recommendation of the Head of the Department.

M.E. COMPUTER SCIENCE & ENGINEERING
SECOND YEAR TERM I

SUBJECT: SEMINAR-III

Practical: 4 Hrs per week	**Term Work: 50 Marks** **Oral: 50 Marks**

DETAILED SYLLABUS

Seminar on special topic. The topic should be on any of the area not included in the regular curriculum. The report should include detailed study of specific concept (i.e. analysis, design & implementation.). This can be a theoretical study or practical implementation approved by the department/guide.

TERM WORK

1. Seminar-III should be conducted at the end of Second Year Term I.
2. The term-work of the Seminar-III will be evaluated by departmental committee consisting of guide and two faculty members of the department appointed by Director/Principal of the college as per the recommendation of the Head of the Department.
3. The Seminar-III presentation will be evaluated by examiners appointed by University, one of which should be the guide.
4. Student must submit the Seminar Report in the form of soft bound copy
5. The marks of seminar-III should be submitted at the end of Second Year Term I to the University.

M.E. COMPUTER SCIENCE & ENGINEERING
SECOND YEAR TERM I

SUBJECT: PROJECT STAGE-I

Practical: 18 Hrs per week	**Term Work: 100 Marks**

DETAILED SYLLABUS

Project will consist of a system Development in Software/Hardware. Project Work should be carried out using Software Engineering principles and practices.

TERM WORK

The term-work of the Project Stage-I will be evaluated by departmental committee consisting of guide and two faculty members of the department appointed by Director/Principal of the college as per the recommendation of the Head of the Department.

M.E. COMPUTER SCIENCE & ENGINEERING
SECOND YEAR TERM II

SUBJECT: PROGRESS SEMINAR

	Term Work: 50 Marks

1. Progress Seminar should be conducted in the middle of Second Year Term II.
2. The Progress Seminar Term-Work will be evaluated by departmental committee consisting of guide and two faculty members of the department appointed by Director/Principal of the college as per the recommendation of the Head of the Department.
3. Student must submit the progress report in the form of soft bound copy.
4. The marks of progress seminar should be submitted along with the marks of Project Stage-II.

M.E. COMPUTER SCIENCE & ENGINEERING
SECOND YEAR TERM II

SUBJECT: PROJECT STAGE-II

Practical: 18 Hrs per week	**Term Work: 150 Marks** **Oral:100 Marks**

DETAILED SYLLABUS

This is continuation of Project Stage-I. The complete System Development in software/hardware carried out using Software Engineering principles and practices is expected. It should be a working system either software or hardware or combination of both.

He/she has to present/publish atleast one paper in reputed National/International Journal/Conference on his/her Project work before submission of his/her Thesis/Dissertation.

TERM WORK

1. The Term Work of Project Stage –II will be assessed jointly by the pair of Internal (Guide) and External examiner along with oral examination of the same.

STRUCTURE OF

M.E. Electronics & Telecommunication (Digital Electronics)

W.E.F. 2010-2011

The scheme of teaching & examination as per university syllabus applicable to ME Electronics & Telecommunication (Digital Electronics) will be as follows.

STRUCTURE OF
M.E. ELECTRONICS AND TELECOMMUNICATION
(DIGITAL ELECTRONICS)
First Year Term-I

Sr. No.	Subject	Teaching Scheme Hours/week		Examination Scheme				
		L	P	Paper duration hours	Maximum marks			
					Paper	TW	PR	OR
1	Advanced Instrumentation System	3	-	3	100	-	-	-
2	Advanced Digital Signal Processing	3	-	3	100	-	-	-
3	Digital System Design	3	-	3	100	-	-	-
4	VLSI Design	3	-	3	100	-	-	-
5	Elective -I	3	-	3	100	-	-	-
6	Laboratory Practice –I	-	6	-	-	100	-	50
7	Seminar-I	-	4	-	-	100	-	-
Total		**15**	**10**		**500**	**200**		**50**
Grand Total		**25**			**750**			

List of Subjects for Elective – I

1. Parallel Computing
2. Biomedical Instrumentation
3. Wireless & Mobile Communication

STRUCTURE OF
M.E. ELECTRONICS AND TELECOMMUNICATION
(DIGITAL ELECTRONICS)
First Year Term-II

Sr. No.	Subject	Teaching Scheme Hours/week		Examination Scheme				
		L	P	Paper duration hours	Maximum marks			
					Paper	TW	PR	OR
1	Image Processing & Pattern Recognition	3	-	3	100	-	-	-
2	Embedded System Design	3	-	3	100	-	-	-
3	Microelectronics Circuit Design	3	-	3	100	-	-	-
4	Advanced Computer Network	3	-	3	100	-	-	-
5	Elective –II	3	-	3	100	-	-	-
6	Laboratory Practice –II	-	6	-	-	100	-	50
7	Seminar-II	-	4	-	-	100	-	-
Total		**15**	**10**		**500**	**200**		**50**
Grand Total		**25**			**750**			

List of Subjects for Elective – II

1. Advanced Digital Communication.
2. Artificial Intelligence
3. Modeling and Simulation Techniques

STRUCTURE OF
M.E. ELECTRONICS AND TELECOMMUNICATION
(DIGITAL ELECTRONICS)
Second Year Term-I

Sr. No.	Subject	Teaching Scheme Hours/week		Examination Scheme				
		L	P	Paper duration hours	Maximum marks			
					Paper	Term work	Practical	Oral
1	Seminar –III	-	04	-	-	50	-	50
2	Project Stage - I	-	18	-	-	100	-	-
Total		**-**	**22**	**-**	**-**	**150**	**-**	**50**
Grand Total		**22**		**200**				

STRUCTURE OF
M.E. ELECTRONICS AND TELECOMMUNICATION
(DIGITAL ELECTRONICS)
Second Year Term-II

Sr. No.	Subject	Teaching Scheme Hours/week		Examination Scheme				
		L	P	Paper duration hours	Maximum marks			
					Paper	Term work	Practical	Oral
1	Project Seminar	-	-	-	-	50	-	-
2	Project Stage - II	-	18	-	-	150	-	100
Total		**-**	**18**	**-**	**-**	**200**	**-**	**100**
Grand Total		**18**		**300**				

Grand Total : 2000

M.E. ELECTRONICS AND TELECOMMUNICATION
(DIGITAL ELECTRONICS)
First Year Term-I

Subject Laboratory Practice-I

Practical: 6 Hrs Per week	**Term work:** 100 Marks **Oral:** 50 Marks

Detailed syllabus

Experiment/ Assignments based on

1. Advanced Instrumentation System
2. Advanced Digital Signal Processing
3. Digital System Design

Note: The concern subject incharge in consultation with H.O.D, should frame minimum of six laboratory assignments, two from each subject.

Subject Seminar-I

Practical: 4 Hrs Per week	**Term work:** 100 Marks

Detailed syllabus

Seminar on related state of art topic of students of own choice approved by the department.

Term work

The Term work and presentation will be evaluated by departmental committee consisting of two faculty members of the department appointed by Principal as per the recommendation of the Head of the Department.

M.E. ELECTRONICS AND TELECOMMUNICATION
(DIGITAL ELECTRONICS)
First Year Term-II

Subject Laboratory Practice-II

Practical: 6 Hrs Per week	**Term work:** 100 Marks **Oral:** 50 Marks

Detailed syllabus

Experiment / Assignments based on

1. Image Processing & Pattern Recognition
2. Embedded System Design
3. Advanced Digital Communication.

Note: The concern subject incharge in consultation with H.O.D, should frame minimum of six laboratory assignments, two from each subject.

Subject Seminar-II

Practical: 4 Hrs Per week	**Term work:** 100 Marks

Detailed syllabus

Seminar on related state of art topic of students of own choice approved by the department.

Term work

The Term work and presentation will be evaluated by departmental committee consisting of two faculty members of the department appointed by Principal as per the recommendation of the Head of the Department.

M.E. ELECTRONICS AND TELECOMMUNICATION
(DIGITAL ELECTRONICS)
Second Year Term-I

Subject Seminar –III

Practical: 4 Hrs Per week	**Term work:** 50 Marks **Oral:** 50 Marks

Detailed syllabus

Seminar on special topic. The topic should be on any of the area not included in the regular curriculum. The report should include detailed study of specific concept (i.e analysis, design and implementation). This can be a theoretical study or practical implementation approved by the guide and department.

Term work

1. Seminar III should be conducted at the end of Second Year Term-I
2. The term-work of the Seminar-III will be evaluated by departmental committee consisting of guide and two faculty members of the department appointed by Director / Principal of the college as per the recommendation of the Head of the Department.
3. The Seminar-III presentation will be evaluated by the examiners appointed by University, one of which should be guide.
4. Student must submit the seminar report in the form of soft bound copy.
5. The marks of seminar-III should be submitted at the end of the Second Year Term-I to the University.

Subject Project Stage-I

Practical: 18 Hrs Per week	**Term work:** 100 Marks

Detailed syllabus

Project stage-I It is the integral part of the dissertation project. The project should be based on the knowledge acquired by the student during the course work and should contribute to the needs of the society. The project aims to provide an opportunity of designing and building, complete system or subsystem in an area where the student like to acquire specialized skills. Project will consist of a system development in Software/ Hardware. The student should present the progress report of the project. It will consist of problem statement, literature survey; project overview and scheme of implementation.

Term work

The term-work of the project stage-I will be evaluated by departmental committee consisting of guide and two faculty members of the department appointed by the Director/Principal of the college as per the recommendation of the Head of the Department.

M.E. ELECTRONICS AND TELECOMMUNICATION
(DIGITAL ELECTRONICS)
Second Year Term-II

Subject Project Seminar

	Term work: 50 Marks

1. The Project Seminar should be conducted at the middle of Second Year Term-II
2. The Project Seminar term-work will be evaluated by departmental committee consisting of guide and two faculty members of the department appointed by Director / Principal of the college as per the recommendation of the Head of the Department.
3. Student must submit the Project Seminar report in the form of soft bound copy.
4. The marks of seminar-III should be submitted at the end of the Second Year Term-I to the University.

Subject Project Stage-II

Practical: 18 Hrs Per week	**Term work:** 150 Marks **Oral:** 100 Marks

Detailed syllabus

This is continuation of Project Stage-I. The complete system development in software / Hardware carried out using Electronics and Telecommunication Engineering principles and practices is expected. It should be working system either software or hardware or combination of both.

He/ She has to present / publish atleast one paper in reputed National / International Journal/ Conference on his/ her project work before submission of his / her Thesis/ Dissertation.

Term work

1. The term-work of the Project Stage-II will be evaluated by departmental committee consisting of guide and two faculty members of the department appointed by Director / Principal of the college as per the recommendation of the Head of the Department.
2. The Project Stage-II oral will be evaluated by the examiners appointed by University, one of which should be guide.

NORTH MAHARASHTRA UNIVERSITY JALGAON
M.E. ELECTRONICS AND TELECOMMUNICATION (Digital Electronics)

W.E.F : 2010-11
Term – I

ADVANCED INSTRUMENTATION SYSTEM

Teaching scheme:
Lectures: 3 hrs / week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)

Digital Instruments:- Introduction, Digital Panel Meters, Digital Frequency Meters, Basic Circuit for Frequency measurements, High Frequency measurements, Digital Measurements of time, Period Measurement, Ratio and Multiple Ratio Measurement, Universal Counter, Digital Measurement of Mains Frequency.

Signal Analyzer :- Wave Analyzer, Harmonic Distortion Analyzer, Spectrum Analyzer, Network Analyzer, Logic Analyzer, Protocol Analyzer.

PC Based Data Acquisition System: - PC Based Instrumentation System, Introduction to PC Based Data Acquisition System.
Introduction to Smart Sensors:- Digital Sensors, Case Studies of Real Time PC Based Instrumentation System, Virtual Instruments, Intelligent Instruments.

Automated Measurement System :- Need And Requirement Automatic Test Equipments (ATE) Computer Based And Computer Controlled ATE Switches in ADTE , ATE For PCB Testing, ATE for Component Testing, IEEE- 488 Electronic Instruments BUS Standards.

Computer Control :- Hierarchy of Computer Control For Industry , Direct Digital Control, Distributed Digital Control, Supervisory Control And Data Acquisition System (SCADA), NC, CNC.

Introduction to process control :- Control System, Process Control Principles, Servo mechanism, Discrete Control System, Process Control Block Diagram , Anlog and Digital Processing , Feedback Control, Basic Principle of Single Loop Controller , Two Position Control, Mutiposition Control, Proportional ,Integral , Derivative Controller (Overview), Multivariable Control , Cascade Control, Ratio Control , Feed Forward Control.

Control Modes:- Close loop Response , Control loop transfer function, Analysis of Chemical Reactor.

Intelligent Controller :- Programmable Logic Controller, PLC Programming Technique , Fuzzy Logic Controller.
Industrial Control Application:- Cement Plant , Thermal Power Plant, Irrigation Cannal Management, Steel Plant.

References :

1. Clyde E. Coombs, Electronic Instruments Handbook(3/e), McGraw Hill International.
2. Mc Lachlan & Buchla, Applied Electronic Instrumentation & Measurement , 1992, Prentice Hall International..
3. Pallas Areny & Webstor, Sensors & Signals Conditioning , (2/e)1994, J.Wiley & sons
4. Critis Johnson, Process control Instrumentation Technology, PHI
5. H.S.Kalasi, Electronic Instrumentation (2/e), Tata McGraw Hill International
6. Bela G. Liptak, Butterworth Heinemann, Instrument Engineer's Handbook (3/e) Process Control,
7. Aibert D. Helfric, William D. Cooper, Modern Electronic Instrumentation And Measurement Technique
8. Krishna Kant, Computer Based Industrial Control.

NORTH MAHARASHTRA UNIVERSITY JALGAON
M.E. ELECTRONICS AND TELECOMMUNICATION (Digital Electronics)
W.E.F : 2010-11
Term – I

ADVANCED DIGITAL SIGNAL PROCESSING

Teaching scheme:
Lectures: 3 hrs / week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)

Discrete time signal & systems, its representation, types of discrete time system,DFT, IDFT, FFT(DIF&DIT). Realization of FIR and IIR filter

Multirate digital signal processing-decimation by factor D, interpolation, filter design & implementation, sampling rate conversion, application of multirate signal processing.

Power spectral estimation- parametric & nonparametric method for power spectral estimation, minimum variance, and realization of FIR & IIR filters.

Least mean square Adaptive filter: Overview of the structure, operation of the LMS algorithm, LMS adaptive algorithm, statistical LMS theory, Comparison of the LMS algorithm with the steepest Descent algorithm, Computer experiment on adaptive prediction, Computer experiment on adaptive equalization, Computer experiment on a minimum- variance distortion less response beam former, Directionality of convergence of the LMS algorithm for Nonwhite Inputs, Robustness of the LMS filter, Upper bound on the step size Parameters for Different Scenarios, Transfer function approach for deterministic input summary problems.

Design of digital filters-symmetric & antisymmetric, linear phase, optimum, Equiripple, FIR differentiation, Hilbert's transformers.

Design of IIR filters-impulse invariance, bilinear transformation, matched transformation, frequency transformation in analog & digital domain.

Design of digital filters based on least square method.

Application of DSP to speech processing & radar signal processing.

Introduction to TMS320c62XX DSP processors.

References :

1. John Proakis, Digital Signal Processing Prentice Hall
2. A.V.Oppenhiem & R.W.Schafer, Digital Signal Processing - Prentice Hall
3. L.R.Rabiner & B.Gold,Theory & application of digital signal processing- Prentice Hall
4. A.Antiniou, Digital Filters; analysis, design & application- Mcgraw Hill
5. Salivahanan,vallavaraj,gnanapriya, Digital Signal Processing-TMH
6. S.K.Mitra, Digital Signal Processing - TMH

NORTH MAHARASHTRA UNIVERSITY JALGAON
M.E. ELECTRONICS AND TELECOMMUNICATION (Digital Electronics)
W.E.F : 2010-11
Term – I

DIGITAL SYSTEM DESIGN

Teaching scheme:
Lectures: 3 hrs / week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)

Design of synchronous and asynchronous sequential logic circuits working in the fundamental mode and pulse mode. Essential hazards Unger's theorm. Map entered variable and synthesis of random logic. Fault detection and error correction.
Register- transfer level systems, Execution Graph, Organization of System, Implementation of RTL Systems, Analysis of RTL Systems, Design of RTL Systems.
Data Subsystems, Storage Modules, Functional Modules, Data paths, Control Subsystems, Micro programmed Controller, Structure of a micro programmed controller, Micro instruction Format, Micro instruction sequencing, Micro instruction Timing, Basic component of a micro system, memory subsystem.
I/O subsystem, Processors, Operation of the computer and cycle time. Binary Decoder, Binary Encoder, Multiplexers and Demultiplexers, Floating Point Arithmetic-Representation of Floating Point Number, Floating Point Multiplication.
Logic simulation: General fault simulation techniques, statistical fault analysis. Testing for single stuck fault: Basic issues, ATG for SSF in combined circuits. ATG for SSFs in sequential circuits. PLA testing.
Design for Testability: Classical testability scan design, compressing tech. built in self test logic level diagnosis, self checking design.
Specific digital system: Deign such as digital IS tester Microcontroller cards, PC add on cards design, PLA based product design.

