



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

(NAAC 'A' Grade Accredited with CGPA 3.14 - 2ND Cycle)

Website : www.ssoetjalgaon.ac.in

Email : sscoetjal@gmail.com

Mandatory Disclosure

Part-I

January 2023





राष्ट्रीय मूल्यांकन एवं प्रत्यायन परिषद

विश्वविद्यालय अनुदान आयोग का स्वायत्त संस्थान

NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL

An Autonomous Institution of the University Grants Commission

Certificate of Accreditation

*The Executive Committee of the
National Assessment and Accreditation Council*

is pleased to declare

Shram Sadhana Bombay Trust's

College of Engineering and Technology

Bambhori, Tal. Dharangaon, Dist. Jalgaon, affiliated to

Kavayitri Bahinabai Chaudhari North Maharashtra University, Maharashtra as

Accredited

with CGPA of 3.14 on four point scale

at A grade

valid up to September 05, 2027

Date : September 06, 2022



S. C. Chandra

Director

Shram Sadhana Bombay Trust's
COLLEGE OF ENGINEERING AND TECHNOLOGY

Principal: Dr. G. K. Patnaik
M.E.(CSE), Ph.D. (CSE)

Ref. No _____ Date: _____



CERTIFICATE

Certified that all enclosures contained in PART-I, PART-II & PART-III bearing page no. 01 to page no. 2321 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

SSBT's College of Engineering & Technology, Bambhori, Jalgaon.

Mandatory Disclosure

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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.ssoetjalgaon.ac.in	E-Mail: sscoetjal@gmail.com	

II. NAME & ADDRESS OF THE DIRECTOR

<u>Name</u>	Dr. Girish Kumar Patnaik
<u>Designation</u>	Principal
<u>Address</u>	PQ, SSBT's C.O.E.T. Campus, P.B. No.94, Bambhori, Jalgaon-425001
<u>STD Code With Phone No.</u>	0257 – 2258393 (O)
<u>Fax No.</u>	0257- 2258392 (O)
<u>E-mail</u>	girishpat2001@yahoo.com

III. NAME OF THE AFFILIATING UNIVERSITY

Name	K.B.C. 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
		Website	www.nmu.ac.in

OD:\Blank Letter Head GKP 011021(jaydev)

UG Programs- Engineering: Chemical, Civil, Computer, Electrical, Electronics & Telecommunication, Mechanical
PG Programs - Engineering: MCA
- Management: MBA

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 | Ex-M.L.A. |
| 2. | Mrs. Manjiri Shekhawat | 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. | Shri. Raosaheb alias Rajendrasingh D. Shekhawat | Chairman |
| 2. | Shri. Jayesh Rathore | Member |
| 3. | Shri. S.R. Girase | Member |
| 4. | Dr. Amit Dutta, Nominee of the
AICTE- Regional Officer (Ex-officio) | Member |
| 5. | An Industrialist/Technologist/Educationist from
the region nominated by the regional committee
as nominee of the Council, out of the panel approved
by the Chairman of the Council | Member |
| 6. | Nominee of the Affiliating University | Member |
| 7. | Prof. D.P. Nathe, Nominee of the | Member |

OD:\Blank Letter Head GKP 011021(jaydev)

UG Programs- Engineering: Chemical, Civil, Computer, Electrical, Electronics & Telecommunication, Mechanical
PG Programs - Engineering: MCA
- Management: MBA

- State Government-DTE (Ex-officio)
8. Dr. G.K. Patnaik, Principal Member Secretary
 9. Dr. S.B. Pawar, Professor Faculty Member
 10. Shri. J.B. Sisodiya, Director, Phy.Edu. Member
 11. Shri. M.M. Ansari, Assistant Professor Faculty Member

CONSTITUTION OF COLLEGE DEVELOPMENT COMMITTEE

Sr. No.	Name	Designation
1)	Shri Raosaheb alias Rajendrasingh D. Shekhawat	Chairman
2)	Shri. Y.K. Chitte, <i>Management's nominee for Secretary</i>	Member
3)	Dr. M. Husain, <i>HOD, Nominated by Principal</i>	Member
4)	Dr. S.B. Pawar, <i>Elected Faculty Member</i>	Member
5)	Shri. M.M. Ansari, <i>Elected Faculty Member</i>	Member
6)	Mrs. Meera P. Kulkarni, <i>Elected Faculty Member</i>	Member
7)	Shri. S.R. Girase, <i>Elected Non-Teaching Staff Member</i>	Member
8)	Dr. K.N. Patil, <i>Nominated from Educational Sector</i>	Member
9)	Shri. V.S. Mahajan, <i>Alumni Nominated from Industrial Sector</i>	Member
10)	Dr. K.B. Patil, <i>Nominated from Research Sector</i>	Member
11)	Dr. S.A. Thakur, <i>IQAC Coordinator</i>	Member
12)	Secretary, Student, Council	Member
13)	Dr. G.K. Patnaik, <i>Principal</i>	Ex-officio Member Secretary

* **Organizational 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 organizational 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 besides 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.

College Development 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 analyzed 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 organizational chart gives out clear flow of authority and responsibility on both academic and administrative front. Faculty, Staff and Students are thus aware of the various processes and policies and can approach any functionary with any supposed difficulty which need to be resolved.

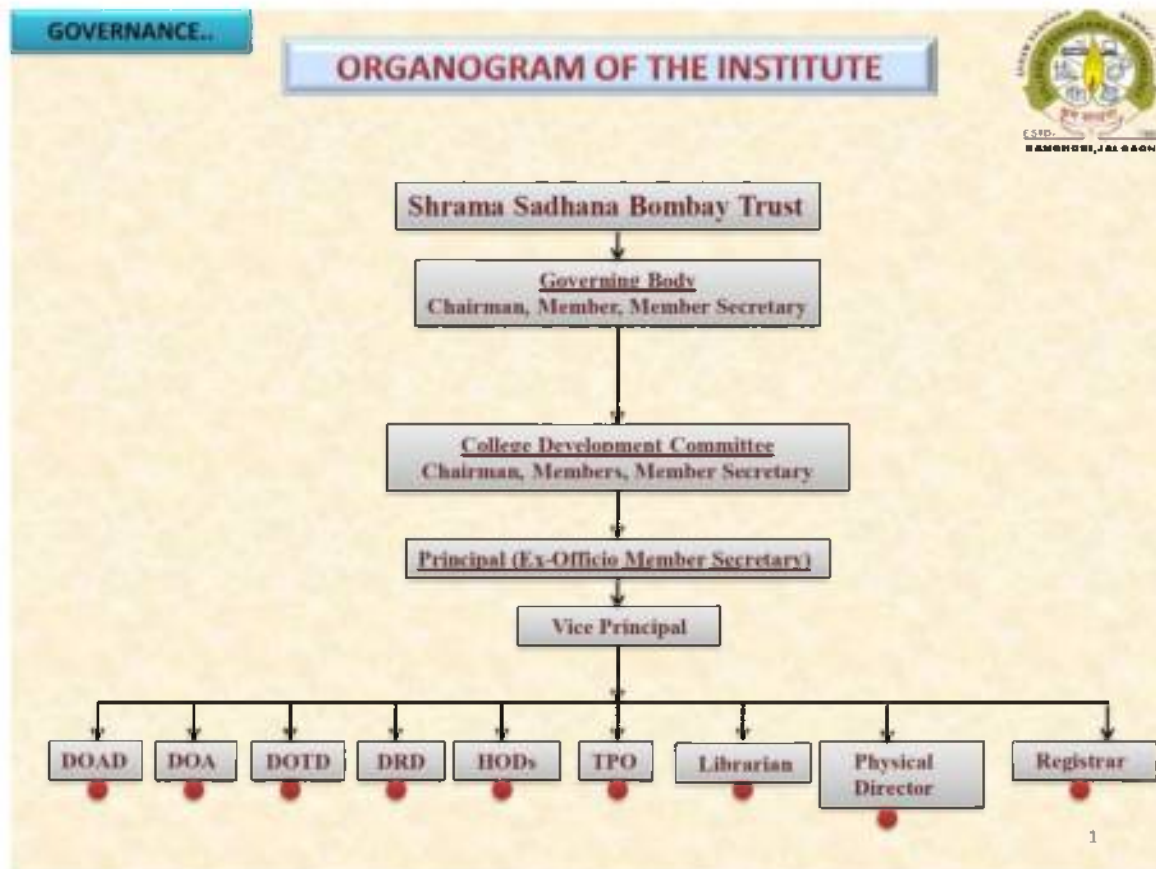
There are suggestion boxes placed at vantage points for all personnel to drop their ideas in confidence which are looked into with all seriousness.

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

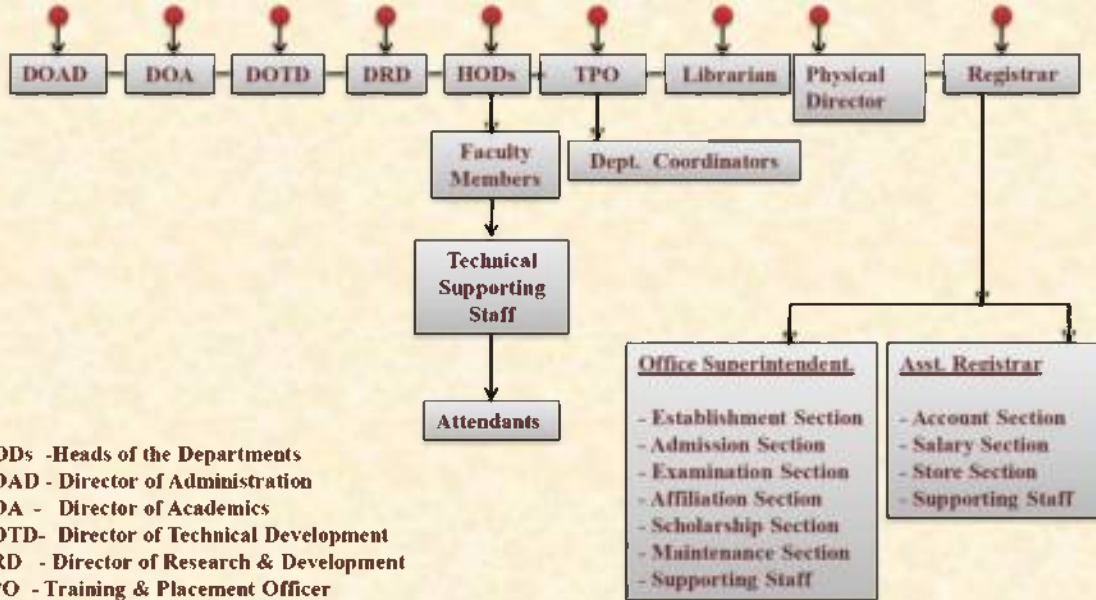
The vigilance committee is formed and which consists of Chairman (Member of CDC). All HODs, Rectors and Students Representative.

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.

Organogram of the Institution



ORGANOGRAM OF THE INSTITUTE





APPROVAL PROCESS 2022-23

Extension of Approval (EoA)

F.No. Western/1-10969831042/2022/EOA

Date: 03-Jul-2022

To,

The Secretary,
Tech. & Higher Education Deptt.
Govt. of Maharashtra, Mantralaya,
Annexe Building, Mumbai-400032

Sub: Extension of Approval for the Academic Year 2022-23

Ref: Application of the Institution for Extension of Approval for the Academic Year 2022-23

Sir/Madam,

In terms of the provisions under the All India Council for Technical Education (Grant of Approvals for Technical Institutions) Regulations, 2022 Notified on 4th February, 2022 and amended on 24th February 2022 and norms standards, procedures and conditions prescribed by the Council from time to time, I am directed to convey the approval to

Permanent Id	1-8773881	Application Id	1-10969831042
Name of the Institution	SSBT'S COLLEGE OF ENGINEERING & TECHNOLOGY	Name of the Society/Trust	SHRAM SADHANA BOMBAY TRUST
Institution Address	POST BOX NO. 94 N.H. 6, BAMBHORI, JALGAON 425 001 MAHARASHTRA STATE, JALGAON, JALGAON, Maharashtra, 425001	Society/Trust Address	HOSTEL WORKING WOMEN OPP. CORDINAL CRACIOUS HIGH SCHOOL SUBHASH NAGAR BANDRA(E), MUMBAI, MUMBAI CITY, Maharashtra, 400051
Institution Type	Private-Self Financing	Region	Western
Year of Establishment	1993		

To conduct following Courses with the Intake indicated below for the Academic Year 2022-23

Level	Program	Course	Affiliating Body (University /Body)	Intake Approved for 2021-22	Intake Approved for 2022-23	NRI Approval Status	FN / Gulf quota/ OCI/ Approval Status
UNDER GRADUATE	ENGINEERING AND TECHNOLOGY	CHEMICAL ENGINEERING	Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon	30	30	NA	NA
UNDER GRADUATE	ENGINEERING AND TECHNOLOGY	CIVIL ENGINEERING	Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon	60	60	NA	NA
UNDER GRADUATE	ENGINEERING AND TECHNOLOGY	COMPUTER ENGINEERING	Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon	180	180	NA	NA

Level	Program	Course	Affiliating Body (University /Body)	Intake Approved for 2021-22	Intake Approved for 2022-23	NRI Approval Status	FN / Gulf quota/ OCI/ Approval Status
UNDER GRADUATE	ENGINEERING AND TECHNOLOGY	ELECTRICAL ENGINEERING	Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon	60	60	NA	NA
UNDER GRADUATE	ENGINEERING AND TECHNOLOGY	ELECTRONICS AND TELECOMMUNICATIONS ENGINEERING	Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon	60	30	NA	NA
UNDER GRADUATE	ENGINEERING AND TECHNOLOGY	MECHANICAL ENGINEERING	Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon	60	30	NA	NA
POST GRADUATE	MANAGEMENT	MBA	Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon	60	60	NA	NA
POST GRADUATE	MCA	MASTER OF COMPUTER APPLICATIONS	Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon	60	60	NA	NA

It is mandatory to comply with all the essential requirements as given in APH 2022-23 (Appendix 6)

Important Instructions

1. The State Government/ UT/ Directorate of Technical Education/ Directorate of Medical Education shall ensure that 10% of reservation for Economically Weaker Section (EWS) as per the reservation policy for admission, operational from the Academic year 2019-20 is implemented without affecting the reservation percentages of SC/ ST/ OBC (NCL)/ General. However, this would not be applicable in the case of Minority Institutions referred to the Clause (1) of Article 30 of Constitution of India. Such Institution shall be permitted to increase in annual permitted strength over a maximum period of two years.
2. The Institution offering courses earlier in the Regular Shift, First Shift, Second Shift/Part Time are now amalgamated as total intake and shall have to fulfil all facilities such as Infrastructure, Faculty and other requirements as per the norms specified in the Approval Process Handbook 2022-23 for the Total Approved Intake. Further, the Institutions Deemed to be Universities/ Institutions having Accreditation/ Autonomy status shall have to maintain the Faculty: Student ratio as specified in the Approval Process Handbook. All such Institutions/ Universities shall have to create the necessary Faculty, Infrastructure and other facilities WITHIN 2 YEARS to fulfil the norms based on the Affidavit submitted to AICTE beginning with the Academic Year 2022-23
3. Strict compliance of Anti-Ragging Regulation, Establishment of Committee for SC/ ST, Establishment of Internal Complaint Committee (ICC), Establishment of Online Grievance Redressal Mechanism, Barrier Free Built Environment for disabled and elderly persons, Fire and Safety Certificate should be maintained as Approval Process Handbook and provisions made in AICTE Regulation notified from time to time.
4. In case of any differences in content in this Computer generated Extension of Approval Letter, the content/information as approved by the Executive Council / General Council as available on the record of AICTE shall be final and binding.

Pharmacy Institute: In compliance with the order dated 05.03.2020 passed by the Hon'ble Supreme Court of India in Transferred Petitions (CIVIL) No 87-101 of 2014, for the existing institutions offering courses in Pharmacy Programme, approval of Pharmacy Council of India (PCI) is mandatory and AICTE approval is NOT required. The requirements for running the Programme (Diploma / UG / PG) such as Land & Build-up Area, Student-faculty ratio, Intake etc. will be as per the respective regulatory body (PCI).

In case of any inconsistency in the course name and intake for EoA issued by AICTE and the approval by PCI, the approval of PCI shall prevail.

Architecture Institute: In compliance with the order dated 08.11.2019 passed by the Hon'ble Supreme Court of Indian CA No.364/ 2005, for the existing Institutions offering Courses in Architecture Programme, approval by the Council of Architecture (CoA) is mandatory and AICTE approval is NOT required. The requirements for running the Programme (Diploma / UG / PG) such as Land & Build-up Area, Student-faculty ratio, Intake etc. will be as per respective regulatory body (CoA). In case of any inconsistency in the course name and intake for EoA issued by AICTE and the approval by CoA, the approval of CoA shall prevail.

Deemed to be University: Institutions Deemed to be Universities (Running Technical Education Programmes), it is mandatory to have AICTE approval from the Academic Year 2018-19 in compliance of the Hon'ble Supreme Court Order dated 03-11-2017 passed in CA No.17869- 17870 /2017.

Prof.Rajive Kumar
Member Secretary, AICTE

Copy to:

1. The Director Of Technical Education**, Maharashtra
2. The Registrar**,
Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon
3. The Principal / Director,
SSBT'S COLLEGE OF ENGINEERING & TECHNOLOGY
Post Box No. 94
N.H. 6, Bambhori, Jalgaon 425 001
Maharashtra State,
Jalgaon, Jalgaon,
Maharashtra, 425001
4. The Secretary / Chairman,
HOSTEL WORKING WOMEN OPP. CORDINAL CRACIOUS HIGH SCHOOL SUBHASH NAGAR BANDRA(E)
MUMBAI, MUMBAI CITY
Maharashtra, 400051

5. The Regional Officer,
All India Council for Technical Education
Industrial Assurance Building
2nd Floor, Nariman Road
Mumbai - 400 020, Maharashtra

6. Guard File(AICTE)

Note: Validity of the Course details may be verified at <http://www.aicte-india.org/>

** Individual Approval letter copy will not be communicated through Post/Email. However, consolidated list of Approved Institutions(bulk) will be shared through official Email Address to the concerned Authorities mentioned above.

This is a computer generated Statement. No signature Required

IV) The cut-off marks / ranks for admission during the levels of percentage & percentile scores of the candidates in the Admission test for the last three years.

Sr.	Branch	2017-18		2018-19		2019-20		2020-21		2021-22		2022-2023	
		CET (M.S. Seats)	JEE (AI Seat)	CET (M.S. Seats)	JEE (AI Seat)	CET (M.S. Seats)	JEE (AI Seat)	CET (M.S. Seats)	JEE (AI Seat)	CET (M.S. Seats)	JEE (AI Seat)	CET (M.S. Seats)	JEE (AI Seat)
1	Civil	49	03	40	20	52	05	18.88	14.78	05.96	05.06	8.60	--
2	Chemical	63	43	54	41	22	04	16.86	45.24	22.89	05.61	2.00	21.16
3	Computer	39	30	53	29	110	17	1.67	65.24	12.64	61.37	44.98	65.97
4	Electrical	55	54	47	04	23	-	12.79	34.74	10.02	59.54	28.48	30.00
5	Electronics & Telecommunication	43	16	57	54	23	04	1.55	--	0.82	10.02	5.39	55.64
6	Information Technology	61	14	40	10	55	06	12.08	54.12	--	--	--	--
7	Mechanical	47	20	38	07	46	06	6.37	--	12.70	--	12.20	30.99
8	Biotechnology	48	20	53	30	10	01	9.92	44.97	--	--	--	--

V) 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 organizations in conducting campus interviews for placements. It is headed by Training & Placement Officer & Departmental 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 and 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.

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

BRANCH / YEAR	Chemical	Biotech	Civil	Computer	Electrical	E&TC	IT	Mech	MBA	MCA	Other	Total
2016-17	07	01	07	11	12	13	23	18	18	--	04	114
2017-18	12	05	23	40	23	71	13	32	19	--	10	248
2018-19	09	01	30	22	26	81	6	57	29	--	7	268
2018-19	09	01	30	22	26	81	6	57	29	--	7	268
2019-20	11	03	15	52	22	50	17	45	03	--	02	220
2020-21	04	11	08	101	40	21	25	45	02	--	00	257
2021-22	04	18	41	153	37	17	59	63	04	--	01	397
2022-2023 (Till Date 04/01/2023)	--	--	02	07	--	--	01	01	04	01	--	16

1. MINIMUM SALARY: Rs. 1/- Lacs per Annum
2. MAXIMUM SALARY: Rs. 20/- Lacs per Annum
3. AVERAGE SALARY: Rs. 3.41/- Lacs per Annum

- ❖ 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

VI) Faculty

Faculty List 2022-23

As on 01/07/ 2022

SHRAM SADHANA BOMBAY TRUST'S COLLEGE OF ENGG. & TECH., BAMBHORI, JALGAON.

Academic Year 2022-23

Sr. No.	Name of staff	Date of Birth	Designation	Qualification	Class	University	Year of Passing	Pay Scale	Date of Joining	University Approval No. & Date	Whether approved by University (Yes/No)	Category
01	Dr.Girish Kumar Patnaik	09/10/1969	Principal	B.E (C.S.&E.) M.E. (C.S.&E.) Ph.D (C.S.&E.)	I-Class I-Class --	Aurangabad Alahabad Alahabad	1990 2001 2012	37400-67000	17/06/2013	NMU/18/548/2016, Dt. 13.06.2016.Wef- 21.03.2016	Yes, as Professor	OPEN

SHRAM SADHANA BOMBAY TRUST'S COLLEGE OF ENGG. & TECH., BAMBHORI, JALGAON.

Name of the Department: Civil Engineering (Academic Year Academic Year 2022-23)

Sr. No.	Name of staff	Date of Birth	Designation	Qualification	Class	University	Year of Passing	Pay Scale	Date of Joining	University Approval No. & Date	Whether approved by University (Yes/No)	Category
01	Dr M. Husain	05/12/1969	Professor & HOD	B.E. Civil M.E. Civil (Environmental) Ph.D.	I-Class I-Class --	Indore Ujjain NMU	1991 1995 2004	37400-67000	15/07/1996	NMU/18/J-4/ 2079/03, Dt. 10-6-03 <u>Wef-15.02.2002</u> NMU/18/553/8 Dt. 21-05-08 <u>Wef-17.07.2006</u> NMU/18/1789/11 Dt. 13-12-2011 <u>Wef-14.02.2012.</u>	Yes, as Lecturer & Asst.Prof. & Professor	OPEN
02	Dr. S.B. Pawar	05/10/1966	Professor & Vice Principal	B.E. Civil ME Civil (Const Tech.&Management) Ph.D. (Civil)	I-Class I-Class --	Pune Vidisha NMU	1989 2006 2016	37400-67000	15/01/1991	NMU/92/97/1122, Dt. 03-02-92 <u>Wef-03.02.92</u> NMU/18/1142, Dt. 03-12-08 <u>Wef-28.08.08</u>	Yes, as Lecturer & Asst.Prof.	OPEN
03	Dr. P.A. Shirule	07/06/1973	Associate Prof.	B.E. Civil Engg. M.E. Civil (Environmental) Ph.D. (Civil)	F.W.D. F.W.D. --	N.M.U. N.M.U. N.M.U.	1997 2008 2018	37400-67000	03/07/2000	NMU/18/J-4/6223/04, Dt. 24-12-04 <u>Wef-9.2.04</u>	Yes, as Lecturer	OBC
04	F.I. Chavan	13/05/1974	Asstt. Prof.	B.E. Civil Engg. M.E. Civil (Environmental)	I-Class I-Class	Amarawati Amarawati	1997 2009	15600-39100	01/09/1998	NMU/18/1137/09, Dt.26.10.09 <u>Wef-15.09.09</u>	Yes, as Lecturer	OPEN
05	Ms. Sonali B. Patil	28/11/1979	Asstt. Prof.	B.E. Civil Engg. M.E. Civil (Environmental)	I-Class I-Class	N.M.U. N.M.U.	2004 2010	15600-39100	01/02/2008	NMU/18/1139/09, Dt.26.10.09 <u>Wef-16.09.09</u>	Yes, as Lecturer	OPEN

Sr. No.	Name of staff	Date of Birth	Designation	Qualification	Class	University	Year of Passing	Pay Scale	Date of Joining	University Approval No. & Date	Whether approved by University (Yes/No)	Category
06	Ms.Jyoti R.Mali	23/04/1971	Asstt. Prof.	BE Civil Engg. M.E. Civil (Environmental)	II-Class I- Class	Pune NMU	2000 2009	15600-39100	01/07/2011	NMU/18/544/2016, Dt. 13.06.2016 .Wef-17.03.2016	Yes, as Asst.Prof.	OPEN
07	J.N. Kale	25/12/1965	Asstt. Prof.	B.E. Civil Engg. M.E. Civil (Const Tech.&Managm ent)	I-Class I-Class	Bangalore N.M.U.	1989 2012	15600-39100	01/01/2009	NMU/18/1140/09, Dt.26.10.09 <u>Wef-16.09.09</u>	Yes, as Lecturer	OBC
08	Pankaj Ramdas Punase	05/08/1991	Asstt. Prof.	B.E. Civil Engg. M.E. Civil (Structures)	I-Class I-Class	N.M.U. Pune	2015 2013	15600/-	10/03/2016	--	No	OPEN
09	Ms. Kavita Chandrasing Jadhav	10/02/1994	Asstt. Prof.	B.E. Civil Engg. M. Tech. (Structural)	I-Class I-Class	Amaravati Amaravati	2016 2019	15600/-	11/07/2022	--	No	VJNT
10	Ms. Dipika Purushottam Mali	07/10/1995	Asstt. Prof.	B.E. Civil Engg M.Tech.	F.W.D 8.23 CGPA	Pune Sandip University	2017 2020	15600/- Con.	11/07/2022	--	No	OBC
11	Ms. Gauri Arvind Kate	16/03/2000	Asstt. Prof.	B.E. Civil	9.41 CGPA	N.M.U.	2021	12000/-	11/07/2022	--	No	OPEN
12	Ganesh Dilip Ahire	11/02/1998	Asstt. Prof.	B.E. Civil	7.44 CGPA	KBCNMU	2020	12000/-	11/07/2022	--	No	OBC
13	Ms. Vrushali Ajay Mahadik	29/10/1996	Asstt. Prof.	B.E. Civil	8.89 CGPA	N.M.U.	2018	12000/-	11/07/2022	--	No	OPEN
14	Ms. Ashwini Sanjay More	05/10/1998	Asstt.Prof.	BE Civil	76.00 CGPA	Pune	2017	12000/-	11/03/2022	--	No	OPEN
15	Shaikh Khatijabano Rahim	01/08/1997	Asstt.Prof.	BE.Civil	82.96 CGPA	N.M.U.	2019	12000/-	18/07/2022	--	No	OPEN

SHRAM SADHANA BOMBAY TRUST'S COLLEGE OF ENGG. & TECH., BAMBHORI, JALGAON.