References:

1. M. Ercegovac, T. Lang and L.J. Moreno, "Introduction to Digital Systems", Wiley,2000
2. John F. Wakerly,"Digital Design principles and practices",3rd edition, PHI publications.
3. Melvin A Breuer, Arthur D Friedmen, MironAbra MOVICI jaico Publishing.

4. House- Digital system testing and testable design.
5. B Holdsworth Digital Logic Design.
6. Puri V.K Digital Electronics
7. Z. Navabi, " VHDL-Analysis and Modeling of Digital Systems", TMH
8. Norman - Digital Logic design principal John Wiley Pub.
9. Samual – Digital Circuit logic design –PHI.
10. Charles H. Roth, "Digital system design using VHDL", Thomson Publication.
11. Balabanian,"Digital logic design principles",Wiley publication.
12. Stephen Brown, "Fundamentals of digital logic", TMH publication.

NORTH MAHARASHTRA UNIVERSITY JALGAON
M.E. ELECTRONICS AND TELECOMMUNICATION (Digital Electronics)
W.E.F : 2010-11
Term – I

VLSI DESIGN

Teaching scheme:
Lectures: 3 hrs / week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)

Review of VHDL Verilog Programming, Hardware modeling with Verilog / VHDL, different verilog /VHDL constructs, and Logic Synthesis. Levels of abstraction, Elements (Data flow, Behavioral, Structural, Mixed and switch level Description).

simulation process, types of simulators FSM modeling, test benches, generics & attributes, synthesis tools features & optimization in VHDL, Synthesis guidelines, Timing issues: terminology, flow diagram, clock, gated clock, setup & hold time, violation,Meta stability, Static & Dynamic timing analysis.

CMOS & Bi-CMOS logic families & PLD architecture, Power dissipation, noise and ESD issues, clock distribution, signal connections, synchronous and asynchronous design features, and memory system design. CMOS systems Design, CMOS Testing. Classification of CPLD architecture, CPLD 9500 series, Xilinx FPGA –XC4000 series,

Designing steps in ASIC, Physical Design flow, Different type of ASIC, CAD Tools, System Partitioning, Estimating ASIC size, Power dissipation, FPGA partitioning methods,

Floor planning, Placement Physical design flow; Information Formats; global routing, detailed routing; special routing; circuit extraction and DRC

References :

1. Douglas Perry, VHDL - McGraw Hill Publication
2. Janic Bergerson, VHDL Using Testbenches
3. Yu. Chin Hsu, K. Tsai, VHDL Modeling for Digital Design Synthesis.-

Kluwer publishers.
4. Xilinx PLD data manual
5. Michael John sebastiab smith, “Application specific IC”, Addison Wesley publication.
6. K. K. Parhi , “VLSI Digital signal processing systems Design & Implementation” John Wiley & Sons
7. Neil Weste and Eshraghian, “Principles of CMOS VLSI Design “(Second Edition) Pearson
Education Asia (Addison – Wesley Publication Company)
8. James E Buchnan – BiCMOS-CMOS system design McGraw Hill Publication.

NORTH MAHARASHTRA UNIVERSITY JALGAON
M.E. ELECTRONICS AND TELECOMMUNICATION (Digital Electronics)
W.E.F : 2010-11
Term – I

Elective – I
PARALLEL COMPUTING

Teaching scheme:
Lectures: 3 hrs / week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)

Parallel Computer Models: The state of computing, Multiprocessors and multi-computers, Multivector and SIMD computers, Architectural development tracks

Program And Network Properties: Conditions of parallelism, Data and resource dependences, Hardware and software parallelism, Program partitioning and scheduling, Grain size and latency, Program flow mechanisms, Control flow versus data flow, Data flow architecture, Demand driven mechanisms, Comparisons of flow mechanisms

System Interconnect Architectures: Network properties and routing, Static interconnection networks, Dynamic interconnection Networks, Multiprocessor system interconnects, Hierarchical bus systems, Crossbar switch and multiport memory, Multistage and combining network.

Processors and Memory Hierarchy: Advanced processor technology, Instruction-set Architectures, CISC Scalar Processors, RISC Scalar Processors, Superscalar Processors, VLIW Architectures, Vector and Symbolic processors Memory Technology: Hierarchical memory technology, Inclusion, Coherence and Locality, Memory capacity planning, Virtual Memory Technology.

Backplane Bus System: Backplane bus specification, Addressing and timing protocols, Arbitration transaction and interrupt, Cache addressing models, direct mapping and associative caches.

Pipelining: Linear pipeline processor, Nonlinear pipeline processor, Instruction pipeline design, Mechanisms for instruction pipelining, Dynamic instruction scheduling, Branch handling techniques, Arithmetic Pipeline Design, Computer arithmetic principles, Static arithmetic pipeline, Multifunctional arithmetic pipelines.

Vector Processing Principles: Vector instruction types, Vector-access memory schemes.

Synchronous Parallel Processing: SIMD Architecture and Programming Principles, SIMD Parallel Algorithms, SIMD Computers and Performance Enhancement

References:

1 Kai Hwang, “Advanced Computer Architecture”, Parallelism, Scalability, Programmability”, McGraw Hill Inc. Ed. 1993.
2 V. Rajaranam & C.S.R.Murthy, “Parallel Computer”; PHI.
3 William Stallings, “Computer organization & Architecture”, PHI, New Delhi, 6th edition.
4 Dezso’Sima, “Kalsuk’Advanced computer Architectures”, Terence Fountain & Peter Pearson’s Edation. (2nd Edition)
5 Hwang and Degroot, “Parallel Processing for Supercomputers and AI”, (Eds) McGraw Hill.
6 J. P. Hayes, “Computer Architecture And Organization”; MGH.
Harvey G. Cragon, “Memory System and Pipelined Processors”; Narosa Publication.
7 R. K. Ghose, Rajan Moona & Phalguni Gupta, “Foundation of Parallel Processing”; Narosa Publications. Kai Hwang and Zu, “Scalable Parallel Computers Architecture”; MGH.

NORTH MAHARASHTRA UNIVERSITY JALGAON
M.E. ELECTRONICS AND TELECOMMUNICATION (Digital Electronics)
W.E.F : 2010-11
Term – I

Elective - I
BIOMEDICAL INSTRUMENTATION

Teaching scheme:
Lectures: 3 hrs / week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)

Measuring, Recording and Monitoring Instruments

Anatomy and Physiology, Physiological Systems of the Body, Basic Medical Instrumentation System, Performance Requirements of Medical Instrumentation System, Intelligent Instrumentation System, General Constraints in Design of Medical Instrumentation System, Regulation of Medical Devices.

Physiological transducers: Displacement, position and motion transducers, Pressure transducers, Transducers for Body Temperature Measurement, Photoelectric transducers, Optical Fibre sensors, Biosensors

Recording systems: Basic Recording systems, Biomedical signal Analysis Techniques, Signal Processing Techniques, Potentiometric Recorders, Digital Recorders, Instrumentation tape Recorders,

Biomedical Recorders: Electrocardiograph, Vectorcardiograph (VCG), Phonocardiograph (PCG), Electroencephalograph (EEG), Electromyograph (EMG), Other Biomedical Recorders, Biofeedback Instrumentation

Patient Monitoring Systems: Bedsides Patient Monitoring Systems, Central Monitors, Measurements of Heart Rate, Measurements of Pulse Rate, Blood Pressure Measurement, Measurement of Temperature, Measurement of Respiration rate

The Matched Filter, Detection of the P Wave,Homomorphic Filtering, Application- ECG Rhythm Analysis, Identification of Heart Sounds, Waveshape and waveform Complexity, Analysis of Event-related Potentials, Morphological Analysis of ECG Waves, Envelope Extraction and Analysis of Activity, Application- Normal and Ectopic ECG Beats, Analysis of Exercise ECG.

Modern Imaging Systems: X-ray Machines and Digital Radiography Portable and mobile X-ray units, Digital Radiography, X-ray Computed Tomography, Computed Tomography, System components, Gantry Geometry, Patient Dose in CT Scanners,

Nuclear Medical Imaging System, Radiation Detectors, Pulse Height Analyzer, Uptake Monitoring Equipment, Radio-isotope Rectilinear Scanner, The Gamma Camera, Emission Computed Topography (ECT) Single Photon Emission Computed Topography (SPECT), Positron Emission Topography (PET scanner)

Ultrasonic Imaging Systems: Diagnostic Ultrasound, Medical Ultrasound, Basic Pulse-echo Apparatus, A-Scan, B-Scanner.

Laser Applications In Biomedical Field: The laser, Pulsed Ruby laser, ND-YAG laser, Helium –Neon Laser, Argon Laser, CO2 Laser, Excimer Lasers, Semiconductors Laser, Laser Safety

References:

1. Cromwell - Biomedical Instrumentation, Pearson
2. Khandpur - Handbook of Biomedical Instrumentation
3. Webster - Biomedical Instrumentation, Wiley
4. R. M. Rangayyan “Biomedical Signal Analysis- A case study approach”, Wiley Publications.
5. Eugene N Bruce “Biomedical signal processing and signal modeling”, Wiley publications.

W.E.F : 2010-11
Term – I

Elective - I

WIRELESS & MOBILE COMMUNICATION

Teaching scheme:
Lectures: 3 hrs / week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)

Basics: History of wireless communication, and future trends, Wireless Generations and Standards, Cellular Concept and Cellular System Fundamentals, Trunking Cell Splitting and Sectoring, Mobile Radio signal propagation, path loss and channel models.

Speech coding for wireless system and application like PCM, DPCM, DM, Vocoder & Linear Predictive coding. Performance comparison.

Wireless LAN
IEEE802-11Hiper LAN, Bluetooth, Adhoc Network: Characteristic, Performance issue, Routing in mobile host.

Wireless Networking:
Difference between wireless & fixed telephone n/w, development, transmission hierarchies, traffic routing, wireless data services, common channel signaling, ISDN, SS7, global cellular network, Interoperability, PCS/PCNs, Protocols for n/w access and n/w data base, UMTS.

Wireless systems and standards:
AMPS, ETACS, United state of digital cellular, (IS 54 and IS 136) GSM, CDMA (IS95), CT2 Standards for cordless telephone, Digital European cordless telephone , PACs, PDC, Personal handy phone systems, US PCS & ISM bands, US wireless cable TV, IEEE802.11.

References:

1. Walker, J.: Mobile Information Systems. Artech House, Inc. 1990, Boston London
2. Mehrotra, A.: GSM System Engineering. Artech House, Inc. 1997, Boston London
3. Redl, S.M., Weber, M.K., Oliphant, M.W.: An Introduction to GSM. Artech House, Inc. 1995, Boston London
4. Feher, Wireless Digital Communication- 1991, PHI.

5. Vijay K. Garg, and J.E. Wilkes, Principles & applications of GSM –1999 – Prentice hall PTR.
6. Roger L. Freeman, Telecom Transmission handwook 4th ed 1998 John Wiley & Sons. Inc. New York.
7. Lee, Mobile Cellular Telecomm, 1995 Mc Graw Hill Inc.
8. J. Schiller, Mobile Communication, Addision Wiley
9. William C.Y. Lee, Mobile Comm. Design Fundamental. John wiley.
10. Mark Ceampa, Design & Implementation of Wireless LANs, Thomson Learning.

Term – I I

IMAGE PROCESSING AND PATTERN RECOGNITION

Teaching scheme:
Lectures: 3 hrs / week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)

Digital Image fundamentals : Basic Image Processing steps, image acquisition, presentation of gray scale and modeling. Human visual perception, sampling and quantization, basic relationships between pixels. Histogram analysis and equalization, geometric image

Applications of pattern recognition, statistical decision theory, image processing and analysis.

Probability: Introduction, probability of events, random variables, Joint distributions and densities, moments of random variables, estimation of parameters from samples, minimum risk estimators Statistical Decision Making: Introduction, Baye's Theorem, multiple features, conditionally independent features, decision boundaries, unequal costs of error, estimation of error rates, the leaving-one—out technique. Characteristic curves, estimating the composition of populations.

Nonparametric Decision Making: Introduction, histograms, Kernel and window estimators, nearest neighbor classification techniques, adaptive decision boundaries, adaptive discriminate Functions, minimum squared error discriminate functions, choosing a decision making technique.

Clustering: Introduction, hierarchical clustering, partitional clustering Artificial Neural Networks, PCA, ICA, SVM.

References:

1) R. C. Gonzalez & Woods, "Digital Image Processing" – Addison Wesley IIIrd Ed.
2) A. K. Jain, "Fundamentals of Digital Image Processing"– Prentice Hall Inc.
3) Robert Jschalkoff, "Digital Image Processing & Computer vision : An introduction to theory & Implementation"– John wiley & Sons Inc.
4) K. R. Castleman, "Digital Image Processing" – PHI
5) W. K. Pratt, "Digital Image Processing" .(3 Ed.) John.Wiley.
6) B. Chanda and D.Mujumdar,"Digital Image Processing & Analysis".-PHI, New Delhi, 2000.

Term – I I

EMBEDDED SYSTEM DESIGN

Teaching scheme:
Lectures: 3 hrs / week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)

Embedded system Introduction:
Introduction to Embedded System, History, Design challenges, optimizing design metrics, time to market, applications of embedded systems and recent trends in embedded systems, embedded design concepts and definitions, memory management, hardware and software design and testing, communication protocols like SPI, SCI, I2C, CAN etc

System Architecture:
ARM7/ARM9 architecture, instruction set, thumb Instruction set, Pipeline, memory management, Bus architecture, Programming concepts, Embedded programming in c and C++.

Multiprocessors Scheduling: Model of multiprocessor & distributed systems, Multiprocessor priority ceiling protocol, Elements of scheduling algorithms for end-to-end periodic tasks, Schedulability of fixed priority end-to-end periodic tasks, end-to-end tasks in heterogeneous systems.

Real Time systems: Characterizing real time systems & tasks, Performance measures, Estimating program runtimes, Task assignment & scheduling, Real time operating systems (RTOS), Task management, Race condition, Inter-task communication, Implementation aspects & estimation modeling in embedded systems, Validation & debugging of embedded systems, Real time communication, Hardware-software co-design in an embedded system, Applications of Real time systems.

References:

1. Krishna & Shin, Real -Time Systems, (McGraw Hill International)
2. Rajkamal, Embedded systems, (Tata - McGraw Hill)
3. Valvano, Embedded Microcomputer systems, (Thomson Delmar publishing)
4. Atmel/ARM Data books.
5. Iyer &Gupta, Embedded Real Time Systems Programming, (Tata McGraw Hill)
6. Lewis Daniel, Fundamentals of Embedded software, (Prentice Hall India)
7. Jane Liu, Real Time Systems, (Pearson India low cost edition)

NORTH MAHARASHTRA UNIVERSITY JALGAON
M.E. ELECTRONICS AND TELECOMMUNICATION (Digital Electronics)
W.E.F : 2010-11

Term – I I

MICROELECTRONICS CIRCUIT DESIGN

Teaching scheme:
Lectures: 3 hrs / week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)

Types of modeling, Models of diode, BJT and FET, CMOS device modeling: Simple MOS Large-signal Model, Simple MOS Small-signal Model,
Analog IC Design : Differential Amplifier, Cascode Amplifer, Current Amplifiers, Output Amplifers, High gain amplifier Architecture,
Operation Amplifier Design of CMOS op-amp, Compensatio of op-amps,
Design of two stage op-amps, PSRR of two stage op-amps, Cascode op-amps, Simulation and Measurement of Op-amps, Micromodels of Op-amps, Switch Capacitor Circuits, Switch Capacitor Amplifiers, Switch Capacitor Integrator, z Domain Models of two phase switched capacitor circuits, First and Second order switched capacitor circuits, Switched capacitor filter.
High frequency amplifier, Mixer, R.F. Power amplifier, Phase- Locked Loops.

References:

1) Phillip E. Allen and Douglas R. Holberg, CMOS Analog Circuit Design,2nd ed. New York : Oxford University Press, 2004
2) Thomas H. Lee, "The Design of CMOS Radio – Frequency Integrated Circuit", Cambridge University Press
3) B. Razavi "RF Microelectronics" PHI 1998
4) R. Jacob Baker, H.W. Li, D.E. Boyce " CMOS Circiut Design, layout and Simulation"
PHI 1998
5) Y.P. Tsividis "Mixed Analog and Digital Devices and Technology" TMH 1996

Term – I I

ADVANCE COMPUTER NETWORK

Teaching scheme:
Lectures: 3 hrs / week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)

Review of computer networking concepts

Topology, LAN, WAN, MAN, Internet, OSI/ISO, TCP/IP reference models, Point to point protocols. ARQ: Retransmission strategies. Functional elements : Multiplexing, Switching , Networks Management & traffic controls. Delay models in Data Networks Switching techniques: Performance measures & architectural issues.

Internetworking

TCP/IP Internet architecture, IPV4, IPV6, IP addressing & related issues, IP address resolution techniques (ARP). IP datagram & forwarding, routing algorithms.

Multiple access techniques

ALOHA, CSMA, CSMA/CD, CSMA/CA, CDMA, OFDM, Delay throughput characteristics, WLAN-Protocols, multiple access, Ad-hoc networks, Bluetooth Specifications, WAP.

Network security issues

Ciphers, DES, Public key cryptography, RAS algorithm, Digital Watermarking, Attacks and Counter Measures , Service Authentication Performa.

References:

1) Dimitri Bertisekas & Robert Gallager, “Data Networks” PHI
2) Gerd E Kieser, “Local Area Networks”,– Mc-Graw-Hill
3) D.E.Comer, “Computer Networks and Internetworking” Pearson Education
4) William Stallings, “Cryptography and Network Security: Principles and Practice”, Pearson Education
5) Steele, “GSM, CDMA and 3G Systems” , Wiely Students Edition
6) Anurag kumar, D. Manjunath & Joy Kuri– Morgn, “Communication Networking” An analytical approach” – Kaufmann publishers

Term – II

Elective - II

ADVANCED DIGITAL COMMUNICATION

Teaching scheme:
Lectures: 3 hrs / week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)

Signal spectra & Random Processes:
Basics of Fourier series & Fourier transform, Probability, Random Variables and processes, Digital PAM & PAM formats, Line coding spectral representation, AT & T and CCITT hierarchies.

Digital CW modulation an overview, BPSK, DPSK, DEPSK, OPSK, M'ary PSK, QASK constellation pattern, BFSK, GMSK, Doubinary encoding, QPR coherent & non coherent systems, Bandwidth & spectrum representation, error probabilities in BPSK, DPSK, QPSK, FSK, 16 QAM, MSK, their performance evaluation in presence of AWGN.

Matched correlation, optimum filters, Integrate & Dump, their transfer function, error probabilities, error rate etc.

Spread spectrum techniques: DS, FH, CDMA based system, Performance of DS-SS & FH-SS, generation of PN sequence code.

Error Control Coding**:** Introduction to algebra**,** Group rings, Galois field, two arithmetic GF, Linear block codes: Structure matrix description, Syndrome decoding, Hamming codes, Perfect & Quest, perfect odes, Cyclic codes: Polynomial description, division algorithm, matrix description, fire codes, golay codes, cyclic Redundancy check codes, circuit implementation of cyclic codes.

Encoding and Decoding of BCH and RS codes, MDS Codes, Nested codes, Convolutional Encoders, Tree & Trellis diagram, Veterbi decoding algorithms, Sequential decoding algorithms.

References :

1. J. G. Prokais, "Digital Communications", McGraw Hill Inc.
2. Bernad Sklar, "Digital Communication: Fundamentals & Applications", Pearson Education Asia (LPE).
3. A. B. Carlson, "Communication System", Mc Graw Hill Inc.
4. Amitabh Bhattacharya, "Digital Communication", TMH.

5. T. S. Rappaport, “Wireless Communication”, Pearson Education.
6. Simon Haykin, “Digital Communications”, John Wiley & Sons
7. Taub &Schilling, “Principle of Communication System”, TMH.

Elective - II

ARTIFICIAL INTELLIGENCE

Teaching scheme:
Lectures: 3 hrs / week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)

Fuzzy Logic Introduction to Fuzzy sets, Fuzzy set Theory, Fuzzy relation, Membership functions, fuzzification, defuzzification, fuzzy rule based system fuzzy inference system.

Fuzzy Decision Making, Fuzzy modeling, Fuzzy reasoning, compositional rules of inference, Fuzzy systems as function estimators, Fuzziness as multivalence, Adaptive neuro fuzzy inference system, cognitive neurofuzzy modelling, Neuro fuzzy control, Application of neuro fuzzy control

Neural Network Fundamental of Artificial Neural Network : Artificial Neuron model. Learning process, Single layer and multilayer feed forward network, training by back propagation, Hop-field model basic concept of
Bidirectional associative memory, self organization map, optimization model.
Recurrent Networks, Hamming Net and MAXNET, Feature mapping, counter propagation networks, cluster discovery Network (ART),
Applications of Neural Network Characters Recognition Network, Neural Network control Application, Network for Robot kinematics, Hand written Numeral recognition.

References:

1 Limin Fu , “Neural Networks in Computer Intelligence”, McGraw Hill Inc., 1994.
2 N. K. Bose, P. Lling , “Neural Network Fundamentals”, McGraw Hill.
3 Zurada “Artificial Neural Networks”,
4 Timothy J. Ross , “ Fuzzy Logic with Engg. Applications”, McGraw Hill.
5 Jang, Sun, Mezutani “Neuro Fuzzy and Soft computing”, TMH
6 Bart Kasko, “Fuzzy Engineering”, PHI
7 S. Hykin , “Neural Networks”, Pearson Education.
8 J.A.Freeman and B.M.Skapure, “Neural Networks, Algorithms Applications and programming Techniques”, Addison – Wesely, 1990
9 Laurence Fausett, “Fundamental of Nerual Networks: Architecture, algorithms and application”,Prentice Hall, 1994.

NORTH MAHARASHTRA UNIVERSITY JALGAON
M.E. ELECTRONICS AND TELECOMMUNICATION (Digital Electronics)
W.E.F : 2010-11
Term – II

Elective - II

Modeling and Simulation Techniques

Teaching scheme:
Lectures: 3 hrs / week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)

Introduction Models and their applications, Common types of mathematical models used for engineering systems, Derivation of models from physical relations, Model determination from input- output observation, Basic principle of simulation, Analog and digital simulation techniques, Models: Structural, Process, Continuous, Discrete, Deterministic,Random, input/output, static, dynamic, multilevel.

Classical and Semi-classical models:
Boltzmann transport equation, classical semiconductor equations- drift diffusion approximation, generation and recombinations, different generation and recombination mechanisms, limitations of drift-diffusions, energy transport, semiclassical and hot electron models, hydrodynamic and semi-classical semiconductor equations, modeling of semiconductor laser diode, general aspects, static models and dynamic models, model verification and validation.

Numerical Techniques: Finite difference methods, first order and second order derivatives and discrimination, finite element method, solution of poison's equation, solution of steady state continuity equation for electrons and holes, advantages and disadvantages of finite element method, Monte Carlo simulation techniques, basic concepts, Random variables, random number generation and testing, analysis of simulation results, confidence intervals, variance reduction techniques. Case studies of analytical and simulation studies

Modeling of Semiconductor Devices p-n junction, p-n junction C-V characteristics, breakdown, Schottky diodes, Hetero-structure diodes, Simulation of above device characteristics in graphical format, Simulation of simple laser diode and plot its characteristics by considering appropriate materials and parameters, PIN diode, Avalanche Photodiode, Quantum transport modeling, 1D models, discretized Schrodinger equation, Transmission matrix formation, I-V characteristics.

Universal FET modeling
sub threshold regime, unified charge control model, short channel effects, I-V modeling.Capacitance modeling (Ward Dutton and Meyer models) Universal models for MOSFET,MESFET, HFET and TFT.

References:

1. Modeling of CMOS G.Gordon, 'System Simulation', 2nd ed., Prentice Hall
2. Narsing Deo, 'System Simulation with Digital Computers', Prentice Hall
3. R. Leigh, 'Modelling and Simulation', Peter Peregrims Ltd.,. 1983.
4. M.Law, W.D.Kelton, 'Simulation Modelling and Analysis, Mcgraw Hill, 1982.
5. Raj Jain, The Art of Computer Systems Performance Analysis, John Wiley and Sons, New York, USA, 1991
6. Trivedi, K.S, Probability and Statistics with Reliability, Queueing and computer science Applications, Prentice Hall of India, Reprinted in 1990.

NORTH MAHARASHTRA UNIVERSITY, JALGAON (M.S.)

MASTER OF ENGINEERING (M.E.)

(MECHANICAL ENGINEERING)
(MACHINE DESIGN)

W.E.F.: 2010-11

North Maharashtra University, Jalgaon
M.E. (Machine Design)
Examination scheme and Structure with effect from Year 2010-11
First Year Term I

Sr No	Subject	Teaching Scheme per week		Examination Scheme				
		L	P	Paper Hr.	Paper	TW	PR	OR
1	Advanced Mechanical Engineering Design of Equipment	3	-	3	100	-	-	-
2	Computer Methods in Mechanical Design	3	-	3	100	-	-	-
3	Vibration Engineering	3	-	3	100	-	-	-
4	Tribology	3	-	3	100	-	-	-
5	Elective-I	3	-	3	100	-	-	-
6	Laboratory Practice-I	-	6	-	-	100	-	50
7	Seminar-I	-	4	-	-	100	-	-
	Total	15	10		500	200		50
	Grand Total	25		750				

Elective I

1) Design of Pressure Vessel
2) Instrumentation and Automatic Control System
3) Design of Material Handling Equipment

First Year Term II

Sr No	Subject	Teaching Scheme per week		Examination Scheme				
		L	P	Paper Hr.	Paper	TW	PR	OR
1	Design and synthesis of Mechanism	3	-	3	100	-	-	-
2	Optimization Techniques in Design	3	-	3	100	-	-	-
3	Machine Tool Design	3	-	3	100	-	-	-
4	Mechatronic Product Design	3	-	3	100	-	-	-
5	Elective-II	3	-	3	100	-	-	-
6	Laboratory Practice-II	-	6	-	-	100	-	50
7	Seminar-II	-	4	-	-	100	-	-
	Total	15	10		500	200		50
	Grand Total	25		750				

Elective II

1) Automotive Design
2) Robotics
3) Design for Manufacture and Assembly

Second Year Term I

Sr No	Subject	Teaching Scheme per week		Examination Scheme				
		L	P	Paper Hr.	Paper	TW	PR	OR
1	Seminar-III	-	4	-	-	50	-	50
2	Project Stage-I	-	18	-	-	100	-	-
	Total	-	22	-	-	150		50
	Grand Total	22		200				

Second Year Term II

Sr No	Subject	Teaching Scheme per week		Examination Scheme				
		L	P	Paper Hr.	Paper	TW	PR	OR
1	Progress Seminar	-	-	-	-	50	-	-
2	Project Stage-II	-	18	-	-	150	-	100
	Total	-	18	-	-	200	-	100
	Grand Total	18		300				

NORTH MAHARASHTRA UNIVERSITY, JALGAON
M.E. (MACHINE DESIGN)
W.E.F.: 2010-11
FIRST YEAR TERM I
ADVANCED MECHANICAL ENGINEERING DESIGN OF EQUIPMENT

Exam Scheme :

Lectures – 03 hours/week.

Theory – 100 marks
Min passing – 40 marks
Duration – 3 Hours

Material selection in Mechanical design: - Design process, Engineering material and their properties, Material property charts, material selection procedure and case studies, Process selection procedure & case studies, Multiple constraints & objectives, selection of shape, designing hybrid materials.

Advanced Design: - Load analysis for two & three dimensional static, dynamic and vibrating loading, Deflection in beam, Castigliano's method, Torsion, Combined stress, Stress concentration, Failure theories, Von Mises – Hencky theory, Fracture mechanics, fatigue failure mechanism & models, Notches & stress concentration, Residual stress, design for high cycle fatigue, design for fully reversed uniaxial stress, Design for fluctuating uniaxial stress, Design for multiaxial stress

Reference:

1) Machine Design By Robert L Norton
2) Mechanical Engineering Design By J.E.Shigley & C R Mischke
3) Selection of engineering material by Gladius Levis

NORTH MAHARASHTRA UNIVERSITY, JALGAON
M.E. (MACHINE DESIGN)
W.E.F.: 2010-11
FIRST YEAR TERM I
COMPUTER METHODS IN MECHANICAL DESIGN

Exam Scheme :

Lectures – 03 hours/week.

Theory – 100 marks
Min passing – 40 marks
Duration – 3 Hours

Advanced Computer Graphics: - review of 2D & 3D geometric transformation, Modeling of curves, cubics, splines, beziers and b-splines, Modelling of surface, modeling of solids, brep, CSG, octree, feature based modeling, Windowing and view porting
Finite Element Analysis : - Principle of potential energy, 1D elements, Derivation of stiffness & mass matrices for a bar, beam and shaft, solution for static problems,
Case studies in stress analysis of mechanical components, FEA using 2D & 3D elements, plain strain & stress problems, FEA using plate & shell, Finite element mesh, Automatic meshing technique, case studies using FE for design of geometrics such as tapered bar, plate with hole, spanner etc. Introduction to dynamic analysis, Basic equation,undamped free vibration, damping, Harmonic response analysis, thermal problem, formulation procedure, 1D & 2D heat transfer problems.

Reference:

1) Introduction to finite element method by C S Desai & J.F Abel
2) Concept & application of finite Element Analysis by Robert Cook
3) CAD/CAM by Groover & Zimmer

NORTH MAHARASHTRA UNIVERSITY, JALGAON
M.E. (MACHINE DESIGN)
W.E.F.: 2010-11
FIRST YEAR TERM I
VIBRATION ENGINEERING

Exam Scheme :

Lectures – 03 hours/week.

Theory – 100 marks
Min passing – 40 marks
Duration – 3 Hours

Introduction to vibration , free vibration and forced response solution of single and multiple degree freedom, of numerical method of finding natural frequencies and mode shape , vibration instrumentation ,vibration design and control, vibration isolation , passive control of , vibration absorber , active control of vibration , whole body vibration perception ,health effect of whole body vibration, motion sickness .

Reference:

1.Engineering vibration By Daniel .J. Inman
2.Mecanical vibration control engineering By S.Rao
3.Noise &vibration control engineering By Ver Beranek

NORTH MAHARASHTRA UNIVERSITY, JALGAON
M.E. (MACHINE DESIGN)
W.E.F.: 2010-11
FIRST YEAR TERM I
TRIBOLOGY

Exam Scheme :

Lectures – 03 hours/week.

Theory – 100 marks
Min passing – 40 marks
Duration – 3 Hours

Friction & Wear : -Types of wear ,theories of friction & wear, dry friction & boundary friction

Viscosity:- Petroff's law, Hagen Poisenille law, variation of viscosity ,

Hydrodynamic Lubrication: - Reynold's Eq. Solution for short & long finite bearing, load carrying capacity, flow rate, hydrodynamic thrust bearing, behaviour under variable laod, squeeze film, thermal equilibrium of sliding system, elasto hydrodynamic lubrication

Hydrostatic Lubrication: -Pressure distribution in hydrostatic thrust bearing, pumping power & capacity, hydrostatic formal & thrust bearing

Gas Lubrication: -Merits & Demerits, aerodynamic and aerostatic journal bearing ,Reynolds equation.

Reference:

1) Principles of tribology by J.Hamrock
2) Tribology in machine Design by T A solarski
3) Principles of Tribology by J.Hasting

NORTH MAHARASHTRA UNIVERSITY, JALGAON
M.E. (MACHINE DESIGN)
W.E.F.: 2010-11
FIRST YEAR TERM I
ELECTIVE – I
DESIGN OF PRESSURE VESSEL

Exam Scheme :

Lectures – 03 hours/week.

Theory – 100 marks
Min passing – 40 marks
Duration – 3 Hours

Introduction: Revision of stress and strain in thick and thin cylinder and pressure vessel. Criteria in vessel design, excessive elastic deformation, plastic instability, brittle, rupture, creep

Design of pressure vessel, internal pressure, construction feature, code, design of shell, types of heads, thickness of heads.

Design of storage vessel, storage of non volatile liquids and gases, code for storage, bottom and shell design

Design of vessel under external pressure, vacuum stress analysis, stiffness , design of circumferential stiffeners, design of covers, pipes and tubing

Design of High Pressure Vessel, autoclave

Support for vessel, types, leg support skirt, support design.