Name of the Department: Computer Engineering Academic Year Academic Year 2022-23

Sr. No	Name of staff	Date of Birth	Designation	Qualification	Class	University	Year of Passing	Pay Scale	Date of Joining	University Approval No. & Date	Whether approved by University (Yes/No)	Category
01	Dr .K.P. Adhiya	07/12/1968	Professor	B.E. Comp. Engg. M.E. (C.S.&E.) Ph.D. (C.S.& E.)	I-Class I-Class --	Amaravati Alahabad NMU	1990 1996 2016	37400-67000	26/08/1991	NMU/18/j- 4/621/03,dt-18.02.03 <u>Wef-15.02.02</u> NMU/18/1119/8, Dt. 27-11-08 <u>Wef-28.08.08</u>	Yes, as Lecturer & Assistant Prof.	OPEN
02	Dr.S.R. Suralkar	28/10/1966	Professor & HOD	B.E. Electronics M.E. Control & Inst Ph.D.(E&TC)	I-Class I- Class --	Amaravati Alahabad N.M.U.	1989 1998 2015	37400-67000	17/08/1991	NMU/95/5/APP/401 3, Dt.5.5.95 <u>Wef-05.05.1995.</u> NMU/18/J-4/580 /06, Dt. 06-03-06 <u>Wef-09.02.2004</u> NMU/18/619 /16, Dt. 29-06-2016 <u>Wef-21.03.2016</u>	Yes, as Lecturer & Assistant Prof. & Professor	OPEN
03	Dr. Manoj E Patil	06/10/1975	Associate Prof.	B.E.Comp. Engg. M.Tech.(C.S.&E.) Ph.D. (C.S.& E.)	I-Class I-Class --	N.M.U. R.G.P.V. BHOPAL J.N.U. Jodhpur	2000 2008 2017	37400-67000	02/12/2002	NMU/18/J-4/4298/04, Dt. 02-09-04 <u>Wef-7.2.04</u> NMU/18/1065/2009 Dt.30.9.09 <u>Wef 1.7.09</u>	Yes, as Lecturer & Assistant Prof.	OBC
04	Ashish T.Bhole	12/09/1976	Associate Prof.	B.E. Comp. Engg. M.Tech (C.S.&E.)	I-Class I-Class	N.M.U. R.G.P.V. BHOPAL	1999 2008	37400-67000	27/11/2007	NMU/18/1067/2009, dt. 30/09/2009 <u>Wef- 01.07.2009</u>	Yes, as Lecturer	OPEN
05	Sandip S. Patil	20/01/1980	Associate Prof.	B.E. Comp. Engg. M Tech. (C.S.& E.)	I-Class I-Class	N.M.U. R.G.P.V. BHOPAL	2001 2009	37400-67000	12/02/2004	NMU/18/J-4/4297/04, Dt. 02-09-04 <u>Wef-12.2.04</u> NMU/18/1066/2009 Dt.30.9.09 <u>Wef 18.7.09</u>	Yes, as Lecturer & Assistant Prof.	OPEN
06	Dr. Dnyaneshwar K. Kirange	27/06/1979	Associate Prof.	B.E.Comp. Engg. M.Tech.(C.S.&E)Ph.D. (C.S.&E)	I-Class I-Class --	N.M.U. Naded Uni. Aurangabad	2000 2010 2017	37400-67000	13/05/2022	NMU/18/J- 8/4498/2005 , Dt. 13.06.2016 . <u>Wef-1.1.2004</u>	Yes,as Lecturer	OBC

Sr. No	Name of staff	Date of Birth	Designation	Qualification	Class	University	Year of Passing	Pay Scale	Date of Joining	University Approval No. & Date	Whether approved by University (Yes/No)	Category
07	Ms. Shital A. Patil	12/10/1982	Asstt. Prof.	B.E. Comp. Engg. M.E. (C.S.&E.)	I-Class I-Class	N.M.U. N.M.U.	2004 2012	15600-39100	02/01/2006	NMU/18/554/07 Dt. 28/03/07 <u>Wef-17.07.06</u>	Yes, as Lecturer	OPEN
08	Nitin Pundlik Jagtap	31/05/1980	Asstt. Prof.	B.E. (I.T.) M. E. (CS&E)	I-Class I-Class	Aurangabad N.M.U.	2004 2012	15600-39100	02/07/2007	NMU/18/870/10 Dt. 22.05.2010 <u>Wef- 15.09.2009</u>	Yes,as Lecturer	OBC
09	Ms. Priti Ramesh Sharma	18/06/1982	Asstt. Prof.	B.E.Comp. Engg. M.E. (C.S.&E.)	I-Class I-Class	N.M.U. N.M.U.	2007 2014	15600-39100	14/02/2008	NMU/18/868/10 Dt. 22.05.2010 <u>Wef- 15.09.2009</u>	Yes,as Lecturer	OPEN
10	Sarkarsinha. Harshinha Rajput	26/10/1984	Asstt. Prof.	B.E. Comp. M. E. (CS&E)	I-Class I-Class	N.M.U. N.M.U.	2007 2012	15600-39100	20/02/2008	NMU/18/347/10 Dt. 10.03.2010 <u>Wef- 15.09.2009</u>	Yes,as Lecturer	OPEN
11	Puri Dinesh Dagadu	15/04/1982	Asstt. Prof	B.E. Comp. Engg. M.Tech. Comp..	I-Class I-Class	Kolhapur Lonere	2004 2010	15600-39100	01/12/2012	NMU/18/550/2016, Dt. 13.06.2016.Wef-17.03.2016	Yes, as Asstt.Prof.	NT-2
12	Akash D.Waghmare	08/06/1982	Asstt. Prof.	B.E.Computer Engg. M.E. (CS&E)	I-Class I-Class	Amravati Amravati	2011 2005	15600-39100	16/12/2013	NMU/18/555/2016, Dt. 13.06.2016Wef-17.03.2016	Yes, as Asstt.Prof.	S.C.
13	Ms.Dhanashree Shashikant Tayade	19/10/1985	Asstt. Prof.	B.E.Com. Engg. M.E. (CS&E)	I-Class I-Class	PUNE N.M.U.	2010 2014	15600-39100	06/07/2015	NMU/18/553/2016, Dt. 13.06.2016 Wef-17.03.2016	Yes, as Asstt.Prof.	SBC
14	Pravin Keshav Patil	31/08/1991	Asstt. Prof.	B.E. Comp. M. E. (CS&E)	I-Class I-Class	N.M.U. N.M.U.	2013 2015	15600-39100	06/07/2015	NMU/18/557/2016, Dt. 13.06.2016 .Wef-17.03.2016	Yes,as Asst. Prof.	OBC
15	Dr.Pankaj H. Zope	24/06/1975	Asstt. Prof.	B.E. Ind Elec. M.E.(Digital Electronics) Ph.D	I-Class I- Class --	Aurangabad Amaravati Jodhapur	1999 2007 2012	15600-39100	01/07/2003	NMU/18/557/2007,dt. 28/03/2007 <u>Wef-17.07.2006</u>	Yes, as Lecturer	OPEN
16	Amol C. Wani	30/07/1976	Asstt. Prof.	B.E. Electronics M.E. E&TC	I-Class I- Class	N.M.U. Aurangabad	1999 2008	15600-39100	09/06/2003	NMU/18/ 558/2007 Dt 28/03/07 <u>Wef 17.07.06</u>	Yes, as Lecturer	OPEN
17	Surendra P. Ramteke	31/03/1979	Asstt. Prof.	B.E. E&TC M.E. (Digital Electronics)	I-Class I- Class	Amaravati Amaravati	2003 2010	15600-39100	13/02/2004	NMU/18/J-4/4307/04, Dt. 02-09-04 <u>Wef 13.2.2004</u>	Yes, as Lecturer	SC
18	Mr. Ramkrishna Hari Patil	14/02/1982	Asst. Prof	M.E.(CS&E)	I-Class	NMU	2015	15600-39100	11/11/2022	--	NO	OBC

Sr. No	Name of staff	Date of Birth	Designation	Qualification	Class	University	Year of Passing	Pay Scale	Date of Joining	University Approval No. & Date	Whether approved by University (Yes/No)	Category
19	Bilalkhan Raufkhan Pathan	13/04/1992	Asst. Prof	M.Tech (CSE)	I-Class	JNTU Hyderabad	2015	40568/-	16/11/2022	--	NO	Open
20	Mr. Chetan Vasant Chaudhari	13/05/1980	Asst. Prof	M.Tech (CSE) Phd Persuing	I-Class	RKDF,M.P SRK,M P	2017	15600-39100	16/12/2022		NO	OBC
21	Priyanka Vinod Medhe	06/04/1992	Asstt. Prof.	B.E. Comp. M. E. (CS&E)	II-Class I-Class	N.M.U. N.M.U.	2014 2020	15600/- Cons.	11/07/2022	--	NO	SC
22	Ms. Pooja Mukundrao Khandar	14/04/1993	Asstt. Prof.	B.E. Comp. M. E. (CS&E)	7.6 8.39 CGPA	Amravati Amravati	2016 2018	15600/- Cons.	14/02/2022	--	No	OBC
23	Mrs. Divya Atulchandra Wani	07/10/1995	Asstt. Prof.	B.E. Comp.	7.96 CGPA	NMU	2017	12000/- Cons.	03/11/2022	--	No	Open
24	Ms. Utkarsha Vijay Mahajan	18/03/1994	Asstt. Prof.	B.E. I.T.	8.09 CGPA	NMU	2019	12000/-	14/17/2022	--	NO	OBC
25	Mr. Milind Rahul Birhade	30/07/1995	Asstt. Prof.	B.E. Comp.	7.72 CGPA	NMU	2020	12000/-	09/04/2022	--	NO	OBC
26	Ms. Khushboo B. Bajaj	12/12/2022	Asstt. Prof.	B.E. Comp.	7.78 CGPA	NMU	2020	12000/-	17/01/2022	--	NO	Open
27	Ms. Diksha Sanjay Suryawanshi	29/10/2000	Asstt. Prof.	B.E. Comp.	CGPA	NMU	2022	12000/-	23/07/2022	--	NO	SC
28	Mr. Krunal Chadrashekhhar Pawar	01/10/1991	Asstt. Prof.	B.E. Comp.	I-Class	NMU	2016	12000/-	29/07/2022	--	NO	OBC
29	Ms. Pratiksha Sudhakar Patil	23/11/1997	Asst. Prof	B.E.Comp	7.76 CGPA	NMU	2020	12000/-	04/11/2022	--	NO	OBC

SHRAM SADHANA BOMBAY TRUST'S COLLEGE OF ENGG. & TECH., BAMBHORI, JALGAON.

Name of the Department: Electrical Engineering Academic Year 2022-23

Sr. No	Name of staff	Date of Birth	Designation	Qualification	Class	University	Year of Passing	Pay Scale	Date of Joining	University Approval No. & Date	Whether approved by University (Yes/No)	Category
01	Mr. V.S. Pawar	08/04/1971	Associate Prof. &I/C HOD	B.E. Electrical M.E. Electrical (EPS)	I-Class I-Class	Amaravati Amaravati	1994 2001	37400-67000	16/08/1999	NMU/18/J-4/621/03, Dt.18.02.03 <u>Wef-15.02.2002</u> NMU/18/1118/08 Dt. 27-11-08 <u>Wef-28.08.2008</u>	Yes, as Lecturer & Assistant Prof.	OPEN
02	Mr.M.M. Aansari	11/10/1973	Asstt. Prof.	B.E. Electrical M.E. Electrical (EPS)	I-Class I-Class	Amaravati Amaravati	1996 2009	15600-39100	05/07/2001	NMU/18/J-4/581/06, Dt. 06/03/06 <u>Wef-09.02.2004</u>	Yes, as Lecturer	OPEN
03	Mr. Suhas M. Shembekar	31/08/1976	Asstt. Prof.	B.E.Electrical M.E. Electrical (EPS)	I-Class I-Class	Amravati Aurangabd	1999 2011	15600-39100	01/01/2009	NMU/18/363/10 Dt. 10.03.2010 <u>Wef- 15.09.2009</u>	Yes,as Lecturer	OPEN
04	Mrs. Abhilasha Naresh Salunkhe	04/10/1993	Asstt. Prof.	B.E. Electrical M.E. Electrical (EPS)	77.76 CGPA 72.83	NMU NMU	2016 2018	15600/-	11/07/2022	--	No	OBC
05	Ms. Harshada M. Rajane	24/09/2000	Asstt.Prof	B.E. Electrical	CGPA	NMU	2022	12000/-	21/07/2022	--	No	OBC
06	Mr. Vijay Abaji Shinde	25/09/1989	Asstt.Prof	M.Tech Electrical Power system	6.52 CGPA	Dr. BAMUni.	2018	15600/-	01/11/2022	--	No	OBC

SHRAM SADHANA BOMBAY TRUST'S COLLEGE OF ENGG. & TECH., BAMBHORI, JALGAON.

Name of the Department: Electronics & Telecommunication Engg. Academic Year 2022-23

Sr. No	Name of staff	Date of Birth	Designation	Qualification	Class	University	Year of passing	Pay Scale	Date of Joining	University Approval No. & Date	Whether approved by University (Yes/No)	Category
01	Dr. M.P. Deshmukh	20/06/1966	Professor	B.E. Electronics M.E.Control Inst. Ph.D.(E&TC)	I-Class I- Class --	Amaravati Alahabad N.M.U.	1989 1997 2014	37400-67000	01/07/1996	NMU/95/97/618, Dt.16.1.92 <u>Wef-16.1.92</u> NMU/18/1117/08 Dt. 27-11-08 <u>Wef 28.08.08</u>	Yes, as Lecturer & Assistant Prof.	OPEN
02	Dr. V.M. Deshmukh	17/06/1965	Associate Prof.	B.E. Electronics M.E. Control Inst. Ph.D. (Electronics Engg.)	I-Class I- Class --	Amaravati Kolhapur N.M.U.	1990 1996 2017	37400-67000	01/08/1998	NMU/18/J-4/579/06, Dt. 06-03-06 <u>Wef -9.2.2004</u> NMU/18/1075/2009 Dt.30.9.09 <u>Wef 1.7.09</u>	Yes, as Lecturer & Assistant Prof.	OPEN
03	N.M. Kazi	22/06/1972	Asstt. Prof.	B.E. Electronics M.E. E&TC	I-Class I- Class	N.M.U. Aurangabad	1995 2008	15600-39100	01/08/2002	NMU/18/J-4/4708/5 Dt. 07-06-05 <u>Wef 1.2.2004</u>	Yes, as Lecturer	OPEN
04	Atul H. Karode	01/06/1976	Asstt. Prof.	B.E. Electronics M.E.E&TC	I-Class I- Class	N.M.U. Amaravati	1999 2011	15600-39100	02/07/2003	NMU/18/556/2007,dt. 28/03/2007 <u>Wef-</u> <u>17.07.2006</u>	Yes, as Lecturer	OPEN
05	Sunil K.Khode	01/01/1979	Asstt. Prof.	B.E. E&TC M.E.(Digital Electronics)	I-Class I- Class	Amaravati Amaravati	2003 2012	15600-39100	01/06/2007	NMU/18/349/10 Dt. 10.03.2010 <u>Wef- 15.09.2009</u>	Yes,as Lecturer	SC

SHRAM SADHANA BOMBAY TRUST'S COLLEGE OF ENGG. & TECH., BAMBHORI, JALGAON.

Name of the Department: Mechanical Engg. Academic Year 2022-23

Sr. No	Name of staff	Date of Birth	Designation	Qualification	Class	University	Year of Passing	Pay Scale	Date of Joining	University Approval No. & Date	Whether approved by University (Yes/No)	Category
01	N.K. Patil	23/09/1969	Associate Prof. & HOD	B.E. Production M.Tech. Energy Mangment M.E. M/c Design.	I-Class I-Class I-Class	Pune Indore NMU	1991 1995 2008	37400-67000	08/01/1997	NMU/18/1003/2006 Dt.25.05.06 <u>Wef 09.02.2004</u> NMU/18/321/2010 Dt.10.03.2010 <u>Wef 15.09.2009</u>	Yes as Lecturer & Assistant Prof.	OBC
02	K.Shrivastav	07/11/1973	Associate Prof.	B.E. Mechanical M.E. (Thermal Power)	I-Class I-Class	Amaravati N.M.U.	1997 2008	37400-67000	08/01/1998	NMU/18/J-4/4313/04, Dt. 01-09-04 <u>Wef – 09.02.2004</u>	Yes, as Lecturer	OPEN
03	Dr. P.G. Damle	08/10/1973	Associate Prof.	B.E. Mechanical M.E. M/c Design. Ph. D.	I-Class I-Class --	Amaravati N.M.U. N.M.U.	1996 2008 2017	37400-67000	15/02/2002	NMU/18/J-4/621/03, Dt. 18.2.2002 <u>Wef –15.02.2002</u> NMU/18/1071/2009 Dt.30.9.09 <u>Wef –22.6.09</u>	Yes, as Lecturer & as AP	SC
04	Prashant N. Ulhe	09/03/1974	Asstt. Prof.	B.E. Production M.E. M/c Design.	I-Class I-Class	Amaravati N.M.U.	1996 2008	15600-39100	02/06/2003	NMU/18/1073/2009, dt. 30/09/2009 <u>Wef- 25.06.2009</u>	Yes, as a Lecturer	OPEN
05	Devendra B. Sadaphale	01/07/1976	Asstt. Prof.	B.E. Mechanical M.E M/c Design	I-Class I-Class	Amaravati N.M.U.	1998 2008	15600-39100	20/02/2002	NMU/18/J-4/621/03, Dt. 18-02-03 <u>Wef –20.02.2002</u>	Yes, as Lecturer	SBC
06	Dr. P. M. Solanki	06/10/1981	Asstt. Prof.	B.E. Production M.E. CAD/CAM Ph.D.	I-Class I-Class	N.M.U. Amravati	2004 2006	15600-39100	08/08/2006	NMU/18/1140/08, dated 03-12-08 <u>Wef – 29.08.2008</u>	Yes, as a Lecturer	OPEN
07	Patil Pravin D.	30/04/1980	Asstt. Prof.	B.E. Mechanical M.E. CAD/CAM	I-Class I-Class	NMU Amravati	2004 2007	15600-39100	25/08/2008	NMU/18/1141/2008 Dated 03-12-08 <u>Wef- 29.08.2008</u>	Yes as Lecturer	OPEN

Sr. No	Name of staff	Date of Birth	Designation	Qualification	Class	University	Year of Passing	Pay Scale	Date of Joining	University Approval No. & Date	Whether approved by University (Yes/No)	Category
08	Ajay Bhardwaj	05/07/1968	Asstt.Prof	B. E. Production M.E. M/c Design	I-Class I-Class	Pune N.M.U.	1999 2012	15600-39100	01/08/2007	NMU/18/326/10 Dt. 10.03.2010 <u>Wef- 19.09.2009</u>	Yes,as Lecturer	OPEN
09	Dipak C. Talele	19/06/1987	Asstt. Prof.	B.Tech. Mechanical M.Tech. CAD//CAM	II- Class I- Class	Pune Vellore, Tamilnadu	2009 2012	15600-39100	15/07/2013	NMU/18/541/2016 Dt. 13.06.2016 <u>Wef-17.3.2016</u>	Yes, as Asstt. Prof.	OBC

SHRAM SADHANA BOMBAY TRUST's COLLEGE OF ENGG. & TECH., BAMBHORI, JALGAON.

Name of the Department: Chemical Engineering Academic Year 2022-23

Sr. No	Name of staff	Date of Birth	Designation	Qualification	Class	University	Year of passing	Pay Scale	Date of Joining	University Approval No. & Date	Whether approved by University (Yes/No)	Category
01	Dr. Vijay R. Diware	10/10/1965	Associate Prof. & I/C HOD	B.Tech. Chemical Ph.D.(Chem.Tech.)	I -Class --	Amaravati N.M.U.	1988 2008	37400-67000	23/08/1999	NMU/18/ 555/07 Dt. 28/03/07 <u>Wef-17.07.2006</u>	Yes, as Lecturer	OPEN
02	Dr.S.A. Thakur	17/09/1968	Asstt. Prof.	B.Tech. Chemical M.B.A. M.Tech. (Chem.) Ph D.	I -Class I -Class 8.31 --	Amaravati Nagpur Amaravati NMU	1989 1992 2014 2012	15600-39100	03/08/1998	NMU/18/ J-4/ 4290/04 Dt. 2.9.2004 <u>Wef- 11.2.2004</u>	Yes, as Lecturer	OPEN
03	V. P. Sangore	29/12/1972	Asstt. Prof.	B.Sc Chem M.Sc. Poly.Chem	I -Class Pass Class	N.M.U. N.M.U.	1993 1996	15600-39100	16/08/1999	NMU/18/871/10 Dt. 22.05.2010 <u>Wef- 15.09.2009</u>	Yes,as Lecturer	VJNT
04	Dr. N.Y. Ghare	14/01/1968	Asstt. Prof.	B.Tech.Chemical M.E. Chemical Engg. Ph.D. Chemical Engg.	I-Class AGrade --	Nagpur Nagpur N.M.U.	1990 1996 2017	15600-39100	10/07/2008	NMU/18/365/10 Dt. 10.03.2010 <u>Wef- 15.09.2009</u>	Yes,as Lecturer	OPEN
05	Ms. Sakshi Sadhashiv Baniya	07/01/1999	Asstt. Prof.	B.E. Chemical Engg.	8.78 CGPA	N.M.U.	2021	12000/-	11/07/2022	--	No	OPEN

SHRAM SADHANA BOMBAY TRUST's COLLEGE OF ENGG. & TECH., BAMBHORI, JALGAON.

Name of Department: Biotechnology Engg.

Academic Year 2022-23

Sr. No	Name of staff	Date of Birth	Designation	Qualification	Class	University	Year of Passing	Pay Scale	Date of Joining	University Approval No. & Date	Whether approved by University (Yes/No)	Category
01	Mrs. Sarika S. Pawar	15/01/1982	Asstt.Prof	B Tech. Chemical M.Tech Chemical	I-Class I-Class	N.M.U. N.M.U.	2004 2009	15600-39100	01/07/2011	NMU/18/535/2016 Dt.13.06.2016. <u>Wef- 18.03.0216</u>	Yes,as Asst. Prof.	OPEN
02	Ms. Ashwini A Badgujar	08/10/1998	Asstt. Prof.	B.E. Botech	74.04 CGPA	N.M.U.	2022	12000/-	11/07/2022	--	No	OBC
03	Ms. Jaymala D. Chaudhari	30/03/2000	Asstt. Prof.	Msc Microbiology.	9.69 CGPA	N.M.U.	2022	15600/-	09/01/2023	--	No	OBC

SHRAM SADHANA BOMBAY TRUST'S COLLEGE OF ENGG. & TECH., BAMBHORI, JALGAON.

Name of department: Applied Science

Academic Year 2022-23

Sr. No	Name of staff	Date of Birth	Designation	Qualification	Class	University	Year of Passing	Pay Scale	Date of Joining	University Approval No. & Date	Whether approved by University (Yes/No)	Category
01	Dr.K. S. Patil	14/05/1974	Asstt.Prof	M. Sc. (Physics) Ph.D.	I-Class --	N.M.U Jodhpur National University	1996 2012	15600-39100	07/07/2000	NMU/18/J-4/621/03, Dt. 18-02-03 <u>Wef-</u> <u>15.02.2002</u>	Yes, as Lecturer	OPEN
02	Y. K. Chitte	01/06/1969	Asstt.Prof	M.A. (English)	Higher II- Class	Pune	1997	15600-39100	06/07/2000	--	No	OPEN
03	Dr. Sunita S. Patil	12/05/1975	Asstt.Prof	M.Sc.Maths M. Phil (Maths) Ph.D. (Maths)	I-Class II-Class --	N.M.U. Alagppa N.M.U.	1998 2010 2016	15600-39100	14/09/2001	NMU/18/J-4/621/03, Dt. 18-02-03 <u>Wef-</u> <u>15.02.2002</u>	Yes, as Lecturer	OPEN
04	C.U. Nikam	05/06/1973	Asstt.Prof	M.Sc. (Physics)	I-Class	A'bad	2001	15600-39100	25/08/2008	NMU/18/1145/2008, dt. 03/12/08 <u>Wef-</u> <u>26.08.2008</u>	Yes as a Lecturer	SC
05	Ms. Deepmala I. Desai	10/10/1979	Asstt.Prof	M.Sc.(Chemistry) M.Phil (Maths)	I-Class A-Grade	N.M.U. N.M.U.	2004 2009	15600-39100	26/08/2008	NMU/18/1144/2008, dt. 03/12/08 <u>Wef-</u> <u>26.08.2008</u>	Yes as a Lecturer	SC
06	Mahendra B. Patil	01/06/1985	Asstt.Prof	M.Sc. (Physics)	I-Class	N.M.U.	2009	15600-39100	27/07/2010	NMU/18/1563/2010, dt. 06/10/10 <u>Wef-</u> <u>27.07.2010</u>	Yes, as Asst.Prof.	OPEN
07	Ms. Meera Prassan Kulkarni	10/06/1975	Asstt.Prof	M.Sc.Maths M.Phil (Maths)	I-Class II-Class	N.M.U. Alagppa	1997 2008	15600-39100	01/07/2011	NMU/18/362/10 Dt. 10.03.2010 <u>Wef- 15.09.2009</u>	Yes,as Lecturer	OPEN
08	Ujawalsing T. Patil	10/07/1985	Asstt. Prof.	M.Sc. (Org.Chemistry)	I-Class	N.M.U.	2008	15600-39100	06/07/2015	NMU/18/538/2016 Dt.13.06.2016 <u>Wef-</u> <u>17.03.0216</u>	Yes,as Asst. Prof.	OPEN
09	Ms. Tanuja Yashwantsing Chouhan	03/04/1985	Asstt. Prof.	M.A. (English)	I-Class	Bhopal	2012	15600/-	11/07/2022	--	No	OPEN

Sr. No	Name of staff	Date of Birth	Designation	Qualification	Class	University	Year of Passing	Pay Scale	Date of Joining	University Approval No. & Date	Whether approved by University (Yes/No)	Category
10	Shaikh Aatif Ahemad Nisar Ahemad	23/06/1991	Asstt. Prof.	M.Sc.Maths	7.45 CGPA	NMU	2015	15600/-	11/07/2022	--	No	Open
11	Jayshree R. Tayade	17/02/1985	Asstt. Prof.	M.Sc.Maths	I-Class	N.M.U.	2007	15600/-	11/07/2022	--	No	SBC
12	Mrs. Puja Mayur Malu	21/03/1986	Asstt.Prof.	M.Sc. (Org.Chemistry)	I-Class	N.M.U.	2010	15600/-	15/07/2022	--	No	Open

SHRAM SADHANA BOMBAY TRUST'S COLLEGE OF ENGG. & TECH., BAMBHORI, JALGAON.

Name of the Department: M.B.A.

Academic Year 2022-23

Sr No	Name of staff	Date of Birth	Designation	Qualification	Class	University	Year of Passing	Pay Scale	Date of Joining	University Approval No. & Date	Whether approved by University (Yes/No)	Category
01	Dr.Vishal Sunil Rana	15/12/1980	Associate Prof. & I/C HOD	M.B.A. (Marketing) M.Com Ph.D (Mgmt Sci.)	I-Class I-Class --	NMU DBAU Aurangabad NMU	2005 2006 2014	37400-67000	01/07/2009	NMU/18/1070/2009 Dt.30.9.09 <u>Wef 1.7.09</u> NMU/18/616/2016 Dt. 29.06.2016 <u>Wef-22.03.2016</u>	Yes, as Lecturer Associate Prof.	Open
02	Dr. Richa A. Modiyani	30/04/1987	Asstt.Prof	M.B.A. Finance Ph.D.(Sindhi Community)	I-Class --	NMU NMU	2009 2016	15600-39100	01/07/2011	NMU/18/547/2016 Dt.13.06.2016 <u>Wef-17.03.0216</u>	Yes,as Asst. Prof.	Open
03	Mahesh V. Rawlani	07/06/1970	Associate Prof.	B.E. Production M.E. (A.P.S.)	I-Class I-Class	Amravati Bhopal	1993 2005	37400-67000	01/07/2006	NMU/18/1139/08, dated 03-12-08 <u>Wef-29.08.2008</u>	Yes, as a Lecturer	OPEN
04	Ms.Faroza A. kazi	16/02/1975	Asstt. Prof.	M.B.A. (H.R) M P M (H.R.)	I-Class I-Class	NMU NMU	2012 2000	15600-39100	06/07/2015	--	No	Open
05	Dr. Mukesh B.Ahirrao	24/06/1984	Asstt. Prof.	M.B.A. Finance Ph.D.	I-Class	NMU	2009	15600-39100	06/07/2015	--	No	Open

SHRAM SADHANA BOMBAY TRUST'S COLLEGE OF ENGG. & TECH., BAMBHORI, JALGAON.

Name of department: MCA

Academic Year 2022-23

Sr No	Name of staff	Date of Birth	Designation	Qualification	Class	University	Year of Passing	Pay Scale	Date of Joining	University Approval No.&Datee	Whether approved by University (Yes/No)	Category
01	Nitin Y. Suryawanshi	27/01/1981	Asstt. Prof	B.E. Comp. Engg. M.E. (C.S.&E.)	I-Class I-Class	Aurangabad N.M.U.	2005 2012	15600-39100	20/12/2008	NMU/18/1068/2009 Dt.30.9.09 <u>Wef 1.7.09</u>	Yes, as Lecturer	OPEN
02	Ms. Sapana Ananrao Fegade	04/06/1983	Asst. Prof	M. E. (CSE)	I-Class	N.M.U	2013	15600-39100	16/12/2022	--	NO	OBC
03	Mr. Mohan Pramod Patil	09/12/1990	Asstt.Prof.	B.E. Comp. M. Tech.	I-Class 7.52 CGPA	N.M.U. Uni Lonere	2012 2014	15600-39100	18/07/2022	--	No	OBC
04	Mr. Vaibhav Rajendra Chaudhari	30/09/1995	Asstt.Prof.	BSC- Com MCA	I-Class 7.09 CGPA	Dr.BAMUni SandipUni	2018 2021	25600/-	01/11/2022	--	No	OBC

SHRAM SADHANA BOMBAY TRUST's COLLEGE OF ENGG. & TECH., BAMBHORI, JALGAON.

Name of department: Sports Academic Year 2022-23

Sr No	Name of staff	Date of Birth	Designation	Qualification	Class	University	Year of Passing	Pay Scale	Date of Joining	University Approval No.&Datee	Whether approved by University (Yes/No)	Category
01	J.B. Sisodiya	01/06/1963	Phy.Director	B.A. BPed MPed	II-Class II-Class I-Class	Poona Poona NMU	1989 1992 2000	37400 - 67000	24/11/1994	NMU/18/1669/06, dated 09/12/06 <u>Wef 09.02.2004</u>	Yes as a Phy.Dir.	OPEN

Name of department: Library

Sr No	Name of staff	Date of Birth	Designation	Qualification	Class	University	Year of Passing	Pay Scale	Date of Joining	University Approval No.&Datee	Whether approved by University (Yes/No)	Category
01	Dr. Sudhir.S.Patil	01/06/1978	Librarian	M.Lib. Ph.D.	I-Class --	NMU NMU	2003 2017	15600 - 39100	01/07/2003	NMU/18/215/07, dated 08/02/07 <u>Wef</u> <u>17.07.2006</u>	Yes as a Librarian	OPEN

SHRAM SADHANA BOMBAY TRUST'S COLLEGE OF ENGG. & TECH., BAMBHORI, JALGAON.

Statistical Information of Faculty, 2022-23

Sr. No.	Department	Professor	Associate Prof.	Asst. Prof.	Total
01	Civil Engineering	02	01	12	15
02	Computer Engineering	02	04	23	29
03	Electrical Engineering	--	01	05	06
04	E&TC	01	01	03	05
05	Mechanical Engineering	--	03	06	09
06	Chemical Engineering	--	01	04	05
07	Biotechnology Engineering	--	--	03	03
08	Applied Science	--	--	12	12
09	M.B.A.	--	02	03	05
10	M.C.A.	--	--	04	04
Total		05	13	75	93

Total Faculty: - 93+1(Principal) = 92

SHRAM SADHANA BOMBAY TRUST'S COLLEGE OF ENGG. & TECH., BAMBHORI, JALGAON.

Statistical Information of Faculty, 2022-2023

Sr. No.	Department	Approved Faculty	Regular but not approved Faculty	Contractual Faculty	Total
01	Civil Engineering	07	01	07	15
02	Computer Engineering	17	03	09	29
03	Electrical Engineering	03	--	03	06
04	E&TC	05	--	--	05
05	Mechanical Engineering	09	--	--	09
06	Chemical Engineering	04	--	01	05
07	Biotechnology Engineering	01	--	02	03
08	Applied Science	07	01	04	12
09	M.B.A.	03	02	00	05
10	M.C.A.	01	02	01	04
Total		57	09	27	93

Total Faculty : - 93

:- 93+01(Principal)

SHRAM SADHANA BOMBAY TRUST'S COLLEGE OF ENGG. & TECH., BAMBHORI, JALGAON.

Statistical Information of Faculty, 2022-2023

Sr. No.	Department	Ph.D.	P.G.	U.G	Total
01	Civil Engineering	03	07	05	15
02	Computer Engineering	05	17	07	29
03	Electrical Engineering	01	04	01	06
04	E&TC	02	03	--	05
05	Mechanical Engineering	02	07	--	09
06	Chemical Engineering	03	01	01	05
07	Biotechnology Engineering	--	02	01	03
08	Applied Science	02	10	--	12
09	M.B.A.	03	02	--	05
10	M.C.A.	--	04	--	04
Total		21	57	15	93

Faculty- 93
Principal- 01
Phy.Dir.- 01
Librarian- 01

SHRAM SADHANA BOMBAY TRUST'S COLLEGE OF ENGG. & TECH., BAMBHORI, JALGAON.

Statistical Information of Faculty, 2022-23

Sr. No.	Department	Professor	Associate Professor		Total	Assistant Professor			Total	Total Faculty
		With Ph.D.	Ph.D.	P.G.		Ph.D.	P.G.	U.G.		
01	Civil Engineering	02	01	00	01	00	07	05	12	15
02	Computer Engineering	03	02	02	04	01	15	07	23	30
03	Electrical Engineering	00	00	01	01	00	04	01	05	06
04	E&TC	01	01	00	01	00	03	00	03	05
05	Mechanical Engineering	00	01	02	03	01	05	00	06	09
06	Chemical Engineering	00	01	00	01	02	01	01	04	05
07	Biotechnology Engineering	00	00	00	00	00	02	01	03	03
08	Applied Science	00	00	00	00	02	10	00	12	12
09	M.B.A.	00	01	01	02	02	01	00	03	05
10	M.C.A.	00	00	00	00	00	04	00	04	04
Total		06	7	06	13	08	52	15	74	94

Total Faculty : - 93

Principal :- 01=94

SHRAM SADHANA BOMBAY TRUST'S COLLEGE OF ENGG. & TECH., BAMBHORI, JALGAON.

Departmentwise Reglar & Contract Male & Female Faculty List 2022-23

Sr. No.	Department	Regular		Contractul.		Total	CHB		Guest Teachers	
		Male	Female	Male	Female		Male	Female	Male	Female
01	Civil Engineering	06	02	01	06	15	-	-	-	-
02	Computer Engineering	16	03	04	7	30	-	-	-	-
03	Electrical Engineering	03	00	01	02	06	-	-	-	-
04	E&TC	05	00	00	00	05	-	-	-	-
05	Mechanical Engineering	10	00	00	00	10	-	-	-	-
06	Chemical Engineering	04	00	00	01	05	-	-	-	-
07	Biotechnology Engineering	00	01	00	01	02	-	-	-	-
08	Applied Science	04	03	02	03	12	-	-	-	-
09	M.B.A.	01	00	01	03	05	-	-	-	-
10	M.C.A.	01	01	02	00	04	-	-	-	-
Total		50	10	11	23	94		-	-	-

Total Faculty: - 93

Principal : - 01=94

DEPARTMENT OF APPLIED SCIENCES

- 1 Name: Dr. KIRAN SAHEBRAO PATIL
2. Date of Birth: 14th MAY 1974
3. Educational Qualification: M. Sc.(PHYSICS.) Ph.D.



- 4 Work Experience :
 - Teaching --21 years
 - Research ---10 years
 - Industry -- --
 - Others -----
- 5 Area of Specializations: - Physics with Electronics
- 6 Subjects teaching at Under Graduate Level:
 - i) Applied Physics-I ii) Applied Physics-II
 - iii)Environmental Studies.
- Post Graduate Level: -
7. Research guidance: Not Applicable

Master's
Ph.D.

No. of papers
published in
- National Journals
-International Journals -10
- Conferences -04

Projects Carried out :
Patents :

8. Technology Transfer : - -
- 9 Research Publications : --
 - i) International Journals :
- 10 .No. of Books published with details : --
- 11.Research Publications : --
 - i) International Journals: 06
- 12.No. of Books published with details : 01

Signature

DEPARTMENT OF APPLIED SCIENCES

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



4.Work Experience :
- Teaching -- 21 years
- Research --06 yrs
- Industry
- Others --

5.Area of Specializations :Mathematics

6.Subjects teaching at Under Graduate Level :
i) Engineering Maths-I ii) Engineering Maths-II
iii) Engineering Maths-III iv) NACM v) Biostatistics

Post Graduate Level : --

7.Research guidance : Not Applicable

Masters's
Ph.D.

No. of papers published in
-National Journals-Nil
-International Journals -08
-Conferences- 05

8.Projects Carried out : - -

9.Patents : - -

10.Technology Transfer : - -

11.Research Publications : --

i) International Journals -08

12.No. of Books published with details : -

Signature

DEPARTMENT OF APPLIED SCIENCES

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 : 15Years
 - i) Teaching 16 Years
 - ii) Research -----
 - iii) Industry -- --
 - iv) Others-----

- 4 Area of Specializations: - Nuclear Physics
Subjects teaching at Under Graduate Level:- i) Applied Physics-I
ii) Applied Physics-II iii)Environmental Studies. iv) Optics v)
Quantum mech., vi)MathematicalPhy., vii) Nuclear Physics.
Post Graduate Level: - Nuclear Physics

6. Research guidance: Not Applicable

Master's
Ph.D.

No. of papers published in
- National Journals -02
- International Journals-01
- Conferences -01

Projects Carried out :
Patents :

- 9 Technology Transfer : - -

- 10 Research Publications : --
 - i) International Journals :

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

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

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

Signature

DEPARTMENT OF APPLIED SCIENCES



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

- 4.Work Experience : 18
10 Teaching :- 18 years
11 Research :---
12 Industry : --
13 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)Biostatistics

Post Graduate Level : --

7.Research guidance : Not Applicable

	No. of papers published in
Masters's	- National Journals
Ph.D.	-International Journals-03 -Conferences-01

8.Projects Carried out : - -

9.Patents : - -

10.Technology Transfer : - -

11.Research Publications :

- i) International Journals:--03

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

Signature

DEPARTMENT OF APPLIED SCIENCES

For each Faculty give a page covering

1.Name: YeshwantKondusingChitte

2.Date of Birth: 2nd June 1969

3.Educational Qualification: M.A.(English), L.L.B.,
B.C.J.



1. Work Experience :

Teaching --15yrs

Research -----

Industry -- --

Others-----

2. Area of Specializations: - English Literature

3. Subjects teaching at Under Graduate Level:

- Professional Communication

Post Graduate Level: --

4. Research guidance: Not Applicable

Master's

Ph.D.

No. of papers published in

- National Journals

- International Journals

- Conferences

Projects Carried out :

Patents :

7. Technology Transfer : - -

8. Research Publications : --

International Journals :

No. of Books published with details : --

Research Publications : --

International Journals

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

Signature

DEPARTMENT OF APPLIED SCIENCES



For each Faculty give a page covering

Name: DEEPMALA ISHVARLAL DESAI

01. Date of Birth: 06th Oct 1979

02. Educational Qualification: M. Sc. (Chemistry)
M.Phil

03 Work Experience:

- i) Teaching --12yrs
- ii) Research ---
- iii) Industry -- --
- iv) Others-----

04 Area of Specializations: -Inorganic Chemistry

05 Subjects teaching at Under Graduate Level:

Applied Chemistry-I ii) Applied Chemistry-II

iii)Environmental Studies.

Post Graduate Level: --

06 Research guidance: Not Applicable

Master's

Ph.D.

No. of papers published in
National Journals -01

International Journals- 03
Conferences-02

07 Projects carried out:

Patents :

08. Technology Transfer: - -

09 Research Publications: --

i) International Journals :03

Research Publications : --
International Journals

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

Signature

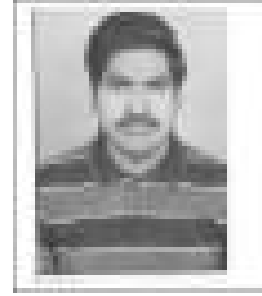
DEPARTMENT OF APPLIED SCIENCES

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:

v) Teaching --10yrs

vi) Research ---05

vii) Industry -- --

viii) Others-----

- Area of Specializations: - ENERGY STUDIES

- Subjects teaching at Under Graduate Level:

Physics

Post Graduate Level: --

06. Research guidance: Not Applicable

Master's

Ph.D.

No. of papers published in

- National Journals

- International Journals-02

- Conferences

Projects carried out:

Patents :

07. Technology Transfer: - -

- Research Publications: --

i) International Journals : 02

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

11 Research Publications : --

8. International Journals

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

Signature

DEPARTMENT OF APPLIED SCIENCES

For each Faculty give a page covering

Name: UjwalsingTryambakPatil

01. Date of Birth: 10th July 1985

02. Educational Qualification: M.Sc. (Chem.)



03. Work Experience:

Teaching --8.6yrs

Research -----

Industry-----

Other

04. Area of Specializations: - Organic Chemistry

05. Subjects teaching at Under Graduate Level:

Applied Chemistry-I ii) Applied Chemistry -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:01

- Conferences:03

Projects carried out:

Patents :

07. Technology Transfer: - -

08. Research Publications: --

i) International Journals : 01

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

4. Research Publications : --

- International Journals

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

Signature

DEPARTMENT OF APPLIED SCIENCES

1.Name:- Tanujakunwar Yashwantsingh Chouhan

2.Date of Birth.:-03.04.1985

3.Educational Qualification :- M.A. (English)

4.Work Experience :

5.Teaching :- 10

6. Research :---

7. Industry : --

8. Others : --

9.Area of Specializations : --English Literature

10.Subjects teaching at Under Graduate Level :

- Professional Communication

11 Post Graduate Level : -- Yes

12.Research guidance : Not Applicable

No. of papers published in

Masters's- National Journals

Ph.D. - International Journals - Conferences

13.Projects Carried out : - -

14.Patents : - -

15.Technology Transfer : - -

16.Research Publications :

i) International Journals:--

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



Signature

1.Name:- **Miss Jayshree R. Tayade**

2.Date of Birth.:-17/02/85

3.Educational Qualification :-M.Sc (Mathematics),

4.Work Experience :

Teaching :-7 Months

Research :-

Industry : -

Others : -

5.Area of Specializations : --

6.Subjects teaching at Under Graduate Level :

1) Math I

2) Math II

3) 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

1.Name:- **Miss Pooja Mayur Malu**

2.Date of Birth:-23/03/86

3.Educational Qualification :-M.Sc (Organic Chemistry),
B.Ed

4.Work Experience :

Teaching :-7 Months

Research :-

Industry :-

Others :-

5.Area of Specializations : --

6.Subjects teaching at Under Graduate Level :Chemistry

I

Post Graduate Level : --

7.Research guidance : Not Applicable

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

8.Projects Carried out : - -

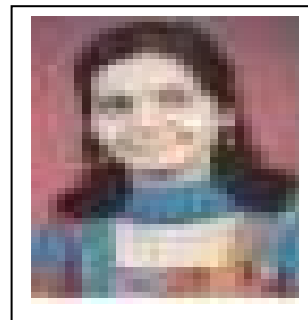
9.Patents : - -

10.Technology Transfer : - -

11.Research Publications :

i) International Journals:--

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



Signature

1.Name:- Vijaydeepa R

2.Date of Birth.:-28/12/1985

3.Educational Qualification :-M.A (English),

4.Work Experience :

Teaching :-7 Months

Research :-

Industry : -

Others : -

5.Area of Specializations : --

6.Subjects teaching at Under Graduate Level : Professional Communication

Post Graduate Level : --

7.Research guidance : Not Applicable

No. of papers published in:-2

Masters's - National Journals

Ph.D. - 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

FACULTY PROFILE

Name : Mrs. Sarika S. Pawar

1. Date of Birth : 15/01/1982

2. Educational Qualification : M. Tech. (Chemical Engineering)

3. Work Experience :

1. Teaching 13 Year
2. Research ---
3. Industry -- --
4. Others-----



4. Area of Specialization: Chemical Engineering

5. Subjects teaching at

Under Graduate Level:--i) Chemical Reaction Engineering ii) Mass Transfer iii) Bioprocess Instrumentation & Analysis iv) Process Heat Transfer
v) Unit Operations – I & II vi) Bioprocess Equipment Design. Vii) Biofuel & Alcohol Technology.

6. Research guidance : Not Applicable

- a. Master's : nil
- b. Ph.D. : nil -

No. of paper published in :-

- c. National Journals : nil -
- d. International Journals : 03
Conference

7. Technology Transfer:

8. Research Publications: 03

9. No. of Books published with details: Nil

Signature



FACULTY PROFILE

1.Name :-Ashwini Arvind Badgujar

2. Date of Birth :- 08/10/98

3.Educational Qualification :

B.E(Biotech.).

4. Work Experience :

Teaching 7 Months

Research ---

Industry -- --

Others-----

5 Area of Specialization: Biotech Engineering

6 Subjects teaching :-

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 --

Signature

Faculty Profile



1. Name : Ashutosh Santosh Shriramajwar

2. Date of Birth :03/07/1999

3. Educational Qualification: B.E (Biotechnology).

4. Work Experienced:

a. Teaching :

b. Research : 1 year

c. Industry :

d. Other :

5. Area of Specialization : Biotechnology

Subjects teaching at UG : -- Bioprocess Engineering, Industrial Biotechnology, Bioprocess Industries

Subjects teaching at PG level : -- Nil

6. Research's Guidance Master's : Nil

PhD : Nil

7. No .of paper published in

a. National journal : 00

b. Inter national journal : 00

c. International Conference : 00

d. National Conference : 00

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



1. Name : Jayamala Dipak Chaudhari
 2. Date of Birth : 30/03/2000
 3. Educational Qualification: Msc Microbiology
 4. Work Experienced:
 - a. Teaching : Yes
 - b. Research :
 - c. Industry :
 - d. Other :
 5. Area of Specialization : Microbiology
 - Subjects teaching at UG : -- Biology
 - Subjects teaching at PG level : -- Nill
 6. Research's Guidance

Master's	:	Mrs. Suvarna Patil
PhD	:	
 7. No .of paper published in
 - a. National journal : 00
 - b. Inter national journal : 00
 - c. International Conference: 00
 - d. National Conference : 00
 8. Project carried out : Studies on screening for PGPRs to improve the growth of Arachis hypogea.
 9. Patents : Nill
 10. Technology Transfer : Nill
 11. Research publication : Nill
 12. No. of book published with detail: Nil
-

Signature

FACULTY PROFILE

1.Name :-Ashwini Arvind Badgujar

2. Date of Birth :- 08/10/98

3.Educational Qualification :

B.E(Biotech.).

4. Work Experience :

Teaching 7 Months

Research ---

Industry -- --

Others-----

5 Area of Specialization: Biotech Engineering

7 Subjects teaching :-

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 --

Signature

FACULTY PROFILE

1.Name : Dr.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 23 yrs
- Research 06 yrs
- Industry 08 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) Computer Aided Process Equipment Design, Modeling and Simulation
iv) Process Equipment Design– I and II vii) Process Heat Transfer viii) Process Equipment Design

Post Graduate Level : --

7.Research guidance : Recognized Ph.D. guide in Chemical Engineering &Technology of N.M.U., Jalgaon

No. of students pursuing Ph.D.: 02

No. of papers published in

Masters's: --

Ph.D.: --

- National Journals : ---

-International Journals :31

-Conferences :32

8.Projects Carried out : - 03

9.Patents : - -

10.Technology Transfer : - -

11.Research Publications : 31

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



FACULTY PROFILE

1.Name: Dr.SANDEEP AVINASH THAKUR

2.Date of Birth : 17th September 1968

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

MBA, Ph.D (Management)

4.Work Experience :

- Teaching: 22yrs
- Research 06 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)Process Engineering
Economics & Costing iv) Plant Utility

Post Graduate Level : --

7.Research guidance : Not Applicable

No. of papers published in

Masters: - -

Ph.D: - -

- National Journals: 01

-International Journals: 15

-Conferences :23

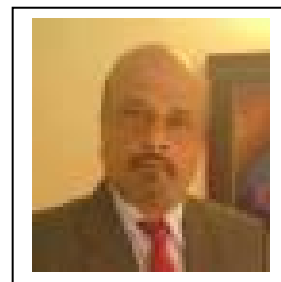
8.Projects Carried out : 02

9.Patents : - -

10.Technology Transfer : - -

11.Research Publications : 16

12.No. of Books published with details : -01



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.

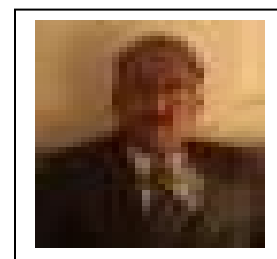


FACULTY PROFILE

1.Name : VIJAY PRABHAKAR SANGORE

2.Date of Birth : 29th December 1972

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



4.Work Experience

- Teaching -23 yrs
- Research -05 year
- Industry ----
- Others -- --

5.Area of Specializations: Polymer Chemistry

6.Subjects teaching at Under Graduate Level :

i) Thermodynamics – I ii) Industrial Chemistry iii) Instrumentation and Instrumental Analysis iv) Material Science v) Industrial Pollution and Control

Post Graduate Level :- -

7.Research guidance : Not Applicable

No. of papers published in

Masters's: - -

National Journals: - -

Ph.D.: - -

International Journals:- 05

Conferences: 23

8.Projects Carried out : - -01

9.Patents : - -

10.Technology Transfer : - -

11.Research Publications : 05

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



FACULTY PROFILE

- 1 Name :Dr. NIKHIL YESHWANT GHARE
2. Date of Birth :14 January 1968
3. Educational Qualification :B.Tech. (Chem. Engg.)
M.E(Chem. Engg.)
Ph.D(Chem. Engg.)



4. Work Experience :
 - Teaching:16 yrs Research :06 yrs
 - Industry :06 yrs Others :02 yrs
5. Area of Specializations : Chemical Engineering, Waste Water Engineering

- 6 Subjects teaching at Under Graduate Level
 - i)Transport Phenomenon ii) Chemical EngineeringThermodynamicsiii) Mass Transfer-II iv) Material and Energy Balance Computationv) Energy Engineeringvi) Thermodynamics – II

Post Graduate Level : - -

7. Research guidance : Not Applicable

No. of papers published in

Masters's: - -	National Journals :02
Ph.D: - -	International Journals :06
	Conferences :08

- 8.Projects Carried out : 03
 - 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:08

12.No of Books published with details : - -



FACULTY PROFILE



- 1 Name : SAKSHI SADASHIV BANIYA
2. Date of Birth :07/01/99
3. Educational Qualification :B.Tech. (Chem. Engg.)
4. Work Experience :
 - Teaching:07 Months

5. Area of Specializations : Chemical Engineering,

6 Subjects teaching at Under Graduate Level

Post Graduate Level : - -

7. Research guidance : Not Applicable

No. of papers published in

Masters's: - -

Ph.D: - -

National Journals :--

International Journals :--

Conferences :--

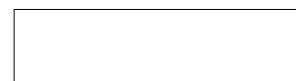
8. Projects Carried out : --

9. Patents : -- --

10. Technology Transfer : - -

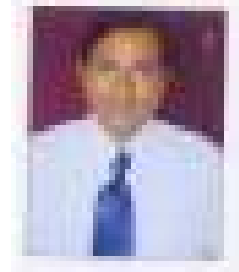
11. Research Publications:08

12.No of Books published with details : - -



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 - 24
Research – Nil
Industry – Six months
5. Area of Specialization – Environmental Engineering
6. Subject teaching at under graduate level – Environmental Engg, Introduction to Civil Engineering
7. Research guidance –
Masters - 24
Ph.D. - 10
8. Projects carried out –
 1. Project Titled Experimental Investigations on Salt Gradient Solar Pond costing 125000/- under ShramSadhana Research Promotion Scheme
 2. IEDC – 1lakh -2013-14
 3. VCRMS – NMU, Jalgaon – 48000/- 2014-16
 4. Rajiv Gandhi Science and Technology Commission: 385000/- Rs 2014-16.
9. Patents – Nil
10. Technology Transfer – Nil
11. Research Publication –
National Journals – Nil
International Journals -16
Conferences - 16
12. No. of books published with details - 1 (Everest publication Elements of Civil Engineering)



Signature

FACULTY PROFILE

1. Name - SudhakarBhikaPawar
2. Date of Birth – 5-10-1966
3. Educational Qualification – M.E. (Civil), Ph D
4. Work Experience
Teaching –30 Yrs.
Research – 0
Industry – 1.5 Yrs.
5. Area of Specialization – Civil (Construction)
- 6 Subject teaching at under graduate level – Watershed Management
At post graduate level – Nil
7. Research guidance –
8. Projects carried out – Nil
9. Patents – Nil
10. Technology Transfer – Nil
11. Research Publication – National Journals - Nil
International Journals - 3
Conferences - 03
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)
Ph.D.

4. Work Experience –

Teaching – 22 Yrs.

Industrial: Nil

5. Area of Specialization – Environmental Engineering

6. Subject teaching at under graduate level – Advanced Structural Design

Engineering Mechanics

7. Research guidance –

M Tech: 10

Ph D: Nil

8. Projects carried out – 05

9 Patents – Nil

10 Technology Transfer – Nil

11. Research Publication – National Journals - Nil

International Journals - 3

Conferences - 03

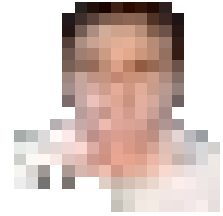
International Journal: 12

12. No. of books published with details – One (“Elements of Civil engineering and Engineering Mechanics)



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: 22 years

Industrial: Nil

Research: Nil

5. Area of Specialization – Environmental Engineering, Structural Engineering
6. Subject teaching at under graduate level –
 1. Mechanics
 2. Engineering & Solid Mechanics
 3. Introduction to Solid Mechanics
 4. Water Resource Engineering II
7. Research guidance –
M Tech: 20
Ph D: Nil
8. Projects carried out – Nil
9. Patents – Nil
10. Technology Transfer – Nil
11. Research Publication –

National Journals - Nil

International Journals - 08

Conferences - 07

12. No. of books published with details - Nil

Signature

FACULTY PROFILE



1. Name – JayantN.Kale
2. Date of Birth – 25th Dec 1965
3. Educational Qualification - B.E. (Civil Engineering)
M E (Construction Technology)
4. Work Experience –
Teaching – 12years.
Research – Nil
Industry – 15yrs
Others - Nil
5. Area of Specialization – Construction technology
6. Subject teaching at under graduate level –1. Estimating & costing
2. Building Construction Practices
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 - 04
Conferences - 03
12. No. of books published with details - Nil

Signature

FACULTY PROFILE

1. Name – Sonali B Patil
2. Date of Birth – 28-11-1979
3. Educational Qualification - B.E. Civil
M E (Environmental Engineering)
4. Work Experience –
 - Teaching – 13 Yrs.
 - Research – Nil
 - Industry – Nil
 - Others - Nil
5. Area of Specialization – Environmental Engineering
6. Subject teaching at under graduate level –
 - 1.Intoduction to Fluid Mechanics
 - 2.Hydraulics Engineering
7. Research guidance –
 - M Tech 03
 - Ph D Nil
8. Projects carried out – Nil
9. Patents – Nil
10. Technology Transfer – Nil
11. Research Publication – National Journals - Nil



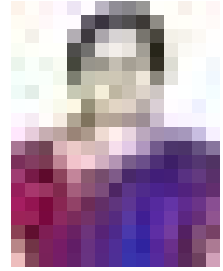
International Journals - 05

Conferences – 03

12. No. of books published with details – Nil

Signature

FACULTY PROFILE



1. Name – JyotiRaghunath Mali.
2. Date of Birth – 23-04-1971
3. Educational Qualification - M.E. Civil
4. Work Experience –
Teaching: 14 years
Industrial: Nil
Research: Nil
5. Area of Specialization – Environmental engineering
6. Subject teaching at under graduate level –
 1. Construction Material
 2. Civil Engineering Computer Aided Drawing
 3. Structural Engineering
7. Research guidance – ME - 10, Ph D Nil
8. Projects carried out – Nil
9. Patents – Nil
10. Technology Transfer – Nil
11. Research Publication –
National Journals - 10
International Journals - 06
Conferences - 06
12. No. of books published with details.