Reference:

1) Process Equipment Design by N.V .Joshi
2) Process equipment design by L.E.Browr ,E.H.Yovng
3) Introduction to process Equipment Design by B.C. Bhattacharya

NORTH MAHARASHTRA UNIVERSITY, JALGAON
M.E. (MACHINE DESIGN)
W.E.F.: 2010-11
FIRST YEAR TERM I
ELECTIVE – I
INSTRUMENTATION AND AUTOMATIC CONTROL SYSTEM

Exam Scheme :

Lectures – 03 hours/week.

Theory – 100 marks
Min passing – 40 marks
Duration – 3 Hours

Classification and representation of control systems,Influence of type control on steady state and transient responce,Time and frequency domain analysis,Stability analysis using Rough Phi Nyquist criteria,Root locus method,Modern control theory,Sequence control and programmable logic controllers,Control components,Comparators,Hydraulie,Neumatic and Electrical type of controllers,Servomotors.

Computer bvased data aquisition system,A-D and D-A convertors,Microprocessor application in measurement and control,Static and dynamic analysis of instrument system,FFT analysers,Current development in measurement and control of motion ,Force torque,pressure,temperature,floe,noice

Reference:

1.Measurement System By Ernest O Josbelin
2.Modern Control Systems ByRichard C Dorf, Robert H Bishop

NORTH MAHARASHTRA UNIVERSITY, JALGAON
M.E. (MACHINE DESIGN)
W.E.F.: 2010-11
FIRST YEAR TERM I
ELECTIVE – I

DESIGN OF MATERIAL HANDLING EQUIPMENT

Exam Scheme :

Lectures – 03 hours/week.

Theory – 100 marks
Min passing – 40 marks
Duration – 3 Hours

Introduction to material handling equipment, interplant transporting facilities, types of equipment,
Working principle, Construction and Design of: - Flexible hoisting application, pulley system,load handling equipment, arresting gears,hoisting gears,traveling gears, luffing gear,various types of drives, crane frame structure, stability of crane, elevators, electromagnetic hoisting equipment, various types of conveyors .

Reference:

1) Material handling equipment by Rudenko
2) Material handling equipment by John R Immer

NORTH MAHARASHTRA UNIVERSITY, JALGAON
M.E. (MACHINE DESIGN)
W.E.F.: 2010-11
FIRST YEAR TERM I
LABORATORY PRACTICE - I

Exam Scheme :

Practical's – 06 hours/week. Term-work – 100 marks
Oral- 50 marks

Experiments/Assignments based on

1) Computer Methods in Mechanical Design
2) Vibration Engineering
3) Tribology

The concerned subject in-charge should frame minimum of six laboratory Experiments / Assignments, two from each subject.

Note: Oral will be based on the prescribed term-work presented in the form of certified journal.

NORTH MAHARASHTRA UNIVERSITY, JALGAON
M.E. (MACHINE DESIGN)
W.E.F.: 2010-11
FIRST YEAR TERM I
SEMINAR-I

Practical's – 06 hours/week. Term-work – 100 marks

Seminar-I should be based on the literature survey on any topic relevant to Design Engineering. It may be leading to selection of a suitable topic of dissertation. Each student has to prepare a write-up of about 25 pages. The report typed on A4 sized sheets and bound in the necessary format should be submitted after approved by the guide and endorsement of the Head of Department. The student has to deliver a seminar talk in front of the teachers of the department and his classmates. The Guide based on the quality of work and preparation and understanding of the candidate shall do an assessment of the seminar

The report copies must be duly signed by the guide and Head of department (one copy for institute, one copy for guide and one copy for the candidate for certification). Attendance of all students for all seminars is compulsory

NORTH MAHARASHTRA UNIVERSITY, JALGAON
M.E. (MACHINE DESIGN)
W.E.F.: 2010-11
FIRST YEAR TERM II
DESIGN & SYNTHESIS OF MECHANISM

Exam Scheme :

Lectures – 03 hours/week.

Theory – 100 marks
Min passing – 40 marks
Duration – 3 Hours

Kinematics analysis of planer mechanism, graphical & analytical methods of velocity & acceleration analysis

Curvature Theorem, fixed & moving centroids, inflection circle, Euler Savary equation, Bobillier construction, cubic & stationary curvature, dwell mechanism

Kinematic synthesis, Dimensional synthesis, function generation, path generation, accuracy point, Chebychev spacing, graphical synthesis for function generation with two, three, four accuracy points, Bermester points

Analytical Synthesis of four bar and slider crank mechanism, Frendenstein equation.

Coupler Curves: - Equation of coupler curves, Robber Chebychev theorem, kinematics analysis of spatial mechanism, Denavit Hartenberg parameters, matrix method.

Reference:

1) Design of Machaniry- An introduction to synthesis & analysis of mechanics & machines by R.L.Norton
2) Mechanism Design - Analysis & synthesis by A.G.Edman & G.N.Sandor
3) Theory of Mechanics & Mechanism by J.E.Shigley & J.J.Ucker

NORTH MAHARASHTRA UNIVERSITY, JALGAON
M.E. (MACHINE DESIGN)
W.E.F.: 2010-11
FIRST YEAR TERM II
OPTIMIZATION TECHNIQUES IN DESIGN

Exam Scheme :

Lectures – 03 hours/week.

Theory – 100 marks
Min passing – 40 marks
Duration – 3 Hours

Optimum design formulation,Problem formulation process;Graphical optimisation;optimum design concepts,Global and local minima,Unconstrained optimum design problems,Constrined optimum design problems,Postoptinality analysis,Linear programming methods for optimum design numerical methods for unconstrined optimisation,Numerical method for constrained optimisation;Multiobjective optimum design concepts and methods,Genetic algorithms,Weighted sum method,Weighted minimum-maximum method;Global optimisation concepts and methods for optimum design,Deterministic method,Stochontic method

Reference:

1.Mechanical design of mechanical element-R.C.Thomson
2.Optimisation concept and application in engineering-Balegundu & Chandrupatla
3.Engineering optimisation-S.S.Rao

NORTH MAHARASHTRA UNIVERSITY, JALGAON
M.E. (MACHINE DESIGN)
W.E.F.: 2010-11
FIRST YEAR TERM II
MACHINE TOOL DESIGN

Exam Scheme :

Lectures – 03 hours/week.

Theory – 100 marks
Min passing – 40 marks
Duration – 3 Hours

Introduction, trends in machine tool design, design specification, working principle,
Kinematics of machine tool, different drives, cutting speeds, gear boxes, ray diagram,
Force analysis, forces for different machining operation, design of beds, columns, tables, support, rigidity consideration,
Vibration in machine tool, vibration of column beds, vibration damping,
Design of side ways & guide ways, types of guide, pressure distribution, wear, accuracy, lubrication .
Design of power screws, design features, strength, rigidity, efficiency, backlash,
Design of spindles, balancing of spindles, strength & wear resistance,
CNC machine tool, CAD/CAM system, programming.

Reference:

1) Machine tool design by N.K.Mehta
2) Design principles of metal cutting—machine tool by F Koenigs Berger

NORTH MAHARASHTRA UNIVERSITY, JALGAON
M.E. (MACHINE DESIGN)
W.E.F.: 2010-11
FIRST YEAR TERM II
MECHATRONIC PRODUCT DESIGN

Exam Scheme :

Lectures – 03 hours/week.

Theory – 100 marks
Min passing – 40 marks
Duration – 3 Hours

Introduction to mechanical system, principles of basic electronics, microprocessor and their application, integrated, circuits, sensors, actuators, other electrical / electronic hardware in mechatronic system communication .

Interfacing DA & AD converters, software and hardware principles and tools to build mechatronic system. Design and selection of mechatronic elements namely sensors like encoders and resolvers stepper and servomotor.

Role of controls in mechatroincs role of modeling in mechatronics design, design optimizations of mechatronics systems.System interface, Data acquisition, Instrumentation system.

Reference:

1) Mechatronics by W. Bolton
2) Mechatronics System Design by Shetty D and Kolk R. A.

NORTH MAHARASHTRA UNIVERSITY, JALGAON
M.E. (MACHINE DESIGN)
W.E.F.: 2010-11
FIRST YEAR TERM II
ELECTIVE – II
AUTOMOTIVE DESIGN

Exam Scheme :

Lectures – 03 hours/week.

Theory – 100 marks
Min passing – 40 marks
Duration – 3 Hours

Design requirements of automobile, engines as a system and its subsystem, lubrication system, fuel injection system, cooling system. Design requirements of automobile transmission, automatic transmission; Dynamic consideration in designing of suspension system, modern system of suspension, kinematic requirements of steering mechanism, need for power steering, braking requirements of automobile. Brake materials, modeling and simulation of different subsystems, instrumentation and control, microprocessor controlled units, safety and comfort in automotive component design.

Reference:

1) Design of Machinery By Robert L Norton
2) Machine Component Design By Willian Orthweein.

NORTH MAHARASHTRA UNIVERSITY, JALGAON
M.E. (MACHINE DESIGN)
W.E.F.: 2010-11
FIRST YEAR TERM II
ELECTIVE – II
ROBOTICS

Exam Scheme :
Lectures – 03 hours/week.

Theory – 100 marks
Min passing – 40 marks
Duration – 3 Hours

Introduction: - Historical perspective, advantage, application
Basic component: -Manipulator sensory devices, controller, power conversion unit
Mechanical system: - translation & linear motion, motion conversion, modeling kinetic chain, end effectors
Control of actuator: - Closed loop control, control of robotics joint, stepper motor, direct drive, hydraulic actuator
Sensory devices: - Non-optical position sensor, optical position sensor, velocity sensor, accelarometer, proximity sensors, touch & slip sensor
Vision of robotics system: - Imaging component, picture coding, object recognition
Computer: -Hardware & software

Reference:
1) Robotics engineering by Richard Klafter
2) Robotics for Engineer by Yoram Korem
3) Robot Control by spong, lewis, Abdallah

NORTH MAHARASHTRA UNIVERSITY, JALGAON
M.E. (MACHINE DESIGN)
W.E.F.: 2010-11
FIRST YEAR TERM II
ELECTIVE – II

DESIGN FOR MANUFACTURE AND ASSEMBLY

Exam Scheme :

Lectures – 03 hours/week.

Theory – 100 marks
Min passing – 40 marks
Duration – 3 Hours

Life cycle of mechanical equipment design, Requirement of life cycle personnel like customer, management, marketing, manufacturing, transportation etc. Need to meet constraints of manufacturing, Advantages of designing for manufacturing and assembly to improve product quality, cost and time to market, Design for manufacture & assembly (DFMA) strategies, DFMA application and case studies, product design for manual assembly, Design for high speed automatic & robot assembly, design for machining, design for injection moulding, die casting and powder metal processing, Design for sheet metal for mechanical system design

Reference:

1) Process and Design for manufacturing by Sherif D EL Wakil
2) Manufacturing, Planning and control systems by Thomas E Vollmann, Willam L Beroy
3) Automation, Production System and Computer Integrated Manufacturing by Mikell P Groover.

NORTH MAHARASHTRA UNIVERSITY, JALGAON
M.E. (MACHINE DESIGN)
W.E.F.: 2010-11
FIRST YEAR TERM II
LABORATORY PRACTICE - II

Exam Scheme :

Practical's – 06 hours/week. Term-work – 100 marks
Oral- 50 marks

Experiments/Assignments based on

1) Mechatronic Product Design
2) Design and Synthesis of Mechanism
3) Optimization Techniques in Design

The concerned subject in-charge should frame minimum of six laboratory Experiments / Assignments, two from each subject.

Note: Oral will be based on the prescribed term-work presented in the form of certified journal.

NORTH MAHARASHTRA UNIVERSITY, JALGAON
M.E. (MACHINE DESIGN)
W.E.F.: 2010-11
FIRST YEAR TERM II
SEMINAR-II

Exam Scheme :
Practical's – 06 hours/week. Term-work – 100 marks

Seminar-II should be based on the literature survey on any topic relevant to Design Engineering. It may be leading to selection of a suitable topic of dissertation. Each student has to prepare a write-up of about 25 pages. The report typed on A4 sized sheets and bound in the necessary format should be submitted after approved by the guide and endorsement of the Head of Department. The student has to deliver a seminar talk in front of the teachers of the department and his classmates. The Guide based on the quality of work and preparation and understanding of the candidate shall do an assessment of the seminar

The report copies must be duly signed by the guide and Head of department (one copy for institute, one copy for guide and one copy for the candidate for certification). Attendance of all students for all seminars is compulsory

NORTH MAHARASHTRA UNIVERSITY, JALGAON
M.E. (MACHINE DESIGN)
W.E.F.: 2010-11
SECOND YEAR TERM I
SEMINAR-III

Exam Scheme :

Practical's – 04 hours/week. Term-work – 50 marks
Oral – 50 marks

Seminar - III should be based on the literature survey on any topic relevant to Design Engineering. It may be leading to selection of a suitable topic of dissertation. The report shall contain some contribution by the candidate in the form of experimental results, deductions, compilation and inferences etc.

Each student has to prepare a write-up of about 25 pages. The report typed on A4 sized sheets and bound in the necessary format should be submitted after approved by the guide and endorsement of the Head of Department. The student has to deliver a seminar talk in front of the teachers of the department and his classmates. The Guide based on the quality of work and preparation and understanding of the candidate shall do an assessment of the seminar.

The report copies must be duly signed by the guide and Head of department (one copy for institute, one copy for guide and one copy for the candidate for certification). Attendance of all students for all seminars is compulsory

NORTH MAHARASHTRA UNIVERSITY, JALGAON
M.E. (MACHINE DESIGN)
W.E.F.: 2010-11
SECOND YEAR TERM I
PROJECT STAGE - I

Exam Scheme :
Practical's – 18 hours/week. Term-work – 100 marks

The candidate shall submit the synopsis of the dissertation work to the evaluation committee at the starting of FIRST YEAR TERM III.

It shall include the problem definition, literature survey, approaches for handling the problem, finalizing the methodology for the dissertation work and design calculations / experimental design etc.

A report of the work shall be submitted at the end of Semester III after approval by the Guide and endorsement of the Head of Department. It will be assessed for term work, by the evaluation committee appointed by the Head of the Department, for appropriateness, sufficiency of contents and offer suggestions if any.

The candidate shall prepare a report of about 50 pages. The report typed on A4 sized sheets and bound in the prescribed format shall be submitted after approval by the Guide and endorsement of the Head of Department. It will be assessed for term work by the evaluation committee appointed by the Head of the Department.

The report copies must be duly signed by the guide and Head of department (one copy for institute, one copy for guide and one copy for the candidate for certification). Attendance of all students for all seminars is compulsory

NORTH MAHARASHTRA UNIVERSITY, JALGAON
M.E. (MACHINE DESIGN)
W.E.F.: 2010-11
SECOND YEAR TERM II
PROGRESS SEMINAR

Exam Scheme :
Practical's – 04 hours/week. Term-work – 50 marks

Progress Seminar shall be based on topic of the Dissertation Work. It may include literature review, required theoretical input, study and comparison of various approaches for the proposed dissertation work. The candidate shall prepare a report of about 25 pages. The report typed on A4 sized sheets and bound in the prescribed format shall be submitted after approval by the Guide and endorsement of the Head of Department. It will be assessed for term work by the evaluation committee appointed by the Head of the Department.

The report copies must be duly signed by the guide and Head of department (one copy for institute, one copy for guide and one copy for the candidate for certification). Attendance of all students for all seminars is compulsory

NORTH MAHARASHTRA UNIVERSITY, JALGAON
M.E. (MACHINE DESIGN)
W.E.F.: 2010-11
SECOND YEAR TERM II
PROJECT STAGE - II

Exam Scheme :
Practical's – 18 hours/week. Term-work – 100 marks

The candidate shall submit the detailed report as per the synopsis approved by the evaluation committee, of the dissertation work in the prescribed format after approval by the Guide and endorsement by the Head of the Department. It will be assessed for term work by the evaluation committee appointed by the Head of the Department, for completion of the proposed work.

Note: - The evaluation committee shall consist of the Guide, one senior expert faculty member and the Head of the Department or his/her representative.

Rules and Regulations for M.E. in ((Machine Design):-

1.The post graduate degree in engineering consisting of 2 years (4 terms) shall be designated as Master of Engineering in Mechanical Engineering.
2. A candidate may be permitted to register him/her self for the M.E. degree in (Machine Designing) under the faculty of engineering & technology of North Maharashtra University, Jalgaon only if the candidate holds a bachelor's degree in Engineering & technology of North Maharashtra University, Jalgaon or its equivalent in Appropriate/Allied branch, recognized by AICTE/UGC & North Maharashtra University, Jalgaon.
3. The student shall be admitted to First Year Term II if his/her Term I is granted.
4. The student shall be admitted to the Second Year when ever he/she clears all the theory papers of First Year. The student in any case should not be allowed to start project work before passing all the subjects of first year. The student will have to work on his/her project for minimum one year after passing first year subjects. He/she will not be allowed to submit his/her thesis/dissertation before that.
5. Every student will be required to produce a record of laboratory work in the form of journal, duly certified for satisfactory completion of the term work by the concerned teacher & head of the department.
6. A student whose term is not granted on account of less attendance (Minimum 75%) or non-submission of term work is required to repeat the term.
7. Any approved guide will not be allowed to guide more than 5 students in a particular batch.
8. Each student is required to present Seminar-I in the First Year Term I on any related state of the art topic of his own choice approved by the department.
9. The term-work & presentation of the Seminar-I will be evaluated by departmental committee consisting of guide and two faculty members of the department appointed by Director/Principal of the college as per the recommendation of the Head of the Department.
10. Each student is required to present Seminar-II in the First Year Term II on any related state of the art topic of his own choice approved by the department.
11. The term-work & presentation of the Seminar-II will be evaluated by the departmental committee consisting of guide and two faculty members of the department appointed by Director/Principal of the college as per the recommendation of the Head of the Department.
12. Each student is required to present Seminar-III in the Second Year Term I on special topic. The topic should be on any of the area not included in the regular curriculum. The report should include detailed study of specific concept (i.e. analysis, design & implementation). This can be a theoretical study or practical implementation approved by the department/guide.
13. Guidelines for the dissertation Seminar-III in Second Year Term-I:

1. Seminar-III should be conducted at the end of Second Year Term I.
2. The term-work of the Seminar-III will be evaluated by departmental committee consisting of guide & two faculty members of the department appointed by Director/Principal of the college as per the recommendation of the Head of the Department.
3. Seminar-III presentation will be evaluated by examiners appointed by University, one of which should be guide.
4. Student must submit the Seminar Report in the form of soft bound copy.

5. The marks of Seminar-III should be submitted at the end of Second Year Term I to the University.

14. Guidelines for the Progress Seminar in Second Year Term-II:
    1. Progress seminar should be conducted in the middle of Second Year Term-II.
    2. The Progress Seminar Term-Work will be evaluated by departmental committee consisting of guide and two faculty members of the department appointed by Director/Principal of the college as per the recommendation of the Head of the Department.
    3. Student must submit the Progress Report in the form of soft bound copy.
    4. The marks of Progress Seminar should be submitted along with the marks of Project Stage-II.

15. Minimum passing marks for all Theory shall be 40% and for Term-Work and Oral shall be 50%.
16. He/she has to present/publish at least one paper in reputed National/International Journal/Conference on his/her Project work before submission of his/her Thesis/Dissertation.
17. The Term-Work of Project Stage-II will be assessed jointly by the pair of Internal & External examiner along with oral examination of the same.
18. The class will be awarded on the basis of aggregate marks of all four terms, giving equal weightage to all terms as shown below:
    a) Less than 50% : Fail
    b) 50% to less than 60% : Second Class
    c) 60% to less than 70% : First Class
    d) 70% & above : First Class with Distinction.

19. Each student is required to complete his/her master's degree within Five academic years from the date of admission, failing which he/she will be required to take fresh admission in first year.

SSBT'S COLLEGE OF ENGINEERING & TECHNOLOGY, BAMBHORI.
DEPARTMENT OF APPLIED SCINCE
TEACHING LOAD DISTRIBUTION FOR SEMESTER- I YEAR 2012-2013

Sr.No	Name	Year and Branch	Subject	Th (Hr)	Practical Batch X Hr	Titorial (Hr)	Total
1	Dr.Panigrahi	F.E.	EM-I	3	-	5	14
		S.E (Comp-B)	EM-III	4	-	2	
2	K.S.Patil	F.E	EP-I	9	09X1=09	-	18
3	S.S.Patil	F.E.	EM-I	6	-	5	20
		S.E(Civil, Chem/BT)	EM-III	8	-	1	
4	Y.K.Chitte	F.E	SOFT SKILL	3	1X2=2	-	5
5	C.U.Nikam	F.E	EP-I	9	09X1=09	-	20
			EVS	2			
6	M.V.Deshpande	F.E.	EM-I	6	-	4	20
		S.E (Comp-A,IT))	EM-III	8	-	2	
7	D.I.Desai	F.E	EC-I	9	09X1=09	-	20
			EVS	2			
8	J.J.Patil	F.E.	EM-I	6	-	5	21
		S.E(Mech-B, Ele)	EM-III	8	-	2	
9	M.B.Patil	F.E	EP-I	9	09X1=09	-	20
			EVS	2			
10	N.B.Bhoi	F.E	SOFT SKILL	7	6X2=12	-	19
11	A.R.Mali	F.E	EC-I	9	09X1=09	-	20
			EVS	2			
12	U.T.Patil	F.E	EC-I	9	09X1=09	-	19
			EVS	1			
13	A.Ansari	F.E.	EM-I	6	-	8	21
		S.E (Mech-A)	EM-III	4	-	3	
14	J.B.Patil	F.E	SOFT SKILL	0	7X2=14	-	14
						Total load =	251

Time table incharge **HOD (Applied Science)**

SSBT'S COLLEGE OF ENGINEERING & TECHNOLOGY, BAMBHORI.
DEPARTMENT OF APPLIED SCINCE
TEACHING LOAD DISTRIBUTION FOR SEMESTER- II YEAR 2012-2013

Sr. No	Name	Year and Branch	Subject	Th. (Hr)	Practical Batch X Hr	Tutorial (Hr)	Total
1	Dr.Panigrahi	S.E (E&TC-A &B)	EM-III	8	-	2	10
2	K.S.Patil	F.E	EP-II	9	12	-	21
3	S.S.Patil	F.E.	EM-II	8	-	5	13
4	C.U.Nikam	F.E	EP-II	12	6	-	20
			EVS	2	-	-	
5	M.V.Deshpande	F.E.	EM-II	8	-	6	14
6	D.I.Desai	F.E	EC-II	12	6	-	20
			EVS	2	-	-	
7	J.J.Patil	F.E.	EM-II	8	-	7	15
8	M.B.Patil	F.E	EP-II	9	12	-	23
			EVS	2	-	-	
9	N.B.Bhoi	F.E	SOFT SKILL	10	10	-	20
10	A.R.Mali	F.E	EC-II	9	12	-	23
			EVS	2	-	-	
11	U.T.Patil	F.E	EC-II	9	12	-	23
			EVS	2	-	-	
12	A.Ansari	F.E.	EM-II	4	-	3	15
		S.E (BT& E&TC)	EM-III	4	-	2(BT), 2(E&TC)	
13	M.T.Shirude	F.E	EM-II	12		1	13
14	Jaysing Raul	F.E	SOFT SKILL		20		20
						Total load =	250

NOTE: 1) Evs Load 6 Hr. For SE (Direct) Students given to Jyoti Mali Mam (Civil Dept) in zero hours

Time 3.45-4.45 pm for IT,ELE,CHEM,BT & 10-11 am for E& TC, COMP, MECH,CIVIL

2)Soft Skill Load (2 Hours per week) is distributed to the Inter departmental Faculty which is given in enclosed sheet.

Time table incharge **HOD (Applied Science)**

DEPARTMENT OF BIOTECHNOLOGY, SSBT's, COET, BAMBHORI, JALGAON

TEACHING LOAD DISTRIBUTION

ACADEMIC YEAR: 2012-2013 (SEMESTER I)

SR.NO.	NAME	DESIGNATION	YEAR	SUBJECT	TH (Hrs)	PR BATCH X (Hrs)	TOTAL
1	Dr.I.D.Patil	Prof. & HOD	SE	PCAL	04	02	14
			BE	Project & Seminar	--	04	
			ME(Env.)	Project	--	04	
2	Sharanappa A.	Lecturer	TE	BPP	04	--	20
			BE	BPE-I	04	--	
			BE	BPMS	04	04	
			BE	Project & Seminar	--	04	
3	Jayant P.P.	Lecturer	SE	CA	--	02	16
			TE	ENZ	04	--	
			BE	FBT-II	04		
			BE	BSP	04	--	
			BE	Project	--	02	
4	Mrs. S.S.Pawar	Assistant Prof.	SE	FFSH	04	--	16
			TE	MT-I	04	04	
			TE	CRE	04	--	
5	Ashwini P. Jatkar	Lecturer	SE	MB	04	04	20
			TE	MBGE	04	04	
			BE	FB(Elect-I)	04	--	
6	Payal A. Patil	Lecturer	SE	CB	04	--	14
			SE	FFSH	--	02	
			TE	CRE	--	04	
			BE	FBT-II	--	04	
TOTAL							**100**

Dr.I.D.Patil
HOD Biotech

DEPARTMENT OF BIOTECHNOLOGY

SSBT'S COLLEGE OF ENGINEERING & TECHNOLOGY, BAMBHORI.

TEACHING LOAD DISTRIBUTION FOR SEMESTER II

YEAR 2012-2013

SR.NO.	FACULTY NAME	DESIGNATION	YEAR	SUBJECT	TH (Hrs)	PR/TW BATCH X (Hrs)	TOTAL
1	Dr.I.D.Patil	Professor and Head	TE	MT-II	04	1X04	
			BE	Project	--	1X04	12
2	Sharanappa A	Lecturer	BE	BPEE	04	----	
			BE	BioInfo	04	1X04	
			BE	Project	--	04	16
3	Mr.Jayant P.P.	Lecturer	BE	BPE-II	04	04	
			BE	ELE-II	04	---	
			BE	Project	--	02	14
4	Mrs Sarika Pawar	Assistant Prof.	SE	PHT	04	1X02	
			TE	IPC	04	1X02	
			TE	MT-II	--	1X04	16
5	Ashwini Jatkar	Lecturer	SE	BCH	04	1X02	
			TE	BWT	---	1X04	
			TE	FBT-I	04	---	
			BE	BPEE	---	1X02	16
6	Payal Patil	Lecturer	SE	CHE	04	1X02	
			TE	BWT	04	1X04	
			TE	IPC	--	1X02	16
7	Sarwat Bano	Lecturer	SE	IMM	04	01X02	
			TE	BTH	04	02X02	14
					TOTAL		104

Dr.I.D.Patil

(HOD, BIOTECH DEPT)

LOAD DISTRIBUTION
CIVIL ENGINEERING DEPARTMENT
SEM-II 2012-2013

Sr No.	Name Of Staff	Year & Branch	Subject	TH	PR Batches*hours	Total
1	Dr. M. Husain	BE CIVIL	PW	0	12	12
2	Dr. S.L.Patil	SE CIVIL	EG	4	4*2	14
		BE CIVIL	PW		2	
3	Mr. S.B.Pawar	SE CIVIL	SUR II	4		12
			TOS I	1		
		TE CIVIL	TRE II	1		
			SDD II		1*4	
		BE CIVIL	PW		2	
4	Mr. P.A.Shirule	BE CIVIL	SDD III	4	1*4	22
			PW		14	
5	Mr. F.I.Chavan	SE CIVIL	FM I	5	2*2	15
		BE CIVIL	WRE II	2		
			PW	4		
6	Mrs. Sonali Patil	SE CIVIL	FM I	1		15
		TE CIVIL	EE I		4*2	
		BE CIVIL	IWPC	4		
			PW		2	
7	Mr.Jayant Kale	TE CIVIL	SDD II	4	2*4	20
		BE CIVIL	CMII	4	2*2	
8	Mrs. Jyoti Mali	SE CIVIL	TOS I	1		16
		TE CIVIL	TOS II	1		
			TOM		4*2	
			EE I	4		
		BE CIVIL	PW		2	
9	Mr. B.V.Shinde	SE CIVIL	BDD		1*4	20
		TE CIVIL	GTE II	4	1*2	
		BE CIVIL	SDD III		1*4	
			PW		6	
10	Swami Suman	SE CIVIL	SUR II		4*2	20
			FM I	1		
			TOS I	1		
		TE CIVIL	TRE II	5		
			TOS II	1		
		BE CIVIL	SDD III		1*4	
11	Ms.Tejaswini Patil	SE CIVIL	TOS I	1		19
			FM I	1		
			BDD		1*4	
		TE CIVIL	TOS II	5		
		BE CIVIL	CMII		1*2	
			WRE II		3*2	

12	Mr.D.G.Pardeshi	SE CIVIL	BDD	4	2*4	19
			FM I		2*2	
		TE CIVIL	TRE II	1		
		BE CIVIL	WRE II	2		
13	Mr.J.G.Kachare	SE CIVIL	TOS I	1		19
		TE CIVIL	GTE II		2*3	
			TRE II	1		
			TOS II	1		
			SDD II		1*4	
		BE CIVIL	IWPC		3*2	
14	Mr.M.M.Sanklecha	SE CIVIL	TOS I	4		4

COLLEGE OF ENGINEERING AND TECHNOLOGY , BAMBHORI, JALGAON

CHEMICAL ENGINEERING DEPARTMENT

TEACHING LOAD - 2012 – 2013 (Term – II)

Sr. No	Name	Year and Branch	Subject	Theory (Hrs)	Practical (Batch × hrs)	Total
1	Dr. K.S.Wani	T.E.	CRE-I	4	0	04
2	Dr. V.R.Diware	B.E. T.E.	CPDPE PROJECT PEDD-II	4 - 4	1X4=4 4 --	16
3	Shri S.A.Thakur	B.E. T.E. S.E.	PROJECT MMC IEM UO II	- 4 4 --	4 -- -- 1X4=4	16
4	Shri V.P.Sangore	T.E. S.E.	IIA CHE-III CP I	4 4 -	2X2=4 1X2=2 1X2=2	16
5	Shri N.Y.Ghare	T.E. S.E.	MT-II PCAL	4 4	2X4=8 1X2=2	18
6	Shri A.R.Lokhande	B.E. S.E.	CAPEDMS PROJECT UO-II	4 -- 4	2X4=8 4 --	20
7	Ms. S.S.Madan	B.E. T.E. S.E.	IP&C CRE - I PEDD -II CP - I	4 - - 4	-- 2X2=4 1X4=4 --	16
8	Ms. S.V.Pande	B.E.. T.E.	PEEC CPDPE PEDD II	4 -- --	2X2=4 1X4=4 1X4=4	16
					TOTAL LOAD	122

COLLEGE OF ENGINEERING AND TECHNOLOGY , BAMBHORI, JALGAON

CHEMICAL ENGINEERING DEPARTMENT

TEACHING LOAD - 2012 – 2013 (Term – I)

Sr. No	Name	Year and Branch	Subject	Theory (Hrs)	Practical (Batch × hrs)	Total
1	Dr. K.S.Wani	B.E.	BCE	04	0	04
2	Dr. V.R.Diware	B.E. T.E.	CRE-II PROJECT SEMINAR PEDD-I	4 0 0 4	0 2 2 0	12
3	Shri S.A.Thakur	B.E. T.E.	PDC PROJECT SEMINAR MT-I	4 0 0 4	0 2 2 1X4=4	16
4	Shri V.P.Sangore	S.E.	CHE-I CHE-II	4 4	2X2=4 2X2=4	16
5	Shri N.Y.Ghare	B.E. T.E.	TP PDC CET PEDD-I	4 0 4 0	0 2X2=4 0 1X4=4	16
6	Shri A.R.Lokhande	B.E. T.E. S.E.	EE PROJECT SEMINAR PHT CA	4 0 0 4 0	0 2 2 0 2X2=4	16
7	Ms. S.S.Madan	B.E. T.E.	CRE-II CP II MT-I	0 4 0	2X4=8 2X2=4 1X4=4	20
8	Shri R.S.Zambare	B.E. T.E. S.E.	EE PHT PEDD-I UO I	0 0 0 4	2X2=4 2X2=4 1X4=4 2X2=4	20
					TOTAL LOAD	120

LOAD DISTRIBUTION
COMPUTER DEPARTMENT
SEM-I 2012-13

Sr No.	Name of Staff	Year & Branch	Subject	TH	PR	Total
1	K.P. Adhiya	BECOMP(A)	AUP	4	4*2	20
		BECOMP(B)	AUP	4	---	
		BECOMP(A+B)	PW	-	04	
2	M. E. Patil	TECOMP(A)	SP	4	1*2	14
		TECOMP(B)	SP	4	--	
		BECOMP(A+B)	PW	--	04	
3	Sandip S. Patil	BECOMP(A)	AI	4	2*2	16
		BECOMP(B)	AI	4	--	
		BECOMP(A+B)	PW	--	04	
4	Ashish Bhole	BECOMP(A)	ACN	4	--	16
		BECOMP(B)	ACN	4	----	
		TECOMP(B)	CN	--	1*2	
		TECOMP(B)	CN	--	1*2	
		BECOMP(A+B)	PW	--	04	
5	S.S. Gharde	BECOMP(A)	OOMD	4	---	16
		BECOMP(B)	OOMD	4	2*2	
		BECOMP(A+B)	PW	--	04	
6	Saroj Patil	SECOMP(A)	PL-I	3	1*4	7
7	Shital Patil	TECOMP(A)	ADTL	--	4*4	20
		BECOMP(A+B)	PW	--	04	
8	N.Y.Suryawanshi	TECOMP(A)	TCS	4	--	18
		TECOMP(B)	TCS	4	--	
		TECOMP(B)	SP	--	3*2	
		BECOMP(A+B)	PW		04	
9	Nilima Patil	TECOMP(A)	CG	4	--	18
		TECOMP(B)	CG	4	3*2	
		BECOMP(A+B)	PW	--	04	
10	Priti Sharma	SECOMP(A)	DSMP	4	3*2	18
		SECOMP(B)	DSMP	4	--	
		BECOMP(A+B)	PW	--	04	