Signature

FACULTY PROFILE



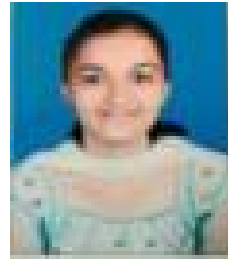
1. Name – Mr. Pankaj Ramdas Punase
2. Date of Birth – 05/08/1991
3. Educational Qualification - M.E. Structural Engineering
4. Work Experience –
Industrial: Nil
Teaching: 5 years
5. Area of Specialization – Structural Engineering
6. Subject teaching at under graduate level –
 1. Mechanics of Material
 2. Structural Design
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 - 05
Conferences - 04

Signature

FACULTY PROFILE

1. Name –VrushaliMahadik
2. Date of Birth – 29/10/1996
3. Educational Qualification - B.E. Civil Engineering,
4. Work Experience –
 - a. Industrial: Nil
 - b. Teaching: 2 years
5. Area of Specialization –
6. Subject teaching at under graduate level –
 - i. Energy Science &Engineering
 - ii. Transportation Engineering
7. Research guidance –
 - a. Masters - Nil
 - b. Ph.D. - Nil
8. Projects carried out –
Nil
9. Patents – Nil
10. Technology Transfer – Nil
11. Research Publication –
 - a. National Journals – 00
 - b. International Journals - 00
 - c. Conferences – 00



Signature

FACULTY PROFILE

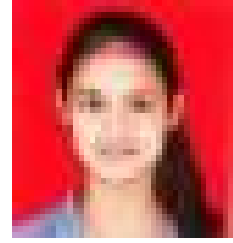


1. Name : Miss.Kavita ChandrasinghJadhav
2. Date Of Birth : 10/02/94
3. Educational Qualification : B.E (Civil)
M..E (Structural engg.)
4. Work Experience
 - Teaching : 07 Month
 - Research : Nil
 - Industry : Nil
5. Area of Specialization : Civil
6. Subject Taught at P.G. level : Nil
Subject Taught at U.G. level : Nil
7. Research guidance at
 - Masters's level : Nil
 - Ph.D. level : Nil

No. of papers published in :Nil
International Journal : Nil
National Conference 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 : **GauriArvindKale**
2. Date Of Birth : 16/03/2000
3. Educational Qualification : B.E (Civil)
4. Work Experience
 - Teaching : 07 Month
 - Research : Nil
 - Industry : Nil
5. Area of Specialization : Civil
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 International Journal : Nil
National Conference : 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:Ganesh Ahire
2. Date Of Birth : 11/02/98
3. Educational Qualification : B.E (Civil)
4. Work Experience
 - Teaching : 07 Month
 - Research : Nil
 - Industry : Nil
5. Area of Specialization : Civil
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 : NilNo. of papers published in :Nil
International Journal : Nil
National Conference
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 : DipikaMali**
2. Date Of Birth : 07/10/95
3. Educational Qualification : B.E (Civil)
M.E (Structure)
4. Work Experience
 - Teaching : 07 Month
 - Research : Nil
 - Industry : Nil
5. Area of Specialization : Civil
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 : Nil
 - International Journal : Nil
 - National Conference
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 : **KHATIJASHAIKH**
2. Date Of Birth : 01/08/97
3. Educational Qualification : B.E (Civil)
4. Work Experience
 - Teaching : 07 Month
 - Research : Nil
 - Industry : Nil
5. Area of Specialization : Civil
6. Subject Taught at P.G. level : Nil
Subject Taught at U.G. : Nil
7. Research guidance at
 - Masters's level : Nil
 - Ph.D. level : Nil
- No. of papers published in : Nil
- International Journal : Nil
National Conference
8. Projects carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publication : NIL
12. No. of books published with details : Nil

Signature

COMPUTER ENGINEERING DEPARTMENT FACULTY PROFILE

1. Name : Dr. Girish Kumar Patnaik
2. Date of Birth : October 9th, 1969
3. Educational Qualification : Ph. D.
M.E. (Computer Science & Engg.)
B.E. (Computer Science & Engg.)
4. Work Experience :
 - Teaching : 30 Years 06 Months
 - Research : Nil
 - Industry : Nil
5. Area of Specialization : Computer Engineering
6. Subject Taught at P.G. level : NIL
7. Subject Taught at U.G. level : Advanced Computer Network, Compiler Design
7. Research guidance at
 - Masters's level : 07
 - Ph.D. level : 2 years
- No. of papers published in
 - National Journals : 01
 - International Journals : 27
 - National Conferences : NIL
 - International Conferences : 07
8. Projects carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publications : 28
12. No. of books published with details : NIL



Signature

COMPUTER ENGINEERING DEPARTMENT FACULTY PROFILE

1. Name : Dr. KrishnakantPrabhudasAdhiya.
2. Date Of Birth : 07-12-1968
3. Educational Qualification : Ph.D. (Computer Engineering)
M.E. (Computer Science. &Engg.)
B.E. (Computer Engineering)
4. Work Experience :
 - Teaching : 28 Years 05 Months
 - Research : Nil
 - Industry : Nil
5. Area of Specialization : Computer Engineering
6. Subject Taught at P.G. level : Distributed Systems, Parallel Computing
Subject Taught at U.G. level :Advanced Unix programming, 8085
Microprocessor, Computer Fundamentals,
Programming lab-I , Digital System Design,
Computer Peripherals & Interfacing , Computer
Organization, Microprocessor-I, Microprocessor-II,
Operating System, Advanced Computer
Architecture , Embedded System, Microprocessor
and Microcontroller, Programming Lab-II,
Computer Organization and Architecture
7. Research guidance at
 - Master's level : 12 Years
 - Ph.D. level : 02 YearsNo. of papers published in
 - National Journals : 01
 - International Journals : 40
 - National Conferences : 28
 - International Conferences : 08
8. Projects carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publications : 41
12. No. of books published with details : 06 (1. Software Engineering,
2. Computer Organization
3. Computer Network
4. Embedded Systems
5. Microprocessor-III
6. Advanced Computer Architecture)



Signature

FACULTY PROFILE



1. NAME : **Dr. S. R. Suralkar**
2. Date Of Birth : 28/10/1966
3. Educational Qualification : BE (Electronics)
ME (Control & Instru.)
Ph.D
4. Work Experience (Years) :
• Teaching : 29 Yrs
• Research : 09 Yrs.
• Industry : -
• Others : -
5. Area Of Specializations : Image processing and pattern recognition.
6. Subject Teaching At
• Under graduation Level : Electronics Measurement, Digital Tech. and App.
• Post Graduate Level : Advanced Instrumentation System, IP&PR
7. Research Guidance :
❖ Master's : 12
❖ Ph.D. : -
• No. of paper published in :-
❖ National Journals : --
❖ International Journals : 26
❖ Conference : 17
8. Projects Carried Out : 01
9. Patents : -
10. Technology Transfer : -
11. Research Publications : 26
12. No. of Books Published -
With Details : -

Signature

COMPUTER ENGINEERING DEPARTMENT FACULTY PROFILE

1. Name : Dr. ManojEknathPatil
2. Date Of Birth : 06/10/1975
3. Educational Qualification : M.Tech. (Computer Science & Engineering)
B. E. (Computer Engineering.)
4. Work Experience :
 - Teaching : 17 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,
Embedded System, Mobile Computing, Cyber
Law and Ethics, Finance and Accounting
7. Research guidance at
 - Masters's level : 19
 - Ph.D. level : Nil

No. of papers published in

 - National Journals : 02
 - International Journals : 11
 - National Conferences : 07
 - International Conferences : 08
8. Projects carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publications : 28
12. No. of books published with details : 02 (Database Management Systems,
Software Metrics and Quality Assurance)



Signature

COMPUTER ENGINEERING DEPARTMENT
FACULTY PROFILE

1. Name : SandipShankarraoPatil
2. Date of Birth : 20/01/1980
3. Educational Qualification : M. Tech. Computer Science & Engineering
: B.E. Computer Engineering
: Ph. D. (Pursuing) KBCNMU
4. Work Experience :
 - Teaching : 18Years
 - Research : 02 Years
 - Industry : Nil
5. Area of Specialization : Natural Language Processing
6. Subject Taught at P.G. level : Advanced Software Engineering, Soft Computing
Subject Taught at U.G. level : Artificial Intelligence, Computer Networks, Advanced Computer Architecture, Data Structures and Algorithms
7. Research guidance at
 - Masters's level : 20 Students
 - Ph.D. level : NilNo. of papers published in
 - National Journals : Nil
 - International Journals : 40
 - National Conferences : 20
 - International Conferences : 12
8. Projects carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publications : 40
12. No. of books published with details : 06 (System Programming, Artificial Intelligence & Quality Advanced Structures) Neural Networks, Software Matrices & Assurance, Computer Programming, Computer Architecture, Data Structures)



Signature

**COMPUTER ENGINEERING DEPARTMENT
FACULTY PROFILE**

1. Name : AshishTryambakBhole
2. Date Of Birth : 12/09/1976
3. Educational Qualification : B.E.(Computer),
M. Tech. (CSE),
Ph.D. (CSE) (Pursuing)
4. Work Experience :
 - Teaching : 17 Years
 - Research : 10 Years
 - Industry : Nil
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 : Software Engineering, Object Oriented Modeling
& Design, Mobile Computing, Computer Networks, Programming for Problem Solving Advanced, Computer Networks, Software Metrics & Quality, Assurance, Microprocessor-III, Internet Security, E-Commerce, Advanced Computer Architecture,
Microprocessor-II.
7. Research guidance at
 - Masters's level : 18
 - Ph.D. level : NilNo. of papers published in Google: Citation index 96, h-index: 4, i10-index:2
 - National Journals : 01
 - International Journals : 25
 - National Conferences : 11
 - International Conferences : 14
8. Projects carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publications : 26
12. No. of books published with details : Nil



Signature

COMPUTER ENGINEERING DEPARTMENT FACULTY PROFILE

1. Name : ShitalAbhimanyuPatil
2. Date Of Birth : 12/10/1982
3. Educational Qualification : ME Comp.Science&Engg.
4. Work Experience :
 - Teaching : 14 Years
 - Research : Nil
 - Industry : Nil
5. Area of Specialization : ----
6. Subject Taught at P.G. level : Nil
Subject Taught at U.G. level : System Programming,
Advanced Computer Architecture,
Computer Graphics,
Data Structure & files,
Discrete structure and graph theory,
Database Management System,
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 : 02
 - Ph.D. level : NilNo. of papers published in
 - National Journals : Nil
 - International Journals : 00
 - National Conferences : 02
 - 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. Nitin Pundlik Jagtap
2. Date of Birth : 31/05/80
3. Educational Qualification : **M.E. (CSE), B.E. (I T)**
4. Work Experience : Teaching : 13 years 04 Months
 - Research : Nil
 - Industry : 1 year 5 month.
5. Area Specialization : Computer Science and Engg.
6. Subject Taught at P.G. level : Nil
- Subject Taught at U.G. level : Cloud Computing, Enterprise Resource Planning, 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, Discrete Structure & Graph Theory. Computer Graphics and Multimedia.
7. Research guidance at
 - Masters's level : Nil
 - Ph.D. level: Nil
- No. Papers published in
 - National Journals: 04 - International Journal: 09 - National Conferences: 02
 - International Conferences: 02
8. Projects carried out: 01
9. Patents: Nil
10. Technology Transfer: Nil
11. Research Publications: 17
12. No. of Books published with details: 02
 - 01) Implementation of Data watcher for Data Leakage Detection system Lambert Publication, Germany
 - 02) Data ware house and Mining Prakash Publication

Signature

**COMPUTER ENGINEERING DEPARTMENT
FACULTY PROFILE**



1. Name : Dr.DNYANESHWARK.KIRANGE
2. Date Of Birth : 27/06/79
3. Educational Qualification : P.hD
M.Tech (Computer Science & Engineering)
B.E (Computer Engineering & Engineering)
4. Work Experience :
 - Teaching : 20 Years
 - 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 : , Software Metrics and Quality Assurance, Object Oriented Modeling & Design, Software Engineering, Data Warehouse and Data mining, Principle of Management Information System, Software Engineering & Project Management. Product Design Engineering, Basic Human Rights.
7. Research guidance at
 - Masters's level : nil
 - Ph.D. level : NilNo. of papers published in
 - National Journals : nil
 - International Journals : 21
 - National Conferences :01
 - International Conferences : 04
8. Projects carried out : Nil
9. Patents : 05
10. Technology Transfer : Nil
11. Research publications : Nil
12. No. of books published with details : Nil

Signature

COMPUTER ENGINEERING DEPARTMENT FACULTY PROFILE

1. Name :Miss Priti R.Sharma
2. Date Of Birth : 18/06/82
3. Educational Qualification : M.E. (Computer Science & Engineering)
B.E. Computer Engineering
4. Work Experience :
 - Teaching : 11 Years
 - 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 : ,Discrete structure & Files, Microprocessor -1,
Theory of computer Science,Digital System &
Microprocessor, Advanced Development Tool
Laboratory, Computer
Graphics,OperatingSystem,Software
Engineering ,Data Warehouse & Mining,
Advanced Computer Architecture, Embedded
System, Computer Programming.
7. Research guidance at
 - Masters's level : 01
 - Ph.D. level : Nil

No. of papers published in

 - National Journals : Nil
 - International Journals : 01
 - 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: Mr. S. H. Rajput
2. Date of Birth: 26/10/1984
3. Educational Qualification: M.E. (CSE), B.E. (Computer Engg.)
4. Work Experience: Teaching: 13 Years
- 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, Formal Languages and Automata Theory, Software Metrics and Quality Assurance, Microprocessor and Microcontroller interfacing, Data Communication, E-commerce and Object Oriented Programming.
7. Research guidance at
- Masters's level : Nil
 - Ph.D. level : Nil
- No. papers published in
- National Journals : Nil
 - International Journals : 04
 - National Conferences : 04
 - International Conferences : 01
8. Projects carried out: Nil
9. Patents: Nil
10. Technology Transfer: Nil
11. Research publications: 09
12. No. books published with details: Nil

Signature

COMPUTER ENGINEERING DEPARTMENT FACULTY PROFILE

1. Name : Dinesh DagaduPuri
2. Date Of Birth : 15/04/1982
3. Educational Qualification : M.Tech in Computer Engg.
4. Work Experience :
 - Teaching : 15 Years and 6 Months
 - Research : Nil
 - Industry : NIL
5. Area of Specialization : Computer science and Engineering
6. Subject Taught at P.G. level : Software Architecture
Parallel Computing
Distributed system
Subject Taught at P.G. level : Data Communication, Computer network,
Distributed System, Mobile computing,
Management and information system, System
operation and Maintenance, Discrete structure,
Computer graphics,Accounts and Finance
Management,
7. Research guidance at
 - Masters's level : 04
 - Ph.D. level : Nil

No. of papers published in

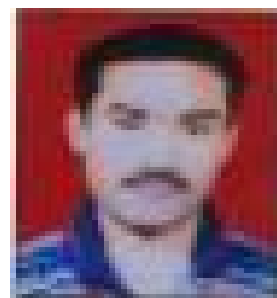
 - National Journals : 01
 - International Journals : 07
 - National Conferences : 02
 - International Conferences : 02
8. Projects carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publications : Nil
12. No. of books published with details : 01



Signature

COMPUTER ENGINEERING DEPARTMENT FACULTY PROFILE

1. Name : Akash Dnyandeo Waghmare
2. Date Of Birth : 08/06/1982
3. Educational Qualification : M.E. in CSE,
B.E. in CSE,Pursuing Ph.D.
in CSE.
4. Work Experience :
 - Teaching : 14 Years 3 Months
 - Research : Nil
 - Industry : Nil
5. Area of Specialization : Computer Science & Engineering
6. Subject Taught at P.G. level : Advanced Database Management System
Subject Taught at U.G. level : Database Management System, Discrete Mathematics, Object Oriented Modeling and Design, Advanced Computer Architecture, Computer Network,Data Communication, Advanced Database Management system, Programming
Programming Paradigm, Information Retrieval
7. Research guidance at
 - Masters's level : 05
 - Ph.D. level : NilNo. of papers published in
 - National Journals : Nil
 - International Journals : 05
 - National Conferences : 07
 - International Conferences : 06
8. Projects carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publications : 02
12. No. of books published with details : Nil



Signature

**COMPUTER ENGINEERING DEPARTMENT
FACULTY PROFILE**



1. Name : Dhanashree S. Tayade
2. Date Of Birth : 19-10-1985
3. Educational Qualification : M.E. (Computer Science &Engg.)
B.E. (Computer Engineering)
4. Work Experience :
- Teaching : 7.5 years
 - Research : Nil
 - Industry : Nil
5. Area of Specialization : Machine Learning
6. Subject Taught at P.G. level : Nil
- Subject Taught at U.G. level : Advanced Unix programming(Th+Pr),
Data Warehousing and Mining(Th+Pr),
Introduction to C Programming(Th+Pr),
Computer Programming Lab(Pr),
Linux Lab(Pr),
Application Development Lab(Pr),
Web Programming Lab(Pr),
Discrete Mathematics(Pr)
7. Research guidance at
- Masters's level : 02
 - Ph.D. level : Nil
8. No. of papers published in
- National Journal : 00
 - International Journal : 05
 - National Conferences : 01
 - International Conferences : 02
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

**COMPUTER ENGINEERING DEPARTMENT
FACULTY PROFILE**



1. Name : PravinKeshavPatil
2. Date Of Birth : 31-08-1991
3. Educational Qualification : Ph.D (Pursuing)
M.E. (Computer Computer Science and Engg.)
: B.E. (Computer Engineering)
4. Work Experience
 - Teaching : 6 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 :AI, NN, COA (TH + PR), OB (TH), MIS (TH),
MPMC (TH +PR), MPMCI (TH +PR), CO(TH),
DSM (TH + PR), E Commerce, ADL(TH+PR),
ES(PR), CNS(PR)
7. Research guidance at
 - Masters's level : Nil
 - Ph.D. level : Nil
No. of papers published in
 - International Journals : 07
 - National Conference : NIL
8. Projects carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publications : 07
12. No. of books published with details : Nil

Signature

FACULTY PROFILE



1. NAME : **Amol C. Wani**
2. Date Of Birth : 30/07/1976
3. Educational Qualification : B.E.(Electronics),
M.E. (Electronics)
4. Work Experience (Years) :
- Teaching : 19Yrs
 - Research : -
 - Industry : -
 - Others : -
5. Area Of Specializations : Basic Electronics, Circuit Design and Communication.
6. Subject Teaching At
- Under graduation Level : SSDC I, SSDC II, EEEE, ECD etc.
 - Post Graduate Level : Microelectronics Circuit Design
7. Research Guidance :
- ❖ Master's : 03
 - ❖ Ph.D. : -
- No. of paper published in :-
- ❖ National Journals : -
 - ❖ International Journals : 04
 - ❖ Conference : 08
8. Projects Carried Out : -
9. Patents : -
10. Technology Transfer : -
11. Research Publications : 04
12. No. Of Books Published 02
- Elements of Electrical Electronics Engineering.
With Details : Prakash Publication
Electronics Circuit Design – Prakash
Publication

Signature

FACULTY PROFILE

1. NAME : **Dr. Pankaj H. Zope**
2. Date Of Birth : 24/06/1975
3. Educational Qualification : Ph.D (E&TC)
ME (Digital Electronics),
B.E(Indust. Electronics),
C-DAC
4. Work Experience (Years) :
- Teaching : 19
 - Research :
 - Industry : 01
 - Others : -
5. Area Of Specializations : Electronics and Nano Electronics and Nano Technology
- 6 Subject Teaching At
- Under graduation Level : Microprocessor and Microcontroller, Embedded System
 - Post Graduate Level : VLSI-D,ADSP
7. Research Guidance :
- ❖ Master's : - 15
 - ❖ Ph.D. : -
- No. of paper published in :-
- ❖ National Journals : -
 - ❖ International Journals : 40
 - ❖ Conference : 24
8. Projects Carried Out : 06
9. Patents : -
10. Technology Transfer : -
11. Research Publications : 40
12. No. Of Books Published With Details : 01



Signature

FACULTY PROFILE



1. NAME : Surendra P.Ramteke.
2. Date of Birth : 31.03.1979
3. Educational Qualification: M.E (Digital Electronics)
BE E&TC, PhD (Pursuing)
4. Work Experience (Years) :
 - Teaching : 16Yrs
 - Research : -
 - Industry : -
 - Others : -
5. Area Of Specializations : Digital Image processing, Pattern Recognition
- 6 Subjects Teaching At
 - Under graduation Level : Radiation&Microwave Techniques, Analog Communication, Digital Electronics, digital Image Processing , Microprocessor, Communication System I
 - Post Graduate Level: Advanced Digital Communication, Digital System Design
7. Research Guidance :
 - ❖ Master's : 09
 - ❖ Ph.D. : -No. of paper published in :-
 - ❖ National Journals : -
 - ❖ International Journals : 10
 - ❖ Conference : 13
8. Projects Carried Out : 01
9. Patents : -
10. Technology Transfer : -
11. Research Publications : 10
12. No. Of Books Published - 01
With Details :

Signature

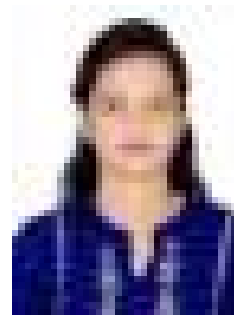
FACULTY PROFILE



1. NAME :PRIYANKA VINOD MEDHE
2. Date of Birth :06/04/92
3. Educational Qualification: M.E (Computer)
BE Computer,
4. Work Experience (Years) :
 - Teaching : 07 Months
 - Research : -
 - Industry : -
 - Others : -
5. Area Of Specializations : Computer Engineering
- 6 Subjects Teaching At
 - Under graduation Level :
 - 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

COMPUTER ENGINEERING DEPARTMENT
FACULTY PROFILE



1. **Name: Divya Atulchandra Wani**
2. Date Of Birth :
3. Educational Qualification : ME (pursuing)
BE(Computer Engineering)
4. Work Experience :
 - Teaching : 10 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 : DAA(TH+PR),ECOM(TH),PPS(PR),ASDM(PR)
7. Research guidance at
 - Masters's level : Nil
 - Ph.D. level : Nil
No. of papers published in
 - International Journals : Nil
 - National Conference : 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. POOJA MUKUNDRAO KHANDAR

2. Date Of Birth : 14/04/93

3. Educational Qualification :BE(Computer science Engineering)
M.E(Computer Science)
:

4. Work Experience
- Teaching :01 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 :

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

No. of papers published in

International Journals : 03
National Conference : 01

8. Projects carried out :Nil

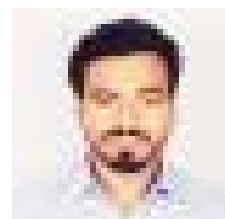
9. Patents : Nil

10. Technology Transfer : Nil
11. Research publications : Nil
12. No. of books published with details : Nil



Signature

FACULTY PROFILE



1. Name: **Milind Rahul Birhade**
2. Date Of Birth : 30thJuly1995
3. Educational Qualification : BE(Computer Engineering)
4. Work Experience :
 - Teaching :10 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 :
7. Research guidance at
 - Masters's level : Nil
 - Ph.D. level : Nil
- No. of papers published in
 - International Journals : Nil
 - National Conference : 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: Diksha Suryawanshi

2. Date Of Birth : 29/10/2000
3. Educational Qualification : BE(Computer Engineering)
4. Work Experience :
- Teaching : 07 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 :
7. Research guidance at
- Masters's level : Nil
 - Ph.D. level : Nil
- No. of papers published in
- International Journals : Nil
 - National Conference : 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

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FACULTY PROFILE



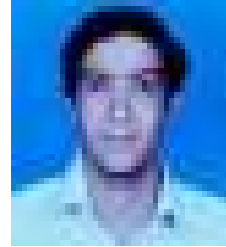
1. Name: **Krunal Chandrashekhar Pawar**
2. Date Of Birth : 01/10/1991
3. Educational Qualification: BE(Computer Engineering)
4. Work Experience :
 - Teaching : 07 Month
 - Research : Nil
 - Industry : Nil
5. Area of Specialization : Computer Engineering
6. Subject Taught at P.G. level : Nil
Subject Taught at U.G. level : Nil
7. Research guidance at
 - Masters's level : Nil
 - Ph.D. level : Nil

No. of papers published in

 - International Journals : Nil
 - National Conference : 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: **Ramkrishna Hari Patil**
2. Date Of Birth :
3. Educational Qualification : BE(Computer Engineering)
:M.E (CSE)
4. Work Experience
 - Teaching : 04 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 : Nil
7. Research guidance at ,
 - Masters's level : Nil
 - Ph.D. level : Nil

No. of papers published in : nil

International Journals : 02

National Conference : 05
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 : Utkarsha Vijay Mahajan**

2. Date Of Birth : 18 March 1994

3. Educational Qualification : B.E (IT)

4. Work Experience
 - Teaching : 07 Month
 - Research : Nil
 - Industry : Nil

5. Area of Specialization : Information Technology

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 : Nil

International Journals : Nil
National Conference :

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 : Pratiksha Sudhakar Patil
2. Date Of Birth : 23 Nov, 1997
3. Educational Qualification : B.E(Computer Engineering)
4. Work Experience :
 - Teaching : 4Months
 - Research : Nil
 - Industry : Nil
5. Area of Specialization : Computer Engineering
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 : Nil
- International Journals : Nil
- National Conference :
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 : **PATHAN BILALKHAN R.**
2. Date Of Birth : 13/04/1992.
3. Educational Qualification : B.E (IT)
M.tech (CSE)
4. Work Experience
 - Teaching : 03Month
 - Research : Nil
 - Industry : Nil
5. Area of Specialization : Information Tenchology
6. Subject Taught at P.G. level : Nil
Subject Taught at U.G. level : Graphics,Software ,UnixProgramming
OrientedModeling&Design, Linux Lab
ProjectManagement,DistributedSystems
Cyber Security
7. Research guidance at
 - Masters's level : Nil
 - Ph.D. level : Nil

No. of papers published in :05

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

Signature

FACULTY PROFILE

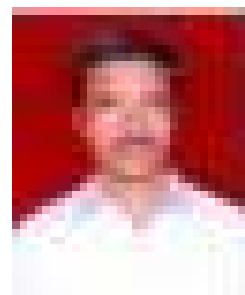
1. Name : **CHETAN V. CHAUDHARI**
 2. Date Of Birth 13/05/80 :
 3. Educational Qualification : M.Tech(Computer)
B.Tech(Computer)
P.hd Pursuing
 4. Work Experience
- Teaching : 10years
- Research : Nil
- Industry : Nil
 5. Area of Specialization : Computer Engineering
 6. Subject Taught at P.G. level : --
Subject Taught at U.G. level : --
 7. Research guidance at
- Masters's level : Nil
- Ph.D. level : Nil
- No. of papers published in :05
- | | |
|------------------------|------|
| International Journals | :11 |
| National Conference | : 05 |
8. Projects carried out :--
 9. Patents : Nil
 10. Technology Transfer : Nil
 11. Research publications : NIL
 12. No. of books published with details : 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 : 27Years
 - b. Research : Nil
 - c. Industry : Nil
 - d. Other : Nil
5. Area of Specialization: Electrical Power System
Subjects teaching at UG level: CS, PSDP, IEE
Subjects teaching at PG level: PSD, PSOT
6. Research's Guidance Master's : 06
 PhD : Nil
7. No. of paper published in
 - a. National journal : Nil
 - b. International journal : 07
 - c. International Conference : 07
 - d. National Conference : 10
8. Project carried out : 01
9. Patents : Nil
10. Technology Transfer: Nil
11. Research publication: 24
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 : 22Years
 - b Research : Nil
 - c Industry : 03 Year
 - d Other
5. Area of Specialization : Electrical Power System
Subjects teaching at UG level : EM/C-II, PSS, EAC
Subjects teaching at PG level : PSD, HVPT
6. Research's Guidance Master's : 05
PhD : Nil
7. No. of paper published in
 - a. National journal : Nil
 - b. International journal : 19
 - c. International Conference : 04
 - d. National Conference : 01
8. Project carried out : 01(MODROBS)
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publication : 19
12. No. of book published with detail : 01, Element of Electrical Engineering
Vrinda Publication, Jalgaon.



Signature

PROFILE OF FACULTY



1. Name : SuhasManoharShembekar
2. Date of Birth: 31/08 /1976
3. Educational Qualification: BE Electrical, ME (EPS)
4. Work Experienced:
 - a. Teaching : 22Years
 - b. Research : Nil
 - c. Industry : Nil
 - d. Other : Nil
5. Area of Specialization : Electrical Power System
Subjects teaching at UG : PS-II, PSOC, SGP, EIED
Subjects teaching at PG level : PSMC,FACTS&PQ
6. Research's Guidance Master's : 05
 PhD : Nil
7. No .of paper published in
 - a. National journal : 00
 - b. Inter national journal : 16
 - c. International Conference: 08
 - d. National Conference : 01
8. Project carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publication : 25
12. No. of book published with detail: Nil

Signature

PROFILE OF FACULTY

1. Name : AbhilashaNareshSalunkhe
2. Date of Birth: 04/10/1993
3. Educational Qualification: BE Electrical, ME (EPS)
4. Work Experienced:
- a. Teaching : 5Years
 - b. Research : Nil
 - c. Industry : Nil
 - d. Other : Nil
5. Area of Specialization : Electrical Power System
- Subjects teaching at UG : MPMC, CP-MATLAB, BEEE, IEE, EM LAB, PS-I LAB
- Subjects teaching at PG level : Nil
6. Research's Guidance Master's : Nil
- PhD : Nil
7. No .of paper published in
- a. National journal : 00
 - b. Inter national journal : 03
 - c. Inter national Conference : 00
 - d. National Conference : 00
8. Project carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publication : 3
12. No. of book published with detail: Nil



Signature

Faculty Profile



1. Name : Mahima A Patil
2. Date of Birth: 30/08/2000
3. Educational Qualification: BE Electrical,
4. Work Experienced:
 - a. Teaching : 01 year
 - b. Research : Nil
 - c. Industry : Nil
 - d. Other : Nil
5. Area of Specialization : Electrical Power System
Subjects teaching at UG : IOM, EM/C-I LAB
Subjects teaching at PG level : Nil
6. Research's Guidance Master's : Nil
PhD : Nil
7. No .of paper published in
 - a. National journal : 00
 - b. Inter national journal : 00
 - c. International Conference: 00
 - d. National Conference : 00
8. Project carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publication : 0
12. No. of book published with detail: Nil

Signature

1. Name : **Vijay Abaji Shinde**
 2. Date of Birth: 25/09/89
 3. Educational Qualification: BE Electrical, M.Tech Power System
 4. Work Experienced:
 - a. Teaching : 01 year
 - b. Research : Nil
 - c. Industry : Nil
 - d. Other : Nil
 5. Area of Specialization : Electrical Power System
- Subjects teaching at UG :
- Subjects teaching at PG level :
6. Research's Guidance

Master's	: Nil
PhD	: Nil
 7. No .of paper published in
 - a. National journal : 00
 - b. Inter national journal : 00
 - c. International Conference: 00
 - d. National Conference : 00
 8. Project carried out : Nil
 9. Patents : Nil
 10. Technology Transfer : Nil
 11. Research publication : 0
 12. No. of book published with detail: Nil



Signature

Faculty Profile



1. Name : Harshal Arvind Patil
2. Date of Birth: 26/03/1999
3. Educational Qualification: BE Electrical,
4. Work Experienced:
 - a. Teaching : 01 year
 - b. Research : Nil
 - c. Industry : Nil
 - d. Other : Nil
5. Area of Specialization : Electrical Power System
Subjects teaching at UG :
Subjects teaching at PG level :
6. Research's Guidance Master's : Nil
PhD : Nil
7. No. of paper published in
 - a. National journal : 00
 - b. International journal : 00
 - c. International Conference: 00
 - d. National Conference : 00
8. Project carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publication : 0
12. No. of book published with detail: Nil

Signature

Faculty Profile



1. Name : Harshada M Rajane
2. Date of Birth: 24/09/2000
3. Educational Qualification: BE Electrical,
4. Work Experienced:
 - a. Teaching : 8 Months
 - b. Research : Nil
 - c. Industry : Nil
 - d. Other : Nil
5. Area of Specialization : Electrical
 - Subjects teaching at UG : --
 - Subjects teaching at PG level : --
6. Research's Guidance

Master's	: Nil
PhD	: Nil
7. No .of paper published in
 - a. National journal : 00
 - b. Inter national journal : 00
 - c. International Conference: 00
 - d. National Conference : 00
8. Project carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publication : 0
12. No. of book published with detail: Nil