11	Deepak Bage	BECOMP(A)	ES	4	3*2	18
		BECOMP(B)	ES	4	--	
		BECOMP(A+B)	PW	--	04	
12	Yogeshwari Borse	TECOMP(A)	CN	4	4*2	20
		TECOMP(B)	CN	4	--	
		BECOMP(A+B)	PW	--	04	
13	Satpal Rajput	SECOMP(A)	IME	4	-	18
		SECOMP(B)	IME	4	--	
		SECOMP(A)	PL-I	--	2*4	
		BECOMP(A+B)	PW	--	02	
14	Babulal Rathod	SECOMP(B)	PL-I	3	3*4	17
		BECOMP(A+B)	PW	--	2	
15	Vijay Ingle	TECOMP(B)	ADTL	--	4*4	18
		BECOMP	PW	--	2	
16	Vijay Kotkar	TECOMP(A)	MP-II	4	4*2	18
		TECOMP(B)	MP-II	4	---	
		BECOMP(A+B)	PW	--	02	
17	Chittaranjan Mangale	SECOMP(A)	DSGT	4	--	16
		SECOMP(B)	DSGT	4	--	
		SECOMP(B)	DSMP	--	3*2	
		BECOMP(A+B)	PW	--	02	
18	Avinash Patil	BECOMP(A)	ES	---	1*2	20
		BECOMP(B)	ES	---	4*2	
		TECOMP(A)	SP	---	3*2	
		TECOMP(B)	SP	---	1*2	
		BECOMP(A+B)	PW	--	02	
19	Manoj Mahajan	FE	CP	3	3*2	19
		BECOMP(B)	AI	--	4*2	
		BECOMP(A+B)	PW	--	02	

20	Poonam Bafana	TECOMP(B)	CN	--	2*2	16
		BECOMP(A)	OOMD	--	4*2	
		BECOMP(B)	OOMD	--	2*2	
21	Nutan Khadse	TECOMP(B)	MP-II	--	4*2	18
		BECOMP(B)	AUP	--	4*2	
		BECOMP(A+B)	PW	--	02	
22	Sushant Bahekar	FE( )	CP	3	3*2	18
		FE( )	CP	3	3*2	
23	Jitendra Patil	FE( )	CP	3	3*2	18
		FE( )	CP	3	3*2	
24	Kalyan Dani	FE( )	CP	3	3*2	18
		FE( )	CP	3	3*2	
25	Ravi Ahuja	FE( )	CP	3	3*2	18
		FE( )	CP	3	3*2	
26	Mayuri Patil	TECOMP(A)	CG	--	4*2	14
		TECOMP(B)	CG	--	1*2	
		BECOMP(A)	AI	--	2*2	

Total=447

Timetable Incharge
Shital A Patil
Priti Sharma

HOD
Comp Deptt.

LOAD DISTRIBUTION 25-12-12

COMPUTER DEPARTMENT

SEM-II 2012-13

Sr No.	Name of Staff	Year & Branch	Subject	TH	PR Batches * hours	Total
1	K.P. Adhiya	SECOMP(A)	CO	4	--	14
		SECOMP(B)	CO	4	--	
		BECOMP(A+B)	PW	-	06	
2	M. E. Patil	BECOMP(A)	SMQA	4	--	14
		BECOMP(B)	SMQA	4	--	
		BECOMP(A+B)	PW	--	06	
3	Sandip S. Patil	BECOMP(A)	DWM	4	--	14
		BECOMP(B)	DWM	4	--	
		BECOMP(A+B)	PW	--	06	
4	Ashish Bhole	TECOMP(A)	SE	4	--	12
		TECOMP(B)	SE	4	--	
		BECOMP(A+B)	PW	--	04	
5	S.S. Gharde	BECOMP(A+B)	$CC_{(elective)}$	4	1*2	12
		BECOMP(A+B)	PW	--	06	
6	Saroj Patil	SECOMP(A)	PL-II	2	2*4	10
7	Shital Patil	TECOMP(A)	ADA	--	4*2	13
		SECOMP(B)	PL-II	--	01	
		BECOMP(A+B)	PW	--	04	
8	N.Y.Suryawanshi	TECOMP(A)	ADA	4	--	14
		TECOMP(B)	ADA	4	--	
		BECOMP(A+B)	PW		06	
9	Nilima Patil	SECOMP(A)	MP-I	4	1*2	16
		SECOMP(B)	MP-I	4	--	
		BECOMP(A+B)	PW	--	06	
10	Dinesh Puri	BECOMP(A+B)	$MN_{(elective)}$	4	2*2	10
		BECOMP(A+B)	PW	--	02	

11	Atul Dusane	BECOMP(A)	ACA	4	--	16
		BECOMP(B)	ACA	4	--	
		SECOMP(B)	MP-I	-	4*2	
12	Priti Sharma	BECOMP(A)	DWM	-	4*2	14
		SECOMP(A)	DSD	1	-	
		SECOMP(B)	DSD	1	--	
		BECOMP(A+B)	PW	--	04	
13	Deepak Bage	TECOMP(A)	MP-III	4	--	14
		TECOMP(B)	MP-III	4	--	
		BECOMP(A+B)	PW	--	06	
14	Yogeshwari Borse	TECOMP(B)	DBMS	--	4*2	12
		BECOMP(A+B)	PW	--	04	
15	Satpal Rajput	SECOMP(A)	DSD	4	-	16
		SECOMP(B)	DSD	4	--	
		TECOMP(B)	SE	--	3*2	
		BECOMP(A+B)	PW	--	02	
16	Babulal Rathod	BECOMP(A)	ACA	--	4*2	12
		BECOMP(A+B)	PW	--	4	
17	Vijay Ingle	TECOMP(B)	MP-III	--	4*2	18
		BECOMP(B)	ACA	--	4*2	
		BECOMP(A+B)	PW	--	2	
18	Vijay Kotkar	TECOMP(A)	OS	4	2*2	14
		TECOMP(B)	OS	4	---	
		BECOMP(A+B)	PW	--	02	
19	Chittaranjan Mangale	TECOMP(A)	DBMS	4	1*2	14
		TECOMP(B)	DBMS	4	--	
		BECOMP(A+B)	PW	--	04	
20	Avinash Patil	SECOMP(A)	DC	4	--	14
		SECOMP(B)	DC	4	--	
		TECOMP(A)	OS	--	2*2	
		BECOMP(A+B)	PW	--	02	

21	Manoj Mahajan	SECOMP(B)	DSF	--	3*4	14
		BECOMP(A+B)	PW	--	02	
22	Nutan Khadse	TECOMP(A)	DBMS	--	3*2	12
		SECOMP(A)	MP-I	--	3*2	
23	Sushant Bahekar	BECOMP(B)	CC	--	3*2	14
		TECOMP(A)	SE	--	2*2	
		BECOMP(A)	ACA	1	--	
		BECOMP(B)	ACA	1	--	
		BECOMP(A+B)	PW	--	02	
24	Jitendra Patil	BECOMP(B)	SMQA	1	---	18
		BECOMP(B)	SMQA	1	4*2	
		SECOMP(A)	PL-II	--	2*4	
25	Kalyan Dani	TECOMP(B)	ADA	--	4*2	12
		BECOMP(A+B)	PW	--	04	
26	Ravi Ahuja	SECOMP(A)	DSF	4	2*4	16
		SECOMP(B)	DSF	4	--	
27	Mayuri Patil	BECOMP(B)	DWM	--	4*2	14
		TECOMP(A)	SE	--	2*2	
		TECOMP(A)	SE	--	1*2	
28	Ashish Patil	TECOMP(A)	MP-III	--	4*2	16
		BECOMP(A)	SMQA	--	4*2	
29	Ravi Mulchandani	SECOMP(B)	PL-II	2	4*4	18
30	Chitra Patil	BECOMP(A)	CC	--	1*2	12
		BECOMP(B)	CC	--	1*2	
		TECOMP(B)	OS	--	4*2	
31	Shruti Pardeshi	SECOMP(A)	DSF	--	2*4	12
		SECOMP(B)	DSF	--	1*4	

Timetable Incharge
Shital A Patil
Priti Sharma

HOD
Comp Deptt.

Electrical Engineering Department

Load Distribution 2012-2013 Semester-I

Sr. No.	Name of Staff member	Year & Branch	Subject	Theory (Hrs.)	Practical Batch X Hrs.	Total
01	D.U.Adokar	TE Electrical BE Electrical	MPMC Seminar Project	4 2	4X2=8 4	18
02	Dr. S. K. Mittal	TE Electrical BE Electrical BE Electrical BE Electrical	EME Elective-I Seminar Project	4 4*+1	 2 2	13
03	V.S.Pawar	SE Electrical BE Electrical	ACCT IEE Project	4 4	 4X2=8 2	18
04	M.M.Ansari	TE Electrical BE Electrical	EM/C-II EAC Project	4 4	4X2=8 2	18
05	S.M.Shembekar	TE Electrical BE Electrical BE Electrical	PS-II PSOC Project	4 4	4X2=8 2	18
06	D.S.Patil	SE Electrical BE Electrical BE Electrical	EEM HVE Seminar	4 4	2X3=6 2	16
07	Miss N. A. Pande	SE Electrical	EM-I	4	2X6=12	16
08	V. K. Patil	TE Electrical TE Electrical	EIED SA	4	4X2=8 2X2=4	16
09	Mr. S.S. Nagarnaik	SE Electrical TE Electrical BE Electrical	ACCT SA HV		2X3=6 2X2=4 4X2=8	18
	Total			52	98	151

*Tutorial

HOD

Electrical Engineering Department

Electrical Engineering Department
Load Distribution 2012-2013 Semester-II

Sr. No.	Name of Staff member	Year & Branch	Subject	Theory (Hrs.)	Practical Batch X Hrs.	Total
01	D.U.Adokar	SE Electrical BE Electrical	ADE Project	4	4X2=8 2	06
02	V.S.Pawar	TE Electrical BE Electrical	CS-I Ellective II Project II	4 4*+1	2X2=4 2	15
03	M.M.Ansari	SE Electrical BE Electrical	EM/C-I PSS Project II	4 4	 2	10
04	S.M.Shembekar	SE Electrical BE Electrical	PS-I SGP Project II	4 4	2X2=4 2	14
05	D.S.Patil	SE Electrical TE Electrical	DCTP EM II	4 4		08
06	N. S. Mahajan	TE Electrical	PE	4	4X2=8	12
07	Miss N. A. Pande	TE Electrical BE Electrical	IOM IDC	4*+1 4	 3X2=6	15
08	V. K. Patil	TE Electrical	EMD	4	6X2=12	16
09	Mr. S.S. Nagarnaik	SE Electrical	NA	4*+1	3X2=6	11
10	Miss. S Mahale	BE Electrical SE Electrical	PSS DCTP		4X2=8 1X2=2	10
11	Miss. Minal Rade	TE Electrical TE Electrical	CS-I P. Training		2X2=4 8	12
12	Miss. Lalita Patil	SE Electrical TE Electrical	EM II DCTP		4X2=8 2X2=4	12
13	Prem Shankar	SE Electrical BE Electrical	EW/S IDC		3X2=6 1X2=2	08
14	Samir Shaikh	SE Electrical BE Electrical	EM/C-I SGP		3X2=6 2X2=4	10
15	Jagdish Chitte	TE Electrical BE Electrical	EMD-I EDS		2X2=4 2X2=4	08
16	K. Deshmukh	SE Electrical	ADE		3X2=6	06
17	Siddharth Patil	SE Electrical	EMIE (Mech)	4	3X2=6	10
	Total			63	138	183

*Tutorial

HOD

Electrical Engineering Department

SSBT's COET, BAMBHORI.
E & TC ENGG. DEPT.
TEACHING LOAD SHEET
Term- I
2012-2013

Sr. No.	Name	Year and Branch	Subject	Theory (Hrs)	Practical (Batch*hrs)	Total
01	Prof. S.R.Suralkar	S.E E&TC BE E & TC BE ETC	DCLD (A) Project Seminar	04 --- ---	2 * 2 = 04 02 02	12
02	Prof.M.P.Deshmukh	S.E ETC SE ETC BE E & TC	SDC (A) ECM (B) Project Seminar	04 04 -- ---	1 * 4 = 04 --- 02 02	16
03	Prof. P.J.Shah	B.E E&TC BE E & TC	VLSI (A,B) Project Seminar	08 --- ---	2 * 2 = 04 02 02	16
04	Prof.V .M. Deshmukh	T.E E&TC TE E&TC BE ETC	EME (B) FCS (A) Project Seminar	4+1 (TUT) 04 --- ---	--- 2 * 2 = 04 02 02	17
05	Prof. P.V. Thakre	BE E & TC BE E & TC BE ETC	FOC (B) DSP (A) Project seminar	04 04 --- ---	1* 2 = 2 --- 02 02	14
06	Prof. S.U.Nyati	BE E & TC TE E&TC BE E & TC	DSP NAS (B) Project Seminar	04 04+1 (TUT) -- ---	2 * 2 = 04 --- 02 02	17
07	Prof. N.M.Kazi	BE E & TC TE ETC BE E & TC	CCN (A,B) NAS Project seminar	08 --- --- ---	---- 2 * 2 = 04 02 02	16
08	Prof. A.H.Karode	SE E&TC BE E&TC	EI (A,B) Project Seminar	08 --- ---	4 * 2 = 08 02 02	20
09	Prof. A.C.Wani	SE E&TC SE COMP BE E & TC	SDC (B) AE Project Seminar	04 04 --- ---	2 * 4 = 08 --- 02 02	20
10	Prof. P.H.Zope	T.E E&TC BE E & TC	MMS (A,B) Project Seminar	08 --- ---	4* 2 = 08 02 02	20

11	Prof. S.P.Ramteke	B.E E&TC BE E & TC	RMT (A,B) Project Seminar	08 --- 	4 * 2 = 08 02 02	20
12	Prof.S.K.Khode	TE E&TC BE E&TC	DC (B) Project Seminar	04 --- ---	6 * 2 = 12 02 02	20
13	Miss. K.S. Mantri	SE COMP BE ETC	AE (B) FOC	04 ---	6 * 2 = 12 1* 2 = 02	18
14	Prof. A. R. Bari	SE E&TC	ECM (A)	08	7 * 2 = 14	18
15	Mrs M. J. Patil	SE E&TC TE ETC SE E&TC	EMC (B) DC (A) EWS	04 04 	--- --- 5 * 2 = 10	18
16	Mrs. D. R. Patil	TE E&TC TE ETC TEETC	FCS (B) NAS (A) SA II	04 04+1 (TUT) ---	3 * 2 = 06 1 * 2 = 02	17
17	Miss P. Shanbhag	SE ETC TE E&TC SE ETC	EI NAS SDC	--- --- ---	3 * 2 = 06 5 * 2 = 10 1 * 4 = 04	20
18	Prof. S. A. Hingonekar	BE ETC SE ETC BE ETC BE ETC	FOC (A) EMC (A) RMT Project Seminar	04 04 --- --- ---	--- --- 4 * 2 = 08 02 02	20
19	Mrs. Bharti Khadse	TE ETC SE ETC BE ETC	EME (A) DCLD (B) PROJECT	04+1 (TUT) 04 ---	--- 3 * 2 = 06 02	17
20	Miss Akshata Sapkal	TE ETC BE ETC SE ETC	 DSP DCLD	--- --- 	 7 * 2 = 14 2 * 2 = 04	18
21	Mr. Ranjeetsingh Kalsi	TE ETC SE ETC SE ETC	SA II SDC EWS	--- --- ---	1 * 2 = 02 3 * 4 = 12 2 * 2 = 04	18
22	Mr. Yogesh Santwani	BE ETC TE ETC BE ETC	FOC MMS VLSI	--- --- --- --- ---	2 * 2 = 04 2 * 2 = 04 6 * 2 = 12	20
23	Mr. Manoj Sadanshiv	BE ETC TE ETC TE ETC	FOC SA II FCS	--- --- ---	4 * 2 = 08 4 * 2 = 08 1 * 2 = 02	18