Signature

FACULTY PROFILE

1. NAME : Dr. M. P. Deshmukh
2. Date Of Birth : 20/06/1966.
3. Educational Qualification : BE (Electronics),
ME (Control & Instru.)
Ph.D (E&TC)
4. Work Experience (Years) :
• Teaching : 30Yrs
• Research : -
• Industry : -
• Others : Patent Filed
5. Area Of Specializations : E&TC
6. Subject Teaching At
• Under graduation Level : AE, ECD, EEE, ECM, SDC, ECA
• Post Graduate Level : -
7. Research Guidance :
❖ Master's : 04
❖ Ph.D. : -
• No. of paper published in :-
❖ National Journals : -
❖ International Journals : 5
❖ Conference : 3
8. Projects Carried Out : -
9. Patents : One filed
10. Technology Transfer : -
11. Research Publications : 05
12. No. Of Books Published -
With Details : -



Signature

FACULTY PROFILE



1. NAME : Dr V. M. DESHMUKH
2. Date Of Birth : 17/06/1965
3. Educational Qualification : B.E.(Electronics),
M.E.(Control Systems)
Ph.D(Electronics)
4. Work Experience (Years) :
 - Teaching : - 30Yrs
 - Research : -
 - Industry : -
 - Others : - 7 Yrs (Visiting lecturer)
5. Area Of Specializations : Electromagnetic & signal system, Networks and Lines
6. Subject Teaching At
 - a. Under graduation Level : EME,NAS, EEE, SNS
 - b. Post Graduate Level :
7. Research Guidance :
 - ❖ Master's : 04
 - ❖ Ph.D. : -
 - No. of paper published in :-
 - ❖ National Journals : - 03
 - ❖ International Journals : - 09
 - ❖ Conference : - 18
8. Projects Carried Out : -
9. Patents : -
10. Technology Transfer : -
11. Research Publications : 03
12. No. Of Books Published -
With Details :

Signature

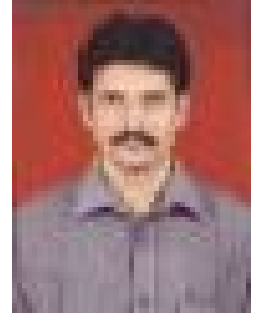
FACULTY PROFILE



1. NAME : Nafees Ahmad M. Kazi
2. Date Of Birth : 22/06/1972
3. Educational Qualification : B.E(Electronics),
ME (Electronics)
Ph.D (Pursuing)
4. Work Experience (Years) :
- Teaching : 22Yrs
 - Research : -
 - Industry : 3Yrs
 - Others : -
5. Area Of Specializations : T.V. Engg, Computer networks
6. Subject Teaching At
- Under graduation Level : CCN, TNM
- Post Graduate Level : Advanced Computer Network
7. Research Guidance :
- ❖ Master's : 05
 - ❖ 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 - 03 i) CCN ii) AICA
With Details :

Signature

FACULTY PROFILE



1. NAME : Atul H. Karode
2. Date Of Birth : 01/06/1976
- 3 Educational Qualification : M.E (Digital Electronics),
4. Work Experience (Years) :
 - Teaching : 19 Yrs
 - Research : -
 - Industry : 2Yrs
 - Others : -
5. Area Of Specializations : - Image processing and pattern rec.
- 6 Subject Teaching At
 - Under graduation Level : Digital Electronics& Application, CDIT , BMI , EM, Industrial Management.FOC
 - Post Graduate Level : Advanced Instrumentation System, IP&PR, Advance digital communication (ADC)
7. Research Guidance :
 - ❖ Master's : 14
 - ❖ Ph.D. : -
 - No. of paper published in :-
 - ❖ National Journals : -
 - ❖ International Journals : 15
 - ❖ Conference : 10
8. Projects Carried Out : -
9. Patents : -
10. Technology Transfer : -
11. Research Publications : 15
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 :
M.E(Digital Electronics.)
4. Work Experience (Years) :
- Teaching : 14.5 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,PE
, EEEE , DSP
- Post Graduate Level : -
7. Research Guidance :
- ❖ Master's : -
 - ❖ Ph.D. : -
- No. of paper published in :-
- ❖ National Journals : -
 - ❖ International Journals : 03
 - ❖ Conference : 08
8. Projects Carried Out : -
9. Patents : -
- 10.Technology Transfer : -
11. Research Publications : -
12. No. Of Books Published
With Details :

Signature

DEPARTMENT OF BUSINESS ADMINISTRATION (M.B.A)

FACULTY PROFILE



1. Name : Dr. Vishal S. Rana
2. Date of Birth: 15/12/1980
3. Educational Qualification: M.Com, M.B.A (Marketing), Ph.D (Mgmt Science)
4. Work Experienced:
 1. Teaching : 14 Years 06 Months
 2. Research : Nil
 3. Industry : 0.7 Months
 4. Other : Nil
5. Area of Specialization: Marketing
6. Subjects teaching at UG level: NIL

Subjects teaching at PG level: Organizational Behavior-I & II, Global Marketing Management, Retail Management & Consumer Behavior, Cases in Marketing, Marketing Management.
7. Research's Guidance

Master's	: Nil
Ph.D	: Nil
- No. Of paper published in

a. National journal	: 03
b. International journal	: 18
c. National Conference	: 14
d. International Conference:	05
8. Project carried out : Nil
9. Patents : Nil
10. Technology Transfer : Nil
11. Research publication : 18
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: 16/02/1978
3. Educational Qualification: M.B.A (HRM), M.P.M, B.com
4. Work Experienced:



1. Teaching : 9 Yrs & 2 Months
2. Research : Nil
3. Industry : 2 Yrs
4. Other : 4 yrs Teaching as Lecturer in Engg.

5. Area of Specialization : HRM

6. Subjects teaching at UG level: Industrial Mgmt (E&TC Engg.), Industrial Org. & Mgmt (Electrical Engg.), Industrial Mgmt & Economics (Comp/IT Engg.)

Subjects teaching at PG level: Management Science, Business Research Methods, Mgmt. Information System & ERP Corporate Business Scenario, E-commerce, Information Technology for Managers, Industrial Relation & Trade Union, HR Legislations, Labour Welfare & Administration & Cases in HRM, Business & Government.

7 Research's Guidance Master's : 31 (MBA)

Ph.D : Nil

No. Of paper published in

a. National Journal	:	02
b. International Journal	:	02
c. National Conference	:	07
d. International Conference	:	04

12. Project carried out : Nil

13. Patents : Nil

14. Technology Transfer : Nil

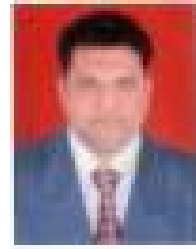
15. Research publication : 15

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 : B.Com, M.Com, M.B.A (Fin.), Ph.D Pursuing
4. Work Experienced:
- 1. Teaching : 09 Years
 - 2. Research : Nil
 - 3. Industry : 3 Years 4 Months
 - 4. Other : Nil
5. Area of Specialization : Finance & Marketing
6. Subjects teaching at UG level: Nil

Subjects teaching at PG level: Entrepreneurship & Project Management, Global Economic Scenario, Managerial Economics, Marketing Research & Business Analytics, Investment & Portfolio Management, Marketing Management, Case Studies in Financial Management, Product & Brand Management, Practical Aspect of Business.

- 7 Research's Guidance
- | | |
|----------|------------|
| Master's | : 36 (MBA) |
| Ph.D | : Nil |
- No. Of paper published in
- | | |
|--------------------------|------|
| a. National journal | : 04 |
| b. International journal | : 17 |
| c. Conference | : 05 |
16. Project carried out : Nil
17. Patents : Nil
18. Technology Transfer : Nil
19. Research publication : 21
12. No. of book published with detail : Nil

Signature

DEPARTMENT OF BUSINESS ADMINISTRATION (M.B.A)
FACULTY PROFILE

1. Name : Dr.Richa A.Modiyani
2. Date of Birth: 30/04/1987
3. Educational Qualification: B.B.S, M.B.A (Fin), PhD (Mgmt)
4. Work Experienced:



1. Teaching : 11Years & 6 Months
2. Research : Phd & VCRMS
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, Business Accounting, Managerial Economics, Management Accounting, Strategic Management, Management Practices, Case Studies in Finance, Consumer behavior & service marketing, Strategic Financial Management & Retail Management & Digital Marketing, Marketing Research & Business Analytics, Service Marketing.

7 Research's Guidance Master's : 100 (MBA)
Ph.D : Nil

No. of paper published in a. National journal : 04
b. Internal national journal : 10
c. National Conference : 09
d. Internal national Conference : 07

08. Project carried out : 01 VCRMS, KBC NMU, Jalgaon
09. Patents : Nil
10. Technology Transfer : Nil

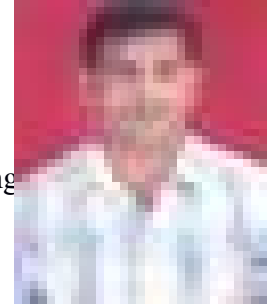
11. Research publication: 30

12. No. of book published with detail: Nil

Signature

**COMPUTER ENGINEERING DEPARTMENT
FACULTY PROFILE**

1. Name : Mr. NitinYashwantSuryavanshi
2. Date Of Birth : 27/01/1981
3. Educational Qualification : M.E.(Computer Science& Engineering)
4. Work Experience :
 - Teaching : 14 Years
 - 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 : Formal Language and Automata Theory,
Analysis & Design of Algorithm
7. Research guidance at
 - Masters's level : 04
 - Ph.D. level : NilNo. of papers published in
 - National Journals : Nil
 - International Journals : 05
 - National Conferences : 03
 - 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 : 01



Signature

**COMPUTER ENGINEERING DEPARTMENT
FACULTY PROFILE**



1. Name : Mr. Mohan P. Patil
2. Date Of Birth : --
3. Educational Qualification : M.Tech(Computer Science& Engineering)
4. Work Experience :
 - Teaching : 07Months
 - 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 : --
7. Research guidance at
 - Masters's level : --
 - Ph.D. level : Nil
- No. of papers published in
 - National Journals : Nil
 - International Journals : --
 - National Conferences : --
 - International Conferences : --
8. Projects carried out : -
9. Patents : --
10. Technology Transfer : --
11. Research publications : --
12. No. of books published with details : --

Signature



**COMPUTER ENGINEERING DEPARTMENT
FACULTY PROFILE**

1. Name : SAPANA A. FEGADE
2. Date Of Birth : 04/06/83
3. Educational Qualification : M.E(Computer Science& Engineering)
B.E(I.T)
4. Work Experience :
 - Teaching : 07Months
 - 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 : --
7. Research guidance at
 - Masters's level : --
 - Ph.D. level : NilNo. of papers published in
 - National Journals : Nil
 - International Journals : 06
 - National Conferences : 05
 - International Conferences : 02
8. Projects carried out : -
9. Patents : --
10. Technology Transfer : --
11. Research publications : --
12. No. of books published with details : --

Signature

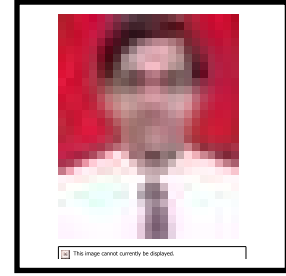
**COMPUTER ENGINEERING DEPARTMENT
FACULTY PROFILE**



1. Name : Mr. Vaibhav Rajendra Chaudhari
2. Date Of Birth : 30/09/95
3. Educational Qualification : BCS
MCA
4. Work Experience :
- Teaching : 04Months
 - Research : Nil
 - Industry : Nil
5. Area of Specialization : Computer
6. Subject Taught at P.G. level : Nil
- Subject Taught at U.G. level : --
7. Research guidance at
- Masters's level : --
 - Ph.D. level : Nil
- No. of papers published in
- National Journals : Nil
 - International Journals : --
 - National Conferences : --
 - International Conferences : --
8. Projects carried out : -
9. Patents : --
10. Technology Transfer : --
11. Research publications : --
12. No. of books published with details : --

Signature

Faculty Profile



1. Name : NAVNEET K PATIL
2. Date of Birth : 23-09-1969
3. Educational Qualification : M.Tech, MBA, PhD (Pursuing)
4. Work Experience
 - Teaching : 26
 - Research : 08
 - Industry : 02
5. Area of Specialization : Production, Thermal, Design, Management
6. Subject taught at P.G. level : Optimization, Design
Subject taught at U.G. level : MQC, Mechanics, Drawing, OR, TOM
7. Research Guidance at
 - Master's level : 15
 - Ph.D. level :
8. No. of papers published in
 - National Journals : 08
 - International Journals : 10
 - National Conferences : 05
 - International Conferences : 05
9. Projects carried out : 10
10. Patents : nil
11. Technology Transfer : nil
12. Research publications :
13. No. of books published in details : 03; MQC, IC Engines, App. Thermodynamics

Signature

Faculty Profile



1. Name : Dr.KrishnaShrivastava
2. Date of Birth : 7th November 1973
3. Educational Qualification : Associate Professor,Mech. Engg. Dept.
4. Work Experience
 - Teaching : 22 Years
 - Research :
 - Industry :
5. Area of Specialization : Thermal Power
6. Subject taught at P.G. level :
Subject taught at U.G. level : Engg. Thermodynamics, HT , Turbo M/c, ED ,
Refrigeration, Mechanics.
7. Research Guidance at
 - Master's level :
 - Ph.D. level :
8. No. of papers published in
 - National Journals :
 - International Journals : 04
 - National Conferences : 05
 - International Conferences : 05
9. Projects carried out : 02
10. Patents :
11. Technology Transfer :
12. Research publications :
13. No. of books published in details : 01

Signature

Faculty Profile

1. Name : **Mahesh Vedprakash Rawlani**
2. Date of Birth : 7th June 1970
3. Educational Qualification : P.hD(Mechanical)
M.E(Mechanical)
B.E(Mechanical)
4. Work Experience :
 - Teaching : 25 YEARS
 - Research : --
 - Industry : --
5. Area of Specialization : MANUFACTURING, MANAGEMENT
6. Subject taught at P.G. level :
Subject taught at U.G. level : Operation research, NACM, ED
7. Research Guidance at :
 - Master's level : --
 - Ph.D. level : --
8. No. of papers published in :
 - National Journals : --
 - International Journals : 5
 - National Conferences : 5
 - International Conferences : 2
9. Projects carried out : PROJECT got 1st prize at DIPEX state level competition
and also project student got award from ZEE 24 TAAS
10. Patents : --
11. Technology Transfer : --
12. Research publications : --
13. No. of books published in details : 08



Signature

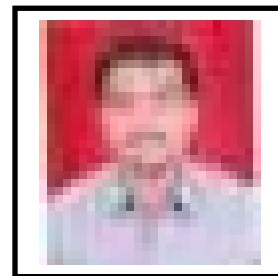
Faculty Profile



1. Name : Dr.Prajitsen G. Damle
2. Date of Birth : 08th Oct. 1973
3. Educational Qualification : Ph. D. (Mechanical)
4. Work Experience
 - Teaching : 18Years
 - Research : --
 - Industry : 1 Year
5. Area of Specialization : Machine Design
6. Subject taught at P.G. level : Mechanical Vibration, Design of Synthesis
Subject taught at U.G. level : Machine Design I and II, EDEME
7. Research Guidance at
 - Master's level : Yes
 - Ph.D. level : --
8. No. of papers published in
 - National Journals : 01
 - International Journals : 10
 - National Conferences : 07
 - International Conferences : 04
9. Projects carried out : Nil
10. Patents : Nil
11. Technology Transfer : Nil
12. Research publications : 04
13. No. of books published in details : 01

Signature

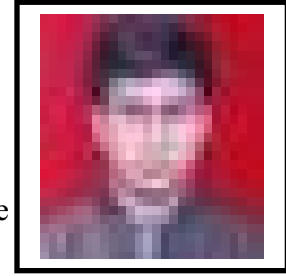
Faculty Profile



1. Name : Dr.D.B.Sadaphale
2. Date of Birth : 01/07/1976
3. Educational Qualification : M.E.(Machine Design)
4. Work Experience
 - Teaching : 19 Years
 - Research : 02Years
 - Industry : nil
5. Area of Specialization : Machine Design
6. Subject taught at P.G. level : AMED,TRIBOLOGY,OTD,MTD
Subject taught at U.G. level : F.M.A.T., MSM, and PPE
7. Research Guidance at
 - Master's level : 12 Students
 - Ph.D. level : nil
8. No. of papers published in
 - National Journals : 04
 - International Journals : 08
 - National Conferences : 03
 - International Conferences : 03
9. Projects carried out : 01
10. Patents : nil
11. Technology Transfer : nil
12. Research publications : 01
13. No. of books published in details : nil

Signature

Faculty Profile



1. Name : Prashant Narendrarao Ulhe
2. Date of Birth : 09/03/1974
3. Educational Qualification : M.E. (Machine Design)
4. Work Experience
 - Teaching : 17 yrs
 - Research : Nil
 - Industry : 5yrs
5. Area of Specialization : Machine Design
6. Subject taught at P.G. level : Tribology, OTD.
Subject taught at U.G. level : SOM, MV, CAD/CAM, AE, Robotics, TOM-I
7. Research Guidance at
 - Master's level : 09
 - Ph.D. level : Nil
8. No. of papers published in
 - National Journals :
 - International Journals : 15
 - National Conferences : 8
 - International Conferences : 4
9. Projects carried out : 1
10. Patents : Nil
11. Technology Transfer : Nil
12. Research publications :
13. No. of books published in details : 1

Signature

Faculty Profile

1. Name : PradeepMohansinghSolanki
2. Date of Birth : 06/10/1981
3. Educational Qualification : M.E. (CAD/CAM)
4. Work Experience
 - Teaching : 14Yrs
 - 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 : CAD/CAM, FEAST, EDEME,
NACM, Mechatronix, and Computer Graphics
7. Research Guidance at
 - Master's level : 11
 - Ph.D. level : NIL
8. No. of papers published in
 - National Journals : 0
 - International Journals : 17
 - National Conferences : 05
 - International Conferences: 09
9. Funded Projects carried out : 02
10. Patents : NIL
11. Technology Transfer : NIL
12. Research publications : 31
13. No. of books published in details : NIL



Signature

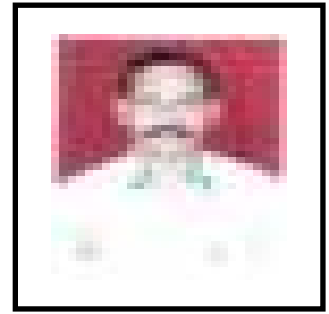
Faculty Profile



1. Name : Pravin Dharmaraj Patil
2. Date of Birth : 30 April 1980
3. Educational Qualification : Ph.D Pursuing
4. Work Experience
 - Teaching: 14 Years
 - Research: NIL
 - Industry: 6 Months
5. Area of Specialization : CAD/CAM
6. Subject taught at P.G. level : NIL
 - Subject taught at U.G. level : CAD/CAM, Engg Drawing, Automobile Engg, Soft Skill, Engg thermodynamics, Manufacturing Engg, MQC
7. Research Guidance at
 - Master's level: YES (01)
 - Ph.D. level: Nil
8. No. of papers published in
 - National Journals: 04
 - International Journals: 08
 - National Conferences: 04
 - International Conferences: 05
9. Projects carried out: Design and development of Human Power Operated Machine
10. Patents : NIL
11. Technology Transfer : NIL
12. Research publications : 21
13. No. of books published in details: NIL

Signature

Faculty Profile



1. Name : Ajay R. Bhardwaj
2. Date of Birth : 05-07-1968
3. Educational Qualification : M.E (Machine Design), PhD. Pursuing
4. Work Experience : 20Years
 - Teaching : 11 Years
 - Research : ----
 - Industry : 08 Years
5. Area of Specialization : Machine Design and Manufacturing Engineering
6. Subject taught at P.G. level : ---
Subject taught at U.G. level : Manufacturing Engineering I, Manufacturing Engineering II
7. Research Guidance at
 - Master's level : NIL
 - Ph.D. level : NIL
8. No. of papers published in
 - National Journals : 01
 - International Journals : 14
 - National Conferences : 03
 - International Conferences : 01
9. Projects carried out : 01
10. Patents : NIL
11. Technology Transfer : NIL
12. Research publications : 19
13. No. of books published in details : NIL

Signature

Faculty Profile



1. Name : Dipak Chandrakant Talele
2. Date of Birth : 19/06/1987
3. Educational Qualification : M.Tech. (CAD/CAM) Ph.D. Pursuing
4. Work Experience
 - Teaching : 06 years
 - Research : Nil
 - Industry : 09 month
5. Area of Specialization : CAD/CAM
6. Subject taught at P.G. level : Nil
Subject taught at U.G. level : FEA&ST, TOM-II, MQC, ERT
7. Research Guidance at
 - Master's level : Nil
 - Ph.D. level : Nil
8. No. of papers published in
 - National Journals : 00
 - International Journals : 15
 - National Conferences : 01
 - International Conferences : 07
9. Projects carried out : Nil
10. Patents : Nil
11. Technology Transfer : Nil
12. Research publications : 23
13. No. of books published in details : Nil

Signature

VIII.FEE

- A) Details of fee, as approved by ShikshanShulkaSamiti, for the instauration.
2022-23

Sr. No.	Branch	Tuition fee
UG Courses		
1	Chemical Engineering	RS.60498
2	Civil Engineering	RS. 60498
3	Computer Engineering	RS. 60498
4	Mechanical Engineering	RS. 60498
5	Electrical Engineering	RS. 60498
6	Electronics and Tele-comm. Engineering	RS. 60498
7	Information TechnologyEngineering	RS. 60498
8	Bio-Technology	RS. 60498
PG Courses		
1	M.B.A.	Rs.44809
2	MCA	Rs.54546

- B) Time schedule forpayment of fee the entire programme.

As per AdmissionruleGovernmentofMaharashtra all fees for the entireprogramme. Should be remitted at the time of admission.

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

NA

- D) Number of scholarshipofferedbythe institute, durationandamount

NA

- E) Criteriaforfeewaivers/scholarship.

NA

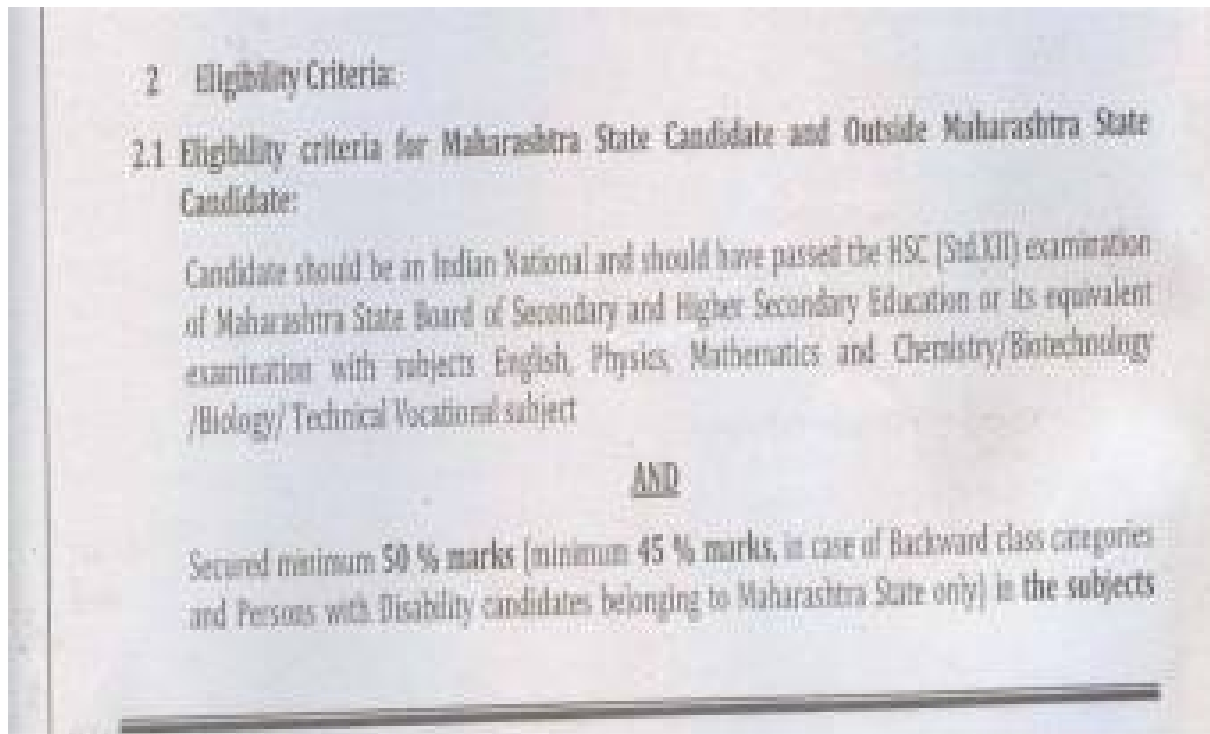
- F) Estimated cost of Boarding and Lodging / Hostels.

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

Ix. Admission Procedure

XI. CRITERIA AND WEIGHTAGES FOR ADMISSION

Each criteria with its respective weightages i.e. Gate examination marks & qualifying examination marks etc.



Physics, Mathematics and Chemistry/Biotechnology/Biology/ Technical Vocational subject added together.

AND

Obtained a positive Composite score* i.e. marks obtained after adding 50% of JEE (Main) 2014 (Paper 1) marks and 50% of normalized Standard XII (Board or Equivalent Examination) marks in Physics, Chemistry and Mathematics.

- Note - 1) * - The details for calculating positive Composite score shall be notified separately.
2) 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 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, Mathematics and Chemistry/Biotechnology/Biology/ Technical Vocational subject

AND

Secured minimum 50 % marks (minimum 45 % marks, in case of Backward class categories and Persons with Disability candidates belonging to Maharashtra State only) in the subjects Physics, Mathematics and Chemistry/Biotechnology/Biology/ Technical Vocational subject added together.

AND

Obtained All-India Rank in JEE (Main) 2014 (Paper 1) given by CBSE

- Note - 1) Maharashtra Candidates eligible as per rule 2.1 and 2.2 shall submit single Application and Option form for the CAP for both Maharashtra State Seats and All India Seats. Such candidates will be given best single admission through CAP as per rules as mentioned.
2) 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/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, Mathematics and Chemistry/Biotechnology/Biology/ Technical Vocational subject

AND

Secured minimum 50 % marks in the subjects Physics, Mathematics and Chemistry/Biotechnology/Biology/ Technical Vocational subject added together.

Note ->

- The eligibility of the candidates passing the HSC (Std XII) or equivalent examination from a school/college/Examinative Board situated outside India shall be further decided by the University Authorities in which the candidate is admitted. Hence such candidates are advised to get their eligibility verified by the respective University Authorities before seeking admission in the Engineering courses in the State of Maharashtra.
- The candidate belonging to this type is not required to appear for the JEE Main 2014 (Paper 1)
- 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, Mathematics and Chemistry/Biotechnology/Biology/ Technical Vocational subject

AND

Secured minimum 50 % marks (minimum 45 % marks, in case of Backward class categories and Persons with Disability candidates of respective States) in the subjects Physics, Mathematics and Chemistry/Biotechnology/Biology/ Technical Vocational subject added together.

AND

Obtained All India Rank in JEE (Main) 2014 (Paper 1) given by CBSE

Note: -

Refer Rule No 2.11 regarding Rounding off of percentage of marks for deciding the eligibility, if applicable. The candidate belonging to this type is required to appear for the JEE (Main) 2014 (Paper 1).

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, Mathematics and Chemistry/Biotechnology/Biology/ Technical Vocational subject

AND

Secured minimum 50 % marks in the subjects Physics, Mathematics and Chemistry/Biotechnology/Biology/ Technical Vocational subject added together.

AND

Obtained All India Rank in JEE (Main) 2014 (Paper 1) given by CBSE

Note: -

Refer Rule No 2.11 regarding Rounding off of percentage of marks for deciding the eligibility, if applicable. The candidate belonging to this type is required to appear for the JEE (Main) 2014 (Paper 1).

2.6 Eligibility criteria for MKB candidates:

In addition to the basic eligibility criterion mentioned in rule no. 2.1, candidates belonging to the Maharashtra Karnataka Disputed Border Area are required to fulfill 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 situated 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.
- Composite Score of MKB Candidates shall be calculated in the manner similar as applied to Maharashtra state board students considering he /she has passed HSC from Maharashtra board.
- Composite Score of MKB Candidates shall be calculated by mapping his or her HSC performance with Maharashtra state board.

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 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 children's' 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 Persons with Disability:

In addition to the basic qualification mentioned in rule no. 2.1, candidate who is suffering from any one of the following permanent disability is eligible to seek admission against seats for Persons with Disability 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/V-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 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 50% marks (45% marks in case of candidates of Backward class categories and Persons with Disability 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 examination, 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 are specified in Annexure-II.

2.11 Rounding off of percentage of marks for deciding eligibility for admission.

In case percentage, marks (converted out of 100) in the subjects **Physics, Mathematics and Chemistry/Biotechnology/Biology/ Technical Vocational** subjects added together at HSC (std.XII), comes in fraction then percentage of marks shall be rounded off as explained in the example for the purpose of deciding the eligibility of the candidate.

Example: - If the percentage of marks comes out to be 44.50% to 44.99% then it shall be rounded to 45% and if the percentage of marks comes out to be 44.01% to 44.49% shall be rounded to 44%.