Total Load = 406 Hrs

Time Table Incharge **HOD**

SSBT's COET, BAMBHORI.
ETC ENGG. DEPT.
TEACHING LOAD SHEET
Term- II
2012-2013

Sr. No.	Name	Year and Branch	Subject	Theory (Hrs)	Practical (Batch*hrs)	Total
01	Prof. S.R.Suralkar	TE ETC BE ETC	EM (A) PROJ	04 --	2 * 2 = 04 04	12
02	Prof.M.P.Deshmukh	FE (H,I,J) BE ETC	EEEE PROJ	09 ---	---- 04	13
03	Prof. P.J.Shah	TE ETC BE ETC	PE (A,B) PROJ	08 --	1 * 2 = 02 04	14
04	Prof.V.M.Deshmukh	SE ETC BE ETC	NL (A,B) PROJ	08+2(TUT) ---	---- 04	14
05	Prof. P.V. Thakre	BE ETC FE (C) BE ETC	SAT (A) EEEE PROJ	04 03 ---	2 * 2 = 04 --- 04	15
06	Prof. S.U.Nyati	BE ETC TE ETC BE ETC	TM (B) ITCT (B) PROJ	04 04+1(TUT) --	1 * 2 = 02 -- 04	15
07	Prof. N.M.Kazi	BE ETC BE ETC FE (A)	TV (B) PROJ EEEE	04 -- 03	1 * 4 = 04 04	15
08	Prof. A.H.Karode	TE ETC BE ETC	EM (B) PROJ	04 ----	4 * 2 = 08 04	16
09	Prof. A.C.Wani	TE ETC BE ETC FE (G)	ECD (B) PROJ EEEE	04+1(TUT) -- 03	2 * 2 = 04 04 ---	16
10	Prof. P.H.Zope	BE ETC BE ETC	ESD (A,B) PROJ	08 --	2* 2 = 04 04	16
11	Prof. S.P.Ramteke	SE ETC BE ETC	AC (A,B) PROJ	08 ---	2 * 2 = 04 04	16
12	Prof.S.K.Khode	TE ETC TE ETC BE ETC	PE ITCT PROJ	-- 4+1(TUT) --	3 * 2 = 06 -- 04	15
13	Miss. K.S. Mantri	SE ETC	ECA (A,B)	08	2 * 4 = 08	16
14	Prof. A. R. Bari	TE ETC BE ETC	AICA (A,B) PROJ	08 ---	2* 2 = 04 04	16

15	Mrs M. J. Patil	SE ETC TE ETC	MS (B) PT/MP	04 ---	--- 6 * 2 = 12	16
16	Mrs. D. R. Patil	FE (D,F)	EEEE	06	4 * 2 = 08	14
17	Miss P. Shanbhag	FE (E) SE ETC	EEEE NL	03 ---	-- 6*2= 12	15
18	Miss Akshada Sapkal	FE (B) SE ETC	EEEE ECA	03 ---	-- 3 * 4 = 12	15
19	Prof. S. A. Hingonekar	BE ETC BE ETC	TV PROJ	04 --	2 * 4 = 08 04	16
20	Mr. Ranjeetsingh	BE ETC SE ETC BE ETC	SAT (B) ECA TV	04 --- ---	--- 2 * 4 = 08 1 * 4 = 04	16
21	Mrs. Bharti Khadse	BE ETC BE ETC BE ETC	TM (A) TV PROJ	04 --- ---	2 * 2 = 04 1 * 4 = 04 04	16
22	Mr. Y. S. Santwani	SE MECH BE ETC	EMID (B) ESD	04 ---	3 * 2 = 06 3 * 2 = 06	16
23	Mr. Manoj Sadanshiv	TE ETC SE ETC	AICA SA I	--- ---	1 * 2 = 02 7 * 2 = 14	16
24	Mr K Pandey	TE ETC BE ETC	ECD(A) SAT COM	4+1 ---	4 * 2 = 08 2 * 2 = 04	17
25	Mr Imran Khan	SE ETC	MS (A) TV & CE	04	--- 03 * 4 = 12	16
26	Mr Shantanu Nanderkar	BE ETC TE ETC	TM AICA	----	5 * 2 = 10 3 * 2 = 6	16
27	Mr Harshal Kamlaskar	TE ETC BE ETC SE ETC	PE SAT COM AC	-----	02 * 2 = 04 01 * 02 =02 5 * 2 = 10	16
28	Mr Pravin Pathade	BE ETC FE	SAT COM EEEE	-----	03 * 02 =06 06 * 02=12	18
29	Miss Rachana Patil	FE SE ETC	EEEE NL	----	07 * 02=14 01 * 02 = 2	16
30	Mr Rahul Deshmukh	FE	EEEE	----	08 * 02=16	16
31	Miss Priyank koshti	BE ETC FE	ESD EEEE	--- ---	03 * 02 = 06 05 * 02 =10	16

Total Load = 480 Hrs

Time Table Incharge **HOD**

SSBT's COET, BAMBHORI.
ETC ENGG. DEPT.
TEACHING LOAD SHEET FIRST YEAR
Term- II
2012-2013

Sr. No.	Name	Year and Branch	Subject	Theory (Hrs)	Practical (Batch*hrs)	Total
01	Prof.M.P.Deshmukh	FE	EEEE	09	---	09
02	Prof. P.V. Thakre	FE	EEEE	03	---	03
03	Prof. N.M.Kazi	FE	EEEE	03	_____	03
04	Prof. A.C.Wani	FE	EEEE	03	---	03
05	Mrs. D. R. Patil	FE	EEEE	06	04*02=08	14
06	Miss P. Shanbhag	FE	EEEE	03	--	03
07	Miss Akshada Sapkal	FE	EEEE	03	--	03
08	Mr Harshal Kamlaskar	FE	EEEE	-----	03*02 =06	06
09	Mr Pravin Pathade	FE	EEEE	-----	06 * 02=12	12
10	Miss Rachana Patil	FE	EEEE	----	07 * 02=14	14
11	Mr Rahul Deshmukh	FE	EEEE	----	08 * 02=16	16
12	Miss Priyanka Koshti	FE	EEEE	---	05 * 02 = 10	10

Total Load = 90 Hrs

Time Table Incharge **HOD**

S.S.B.T'S College of Engineering & Technology, Bambhori, Jalgaon
Department of Information Technology
Load Distribution (SEM-I) 2012-13

Sr. No.	Staff Name	Designation	Class	Subject	Theory	Practical	Total Load
1	Mrs. A. K. Bhavsar	Asso. Prof	BE IT	OOMD	04	03*02=06	14
			BE IT	PW		02	
			BE IT	SM		02	
2	Mr. S. J. Patil	A.P	TE IT	CN	04	03*02=06	18
			BE IT	E-COM	04	--	
			BE IT	PW		02	
			BE IT	SM		02	
3	Mr. N. P. Jagtap	A.P	BE IT	ES	04	03*02=06	18
			SE IT	PPM	04	--	
			BE IT	PW		02	
			BE IT	SM		02	
4	Mr. S. H. Rajput	A.P	TE IT	TCS	04	--	20
			SE IT	DSMP	04	04*02=08	
			BE IT	PW		02	
			BE IT	SM		02	
5	Mr. R. B. Sangore	Lecturer	TE IT	MT	04	05*02=10	22
			SE IT	IME	04	--	
			BE IT	PW		02	
			BE IT	SM		02	
6	Mr. P. C. Harne	Lecturer	TE IT	SP	04	05*02=10	22
			BE IT	ERP	04	--	
			BE IT	PW		02	
			BE IT	SM		02	
7	Mr. B. S. Kalsi	Lecturer	BE IT	AUP	04	03*02=06	20
			TE IT	ADTL	--	02*04=08	
			BE IT	PW		02	
8	Ms. A. D. Punjabi	Lecturer	SE IT	PL-I	03	01*04=04	21
			TE IT	ADTL	--	03*04=12	
			BE IT	PW		02	
9	Ms. Pinjari	Lecturer	TE IT	CG	04	05*02=10	20
			BE IT	ERP	--	03*02=06	
10	Ms. T. S. Joshi	Lecturer	SE IT	DSGT	04	--	20
			TE IT	CN	--	02*02=04	
			SE IT	PL-I	--	03*04=12	
Total							**195**

TIME TABLE I/C **HOD** **PRINCIPAL**

S.S.B.T'S College of Engineering & Technology, Bambhori, Jalgaon
Department of Information Technology
Load Distribution (SEM-II) 2012-13

Sr. No.	Staff Name	Designation	Class	Subject	Theory	Practical (Batch *Hrs)	Total Load
1	Mrs. A. K. Bhavsar	Asso. Prof	TE IT	SE	04	3*2=6	14
			BE IT	PROJECT	--	04	
2	Mr. S. J. Patil	A.P	TE IT	WD	04	--	16
			BE IT	IS	04	2*2=4	
			BE IT	PROJECT	--	04	
3	Mr. N. P. Jagtap	A.P	BE IT	DWM	04	2*2=04	16
			TE IT	DBMS	04	--	
			BE IT	PROJECT	--	04	
4	Mr. S. H. Rajput	A.P	BE IT	SMQA	04	--	16
			SE IT	MP-I	04	2*2=04	
			BE IT	PROJECT	--	04	
5	Mr. R. B. Sangore	Lecturer	TE IT	OS	04	3*2=06	18
			SE IT	DC	04	--	
			BE IT	PROJECT	--	04	
6	Mr. P. C. Harne	Lecturer	BE IT	AINN	04	3*2=06	18
			TE IT	MIS	04	--	
			BE IT	PROJECT	--	04	
7	Mr. B. S. Kalsi	Lecturer	SE IT	IT	04	--	16
			BE IT	DWM	--	1*2=02	
			BE IT	SMQA	--	3*2=06	
			BE IT	PROJECT	--	04	
8	Ms. A. D. Punjabi	Lecturer	SE IT	DSF	04	01*04=04	14
			TE IT	OS	--	02*02=4	
			BE IT	PROJECT	--	02	
9	Ms. S.S. Pinjari	Lecturer	SE IT	CO	04	--	14
			TE IT	DBMS	--	2*5=10	
10	Ms. T. S. Joshi	Lecturer	SE IT	PL-II	02	3*4=12	16
			BE IT	IS	--	1*2=2	
11	Mr. S. B. Patil	Lecturer	TE IT	WD	---	3*4=12	16
			SE IT	PL-II	--	1*4=04	
12	Ms. S. A. Dhumale	Lecturer	SE IT	DSF	--	3*4=12	16
			TE IT	SE	--	2*2=4	
13	Mr. S. K. Singh	Lecturer	SE IT	MP-I	--	2*2=4	12
			TE IT	WD	--	2*4=8	

TOTAL:-202

TIME TABLE I/C **HOD** **PRINCIPAL**

DEPARTMENT OF MEANICAL ENGG. (UNDERGRADUATE)

Load distribution

SEM – I (2012 – 13)

Sr. No.	Name	Class	Subject	Theory (Hr)	Practical (Batch X Hr)	Total
1.	J. R. Chaudhari	FE(A)	EM	03	---	11
		SE(A)	MS	04	---	
		BE	Project/seminar	---	04	
2.	N. K. Patil	FE(B)	EM	03	---	15
		SE	CG	---	02 x02	
		BE(A)	OR	04	---	
		BE	Project/seminar	---	04	
3.	M. S. Murthy	TE(A)	HTMT	04	---	14
		BE(B)	RAC	04	01 x02	
		BE	Project/seminar	---	04	
4.	K.Shrivastava	TE(B)	HTMT	04	01 x02	14
		BE(A)	RAC	04	---	
		BE	Project/seminar	---	04	
5.	S.P. Shekhawat	TE(A)	TOM-II	04	---	08
		BE	Project/seminar	---	04	
6.	M.V. Rawlani	TE(A)	NACM	02	---	14
		BE(B)	OR	04	---	
		SE	MS	---	02 x02	
		BE	Project/seminar	---	04	
7.	P.G. Damle	TE(A&B)	MD-I	08	02 x02	16
		BE	Project/seminar	---	04	
8.	D.B. Sadaphale	SE(B)	MS	04	02 x02	18
		SE(A)	AT	04	01 x02	
		BE	Project/seminar	---	04	
9.	P.N. Ulhe	SE(A&B)	SOM	08	--	18
		SE	CG	---	03 x02	
		BE	Project/seminar	---	04	
10.	P. M. Solanki	TE(A)	NACM	02	---	18
		BE(A)	CAD/CAM	04	02 x02	
		SE	CG	---	02 x02	
		BE	Project/seminar	---	04	
11.	P. D. Patil	BE(B)	CAD	04	04 x02	18
		BE(A)	AUTOBOMILE	02	---	
		BE	Project/seminar	---	04	
12.	A. R. Bhardwaj	SE(A)	ME-I	04	---	18
		SE	MD	---	04 x02	
		TE	MD-I	---	03 x02	
13.	C. K. Mukherjee	TE(B)	NACM	04	06 x02	18
		BE(A)	AUTOMOBILE	02	---	
14.	P. P. Bornare	TE (A)	ICE	04	04 x02	18
		BE(B)	AUTO	04	---	
		TE	NACM	---	01 x02	
15.	D. R. Patil	TE(B)	ICE	04	04 x02	18

		TE	MD-I	---	03 x02	
16.	V. K. Saindane	SE(B)	AT	04	03 x02	18
		BE	MTX	---	03 x02	
		TE	TOM-II	---	01 x02	
17.	D. S. Shinde	TE(B)	TOM-II	04	07 x02	18
18.	D. D. Patil	BE(A)	MTX	04	03 x02	18
		TE	CPP	---	03 x02	
		TE	NACM	---	01 x02	
19.	M. D. Dhanke	BE(A)	MTX	04	02 x02	20
		BE	RAC	---	06 x02	
20.	P. S. Jadhav	SE(Elect.)	AT	04	03 x02	18
		SE	AT	---	02 x02	
		BE	RAC	---	01 x02	
		TE	HTMT	---	01 x02	
21.	J. R. surange	SE(B)	ME-I	04	---	18
		BE	CAD	---	02 x02	
		TE	CPP	---	05 x02	
22.	M. D. Hadpe	SE	MS	---	02 x02	20
		SE	MD	---	02 x02	
		TE	HTMT	---	06 x02	

H.O.D
Dept. Mechanical Engg.