General Notes:

1. In case the maximum marks in individual subject is other than 100, convert the marks out of 100 for individual subject but do not *round off* these marks. If the sum of the converted marks of three individual subjects without rounding off works out to be a figure with fraction then fraction up to two decimal places shall only be considered and the percentage of marks shall be calculated considering maximum marks as 300 and, if the percentage comes in fraction, rounding off shall be done as given in rule No. 2.11 to decide the eligibility.

Example: If a candidate obtains 85 marks out of 200 in Physics, 76 marks out of 150 in Chemistry and 40 Marks out of 100 in Mathematics, then the sum of marks obtained works out to be 201 out of 450 marks. If it is converted out of 300, it works out to be 134. The % of marks comes out 44.6666 %.

However if the marks in individual subjects are converted out of 100, then the marks are as 42.5 in Physics, 50.6666 in Chemistry and 40 in Mathematics. It means the sum of converted marks of individual subject is 133.1666, which is 133.16 up to two fractions. The % of marks comes out 44.38 % after rounding off it is 44%. Hence the candidate is not eligible for admission.

2. If **letter grades** are assigned instead of marks at SSC, HSC or its equivalent examination the candidate must obtain the certificate of conversion of letter of grades into marks from the competent authority where from the candidate has passed the examination. The candidate should produce such certificate at the time of submission of application form. The Eligibility shall be decided based on the equivalent marks submitted by such candidates.

Institute Level Seat and Vacant Seat.

Candidate passing the HSC (Std. XII) or its equivalent examination with subjects English, Physics, Chemistry and Mathematics and should have secured minimum 50% marks in General Category and reserve Category 45% marks in Physics, Chemistry and Mathematics added together.

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 and reserve Category 45% marks from the Polytechnics affiliated to MSBTE or AICTE approved autonomous Polytechnics in Maharashtra State.

B) Minimum level of acceptance, if any.

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, Mathematics and Chemistry / Biotechnology / Biology / Technical Vocational subject

And

Secured minimum 50% marks (minimum 45% marks, in case of Backward class categories and Persons with Disability candidates belonging to Maharashtra State only) in the subjects

Admission Procedure : (PG COURSES)

RULES & REGULATIONS FOR M.E. COURSE

The postgraduate degree in Engineering consisting of 2 years (4 semesters) shall be designated as Master of Engineering in prescribed branches

A candidate may be permitted to register him/er self for the M.E. degree 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 by AICTE, and North Maharashtra University, Jalgaon.

Preference will be given to graduates of North Maharashtra University, Jalgaon.

The students shall be admitted to second term of first year if his/her first term is granted.

The students shall be admitted to second year if his/her second term of first year is granted.

However he/she will not be allowed to submit his/her thesis/ dissertation unless he/she has cleared all the Theory papers and has completed all the presentations of first term of second year.

Every students 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 and head of the department.

A student whose term is not granted on account of unsatisfactory attendance/ term work is required to repeat the semester.

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:

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.

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.

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

Sr.	Branch	Year					2020-21	2021-22	2022-2023
		2015-16	2016-17	2017-18	2018-19	2019-20			
1	Chemical Engineering	30	30	30	30	30	30	30	30
2	Civil Engineering	120	120	120	120	120	60	60	60
3	Computer Engineering	120	120	120	120	120	120	180	180
4	Mechanical Engineering	120	120	120	120	120	60	60	30
5	Electrical Engg.	60	60	60	60	60	60	60	60
6	Electronics and Tele-comm. Engg.	120	120	60	60	60	60	60	30
7	Information Technology	60	60	60	60	60	60	00	--
8	Bio-Technology	30	30	30	30	30	30	30	--
	Total	660	660	600	600	600			390
	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	18	18	--	--	--
05	ME Electrical (Electrical Power System)	18	18	18	18	18	--	--	--
	Total	90	90	90	36	36	--	--	
06	M.B.A.	60	60	60	60	60	60	60	60
07	M.C.A.	--	--	--	--	--	--	60	60
	Total	60	60	60	60	60	60	120	120

Number of students admitted under various categories each year in the last four years.

UG										
Year	Open	SC	ST	NT1	NT2	NT3	VJ	OBC	SBC	Total
2016-17	103	34	13	12	13	08	15	295	23	516
2017-18	127	36	20	13	12	08	21	313	15	565
2018-19	100	38	05	11	11	03	13	271	14	466
2019-20	67	16	04	00	17	09	15	241	15	384
2020-21	49	10	10	06	10	03	11	183	06	288
2021-22	59	24	02	10	7	7	12	160	12	293
2022-23	71	25	10	16	10	05	19	214	09	379

PG										
Year	Open	SC	ST	NT1	NT2	NT3	VJ	OBC	SBC	Total
2016-17	10	01	01	00	00	01	00	08	01	22
2017-18	12	00	00	00	00	00	00	04	01	17
2018-19	06	01	01	00	00	00	01	02	00	11
2019-20	00	01	01	00	00	00	00	01	00	03
2020-21	00	00	00	00	00	00	02	00	00	02
2021-22	00	00	00	00	00	00	00	00	00	00
2022-23	00	00	00	00	00	00	00	00	00	00

MBA										
Year	Open	SC	ST	NT1	NT2	NT3	VJ	OBC	SBC	Total
2017-18	22	03	02	01	00	01	03	25	03	60
2018-19	23	02	00	03	01	01	01	26	03	60
2019-20	18	03	01	01	00	00	04	33	18	18
2020-21	15	00	00	02	00	00	02	33	00	00
2021-22	14	04	00	01	00	00	01	42	00	00
2022-23	14	02	00	01	02	00	01	33	00	00

MCA										
Year	Open	SC	ST	NT1	NT2	NT3	VJ	OBC	SBC	Total
2021-22	13	02	01	02	01	00	02	44	00	65
2022-23	14	04	00	02	02	00	01	47	00	69

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

Sr.no	Year	Application Received	Admitted Number
01	2017-18	73	60
02	2018-19	65	62
03	2019-20	58	41
04	2020-21	45	26
05	2021-22	57	31
06	2022-23	77	18

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	JEE	CBSE, New Delhi	

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

2019-2020

Sr.	MH-CET/JEE State Conducted test	AI(CET/JEE)	Management Quota(CET / JEE)
1	65% (390 Seats)	15% (90 Seats)	20% (120 Seats)

C) Calendar for admission against management/vacant seats 2019-20

Sr. No.	Particular	Institute level Seats
1.	Sale of Information Broacher	30/07/2019
2.	Last date for submission of application.	31/07/2019
3.	Admission counseling & conformation of admission	02/08/2019



Application Form
for
(FE / Direct SE / First Year ME/ MBA)
ShramSadhana Bombay Trust's
College of Engineering & Technology,
P.B.No.94, BAMBHORI, JALGAON 425 001
(Maharashtra State)

Affix Recent
Passport size
Photograph
here

Website- www.ssoetjalgaon.ac.in
Email: ssoetjal@gmail.com

Phone No. (0257) 2258393
Fax No. (0257) 2258392

Note:- (a) To be filled in and signed by the candidate.

Application submitted without required certificates shall not be considered.
Score out which is not applicable

1) Details of student

Particular	Surname	First Name	Middle Name
Name of Student			
Father Name			
Mother Name			

Date of birth:- _____

Address for correspondence :- _____

Address for permanent:- _____

Pin Code _____ State _____

Telephone No. _____ Mobile No.:- _____

Email Address:- _____ Admitted in College Hostel :- Yes/No

(a) State & District from which you have passed SSC (Std. X) :- _____

State & District from which you have passed HSC (Std. XII) :- _____

SEX :- (Male/Female) _____

Occupation of the Earning member(s) of the family :- _____

Annual income of the family:- _____

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

U.G. Programme: 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				

P.G. Programme:- 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.

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)	Percentage
1	2	3	4	5	6	7	8
1 st Year Engineering							
2 nd Year Engineering							
3 rd Year Engineering							
4 th 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:

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.

The information given by me in my application is true to the best of my knowledge and belief.

I have not been debarred from appearing at any examination held by any Govt. body constituted or statutory examination authority in India.

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.

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.

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.

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.

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

VIII.FEE

- A) Details of fee, as approved by ShikshanShulkaSamiti, for the instauration.
2022-23

Sr. No.	Branch	Tuition fee
UG Courses		
1	Chemical Engineering	RS.60498
2	Civil Engineering	RS. 60498
3	Computer Engineering	RS. 60498
4	Mechanical Engineering	RS. 60498
5	Electrical Engineering	RS. 60498
6	Electronics and Tele-comm. Engineering	RS. 60498
7	Information TechnologyEngineering	RS. 60498
8	Bio-Technology	RS. 60498
PG Courses		
1	M.B.A.	Rs.44809
2	MCA	Rs.54546

- B) Time schedule forpayment of fee the entire programme.

As per AdmissionruleGovernmentofMaharashtra all fees for the entireprogramme. Should be remitted at the time of admission.

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

NA

- D) Number of scholarshipofferedbythe institute, durationandamount

NA

- E) Criteriaforfeewaivers/scholarship.

NA

- F) Estimated cost of Boarding and Lodging / Hostels.

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

**XV. INFORMATION ON INFRASTRUCTURE AND OTHER
RESOURCES AVAILABLE LIBRARY**

Number of Library books /Titles/ Journals available (Programme-wise 2022-23)

Sr.No.	Department	No of Titles of the books	No. of Volumes	National Journals	International Journals
1	Civil	1936	9458	06	02
2	Chemical	1123	4333	06	02
3	Computer	2218	11901	12	02
4	I.T.	861	4364	06	02
5	E&TC	1480	8400	06	02
6	Electrical	1114	5257	06	02
7	Mechanical	1625	9827	06	02
8	M.B.A.	1015	2835	06	06
9	Applied Science	816	5128	06	02
10	Bio-Tech	686	1850	06	02
11	MCA	65	219	--	--
12	General	776	1121	--	--
	Total	13716	64693	66	24

A) E-Library facilities –Our College Library is Subscribed E-Journalsi.e. 1) J-Gate (Engineering & Technology) 2) J-Gate (Management Science) for the year 2022-23.



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

(NAAC 'A' Grade Accredited with CGPA 3.14 - 2ND Cycle)

Website : www.sscoetjalgaon.ac.in

Email : sscoetjal@gmail.com

Mandatory Disclosure

Part-II

January - 2023



Computing Facilities existing for the existing Programs

Sr. No.	Particulars	Availability
01.	No of Computer Terminals	Available as per AICTE norms
02.	Hardware Specification	Dual Core and Higher Specifications
03.	No of Terminals on LAN/WAN	Available as per AICTE norms
04.	Relevant Legal Software	<ul style="list-style-type: none">• System software packages:- Available as per AICTE norms• Application software packages:- Available as per AICTE norms
05.	Peripherals / Printers	<ul style="list-style-type: none">• Printers= 85• Scanners = 9
06.	Internet Accessibility (in kbps & hrs)	<ul style="list-style-type: none">• Leased Line = 68 MBPS

College is having Wireless and OFC Connectivity throughout the Campus

Microsoft Open value subscription education solutions



**SSBT's COLLEGE OF ENGINEERING & TECH. BAMBHORI,
JALGAON.**

ISO 9001:2015

DEPARTMENT OF PHYSICAL EDUCATION

Sports Facilities Available

a) List of outdoor facilities:-

Sr. No	Games	Area	Facility
01	Football	102m*68m	Playground (01)
02	Cricket	50 Yards(45m radius)	Playground (01)
03	Volleyball	9m*18m	Playground (02)
04	Basketball	28m*15m	Basketball Court(01)
05	Kho-Kho	29m*16m, 25m*14m	Playground (01)
06	Kabaddi	13m*10m, 12m*10m	Playground (02)
07	Handball	40m*20m	Playground(01)
08	Athletics	300m Track	Playground(01)
09	Archery	50m Range	Playground(01)
10	Hockey	45m*90m	Playground(01)

b) List of indoor facilities:-

01	Badminton Court	13.40m *6.10m	Separate for Boys & Girls
02	Gymnasium	NA	Common for Boys & Girls
03	Table Tennis	NA	Separate for Boys & Girls
04	Chess	NA	Separate for Boys & Girls
05	Carom	NA	Separate for Boys & Girls
06	Billiards	NA	For Students & Staff
07	Fencing	NA	Yoga Hall

c) Total Ground Area:-

01	Details	Available Area (sq.mtr.)
02	Play Ground	12,204
03	Basket ball Court	1,140
04	Gym and Sports Office	226
05	Bad Minton court	988
06	Total	14,558 sq.mtr

Achievements at Intercollegiate Level

Year	No of Teams Played		No of Students Played		Events
	MEN	WOMEN	MEN	WOMEN	
2016-17	20	10	181	83	Swimming, Badminton, Chess, Lawn Tennis, Basketball, Boxing, Volley-Ball, Athletics, Kho-Kho, Cricket, Hockey, Football, Fencing, Softball, Table Tennis.
2017-18	18	12	165	89	Swimming, Basketball, Chess, Handball, Riffel Shooting, Pistol shooting, Volley-ball, Kabaddi, Kho-Kho, Badminton, Boxing, Athletics, Table Tennis, Cricket, Football, Hockey, Fencing, Softball.
2018-19	16	11	152	76	Chess, Swimming, Table tennis, Basketball, Badminton, Kabaddi, Riffel Shooting, Pistol Shooting, Boxing, Football, Athletics, Hockey, Softball, Volley Ball, Cricket, Fencing.
2019-20	22	16	185	138	Chess, swimming, Riffel Shooting, Pistol Shooting, Softball, Wrestling, Body Building, Hockey, Athletics, Volley ball, Kabaddi, Kho-Kho, Table tennis, basketball, Badminton, Boxing, Football, Judo, Cricket, Fencing, Ball-Badminton, Yoga, Taekwondo, Mini-golf.
2020-21	----- NO EVENTS HELD DUE TO PANDAMIC (COVID-19)-----				
2021-22	19	8	143	71	Yoga, Badminton, Volleyball, Table-Tennis, Swimming, Kabaddi, Football, Hockey, Judo, Wrestling, Best Physic, Athletics, Fencing, Riffel Shooting, Cricket, Ball badminton, Soft ball, Taekwondo, Floor Ball, Minigolf.

Achievements at Inter Group Level

Year	No of Students Selected		Participation in Events
	MEN	WOMEN	
2016-17	59	50	Swimming, Badminton, Chess, Basketball, Handball, Riffel shooting, Pistol shooting, Kabaddi, Volley ball, Kho-Kho, Archery, Hockey, Fencing, Table Tennis, taekwondo
2017-18	54	48	Swimming, Chess, Basketball, Taekwondo, Volley ball, Riffel Shooting, Pistol shooting, Boxing, Kabaddi, Kho-Kho, Table Tennis, Badminton, Hockey, Archery, Football, Fencing, Cricket, Softball.
2018-19	39	48	Chess, Swimming, Table tennis, Basketball, Badminton, Football, Softball, boxing, Riffel shooting, Pistol shooting, Volley Ball, Hockey, Athletics, Cricket, Fencing, Taekwondo, Minigolf
2019-20	61	78	Swimming, Wrestling, riffle shooting, Pistol Shooting, Chess, Body Building, Hockey, Volleyball, Athletics, Kabaddi, Kho-Kho, Table tennis, Basketball, badminton, Football, Boxing, Fencing, Judo, Badminton, cricket, Softball, Yoga, Taekwondo, Minigolf.
2020-21	----- NO EVENTS HELD DUE TO PANDAMIC (COVID-19)-----		
2021-22	54	39	Swimming, Tablrtennis, Badminton, Volleyball, Bestphysic, Yoga, Judo, Football, Hockey, Athletics, Riffel Shooting, Pistol shooting, Fencing, Softball, Taekwondo, Ball Badminton, Cricket, Minigolf

Achievements at Inter University Level

Year	No. of students played at Zonal Level		No of Students Selected in University		Event
	MEN	WOMEN	MEN	WOMEN	
2016-17	60	50	9	5	Swimming, Badminton, Chess, Basketball, Handball, Riffel shooting, Pistol shooting, Kabaddi, Volley ball, Kho-Kho, Archery, Hockey, Fencing, Table Tennis, taekwondo
2017-18	51	45	5	7	Swimming, Chess, Basketball, Taekwondo, Volley ball, Riffel Shooting, Pistol shooting, Boxing, Kabaddi, Kho-Kho, Table Tennis, Badminton, Hockey, Archery, Football, Fencing, Cricket, Softball.
2018-19	39	48	6	11	Chess, Swimming, Table tennis, Basketball, Badminton, Football, Softball, boxing, Riffel shooting, Pistol shooting, Volley Ball, Hockey, Athletics, Cricket, Fencing, Taekwondo, Mini-golf
2019-20	61	78	4	7	Swimming, Wrestling, riffle shooting, Pistol Shooting, Chess, Body Building, Hockey, Volleyball, Athletics, Kabaddi, Kho-Kho, Table tennis, Basketball, badminton, Football, Boxing, Fencing, Judo, Badminton, cricket, Softball, Yoga, Taekwondo, Minigolf.
2020-21	NO EVENTS HELD DUE TO PANDAMIC (COVID-19)				
2021-22	54	39	05	08	Swimming, Table-tennis, Badminton, Volleyball, Best-physic, Yoga, Judo, Football, Hockey, Athletics, Riffel Shooting, Pistol shooting, Fencing, Softball, Taekwondo, Ball Badminton, Cricket, Mini-golf

Host for Inter-Collegiate Tournament				
Year	Event	Date	Number of Teams Participated	
			Men	Women
2016-17	Hockey	17/12/2016	03	-
2017-18	Hockey	16/12/2017	03	-
2018-19	Hockey	15/10/2018	03	-
2019-20	Hockey	05/10/2019	03	03
2019-20	Football	17/11/2019	04	03
2019-20	Ball badminton	01/12/2019	04	03
2019-20	Mini-Golf	28/01/2019	03	03
2020-21	NO EVENTS HELD DUE TO PANDAMIC (COVID-19)			
2021-22	Football	08/12/2021	03	03
2021-22	Hockey	08/12/2021	03	03

Host for Inter-Group Tournament				
Year	Event	Date	Number of Teams Participated	
			Men	Women
2016-17	Hockey KBC NMU Selection Trial	13/12/2016	-	Selection Trial
2016-17	Hockey	19/12/2016 20/12/2016	04	-
2016-17	Football KBC NMU Selection Trial	29/09/2016	-	Selection Trial
2016-17	Basketball	26/09/2016 27/09/2016	04	04
2017-18	Hockey KBC NMU Selection Trial	13/12/2017	-	11
2017-18	Hockey	17/12/2017	04	-
2018-19	Football	10/10/2018	04	-
2018-19	Football KBC NMU Selection Trial	25/10/2018	-	Selection Trial
2019-20	Softball	23/12/2018	04	04
2020-21	NO EVENTS HELD DUE TO PANDAMIC (COVID-19)			
2021-22	Football	17/12/2021 18/12/2021	04	-
2021-22	Football	14/12/2021 15/12/2021	-	04
2021-22	Hockey	18/12/2021 19/12/2021	04	04

KBC NORTH MAHARASHTRA UNIVERSITY UNDER ERONDOL GROUP UNDER INTER COLLEGE, INTER- GROUP

Annual Sports		
Year	No. of Students participated	Events
2016-17	881	Chess, Carom, Table-Tennis, Badminton, Snokker, Archery, Fencing, Athletics, Cricket, Handball, Volleyball, Basketball, Kho-Kho, Football, Khabaddi, 100 Mtr. Race
2017-18	890	Chess, Carom, Table-Tennis, Badminton, Snooker, Archery, Fencing, 100 Mtr. Race, Running, Cricket, Basketball, Volleyball, Kho-Kho, Kabaddi, Football.
2018-19	1114	Chess, Carom, Tabletennis, Badminton, Snooker, Fencing, 100 Mtr Race, Running, 4x100 Mtr. Relay, Shot-Put, Discus Through, Javelin, Cricket, Basketball, Volleyball, Kho-Kho, Kabaddi Hockey, Softball, Football
2019-20	1330	Chess, Carom, Table-Tennis, Badminton, Snooker, Fencing, 100 Mtr. Race, 4x100 Mtr Relay, Shotput, Discus Through, Javelin, Cricket, Basketball, Volleyball, Kho-Kho, Kabaddi, Hockey, Softball, Football, Ball Badminton, Long Jump
2020-21	NO EVENTS HELD DUE TO PANDAMIC (COVID-19)	
2021-22		

SSBT's College of Engineering and Technology, Bambhori, Jalgaon
CULTURAL COMMITTEE (2019-20)
Activities during Academic Year 2019-20 Sem-1

Year 2019-20 (Term 1) Cultural Activities				
Sr.No	Date	Events	Venue	Participants
1	3/08/19 - 22/08/19	Induction Programe	Pharmacy building	First year
2	15/08/2018	Independence Day	Lawn	800 students,200 staff
3	24/08/2019	Dahi Handi	GROUND	500 STUDENTS
4	28/08/2019	Safety Awareness	A/C SEMINAR HALL	200 students
5	28/08/2019	Seminar by Sakal and Gilet company	A/C SEMINAR HALL	200 STUDENTS
6	02/09/2018	Ganesh Utsav	Near shree ganesh mandir	Staff and students
7	07/09/2019	My Campus star by 94.3 MY FM	Non a/c SEMINAR HALL	80 students
8	15/09/2019	Engineer day	Ac seminar hall	200 students

Soft Skill Development Facilities

The soft skill development facilities are provided at the college level through training and placement cell which is headed by Training and Placement Officer. Faculty members of each department are the member of the cell. They are provided with computer tools such as scanner, Internet etc.

The College has signed MOU with AON Consulting Private Limited, New Delhi, online assessment platform for verbal, technical and aptitude test for success in professional & personal life also the college is inducing Soft Skills, Technical Skills, Interpersonal Skills by arranging Short Term Training programs regularly for students.

The college is the member of the federation of the engineering colleges under Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon and the soft skills 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 work place
- f) Language Proficiency and environmental awareness

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	8.75	Shram Sadhana Bombay Trust
02	The Collector, Jalgaon vide letter No.3-RR4431, dated 17/10/1984	290	0.44	Shram Sadhana Bombay Trust
	Total Area		9.19	

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 314	2x3x4 2x3x4 4.5 x 4.5 6 x 3 3 x 3 7.5x3 6x3	24 24 20 18 09 22 18	Administrative 180
4	Class Room Class Room Class Room Class Room Class Room Class Room Tutorial UG Tutorial UG	203 205 212 305 114 321 G13A G10A	12 x 9 15 x9 12x9 12x9 12x9 12x9 4.5 x 7.5 6x5.65	108 135 108 108 108 108 34 34	Instructional 473
5					Instructional
	Seminar Hall	G14	18x9	162	
6	Laboratories				UG 388
	1) Engg. Geology Lab	108	10.5 x 9	95	Instructional
	2) TOM I Lab Concrete	G9 + G10	12 x 9-6x5.5	74	UG
	3) TOM II lab	G10	9x9	81	
	4) Engineering Mechanic I	109	9 x 9	81	PG
	5) Engg. Mechanics II	110	9 x 9	81	12 labs 1101
	6) Geotechnical Lab	G13	18 x 9+9 x 3-3x3-4.5x7.5	147	
	7) Survey Lab	108 (A)	7.5x9	68	
	8) Fluid Mechanics I	G19	12 x 9-3x4	96	
	9) Fluid Mechanics II	G20	9x9+3x3	90	
	10) Comp lab UG & PG	101	12 x 9	108	
	11) Environmental Lab/ Research Lab	103+104	12 x 9-3x3	99	PG Shared UG
	12) Transportation Lab	105	9 x9	81	
	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 =2029

Total Administrative area = 198

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	G22A	6 x 3	18	Administrative
2	HOD Cabin (Computer)	G22 (B)	(6 x6)* 1.5x3	40	Administrative
3	Staff Cabin	B2 G22C G22D G22F G25A G28 G30A 115A2 115B2 115C2 115D1 115D2 129 G31 B1A B3A	6X3 3.2X3.2 3.2X3.2 3.2X3.2 3X4.5 3.0X4.5 3X7.5 3.2X3.2 3.2X3.2 3.2X3.2 3.2X3.2 3.2X3.2 6X3 6X3 3X3 3X3	18 10 10 10 13 13 22 10 10 10 10 10 18 18 09 09	Administrative 258
4	Class Room Class Room Class Room Class Room Class Room Tutorial Room U G Tutorial Room U G Tutorial Room P G	303 309 316 320 115 310 315 115A1	12 x 9 12 x 9 12 x 9 12 x 9 12 x 9 6X9 6X9 6 x 5.5	108 108 108 108 108 54 54 33	Instructional 681 UG UG PG
5	Seminar Hall	317	18 x 9	162	Instructional
6	Laboratories				Instructional
	1) Lab 1/ Data Structure Lab	B2A	15 x 6	90	UG
	2) Lab 2/Embedded System Lab	B1	9 x 7.5	68	UG
	3) Lab 3/M.E.(CSE) Computer Lab	115A	12x9- 3x3-6X5.5	66	PG
	4) Lab 4/ Digital & Microprocessor Lab	B3	9 x 9	81	UG
	5) Lab 5/Software Engg. Lab	G25 C	9 x 7.5	68	UG
	6) Lab 6/Programming Lab-I	G25B	9 x 9- 3 x 4.5	67	UG
	7)Lab 7/Database Lab	G28 C	9 x 7.5	67	UG
	8)Lab 8/System Programming Lab	G28A	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	115C	9 x9-3X3.	71	UG
	12) Lab12 /M.E. (CSE) Research Lab	115B	9 x9-3X3.	71	PG
	13) Departmental Library	G30	6 x 3	18	
7	Pantry Toilet	G22E G26,G27 318,19	3.2x3.2 3 x 6 3x6	10 18 18	Amenities

Passage, Store Server Room UPS Room UPS Room I Passage GF Passage Basement Stair GF , Basement	B2(C)	3 x 3	09	Circulation & Other 387 Administration Administration Administration
	B1	12 x 3	36	
		3 x 3	09	
	G28	9 x 1.5	13.5	
	G25	9 x 1.5	13.5	
	B2 (D)	3 x 3	09	
	G25 (A)	3 x 3	09	
	B4A	3 x 3	09	
	B5	9x3	27	
	GF	50x3	150	
	SF	21x3	66	
	12x3	36		
	2x3x4.5	27		

Total Instructional area = 1802

Total Administrative area = 258

Total Amenities area= 46

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	236A	6 x 3	18	Administrative
2	HOD Cabin	234	6 x 3+6x2	30	Administrative
3	Staff Cabin	237A	6x3	18	98
		238A	3x4	12	
		239 A	3x4	12	
		227 ^a	2.7x3	8	
4	Class Room	224	6x9	54	Instructional 222
		225	6x7.5	45	
		B12	9x6	54	
		226	4x9	36	
	Tutorial room	111A	5.5x6	33	
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) Bio process Engg.	242	4.8 x 9+ 3x7.5	66	
	4) Fermentation	241	9 x 7.3	66	
	5) Bioprocess model & simulation Lab	244	4.8 x 9+ 3x7.5	66	
	6) Plant tissue culture	245	9 x 7.3	66	UD
	7) Project lab	235	9x9-2x6	69	UD
	8) Immunology MBGE	236	9X9-6X2	69	UD
	9) Research lab	227	6.2x9+3.5x3	66	UD
10) Bioinformatics Lab	111	12x5.5	66		
7	Toilet	240	3 x 3	09	Amenities
	Passage SF		66x3	198	Circulation
	Stair		1x3x4.5	13.5	212
	Total				

Total Instructional area = 1056

Total Administrative area = 98

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 2,3,6,7 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 (B) TE (A) TE (B) BE (A) BE (B) SE (A) Tutorial Room P G*	M301 M302 M303 M304 M306 M309 M102 A	7.5x11 7.5x11.3 7.5x11.3 7.5x11.3 9.5x11.3 9.5 x 11.3 7.5 x4.5	82 85 85 85 107 107 34 P G	Instructional 658 Cr 551 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	7.5 x18.75	141	UG PG 1298
	2) Heat Power Lab	M004	7.5 x18.75	141	UG
	3) RAC lab	M007	7.5x11.30	85	PG
	4) Lab	M007A	7.5x7.45 +2.25x7.5	73	
	5) Computer Lab	M102	7.5x14.5	109	
	6) Research Lab	M103	7.5x18.75	141	Research Institute lab
	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	
	13) Automobile lab	M005	10.5x18.75	196	
	14) 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 Instructional area = 2395

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)	3 x 3	09	Administrative 126
		G42 (B)	3 x 6	18	
		134	3 x 6	18	
		138A	3 x 6	18	
		140 A	3x6	18	
4	Class Room	122	6 x 9	54	Instructional 189
		123	6 x 9	54	
		124	6x7.5	45	
	Tutorial Room	125	4x9	36	
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	3 x 3	09	Amenities 18
		G43	3 x 3	09	
9	Passage GF,FF		2x54x3	324	Circulation & Other 406
	Passage GF,FF		2 x 6x3	36	
	Stair GF'FF'		3x3x4 5	40.5	
	Total				

Total Instructional area = 1009

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	HOD Cabin	E110	7.60x3.8	29	Administrative
	Staff Cabins	E002B E006A E007A,B E105A E111 E112	3.8x3.8 3.8x 3.8 2x3x3.8 3x3.8 3.8x2.8 3.8x3.8	14 14 22 11 11 14	115
2	Class Room Class Room* Class Room* Tutorial UG Tutorial PG Seminar Room	E104 E107 E108 E002A E102 A310	6x11.4 7.3x11.4 7.3x11.4 4.4x7.7 5.5 x7.5 9.10x17	68 83 83 33 40 155	Instructional 462
3	Laboratories				Instructional
	1) Measurement Lab1	E002	10.8x7.6 - 3.8x3.8	68	UG+PG 904
	2) Control System lab2	E003	10.8x7.6	82	UG 728
	3) Electrical Machine Lab I Lab 3	E004	15.2 x 4.5 + 3.8 x 1.8	75	PG 184
	4) Machine lab II / PSS	E005	7.6 x 10.7	81	
	5) Power System lab	E006	7.6x10.7 - 3.8x3.8	67	
	6) Switch Gear Lab SGP	E007	7.6 x9	68	
	7) P G Lab	E001	7.6 x9	68	
	8) High voltage lab	E008	7.6 x 8.7	68	
	9) Research lab PG	E 101	6x11.4	68	
	10) Electronic Lab	E105	7.6x9.0	68	
	11) Control System	E106	9 x 7.6	68	
	12) Computer Lab	E109	7.30 x 11.4	83	
	13) Library	E 003A	7.6X4.4+ 1.8x3.8	40	
5	Toilets	E102	3.65x7.30	27	Amenities 13
6	Circulation Paved passage	stair GF	2x12 3 x 46 3 x 23	24 138 69	231
	Total			1786	

Total Instructional area = 1366

Total Administrative area = 115

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	202A	4.5x6	27	Administrative
2	HOD Cabin	202	4.5 x 6	27	Administrative
3	Staff Cabin	119A 121B 202B,C 209A B 210 211 213ABC 214 215A 216 A 217A1 217B1 201B	3.2x3.2 2.4x2.4 2x3 x 7.5 2x3.2x3.2 3 x 3 3 x 3 3 x 2.5x2.5 6 x 3 3.2 x 3.2 3.2x3.2 2.8x2.8 3.2x3.2 3.2x3.2	10 6 45 20 9 9 18 18 10 10 8 10 10	237 Administrative
4	Class Room Tutorial Room U G Tutorial Room P G	301 302 312 313 322 325 220A 221 A	12 x 9 12 x 9 12 x 9 12 x 9 12X9 12x9 9 x 3.8 9X 3.8	108 108 108 108 108 108 34 UG 34 PG	Instructional 716
5	Seminar Hall	208	18x9	162	Instructional
6	Laboratories 1) Computer lab 2) EM / EI Lab 3) NAS / FOC Lab 4) Communication Lab 5) RMT Lab 6)TV & CE Lab 7) E D / TM Lab 8)Basic electronics &project Lab 9) EE E/P E Lab 10) Comp lab PG 11) Research lab PG 12) Library	119 201 213 215 216 217(B) 217(A) 220 221 209 A 209 B 201(A)	9 x 9 9 x 9-3.2x3.2 12x9-3x9 9 x 9-3.2x3.2 9 x 9-3.2x3.2 9 x 9-3.2x3.2 9.3 x8-2.8x2.8 9 x 7.5 12 x 9 -9X3.8 9x9-3.2x3.2 9 x 7.5 3 x 7.5	81 71 81 71 71 71 67 68 75 67 71 22	Instructional PG 11 lab 816 * PG PG
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 = 1694

Total Administrative area =237

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	E211- 213 E 203 A E 204 A E 205 A	3x3x3.65 4x3 7.6 x 3.8 3.4 x 3.5	33 12 20 12	Administrative 128
4	Class Rooms Tutorial Room Tutorial Room	E 305 E 311 E 312 E308A E310A	10.80x7.60 11.40x7.60 11.40x7.60 7.8x5.2 7.8x5.2	82 87 87 40 40	Instructional 336 UD
5	Seminar Hall	310	18.30x7.60	139	139
6	Laboratories				Instructional
	1)Programming lab / lab3	E 201	9.50 x 7.60	72	753
	2) Digital & micro processor / lab 1	E202	9.50 x 7.60	72	
	3) Computer Network / lab 6	E203	11.4 x 7.60	86	
	4) Data base & management / lab 7*	E204	7.60 x 9	68	
	5) Lab 8	E205	9.10 x 9.30	84	
	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 - 3.5x3.8	69	
	10)Lab 10 undeveloped	E304	7.60 x 8.80	67	
	11) Dept. Library	E205B	9.1x3.5	32	
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

Total Instructional area = 1228

Total Administrative area = 128

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	3.0x4.00	12	Administrative 111
		A204A	3x3.0x3.0	27	
		A212	3x4	12	
3	Class Room	A202	9.1x7.4	67	Instructional 436
	Class Room	A213	9.1x7.4	67	
4	Seminar Hall*	A211	7.9x17.0	134	Instructional
5	Computer Lab	A204	7.3x14.0	102	Instructional
	Tutorial room I	A206	4.5x7.4	33	
	Tutorial room II	A207	4.5x7.4	33	
6	Toilets	A203,12A	2x1.2x1.8	4	
		A205,10	2x2.9x3.3	19	
7	Passage	FF	19.5x2.4	47	Circulation 158
		SF	19.5x2.4	47	
	Stair		3x3.2x6.7	64	
	Total				

Total Instructional area = 436

Total Administrative area = 111

Total Amenities area= 23

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 x 6 3x9 3x7.5	18 9 22 22 27 18 27 22 - 165	Administrative 210
3	Class Room	130 131 132 133 229 230 232 233	9 x 9 9 x 9 9 x 9 9 x 9 9 x 9 9 x 9 9 x 9 9 x 9	81 81 81 81 81 81 81 81	Instructional 999 CR 8 648
4	Drawing Hall/ class Room	G37	15x9	135	
5	Laboratories				Instructional
	1) Physics Lab	B14	15 x 9+3 x 3	144	Lab 4-522
	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		54x3	162	Circulation
	Stair		3x4.5	13.5	& other 175
	Total				

Total Instructional area =1170

Total Administrative area = 210

Total Amenities area= 36

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 tests at each month end and an assignment week is conducted where in the students are given an assignment sheets in a period sometime during 5th and 6th 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 signed 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.

Ref No. COET/Acc cal. / 1047/11/22

Shram Sadhana Bombay Trust's
COLLEGE OF ENGINEERING & TECHNOLOGY, BAMBHORI, JALGAON

04 NOV 2022

TENTATIVE ACADEMIC CALENDAR 2022 - 23 (TERM-I) for F.E., D.S.E., MCA - I and MBA - I

Sr. No.	Activity	Class	F.E.	D.S.E.	MCA - I	MBA - I
		Day	Date / From -To	Date / From -To	Date / From -To	Date / From -To
1	Opening of College for Students & their registration	Friday	4 Nov. 2022	21 Nov. 2022	9 Nov. 2022	10 Nov. 2022
2	Commencement of Classes	Wednesday	9 Nov. 2022	21 Nov. 2022	9 Nov. 2022	10 Nov. 2022
3	Induction Programme*	Wednesday and Saturdays	9, 12, 19, 26 Nov. and 3 Dec. 2022	21, 26 Nov. and 3 Dec. 2022	9, 12, 19, 26 Nov. and 3 Dec. 2022	10, 12, 19, 26 Nov. and 3 Dec. 2022
4	ISE-I	Saturday, Monday and Tuesday	17, 19, 20 Dec. 2022	17, 19, 20 Dec. 2022	17, 19, 20 Dec. 2022	17, 19, 20 Dec. 2022
5	Display of ISE - I Results	Friday	23 Dec 2022	23 Dec 2022	23 Dec 2022	23 Dec 2022
6	Feedback from Students	Friday and Saturday	6 -7 Jan. 2023	6 -7 Jan. 2023	6 -7 Jan. 2023	6 -7 Jan. 2023
7	ISE-II	Friday, Saturday and Monday	20, 21, 23 Jan. 2023	20, 21, 23 Jan. 2023	20, 21, 23 Jan. 2023	20, 21, 23 Jan. 2023
	Republic Day	Thursday	26 Jan 2023	26 Jan 2023	26 Jan 2023	26 Jan 2023
8	Display of ISE - II Results	Friday	27 Jan 2023	27 Jan 2023	27 Jan 2023	27 Jan 2023
9	ISE - III	Wednesday, Thursday and Friday	1 - 3 Feb. 2023	1 - 3 Feb. 2023	1 - 3 Feb. 2023	1 - 3 Feb. 2023
10	Display of ISE - III Results	Monday	6 Feb. 2023	6 Feb. 2023	6 Feb. 2023	6 Feb. 2023
11	ICA Submission	Saturday	4 Feb. 2023	4 Feb. 2023	4 Feb. 2023	4 Feb. 2023
12	University PR/OR Exam. (Tentatively)	Monday	6 Feb. 2023	6 Feb. 2023	6 Feb. 2023	6 Feb. 2023
13	End of Term	Thursday	9 Feb. 2023	9 Feb. 2023	9 Feb. 2023	9 Feb. 2023
14	University Theory Examination (Tentatively)	Monday	13 Feb. 2023	13 Feb. 2023	13 Feb. 2023	13 Feb. 2023
15	Commencement of Term - II	Friday	24 Feb. 2023	24 Feb. 2023	24 Feb. 2023	24 Feb. 2023

* Induction Program will be conducted offline that is combined for FE, DSE, MCA - I and MBA - I classes. Remaining activities of Induction Program will be scheduled in Week end days and Term - II.

Copy to:

- 1) Chairman, G.B. & C.D.C.
- 2) Vice Principal
- 3) All H.O.Ds.
- 4) DOA
- 5) Director, R&D
- 6) Director, Technical Development
- 7) TPO
- 8) Registrar
- 9) A.R.
- 10) U.S.
- 11) Exam. Office
- 12) Chairman, Alumni Meet
- 13) Store
- 14) Library
- 15) Chairman, Cultural Activities
- 16) Physical Director
- 17) Admission Office
- 18) PRO & Coordinator- Parents Meet
- 19) Student Welfare Officer
- 20) Rector (Boys Hostel)
- 21) Rector (Girls Hostel)
- 22) Vehicle In-charge
- 23) Principal office

(Signature)
PRINCIPAL

SSBT's College of Engg. & Technology
10, O.S., (I) Exam. Office, (II)
Bambhori, Jalgaon-425001 (M.S.)

Sr. No.	Activity	TE & BE	FE & SE and MCA - I	MBA - I
1	Registration of Students and Commencement of Classes	09-Jan-23	09-Jan-23 (SE - Regular), 20-03-2023 (DSE)	13-Mar-23
2	Republic Day Celebration	26-Jan-23		
3	ISE-I	10, 11 & 13 Feb 2023	15, 17 & 18 Apr 2023	08, 10, 11 Apr 2023
4	Display of ISE – I Results	16-Feb-23	24-Apr-23	
5	Add-on Course	20 – 25 February 2023		
6	ISE-II	11, 13 & 14 Mar 2023	19, 20 & 22 May 2023	13, 15 & 16 May 2023
7	Feedback from Students	15 - 16 Mar 2023	19 - 20 Apr 2023	19 - 20 Apr 2023
8	Display of ISE – II Results	18-Mar-23	26-May-23	20-May-23
9	Annual Sports	20 - 22 Mar 2023	20 - 22 Mar 2023	20 - 22 Mar 2023
10	Paper presentation and Technical event for student (Milestone 2K23)	23-Mar-23	23-Mar-23	23-Mar-23
11	Science Exhibition	23-Mar-23	23-Mar-23	23-Mar-23
12	Annual Gathering	24-25 Mar 2023	24-25 Mar 2023	24-25 Mar 2023
13	Parents Meet	25-Mar-23	25-Mar-23	25-Mar-23
14	Project Presentation (Date of Completion)	29-Mar-23		
15	ISE - III	08, 10, 11 Apr 2023	3, 5 & 6 Jun 2023	26, 27 & 29 May 2023
16	ISE Backlog	12 & 13 Apr 2023	7 & 8 Jun 2023	30 & 31 May 2023
17	Display of ISE III results	15-Apr-23		
18	ICA Submission	17 & 18 Apr 2023	9 & 10 Jun 2023	2 & 3 Jun 2023
19	PR/OR Examination	24 - 30 Apr 2023	12 - 17 Jun 2023	5 - 10 Jun 2023
20	End of Term	02-May-23	17-Jun-23	12-Jun-23
21	University Theory Examination	02 - 20 May 2023	19 - 30 Jun 2023	12 - 24 Jun 2023
22	Internship for SE and TE students	22 May – 12 June 2023		
23	Commencement of Next Academic Year	03-Jul-23	03-Jul-23	03-Jul-23



Principal
25/02/2023
PRINCIPAL

SSBT's College of Engineering & Technology
Bambhori, Jalgaon-425001(M.S.)

Copy to:

- 1) Chairman, G.B. & C.D.C. 2) Vice Principal 3) All H.O.s, 4) IQAC Coordinator, 5) IT Cell In-charge, 6) Registrar 7) A.R. 8) O.S., 9) Exam. Office, 10) Chairman, Alumni Meet, 11) Store, 12) Library, 13) Chairman, Cultural Activities 14) Physical Director 15) Admission Office, 16) Coordinator- Parents Meet, 17) Student Welfare Officer, 18) Rector (Boys Hostel), 19) Rector (Girls Hostel), 20) Vehicle In-charge, 21) Principal office

NORTH MAHARASHTRA UNIVERSITY,

JALGAON (M.S.)

First Year Engineering

(Common for All)

Faculty of Science and Technology



**'A' Grade
NAAC Re-Accredited
(3rd Cycle)**

SYLLABUS STRUCTURE

Semester – I & II

W.E.F. 2018 – 19

Subject Group Code and Subject Groups

Sr. No.	GROUP	Category	Breakup of Credits (Total 160)
1	A	Humanities and Social Sciences including Management Courses (HSMC)	10
2	B	Basic Science Courses (BSC)	26
3	C	Engineering Science Courses including workshop, drawing, basics of electrical/mechanical/computer etc. (ESC)	26
4	D	Professional Core Courses (PCC)	53
5	E	Professional Elective Courses relevant to chosen specialization/branch (PEC)	18
6	F	Open subjects – Electives from other technical and /or emerging subjects (OEC)	12
7	G	Project work, seminar and internship in industry or appropriate work place/ academic and research institutions in India/abroad (PROJ)	15
8	H	Mandatory Courses (MC) [Environmental Sciences, Induction program, Indian Constitution, Essence of Indian Traditional Knowledge]	
Total			160

Syllabus Structure for First Year Engineering (Semester – I) (Computer, IT, Electrical, E & TC, Instrumentation) (w.e.f. 2018 – 19)
(As per AICTE Guidelines)

(As per AICTE Guidelines)	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Physics	B	3	1	-	4	40	60	-	-	100	4
Mathematics - I	B	3	1	-	4	40	60	-	-	100	4
Basic Electrical & Electronics Engineering	C	3	1	-	4	40	60	-	-	100	4
Programming for Problem Solving	C	3	-	-	3	40	60	-	-	100	3
Physics Lab	B	-	-	2	2	-	-	25	-	25	1
Basic Electrical & Electronics Engineering Lab	C	-	-	2	2	-	-	25	25 (OR)	50	1
Programming for Problem Solving Lab	C	-	-	2	2	-	-	25	25 (PR)	50	1
Induction Program*	H	-	-	-	-	-	-	-	-	-	-
		12	3	6	21	160	240	75	50	525	18

* 3-week long Induction Program for students entering the institution, right at the start.

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

**Syllabus Structure for First Year Engineering (Semester – I) (Mechanical, Civil, Chemical, Biotech, Automobile) (w.e.f. 2018 – 19)
(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Chemistry	B	3	1	-	4	40	60	-	-	100	4
Mathematics –I	B	3	1		4	40	60	-	-	100	4
Engineering Graphics	C	3	-	-	3	40	60	-	-	100	3
English	A	3		-	3	40	60	-	-	100	3
Chemistry Lab	B	-	-	2	2	-	-	25	-	25	1
Engineering Graphics Lab	C	-	-	2	2	-	-	25	25 (OR)	50	1
English Lab	A	-	-	2	2	-	-	25	25 (OR)	50	1
Workshop Practices	C	1	-	2	3	-	-	25	25 (OR)	50	2
Induction Program*	H	-	-	-	-	-	-	-	-	-	-
		13	2	8	23	160	240	100	75	575	19

* 3-week long Induction Program for students entering the institution, right at the start.

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Syllabus Structure for First Year Engineering (Semester – II) (Computer, IT, Electrical, E & TC, Instrumentation) (w.e.f. 2018 – 19)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Chemistry	B	3	1	-	4	40	60	-	-	100	4
Mathematics – II	B	3	1		4	40	60	-	-	100	4
Engineering Graphics	C	3	-	-	3	40	60	-	-	100	3
English	A	3		-	3	40	60	-	-	100	3
Chemistry Lab	B	-	-	2	2	-	-	25	-	25	1
Engineering Graphics Lab	C	-	-	2	2	-	-	25	25 (OR)	50	1
English Lab	A	-	-	2	2	-	-	25	25 (OR)	50	1
Workshop Practices	C	1	-	2	3	-	-	25	25 (OR)	50	2
		13	2	8	23	160	240	100	75	575	19

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Syllabus Structure for First Year Engineering (Semester –I I) (Mechanical, Civil, Chemical, Biotech, Automobile) (w. e. f. 2018 – 19)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Physics	B	3	1	-	4	40	60	-	-	100	4
Mathematics - II	B	3	1	-	4	40	60	-	-	100	4
Basic Electrical & Electronics Engineering	C	3	1	-	4	40	60	-	-	100	4
Programming for Problem Solving	C	3	-	-	3	40	60	-	-	100	3
Physics Lab	B	-	-	2	2	-	-	25	-	25	1
Basic Electrical & Electronics Engineering Lab	C	-	-	2	2	-	-	25	25 (OR)	50	1
Programming for Problem Solving Lab	C	-	-	2	2	-	-	25	25 (PR)	50	1
		12	3	6	21	160	240	75	50	525	18

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

NORTH MAHARASHTRA UNIVERSITY,

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**'A' Grade
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(3rd Cycle)**

COURSE OUTLINE

Semester – I&II

W.E.F. 2018 – 19

Physics					
COURSE OUTLINE					
Course Title:	Physics	Short Title:	PHY	Course Code:	
Course description: To impart knowledge of basic concepts in applied physics and implementation to various engineering fields also provide the methodology necessary for solving problems in the field of engineering.					
Lecture	Hours/week	No. of weeks	Total hours	Semester credits	
	03	14	42	04	
Tutorial	01	14	14		
Prerequisite course(s):					
11 th and 12 th Physics					
Course objectives:					
(i) To acquire the knowledge of Electromagnetic field theory that allows the student to have a solid theoretical foundation to be able in the future to design emission , propagation and reception of electro- magnetic wave systems. (ii) Gain an understanding of the basic principles and the experimental basis of the various fields of physics and the logical relationships of the various fields. (iii) To develop in the student awareness of situations in engineering, which need ideas of quantum mechanics. (iv) To enable the student with those aspects of quantum mechanics, which are necessary to begin to work in small structures such as those common in nanotechnology. (v) Students will understand semiconductor materials and devices for optoelectronics in this course.					
Course outcomes:					
After successful completion of this course students will be familiar with <ol style="list-style-type: none"> To study Bragg's Law and introduced to the principles of lasers, types of lasers and applications Various terms related to properties of materials such as, permeability, polarization, etc. Some of the basic laws related to quantum mechanics as well as magnetic and dielectric properties of materials Simple quantum mechanics calculations Nanotechnology and their industrial applications. 					
COURSE CONTENT					
Physics			Semester:	I or II	
Teaching Scheme:			Examination scheme		
Lectures:	3 hours/week		End semester exam (ESE):	60 marks	
			Duration of ESE:	03 hours	
			Internal Sessional Exams (ISE):	40 marks	
Unit-I:		No. of Lectures: 08 Hours	Marks: 12		
Introduction to Electromagnetic Theory and Optics					
Electrostatics, Calculation of electric field and electrostatic potential for a charge distribution: Divergence and curl of electrostatic field; Laplace's and Poisson's equations for electrostatic potential and uniqueness of their solution, Bio-Savart law, Divergence and curl of static magnetic field. Magnetization and associated bound currents; magnetic susceptibility and ferromagnetic, paramagnetic and diamagnetic materials; Faraday's law in terms of EMF produced by changing magnetic flux; Lenz's law; Maxwell's equation in vacuum and non-conducting medium; Electrodynamics motion of a charged particle in electric and magnetic fields. Optics: Interference , Diffraction, Polarization. Applications: CRO					
Unit-II:		No. of Lectures: 08 Hours	Marks: 12		

Acoustics and Introduction to Mechanics:		
Architectural acoustics and Ultrasonic. Potential energy function, $F = -\text{Grad } V$, equipotential surfaces and meaning of gradient; Conservative and non-conservative forces, curl of a force field, Problem of central force field, Keplers laws, Inertial and non Inertial frame of references, Motion of rigid body in 2D		
Unit-III:	No. of Lectures: 08 Hours	Marks: 12
Quantum Mechanics and Nanotechnology for Engineers		
Introduction to Quantum mechanics, Wave nature of Particles, Time-dependent and time independent Schrodinger equation for wave function, Solution of stationary-state Schrodinger equation for one dimensional problems– particle in a box. wave function, Born interpretation, probability current, Expectation values, Free-particle wave function and wave-packets, Uncertainty principle. Nanotechnology: Synthesis, Characterization and applications of nanoscience and nanotechnology		
Unit-IV:	No. of Lectures: 08 Hours	Marks: 12
Atomic Molecular physics		
Inner-shell vacancy, X-rays and Auger transitions, Compton effect. Properties of laser beams: monochromaticity, coherence, directionality and brightness, laser speckles, absorption, spontaneous emission, and stimulated emission; Einstein's theory of matter radiation interaction and A and B coefficients; applications of lasers in science, engineering and medicine)., types of lasers gas lasers (He-Ne,Co ₂); Application: Fiber optics		
Unit-V:	No. of Lectures: 08 Hours	Marks: 12
Solid state physics and Semiconductor Physics		
Energy bands in solids, metals, semiconductors, and insulators; Intrinsic and extrinsic Semiconductors; p-n junction, Photovoltaic effect. Superconductivity (Superconductivity-basic phenomenology, Meissner effect, Type I and Type II superconductors, BCS pairing mechanisms, High T _c materials.) Applications Hall effect. Solid state laser (Ruby, Nd: YAG).		
Text Books:		
<ol style="list-style-type: none"> 1. David Griffiths, Introduction to Electrodynamics, 4th edition, Pearson Publication 2. Eisberg and Resnick, Quantum Physics of Atoms, Molecules, Solids, Nuclei and Particles 2nd Edition, Wiley Publication 3. Gupta , Kumar and Saxena. "Solid State Physics "Pragati Publication 4. N Zettili, "Quantum Physics" 2th edition, Wiley Publication 5. Gupta ,Kumar and Sharma, Atomic and Molecular Physics, Pragati Prakashan 6. Murthy, "Textbook Of Nanosciene And Nanotechnology", University Press 7. J. C. Upadhyya, "Classical Mechanics" Himalaya Publication House. 		
Reference Books:		
<ol style="list-style-type: none"> 1. Resnick , Halliday, Krane, "Physics. Volume I and II" Wiley Publication, 5th Edition 2. W. Saslow, Electricity, Magnetism and light,Academic Press Publication 3. O. Svelto, Principles of Lasers, Springer Publication. 4. Quila " Perspective of Quantum Mechanics", NCBA Publication 5. M A Wahab ,Solid State Physics, Narosa Publishing House, 		

MATHEMATICS-I					
COURSE OUTLINE					
Course Title:	Mathematics –I	Short Title:	M-I	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	
	3	14	42	4	
Tutorial	1	14	14		
Prerequisite course(s): 11 th & 12 th mathematics					
Course objectives:					
The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariate analysis and linear algebra. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their discipline					
Course outcomes:					
After successful completion of this course the student will be able to:					
<ol style="list-style-type: none"> 1. Apply differential and integral calculus. Apart from some other applications they will have a basic understanding of Beta and Gamma functions. 2. The fallouts of Rolle's Theorem that is fundamental to application of analysis to Engineering problems. 3. The tool of Fourier series for learning advanced Engineering Mathematics. 4. To deal with functions of several variables that are essential in most branches of Engineering. The essential tool of matrices and linear algebra in a comprehensive manner. 					
COURSE CONTENT					
Mathematics -I			Semester:	I	
Teaching Scheme:			Examination scheme		
Lectures:	3 hours/week	End semester exam (ESE):		60 marks	
Tutorial	1 hours/week	Duration of ESE:		03 hours	
		Internal Sessional Exams (ISE):		40 marks	
Unit-I:		No. of Lectures: 08 Hours	Marks: 12		
Matrices:					
Introduction to rank of a matrix; System of linear equations; Symmetric and orthogonal matrices; Eigen values and Eigenvectors, Diagonalization of matrices. Application of matrices (Rotation)					
Unit-II:		No. of Lectures: 08 Hours	Marks: 12		
Differential and Integral Calculus:					
Rolle's Theorem, Mean value theorem, Taylor's and Maclaurin's theorem; Gamma function, Beta function					
Unit-III:		No. of Lectures: 08 Hours	Marks: 12		
Partial Differentiation:					
Partial derivatives, Eulers theorem, Composite function. total derivative: Method of Lagranges multipliers.					
Unit-IV:		No. of Lectures: 08 Hours	Marks: 12		
A) Fourier series					
Full range Fourier series, Half range sine and cosine series.					

B)Vector Calculus : Gradient ,Curl, Divergence, Directional Derivatives.		
Unit-V:	No. of Lectures: 08 Hours	Marks: 12
Complex Number:		
Circular functions, Hyperbolic and Inverse Hyperbolic functions, logarithms of complex number, resolving real and imaginary parts of a complex number.		
Text Books:		
<ol style="list-style-type: none"> 1. H.K.DASS “Advance Engineering Mathematics” S. Chand publications. 2. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications,Reprint, 2010,2016. 3. DebashisDatta “Textbook of Engineering Mathematics” New Age International Publication. Revised second edition. 4. “Engineering Mathematics A Tutorial Approach”. Ravish R..Singh, Mukul Bhatt.Tata McGraw Hill Education Private Limited .New Delhi. 		
Reference Book:		
<ol style="list-style-type: none"> 1. G.B. Thomas and R.L. Finney. Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002. 2. Erwin kreyszig. Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006. 3. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi,2008. 4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010. 5. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.. 6. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010 		

Basic Electrical and Electronics Engineering					
COURSE OUTLINE					
Course Title:	Basic Electrical and Electronics Engineering	Short Title:	BEEE	Course Code:	
Course description:					
This course provides an introduction to electrical and electronics engineering which includes over view of electric power generation, single and three phase AC circuit, fundamentals of electrical installation, semiconductor devices such as diodes, transistor, FETs and Power Electronic devices, logic gates and their application.					
	Hours/week	No. of weeks	Total hours	Semester credits	
Lecture	03	14	42	04	
Tutorial	01	14	14		
Prerequisite course(s):					
11 th & 12 th Physics					
Course objectives:					
<ol style="list-style-type: none"> 1. To explain basic laws and theorems of electrical networks 2. To explain fundamentals alternating current circuits. 3. To provide students with a firm grasp of the essential principles of basic electronics. 4. To understand the concepts and terminology that is used in electronics engineering. 5. It is not an in-depth Electronic course but, rather a course aimed at acquiring an understanding of basic principles that are used in electronic engineering. 					
Course outcomes:					
After successful completion of this course the student will be able to:					
<ol style="list-style-type: none"> 1. Students will be able to demonstrate knowledge of circuit analysis using various basic laws and theorems of electrical circuits 2. Students will be able to demonstrate and understand definition and relationship of various AC circuits. 3. Understand working principle of PN junction diode, Zener diode and their applications. 4. Describe different configuration of Bipolar Junction Transistor. 5. Describe different configurations of FET 6. Understand operating principle Power Electronics Devices 7. Describe use of the Basic gate and Universal gate 					
COURSE CONTENT					
Basic Electrical and Electronics Engineering			Semester:	I or II	
Teaching Scheme:			Examination scheme		
Lectures:	3 hours/week	End semester exam (ESE):		60 marks	
Tutorial	1 hours/week	Duration of ESE:		03 hours	
		Internal Sessional Exams (ISE):		40 marks	
Unit-I:		No. of Lectures: 08 Hours	Marks: 12		
DC Circuit: Kirchoff's laws, series and parallel circuit, current and voltage division rule, Delta-star and star-delta conversion, Node voltage and Mesh current methods, Superposition theorem, Thevenin's theorem, Norton Theorems, Maximum power transfer theorem.					
Unit-II:		No. of Lectures: 08 Hours	Marks: 12		

AC Circuits:		
Single phase AC Circuits: Concept of single phase supply, Terms related with A.C. quantities, pure resistive, inductive and capacitive circuits, complex and phasor representation of AC quantities. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, combinations (series and parallel),		
Three phase AC Circuits: Concept of Three phase supply, star and delta connections, line and phase values, solution of balanced three phase circuits, phasor diagram.		
Unit-III:	No. of Lectures: 08 Hours	Marks
Semiconductor Basics, Diode Equivalent Circuits, Diode Characteristics, Diode as a Switch, Diode as a Rectifier (half wave & full wave), capacitor filter, Comparison of rectifiers, Breakdown Mechanisms, Zener Diode – Operation, characteristics and Application, Photo diode, LED.		
Bipolar Junction Transistor (BJT): Common Base, Common Emitter and Common Collector Configurations, their dc current gains, regions of operations, Operating Point, Load line, Voltage Divider Bias Configuration, BJT amplifier.		
Unit-IV:	No. of Lectures: 08 Hours	Marks: 12
Field Effect Transistor (FET): Construction, Characteristics and working of Junction FET, JFET Parameters, JFET as switch.		
Depletion and Enhancement type MOSFET: Construction, Characteristics and working, Comparison of MOSFET with JFET and BJT.		
Introduction to NMOS, PMOS & CMOS circuits, CMOS as Switch.		
Unit-V:	No. of Lectures: 08 Hours	Marks: 12
Silicon Controlled Rectifier (SCR): Operation, Construction, Characteristics, Applications.		
Triac & UJT (Working, Characteristics and applications)		
Number System & their Conversions, De-Morgan's theorem, Boolean Algebra		
Truth Tables and Functionality of Logic Gates – NOT, OR, AND, NOR, NAND, XOR and XNOR.		
Electric Wiring installations: Types of insulated wires & wiring systems, concept of fuses, MCBs, RCCB, ELCBs, etc. in wiring installations, concept of earthing, energy bill calculations.		
Text Books:		
1. B. L. Theraja and A. K. Theraja, "A Text book of Electrical Technology - Vol-I and Vol-II", S. Chand, 1 st Edition, 2001.		
2. K. A. Krishnamurthy, M. R. Raghuvver, "Electrical and Electronics Engineering for Scientists and Engineers." Willey Eastern Limited.		
3. J. B. Gupta, "A Course in Electrical Power", S. K. Kataria and Sons, 12 th Edition, 2002.		
4. R. S. Sedha, "Applied Electronics", S. Chand Publication		
5. V.K. Mehta, "Principles of Electronics", S. Chand Publications		
Reference Books:		
1. V. N. Mittal, Arvind Mittal, "Basic Electrical Engineering", Tata McGraw Hill publishing co. ltd, New Delhi.		
2. D. P. Kothari, I.J Nagrath . "Basic Electrical Engineering", Tata McGraw Hill		
3. M. S. Naidu, S. Kamakshaiah . "Introduction to Electrical Engineering", Tata McGraw Hill.		
4. P. Tiwari, "Basic Electrical Engineering", New Age Publication.		
5. Vincent Del Toro, "Electrical Engineering Fundamentals", Pearson		
6. R. P. Jain, "Modern Digital Electronics" McGraw Hill Education (India) Private Limited, Fourth Edition, 2017.		
7. B. L. Theraja, "Applied Electronics" S. Chand Publication		
8. A.P. Malvino, "Electronics Principles" TMH Publications.		