DEPARTMENT OF MEANICAL ENGG. (UNDERGRADUATE)

Load distribution

SEM – II (2012 – 13)

Sr. No.	Name	Class	Subject	Theory (Hr)	Practical (Batch X Hr)	Total
1.	J. R. Chaudhari	FE	EDEME	06	01 x 04	14
		BE	PROJECT	--	04	
2.	N. K. Patil	FE	EDEME	03	01 x 04	15
		TE	MMM	04	--	
		BE	PROJECT	--	04	
3.	D.S. Deshmukh	FE	EDEME(EME)	06	01 x 04	18
		TE	TURBO	--	02 x 02	
		BE	PROJECT	--	04	
4.	K. Shrivastava	FE	EDEME	03	01 x 04	15
		TE	TURBO	04	--	
		BE	PROJECT	--	04	
5.	S.P.Shekhawat	SE	TOM-I	05	--	09
		BE	PROJECT	--	04	
6.	M.V. Rawlani	FE	EDEME	03	01 x 04	15
		TE	PBM	04	--	
		BE	PROJECT	--	04	
7.	P. G. Damle	FE	EDEME	03	01 x 04	18
		TE	MD-II	05	01 x 02	
		BE	PROJECT	--	04	
8.	D.B. Sadaphale	SE	FM	05	03 x 02	15
		BE	PROJECT	--	04	
9.	P. N. Ulhe	BE(A & B)	MV	08	01 x 02	14
		BE	PROJECT	--	04	
10.	P.M.Solanki	FE	EDEME	03	01 x 04	20
		BE	FEA	05	01 x 04	
		BE	PROJECT	--	04	
11.	P.D. Patil	FE	EDEME	03	01 x 04	17
		SE	ME-II	02	--	
		BE	FEA	--	01 x 04	
		BE	PROJECT	--	04	
12.	A.R. Bhardwaj	SE	ME-II	02	--	14
		FE	EDEME	--	01 x 04	
		TE	PBM	--	04 x 02	
13.	C.K. Mukherjee	SE	IE	04	--	19
		FE	EDEME	03	03 x04	
14.	P.P. Bornare	TE	PBM	04	02 x 02	16
		FE	EDEME	--	02 x 04	
15.	D. R. Patil	TE	MD-II	05	02 x 02	17
		BE	FEA	--	01 x 04	
		FE	EDEME	--	01 x 04	
16.	V. K.Saindane	BE	TRIBO.	04	05 x 02	18
		FE	EDEME	--	01 x 04	
17.	D. S. Shinde	SE	FM	05	01 x 02	17
		SE	TOM-I	02	02 x 02	

		FE	EDEME	--	01 x 04	
18.	D. D. Patil	BE	ROBOTICS	04	--	18
		FE	EDEME	--	03 x 04	
		TE	EM	--	01 x 02	
19.	M. D. Dhanke	BE	ROBOTICS	04	--	14
		TE	PBM	--	01 x 02	
		TE	MMM	--	02 x 02	
		TE	MD-II	--	02 x 02	
20.	P. S. Jadhav	TE	EM	04	04 x 02	16
		FE	EDEME	--	01 x 04	
21.	J. R. Surange	SE	ME-II	04	--	16
		BE	FEA	--	02 x 04	
		FE	EDEME	--	01 x 04	
22.	M. D. Hadpe	FE	EDEME	03	04 x 04	19
23.	M. V. Kulkarni	TE	TURBO	04	05 x 02	18
		FE	EDEME(EME)	04	--	
24.	D. C. Talele	BE	FEA	05	03 x 04	17
25.	S. B. Chaudhari	BE	TRIBO	04	03 x 02	18
		FE	EDEME	--	02 x 04	
26.	N. B. Bauskar	SE	IE	04	--	14
		BE	MV	--	05 x 02	
27.	V. A. Revskar	TE	MMM	04	06 x 02	16
28.	M. I. Shaikh	SE	TOM-I	03	04 x 02	15
		TE	PBM	--	01 x 02	
		TE	TURBO	--	01 x 02	
29.	Jagruti Rane	TE	EM	04	03 x 02	16
		TE	MD-II	--	03 x 02	
30.	J. L. chaudhari	FE	EDEME	--	02 x 04	16
		SE	FM	--	02 x 02	
		BE	MV	--	02 x 02	

H.O.D
Dept. Mechanical Engg

DEPARTMENT OF MEANICAL ENGG. (POSTGRADUATE)
Load distribution
SEM – I (2012 – 13)

Sr. No.	Name	Class	Subject	Theory (Hr)	Practical (Batch X Hr)	Total
1.	J. R. Chaudhari	FE	Seminar- I	--	04	04
2.	N. K. Patil	FE	CMMD	01	03 x 02	
		FE	Seminar- I	--	04	11
3	S. P. Shekhawat	FE	IACS	03	--	
		FE	Seminar -I	--	04	07
4	P. G. Damle	FE	VE	03	03 x 02	
		FE	Seminar -I	--	04	13
5	D. B. Sadaphale	FE	AMED	03	--	
		FE	Seminar -I	--	04	07
6	P. N. Ulhe	FE	TRIBO	03	03 x 02	
		FE	Seminar-I	--	04	13
7	P. M. Solanki	FE	CMMD	02	--	
		FE	Seminar -I	--	04	06

DEPARTMENT OF MEANICAL ENGG. (POSTGRADUATE)
Load distribution
SEM – II (2012 – 13)

Sr. No.	Name	Class	Subject	Theory (Hr)	Practical (Batch X Hr)	Total
1.	J. R. Chaudhari	FE	Seminar- II	--	04	04
2.	N. K. Patil	FE	MTD	01	--	05
		FE	Seminar- II	--	04	
3	S. P. Shekhawat	FE	MPD	03	--	07
		FE	Seminar -II	--	04	
4	P. G. Damle	FE	DSM	03	03 x 02	13
		FE	Seminar -II	--	04	
5	D. B. Sadaphale	FE	MTD	02	--	
		FE	Seminar -II	--	04	12
		FE	MPD	--	03 x 02	
6	P. N. Ulhe	FE	OTD	03	03 x 02	13
		FE	Seminar-II	--	04	
7	P. M. Solanki	FE	PBT	03	--	07
		FE	Seminar -II	--	04	

H.O.D
Dept. Mechanical Engg

SSBT'S COLLEGE OF ENGG. AND TECH.BAMBHORI,JALGAON

DEPARTMENT OF BUSINESS ADMINISTRATION

Teaching Load Distribution for M.B.A. (2012-13) : (SEM-I & III)

SR.NO	Name of Staff	SUBJECT	TH	PR (Batches*Hrs)	TOTAL
1	Mr.V.S.Rana	Information Technology	4		13
		Industrial Relations & Trade Union	4		
		Industrial Relations & Trade Union	4		
		Information Technology		1	
2	Mr.S.R.Vasishtha	Promotion Management	4		8
		Corporate Communication	4		
3	Er.P.A.Anawade	Global Marketing Management	4		17
		Introduction to Operations Management	4		
		Legal Aspects of Business	4		
		Services Marketing	4		
		Information Technology		1	
4	Mr.H.A.Salunkhe	Corporate Social Responsibility	4		16
		Management of Banks & Financial Services	4		
		Tax Management	4		
		Financial Derivatives	4		
5	Ms.R.A.Modiyani	Accounting For Managers	4		17
		Strategic Management	4		
		Strategic Financial Management	4		
		Management of Banks & Financial Services	4		
		Information Technology		1	
6	Ms. Faroza Kazi	Labour Welfare and Administration	4		9
		Strategic and e-Human Resource Management	4		
		Information Technology		1	
7	Ms. Deepa Matani	Management Science	4		12
		Organizational Behaviour	4		
		HR Legislations	4		
8	Mr. Mukesh Ahirrao	Marketing Research	4		16
		Marketing Research	4		
		Entrepreneurship & PM	4		
		Managerial Economics	4		
			104	**4**	**108**

TIME TABLE I/C **HOD (MBA)** **PRINCIPAL**

SSBT'S COLLEGE OF ENGG. AND TECH.BAMBHORI,JALGAON

DEPARTMENT OF BUSINESS ADMINISTRATION

Teaching Load Distribution for M.B.A.(2012-13): (SEM-II & IV)

SR.	Name of Staff	Class	SUBJECT	TH	PR (Batches*Hrs)	TOTAL
1	Mr.V.S.Rana	MBA - II	Retail Mgmt & Consu Behavior	4		**8**
		MBA - I	Business Research Methods	4	-	
2	Mr.S.R.Vasishtha	MBA - II	Cases in Marketing Mgmt	4	-	**4**
3	Er.P.A.Anawade	MBA - I	Quantitative Techniques	4		**18**
		MBA - II	Supply Chain Management	4		
		MBA - II	Supply Chain Management	4		
		MBA - II	Indian Commercial Laws	4		
		F.E. Engg	Softskill Training	2	-	
4	Mr.H.A.Salunkhe	MBA - II	International financial mgmt	4		**12**
		MBA - II	Family Business Mgmt	4		
		MBA - I	Financial Mgmt	4	-	
5	Ms.R.A.Modiyani	MBA - I	Marketing Management	4		**14**
		MBA - I	Management Practices	4		
		MBA - I	Human Resource Mgmt	4		
		F.E. Engg	Softskill Training	2	-	
6	Ms. Faroza Kazi	MBA - II	Cases in HRM	4		**14**
		MBA - II	E-Commer & Excell mgmt	4		
		MBA - I	Mgmt Info system & ERP	4		
		F.E. Engg	Softskill Training	2	-	
7	Ms. Deepa Matani	MBA - II	Performance & Compe mgmt	4		**12**
		MBA - II	Performance & Compe mgmt	4		
		MBA - II	International HRM	4	-	
8	Mr. Mukesh Ahirrao	MBA - I	Glabal Economic Scenario	4		**16**
		MBA - II	Investment & Portfolio Mgt	4		
		MBA - II	Investment & Portfolio Mgt	**4**		
		MBA - II	Cases in Financial Mgt	**4**	-	
				98		**98**

TIME TABLE I/C **HOD (MBA)** **PRINCIPAL**

LOAD DISTRIBUTION
CIVIL ENGINEERING DEPARTMENT
SEM-II 2012-2013

Sr No.	Name Of Staff	Year & Branch	Subject	TH	PR Batches *hours	Total
1	Dr.M.Husain	M.E.CIVIL(F.E)	SWM	3		3
2	Dr.S.L.Patil	M.E.CIVIL(F.E)	WSM	3		3
3	Mr.P.A.Shirule	M.E.CIVIL(F.E)	AWTT	3		15
		M.E.CIVIL(S.E)	PW	12		
4	Mr.F.I.Chavan	M.E.CIVIL(F.E)	IWWWM	3		14
		M.E.CIVIL(S.E)	PW	11		
5	Mrs.Sonali Patil	M.E.CIVIL(F.E)	LP II		1*6	10
		M.E.CIVIL(S.E)	PW	4		
6	Mrs.Jyoti Mali	M.E.CIVIL(F.E)	AWWTT	3		10
		M.E.CIVIL(S.E)	PW	7		
7	Mr.B.V.Shinde	M.E.CIVIL(S.E)	PW	2		2

PG LOAD DISTRIBUTION
COMPUTER DEPARTMENT
SEM-I 2012-13

Sr No.	Name of Staff	Class	Subject	TH	PR Batches * hours	Total
1	K.P. Adhiya	ME I CSE	DS	3	--	7
		ME I CSE	Seminar	--	4	
2	M. E. Patil	ME I CSE	SPM	3	2*2	11
		ME I CSE	Seminar	--	4	
3	Sandip S. Patil	ME I CSE	ASE	3	2*2	11
		ME I CSE	Seminar	--	4	
4	Ashish Bhole	ME I CSE	NCC	3	2*2	11
		ME I CSE	Seminar	--	4	
5	S.S. Gharde	ME I CSE	AA	3	--	07
		ME I CSE	Seminar	--	4	

Total Load = 47

Timetable Incharge

HOD
Comp Deptt.

PG LOAD DISTRIBUTION
COMPUTER DEPARTMENT
SEM-II 2012-13

Sr No.	Name of Staff	Class	Subject	TH	PR Batches * hours	Total
1	M. E. Patil	ME I CSE	STQA	3	2*2	11
		ME I CSE	Seminar	--	4	
2	Sandip S. Patil	ME I CSE	SC	3	2*2	11
		ME I CSE	Seminar	--	4	
3	Ashish T.Bhole	ME I CSE	WE	3	--	07
		ME I CSE	Seminar	--	4	
4	S.S. Gharde	ME I CSE	ADBMS	3	2*2	11
		ME I CSE	Seminar	--	4	
5	Dinesh Puri	ME I CSE	PC	3	--	07
		ME I CSE	Seminar	--	4	

Total Load = 47

Timetable Incharge

HOD
Comp Deptt.

COLLEGE OF ENGINEERING & TECHNOLOGY, BAMBHORI.
ELECTRONICS & TELECOMMUNICATION DEPARTMENT
TEACHING LOAD SHEET
M.E. (DIGITAL ELECTRONICS) for Term- I
Year 2012-2013

Sr. No.	Name	Year and Term	Subject	Theory	Practical	Total
01	Prof. S.R.Suralkar	ME FY Term I	AIS DSD Seminar-I	01 -- --	02*01=02 02*01=02 04*01=04	09
02	Prof.P.H.Zope	ME FY Term I	P.C. Seminar-I	03	-- 04*01=04	07
03	Prof.A.H.Karode	ME FY Term I	AIS	02	02*01= 02	04
05	Prof.P.J.Shah	ME FY Term I	VLSI	03	----------	03
06	Prof.P.V.Thakare	ME FY Term I	ADSP	03	02*01= 02	05
07	Prof. D.U.Adokar	ME FY Term I	DSD	02	02*01= 02	04
08	Prof. S. P. Ramteke	ME FY Term I	ADSP		02*01= 02	02
09	Prof. B. K. Khadse	ME FY Term I	DSD	01		01
			Subtotal	15	20	
					Total	**35**

Total Teaching Load =35 Hrs.

Shram Sadhana Bombay, Trust's.
College of Engineering and Technology, Bambhori.
Department of Electronics and Telecommunication Engineering

TEACHING LOAD SHEET
M.E. (DIGITAL ELECTRONICS)
First Year Term- II
Year 2012-2013

Sr. No.	Name	Year and Term	Subject	Theory	Practical	Total
01	Prof. S. R. Suralkar	ME FY Term II	IP&PR(Th+LP-2) Seminar-II ADC(LP-2)	01 -- --	02*01=02 *04*01=04* 02*01=02	09
02	Prof. P. H. Zope	ME FY Term II	E.S.D (Th+LP-2) Seminar-II	03	02*02=04 *04*01=04*	11
03	Prof. A. H. Karode	ME FY Term II	IP&PR(Th+LP-2)	02	02*1 = 02	4
04	Prof. M. P. Deshmukh	ME FY Term II	MCD (Th)	01	----------	01
05	Prof. N. M. Kazi	ME FY Term II	ACN(Th)	03	--	03

06	Prof. A. C. Wani	ME FY Term II	MCD(Th)	02	--	02
07	Prof. S. U. NYATI	ME FY Term II	ADC(Th)	03	---	03
08	Prof S. P Ramteke	ME FY Term II	ADC(PR)	--	02*01 = 02	02
					TOTAL	35

Total Teaching Load = 35 Hrs.

H. O. D

(E & TC)

DEPARTMENT OF MEANICAL ENGG. (POSTGRADUATE)
Load distribution
SEM – I (2012 – 13)

Sr. No.	Name	Class	Subject	Theory (Hr)	Practical (Batch X Hr)	Total
1.	J. R. Chaudhari	FE	Seminar- I	--	04	04
2.	N. K. Patil	FE	CMMD	01	03 x 02	11
		FE	Seminar- I	--	04	
3	S. P. Shekhawat	FE	IACS	03	--	07
		FE	Seminar -I	--	04	
4	P. G. Damle	FE	VE	03	03 x 02	13
		FE	Seminar -I	--	04	
5	D. B. Sadaphale	FE	AMED	03	--	07
		FE	Seminar -I	--	04	
6	P. N. Ulhe	FE	TRIBO	03	03 x 02	13
		FE	Seminar-I	--	04	
7	P. M. Solanki	FE	CMMD	02	--	06
		FE	Seminar -I	--	04	

DEPARTMENT OF MEANICAL ENGG. (POSTGRADUATE)
Load distribution
SEM – II (2012 – 13)

Sr. No.	Name	Class	Subject	Theory (Hr)	Practical (Batch X Hr)	Total
1.	J. R. Chaudhari	FE	Seminar- II	--	04	04
2.	N. K. Patil	FE	MTD	01	--	05
		FE	Seminar- II	--	04	
3	S. P. Shekhawat	FE	MPD	03	--	07
		FE	Seminar -II	--	04	
4	P. G. Damle	FE	DSM	03	03 x 02	13
		FE	Seminar -II	--	04	
5	D. B. Sadaphale	FE	MTD	02	--	12
		FE	Seminar -II	--	04	
		FE	MPD	--	03 x 02	
6	P. N. Ulhe	FE	OTD	03	03 x 02	13
		FE	Seminar-II	--	04	
7	P. M. Solanki	FE	PBT	03	--	07
		FE	Seminar -II	--	04	

H.O.D
Dept. Mechanical Engg

Internal Continuous Evaluation System in place

The internal continuous evaluation system in place at this college level is done as per University guidelines currently enforce/ received before the start of term. The schedule for performance of practicals is notified on the departmental lab notice board. This schedule is batchwise and it also indicates the completion/ submission date of practical, drawing and assignment sheets. It is meant for those subjects for which term work marks are to be sent to the University.

The weekly record of the attendance of the students is maintained in the register meant for this purpose. This register also evaluates the performance of the students under the following headings :

a) Attendance in class/practical
b) Performance in class/practical
c) Class tests/ viva voce
d) Assignment/ Journal

The above are quantified and marks are awarded in the next week, displayed and consolidated at the end of term. At term end the term work assessment programme is displayed and the work is evaluated by two faculty members who are appointed by the Principal and the term work marks are forwarded to the University under the signature of both the examiners.

Students' assessment of Faculty, System in place.

During the 5th week of the term the feedback by the students is taken subject wise for the staff who teach them. A set of questionnaire is circulated them and feedback is obtained. This feedback is taken by academic monitoring committee comprising of three HOD's and Coordinator of Academic and Research and Development. The feedback is submitted to the Principal and he apprises the faculty member about their weak points and they are given the opportunity to improve upon their deficiencies and their weak points during the term itself.

Also during the term, students are free to pass on the difficulties through suggestion boxes kept at various location and if they are related to their academic difficulties, their difficulties are solved and the concerned faculty is advised by the Principal with sole aim of improvement in academics. Personal hearing are given by Coordinator of Academics and Research and Development and the Principal.