Programming for Problem Solving					
COURSE OUTLINE					
Course Title:	Programming for Problem Solving	Short Title:	PPS	Course Code:	
Course description:					
This course provides students with a comprehensive study of the C programming language. This course focuses on introduction to program design and problem solving using the C programming language. Programming topics include control structures, functions, arrays, pointers, and file I/O.					
Lecture	Hours/week	No. of weeks	Total hours	Semester credits	
	03	14	42	04	
Prerequisite course(s):					
Physics					
Course objectives:					
To impart knowledge so that the student will:					
1. Learn the fundamentals, structure and syntax of C Language.					
2. Write simple programs in C Language.					
Course outcomes:					
After successful completion of this course the student will be able to:					
1. To formulate simple algorithms for arithmetic and logical problems					
2. Understand the fundamentals of C programming.					
3. To test and execute the programs and correct syntax and logical errors					
4. Choose the loops and decision making statements to solve the problem.					
5. To decompose a problem into functions and synthesize a complete program using divide and conquer approach					
6. To use arrays, pointers and structures to formulate algorithms and programs					
COURSE CONTENT					
Programming for Problem Solving			Semester:	I or II	
Teaching Scheme:			Examination scheme		
Lectures:	3 hours/week		End semester exam (ESE):	60 marks	
			Duration of ESE:	03 hours	
			Internal Sessional Exams (ISE):	40 marks	
Unit-I:		No. of Lectures: 08 Hours		Marks: 12	
Introduction					
What is C, The C Character set, Constant, Variables & Keywords, Types of C Constants, Rules for constructing Integer Constants, Rules for constructing Real Constants, Rules for constructing Character Constants, Types of C Variables, Rules for constructing Variable Names, Comments in a C Program					
Type Declaration Instruction, Type Conversion in Assignments					
Data Types Revisited: Integers, long & short, signed & unsigned, Chars, signed & unsigned, Float & Doubles					
Console Input/Output: Types of I/O, Console I/O Function, Formatted Console I/O Functions, Unformatted Console I/O Functions					
Decision Control Instruction: The if statement, Multiple Statements within if, The if-else statement, Nested if-else, Forms of if					
Use of Logical Operators, The else if Clause, The Operator, The Conditional Operators					
Unit-II:		No. of Lectures: 08 Hours		Marks: 12	
Loop					
Loop Control Instruction: Loops, the while Loop, Tips & Traps, More Operators, for Loop, Nesting of Loops, Multiple Initialization in the for Loop, the break Statement, the continue Statement, The do-while Loop, The Odd Loop					

Case Control Instruction: Decisions using switch, The Tips & Traps. switch versus if-else Ladder, The go to Keyword		
Unit-III:	No. of Lectures: 08 Hours	Marks: 12
Function & Pointers		
Function: What is a Function? Why use Functions? Passing Values between Functions, Scope Rule of Functions, Order of Passing Arguments, Using Library Functions Pointers: Call by Value and Call by Reference, An Introduction to Pointers, Pointer Notation, Back to Function Calls		
Unit-IV:	No. of Lectures: 08 Hours	Marks: 12
Array		
Arrays: What are Arrays? A Simple Program using Array, more on Arrays, Array Initialization, Array Elements in Memory, Bounds Checking, Passing Array Elements to a Function, Pointers and Arrays, Passing an Entire Array to a Function Multidimensional Array: Two Dimensional Arrays. initializing a Two-Dimensional Array, Memory Map of a Two-Dimensional Array, Pointers and Two Dimensional Arrays, Pointer to an Array, Passing 2 D Array to a Function, Array of Pointers, Three-Dimensional Array		
Unit-V:	No. of Lectures: 08 Hours	Marks: 12
Strings & Structure		
Strings: What are Strings? More about Strings, Pointers and Strings, Standard Library String Functions: strlen(), strcpy(), strcat(), strcmp() Handling Multiple Strings: Two-Dimensional Array of Characters, Array of Pointers to strings, Limitations of Array of Pointers to Strings Structures: Why use Structures? Declaring a Structure, Accessing Structure Elements. How Structure Elements are Stored? Array of Structure		
Text Books:		
1. Yashavant Kanetkar, Let Us C, BPB Publication, 14 th Edition		
Reference Books:		
1. E Balagurusamy, Programming in ANSIC C by, Tata McGraw Hill, 4 th Edition 2. K. R. Venugopal and S. R. Prasad, Mastering C, Tata McGraw Hill, 2011, 2 nd Edition 3. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, PHI, 2 nd Edition 4. Paul Deitel and Harvey Deitel, C How to Program, Pearson, 8 th Edition 5. R.S. Salaria, Computer concepts and Programming in C, Khanna Publication		

Chemistry							
COURSE OUTLINE							
Course Title:	Chemistry			Short Title:	CHY	Course Code:	
Course description:							
This course is aimed at introducing the fundamentals of basic sciences (Chemistry) 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 Chemistry and their applications in different branches of engineering.							
Lecture	Hours/week	No. of weeks	Total hours	Semester credits			
	03	14	42	04			
Tutorial	01	14	14				
Prerequisite course(s):							
11 th & 12 th Chemistry							
Course 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.							
Course outcomes:							
After successful completion of this course the student will be able to:							
The concepts developed in this course will aid in quantification of several concepts in Chemistry that have been introduced at the 10+2 levels in schools. Technology is being increasingly based on the electronic, atomic and molecular level modifications. Quantum theory is more than 100 years old and to understand phenomena at nanometer levels, one has to base the description of all chemical processes at molecular levels. The course will enable the student to:							
<ol style="list-style-type: none"> Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces. Rationalise bulk properties and processes using thermodynamic considerations. Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques Rationalise periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity. List major chemical reactions that are used in the synthesis of molecules. 							
COURSE CONTENT							
Chemistry			Semester:	I or II			
Teaching Scheme:			Examination scheme				
Lectures:	2 hours/week	End semester exam (ESE):		60 marks			
Tutorial	1 hours/week	Duration of ESE:		03 hours			
		Internal Sessional Exams (ISE):		40 marks			
Unit-I:		No. of Lectures: 08 Hours		Marks: 12			
Atomic and molecular structure							
Schrodinger equations, Schrodinger equation. Particle in a box solutions and their applications for conjugated molecules and nanoparticles. Molecular orbitals of diatomic molecules and plots of the multicentre orbitals. Equations for atomic and molecular orbitals. Energy level diagrams of diatomics. Pi-molecular orbitals of butadiene and benzene and aromaticity. Crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties. Band structure of solids and the role of doping on band structures.							
Unit-II:		No. of Lectures: 08 Hours		Marks: 12			
Spectroscopic techniques and applications							

Principles of spectroscopy and selection rules. Electronic spectroscopy. Fluorescence and its applications in medicine. Vibrational and rotational spectroscopy of diatomic molecules. Applications of Nuclear magnetic resonance and magnetic resonance imaging. Diffraction and scattering.		
Unit-III:	No. of Lectures: 08 Hours	Marks: 12
Periodic properties Effective nuclear charge, penetration of orbitals, variations of s, p, d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes, ionization energies, electron affinity and electronegativity, polarizability, oxidation states, coordination numbers and geometries, hard soft acids and bases,		
Unit-IV:	No. of Lectures: 08 Hours	Marks: 12
Intermolecular forces and potential energy surfaces. Ionic, dipolar and van Der Waals interactions. Equations of state of real gases and critical Phenomenon . Potential energy surfaces of H ₂ , H ₂ F and HCN. Use of free energy in chemical equilibria Thermodynamic functions: definitions - energy, entropy and free energy. Estimations of entropy and free energies. Free energy and e.m.f. Cell potentials, the Nernst equation and applications.		
Unit-V:	No. of Lectures: 08 Hours	Marks: 12
Stereochemistry. Isomerism, structural isomers and stereoisomers, configurations and symmetry and chirality, enantiomers, diastereomers, optical activity, absolute configurations (R and S Configuration with Ex.) and conformational analysis.(Staggered and eclipsed Conformation of Ethane) Organic reactions and synthesis of a drug molecule Introduction to reactions involving substitution, addition, elimination, oxidation, reduction, Synthesis of a commonly used drug molecule.(Aspirin and Paracetamol)		
Text Books		
1.Tembe, Kamaluddin and Krishnan,,Engineering Chemistry. (NPTEL Web-book)		
Reference Books:		
<ol style="list-style-type: none"> 1. B. H. Mahan University chemistry, Pearsons Publication, 4th edition 2. M. J. Sienko and R. A. Plane, Chemistry: Principles and Applications, 3. C. N. Banwell, Fundamentals of Molecular Spectroscopy,Mcgraw Higher Ed., 4th edition, 4. P. W. Atkins, Physical Chemistry, Oxford University Press, 7th edition. 5. J. D. Lee Concise Inorganic Chemistry ,Oxford University Press, 5 th edition 6. Puri,Sharma, Kalia, Principles of Inorganic Chemistry 		

ENGINEERING GRAPHICS				
COURSE OUTLINE				
Course Title:	ENGINEERING GRAPHICS	Short Title:	EG	Course Code:
Course description:				
Engineering Graphics is the language of engineers. The concepts of Engineering Graphics are used to develop, express the ideas, and convey the instructions which are used to carry out jobs in the field Engineering. The course illustrates the techniques of graphics in actual practice. This preliminary course aims at building a foundation for the further course in drawing and other allied subjects. This subject is useful in developing drafting and sketching skills of students.				
Lecture	Hours/week	No. of weeks	Total hours	Semester credits
	03	14	42	03
Prerequisite course (s):				
Course objectives:				
This course objectives are -				
<ol style="list-style-type: none"> 1. To design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability 2. To communicate effectively 3. To use the techniques, skills, and modern engineering tools necessary for engineering practice 				
Course outcomes:				
All phases of manufacturing or construction require the conversion of new ideas and design concepts into the basic line language of graphics.				
The student will learn :				
<ol style="list-style-type: none"> 1. Introduction to engineering design and its place in society 2. Exposure to the visual aspects of engineering design 3. Exposure to engineering graphics standards 4. Exposure to solid modeling. 				
COURSE CONTENT				
ENGINEERING GRAPHICS		Semester:	I or II	
Teaching Scheme:		Examination scheme		
Lectures:	3 hours/week	End semester exam (ESE):	60 marks	
		Duration of ESE:	04 hours	
		Internal Sessional Exams (ISE):	40 marks	
Unit-I:		No. of Lectures: 08 Hours		Marks: 12
Introduction To Engineering Graphics:-				
<ol style="list-style-type: none"> A) Principles of Engineering Graphics and their significance, usage of Drawing Instruments and Supporting Material. Letters and Numbers as per BIS : SP46-2003, Scale (Plane , Diagonal & Vernier scale) B) Curves and Conic Section draw ellipse by directrix and arc of circle method. draw parabola by directrix and rectangle method . draw hyperbola by rectangle and directrix method.Cycloid, Epicycloid, Hypocycloid and Involute. 				
Unit-II:		No. of Lectures: 08 Hours		Marks: 12
A) PROJECTIONS OF STRAIGHT LINES:- Principle of Orthographic Projections,-, Projections of Points, Projection of Line, Lines inclined to both the Planes,				

B) PROJECTIONS OF PLANES:- Projection of different simple shapes e.g. Circle, Triangle, Rectangle, Pentagon and Hexagon on principle plane (Inclined to one plane and to both planes).		
Unit-III:	No. of Lectures: 10 Hours	Marks: 12
A) Projection of simple solid. Projection of Prism, Pyramid, Cone, Cylinder and Cube with their axis inclined to one reference plane and parallel to other Projection of Prism, Pyramid, Cone, Cylinder and Cube with their axis inclined to one reference plane and parallel to other B) Development of solid surfaces e.g. Prism, Cylinder, Cone, Pyramid and Cubes		
Unit-IV:	No. of Lectures: 08 Hours	Marks: 12
A) Orthographic projections of different machine parts problem on first angle &Third Angle. B) Types of sections and Conversion of pictorial view into sectional orthographic views		
Unit-V:	No. of Lectures: 08 Hours	Marks: 12
ISOMETRIC PROJECTIONS		
Introduction. Isometric axes, lines and planes, true scale and isometric scale. Isometric projection and Isometric view Conversion of given orthographic view into isometric projection.		
Text Books:		
1. Venugopal K and Prabhu Raja V(2015), "Engineering Graphics", New AGE International Publishers., 2. Narayana.K.L& P Kannaiah(2008),Text book on "Engineering Drawing. SciTech Publication.		
Reference Books:		
1. N.D. Bhat and V.M. Panchal, Engineering Graphics, Charotar Publishers 2013 2. Agrawal B &Agrawal B.C (2008) Engineering Graphics, TMH Publication.		

Workshop Practices						
COURSE OUTLINE						
Course Title:	Workshop Practices		Short Title:	WP	Course Code:	
Course description:						
This course covers the basic knowledge of different manufacturing methods like sand casting, dies casting, metal casting, forming, machining, joining, CNC machining, additive manufacturing and advanced manufacturing methods. It also covers the fundamentals of fitting operations, power tools, knowledge of electrical & electronics, carpentry tools and equipment, plastic molding, glass cutting, arc welding, gas welding and brazing.						
Lecture	Hours/week	No. of weeks	Total hours	Semester credits		
	01	14	14	02		
Practices	02	14	28			
Prerequisite course(s):						
12 th Physics, mathematics, basic knowledge of drawing						
Course objectives:						
<ol style="list-style-type: none"> 1. To study the basics of metal machining. 2. To study the different cutting tool materials and types & geometry of cutting tools. 3. To learn introductory concepts of additive manufacturing. 4. To understand basic manufacturing processes like casting and welding and learn various aspects of casting methods and welding methods. 5. To know about the applications of advanced manufacturing processes. 6. To understand basics of electrical & electronics, carpentry joints, tools equipment, fitting operations, tools, equipment. 7. To understand concepts of plastic molding and glass cutting. 8. To get the knowledge of brazing. 						
Course outcomes:						
After successful completion of this course the student will be able to:						
<ol style="list-style-type: none"> 1. Students will be able to fabricate components with their own hands. 2. Get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes. 3. Assemble different components, they will be able to produce small devices of their interest. 						
COURSE CONTENT						
Workshop Practices			Semester:	I or II		
Teaching Scheme:						
Lectures:	01 hour/week					
Unit-I: Manufacturing Methods		No. of Lectures: 04 Hours				
<ol style="list-style-type: none"> a) Sand casting, die casting, casting defects etc. rolling, forging etc. b) Introduction to machining, cutting tool, cutting tool materials, different machining operation, welding, classification of welding, different welding process. c) Advanced Manufacturing methods- Introduction, different advanced manufacturing methods. d) Introduction to metal casting, patterns, pattern material, gating system, core, mold. 						
Unit-II: CNC machining		No. of Lectures: 01 Hour				

and Additive manufacturing		
Introduction to CNC, classification of CNC, advantages, disadvantages, part programming, Additive manufacturing		
Unit–III: Fitting Operations & Power tools	No. of Lectures: 03 Hour	
Different type of fitting operations, tools, equipment, Introduction to power tools, classification of power tools. Introduction to carpentry tools and equipment, types of carpentry joints. Introduction to plastic molding, plastic molding technique, etc. Introduction to glass cutting, use of glass cutter.		
Unit–IV: Electrical & Electronics	No. of Lectures: 01 Hour	
Single phase, three phase, direct current, transformers, transformer losses, miniature circuit breakers, earth leakage circuit breakers, house wiring, different type of cables, extension boards, concept of maintenance, maintenance of electrical equipment, importance of grounding. Introduction of PCB, types of PCB, mounting components and soldering.		
Unit–V: Welding (arc welding & gas welding), Brazing	No. of Lectures: 01 Hour	
Introduction to arc welding and gas welding, types of welding joints, types of flames, etc. Introduction to brazing process, difference between brazing and welding, flux, filler material.		
Text Books:		
1. Hajrachoudhury S. K., hajraChoudhury A. K and Nirjhar Roy “Elements of Workshop Technology” Vol.1 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.		
Reference Books:		
1. Kalpakjian S. and Steven S. Schmid, “Manufacturing Engineering and Technology” 4th edition, Perason Education India Edition, 2002. 2. Gowri P. hariharan and A. Suresh Babu, “ Manufacturing Technology – I” Perason education, 2008 3. Roy A. Lindberg, “Processes and Materials of manufacture”, 4th Edition, Prentice hall India,1998.		

English				
COURSE OUTLINE				
Course Title:	English	Short Title:	ENG	Course Code:
Course description:				
This course has been designed paying special attention to the contemporary industrial needs and current society demands for Communicative Language skills.				
Lecture	Hours/week	No. of weeks	Total hours	Semester credits
	03	14	42	3
Prerequisite course(s):				
11th& 12th English				
Course objectives:				
<ol style="list-style-type: none"> 1. To acquire basic proficiency in English including reading and listening 2. To demonstrate proficiency in the use of written English, including proper spelling, Grammar and punctuation. 3. To enhance their ability to use spoken words in interpersonal communication, small group interactions and public speaking Comprehension, writing and speaking skills. 4. Become accomplished technical communicators. 				
Course outcomes:				
After successful completion of this course the student will be able to:				
<ol style="list-style-type: none"> 1. To acquire basic proficiency in English including reading and listening 2. To demonstrate proficiency in the use of written English, including proper spelling, Grammar and punctuation. 3. To enhance their ability to use spoken words in interpersonal communication, small group interactions and public speaking Comprehension, writing and speaking skills. 4. Become accomplished technical communicators. 				
COURSE CONTENT				
English		Semester:		I or II
Teaching Scheme:		Examination scheme		
Lectures:	03 hours/week	End semester exam (ESE):		60 marks
		Duration of ESE:		03 hours
		Internal Sessional Exams (ISE):		40 marks
Unit-I:		No. of Lectures: 08 Hours		Marks: 12
1. Introduction to Phonetics 1.1 Vowel Sounds 1.2 Consonant Sounds 1.3 Diphthongs 1.4 Intonation				
Unit-II:		No. of Lectures: 08 Hours		Marks: 12
2. Basic Writing Skills 2.1 Sentence Structures 2.2 Use of phrases and clauses in sentences 2.3 Importance of proper punctuation 2.4 Creating coherence 2.5 Organizing principles of paragraphs in documents 2.6 Techniques for writing precisely				

Unit-III:	No. of Lectures: 08 Hours	Marks: 12
3. Identifying Common Errors in Writing		
3.1 Subject-verb agreement		
3.2 Noun-pronoun agreement		
3.3 Tenses		
3.4 Articles		
3.5 Prepositions		
3.6 Primary Auxiliary Verbs		
3.7 Modal Auxiliary Verbs		
Unit-IV:	No. of Lectures: 08 Hours	Marks: 12
4. Nature and Style of sensible Writing		
4.1 Describing		
4.2 Defining		
4.3 Classifying		
4.4 Job Application		
4.5 Résumé, Curriculum Vitae & Bio-Data		
Unit-V:	No. of Lectures: 08 Hours	Marks: 12
5. Reading Comprehension		
5.1 Skimming		
5.2 Scanning		
5.3 Intensive		
5.4 Extensive		
Text Book		
1. Raymond Murrphy. Essential English Grammar, Cambridge University Press, 2 nd edition		
2. Rajinder Pal & PremLata , English Grammar&Composition, Sultan chand Publication		
Reference Books:		
1. Michael Swan. Practical English Usage. OUP. 1995.		
2. F.T. Wood. Macmillan Remedial English Grammar..2007		
3. William Zinsser, On Writing Well., Harper Resource Book. 2001		
4. Hamp-Lyons and Ben Heasley, Study Writing. Liz Cambridge University Press. 2006.		
5. Sanjay Kumar and PushpLata, Communication Skills, Oxford University Press. 2011.		
6. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press		

Physics Lab				
LAB COURSE OUTLINE				
Course Title:	Physics(Lab)	Short Title:	PHY (Lab)	Course Code:
Course description:				
To impart knowledge of basic concepts in applied physics and implementation to various engineering fields also provide the methodology necessary for solving problems in the field of engineering.				
Laboratory	Hours/week	No. of weeks	Total hours	Semester credits
	02	14	28	1
End Semester Exam (ESE) Pattern:				
Prerequisite course(s):				
11 th and 12 th Physics				
Course objectives:				
(i) To acquire the knowledge of Electromagnetic field theory that allows the student to have a solid theoretical foundation to be able in the future to design emission , propagation and reception of electro- magnetic wave systems. (ii) Gain an understanding of the basic principles and the experimental basis of the various fields of physics and the logical relationships of the various fields. (iii) To develop in the student awareness of situations in engineering, which need ideas of quantum mechanics. (iv) To enable the student with those aspects of quantum mechanics, which are necessary to begin to work in small structures such as those common in nanotechnology. (v) Students will understand semiconductor materials and devices for optoelectronics in this course.				
Course outcomes:				
Upon successful completion of lab Course, student will be able to:				
1. To study Bragg's Law and introduced to the principles of lasers, types of lasers and applications 2. Various terms related to properties of materials such as, permeability, polarization, etc. 3. Some of the basic laws related to quantum mechanics as well as magnetic and dielectric 4. properties of materials 5. Simple quantum mechanics calculations 6. Nanotechnology and their industrial applications.				
LAB COURSE CONTENT				
Physics (Lab)		Semester:	I or II	
Teaching Scheme:		Examination scheme		
Practical:	2 hours/week	Internal Continuous Assessment (ICA):		25 marks
To conduct ten practical from given following list				
Introduction to Electromagnetic and Optics				
<ul style="list-style-type: none"> • Experiments on electromagnetic induction and electromagnetic breaking; • LC circuit and LCR circuit; • Resonance phenomena in LCR circuits; • Magnetic field from Helmholtz coil; • Measurement of Lorentz force in a vacuum tube. 				

- Michelsons Interferrometer
- Brewsters Law
- Varification of Law of Malus
- To study B-H curve
- Determination of e/m by Thomsons method

Acoustics and Introduction to Mechanics

- Ultrasonic Detector
- Sound level meter
- Coupled oscillators:
- Resonance phenomena in mechanical oscillators.

Quantum Mechanics and Nanotechnology for Engineers

- Frank-Hertz experiment;
- Photoelectric effect experiment:
- Synthesis of Graphene by Hummer's method
- Characterization of Graphene by Hummer's method
- Synthesis of nanostructures such as nanoparticles, nanofibers, nanorods by Chemical Method; Physical Method or Hybrid Method;
- Characterization of nanostructures such as nanoparticles, nanofibers, nanorods by Chemical Method; Physical Method or Hybrid Method;
- Use of Nanostructure for solar cell fabrication.
- Conducting polymers for nanotechnology applications

Atomic Molecular physics

- To determine the wavelength of He-Ne laser .
- Fiber optics communication
- Diffraction and interference experiments (from ordinary light or laser pointers)

Solid state physics and Semiconductor Physics

- Diode characteristics
- I-V characteristics of Solar cell
- Determination of forbidden band gap.
- Determination of wavelength of He-Ne Laser.
- Hall effect
- Four Probe method
- Crystal structure

Text Books:

1. David Griffiths, Introduction to Electrodynamics, 4th edition, Pearson Publication
2. Eisberg and Resnick, Quantum Physics of Atoms, Molecules, Solids, Nuclei and Particles 2nd Edition, Wiley Publication
3. Gupta , Kumar and Saxena, "Solid State Physics" Pragati Publication
4. N Zettili, "Quantum Physics" 2th edition, Wiley Publication
5. Gupta ,Kumar and Sharma, Atomic and Molecular Physics, Pragati Prakashan
6. Murthy, "Textbook Of Nanosciene And Nanotechnology", University Press
7. J. C. Upadhya, "Classical Mechanics" Himalaya Publication House.

Reference Books:

1. Resnick , Halliday , Krane, "Physics, Volume I and II" Wiley Publication, 5th Edition
2. W. Saslow, Electricity, Magnetism and light, Academic Press Publication
3. O. Svelto, Principles of Lasers, Springer Publication.
4. Quila " Perspective of Quantum Mechanics", NCBA Publication
5. M A Wahab ,Solid State Physics, Narosa Publishing House,

Guide lines for ICA:
Students must submit ICA in the form of journal. Each assignment should be well documented. Faculty in charge will assess the assignments continuously and grade or mark each assignment on completion date declared for each assignments.
Guidelines for ESE:
ESE will be based on the laboratory assignments submitted by the students in the form of journal.

Basic Electrical and Electronics Engineering Lab.				
LAB COURSE OUTLINE				
Course Title:	Basic Electrical and Electronics Engineering (Lab)	Short Title:	BEEE (Lab)	Course Code:
Course description:				
Also in this laboratory course emphasis is on the understanding of the characteristics of basic circuits that use resistors, capacitors, ac/dc circuits, diodes, bipolar junction transistors, logic gates etc. The students can use this knowledge to analyze more complex circuits such as complex electrical networks, rectifiers, amplifiers, digital circuits etc. The students can use this knowledge to analyze more complex circuits such as electrical networks, single and three phase circuits etc.				
Laboratory	Hours/week	No. of weeks	Total hours	Semester credits
	02	14	28	01
End Semester Exam (ESE) Pattern:		Oral (OR)		
Prerequisite course(s):				
11 th & 12 th Physics				
Course objectives:				
<ol style="list-style-type: none"> 1. 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 engineering Systems. 2. In this lab, students will be familiar with use of different theorems to analyze electrical networks. Students will also become familiar with R, L and C circuit, power measurement, etc. 3. In this lab, students will become familiar with various basic analogue and digital electronic circuits. 				
Course outcomes:				
Upon successful completion of lab Course, student will be able to:				
<ol style="list-style-type: none"> 1. Identify electrical and electronics components/equipments. 2. Simplify D.C. network using Superposition Theorem. 3. Simplify D.C. network using Thevenin's Theorem. 4. Learn diode V-I Characteristic 5. Understand BJJ as a switch 6. Understand LED, JFET, SCR V-I characteristics 				
LAB COURSE CONTENT				
Basic Electrical and Electronics Engineering (Lab)		Semester:	I or II	
Teaching Scheme:		Examination scheme		
Practical:	2 hours/week	End semester exam (ESE):	25 marks	
		Internal Continuous Assessment (ICA):	25 marks	

(Minimum FOUR practicals in each group)

Group A

1. Study and representation of electrical and electronics components/equipments.
2. Verification of Thevenin's theorems.
3. Verification of Superposition theorems.
4. Verification of Maximum power transfer theorems.
5. Measurement of current, voltage and power in R-L series excited by single phase AC supply.
6. Measurement of current, voltage and power in R-C series excited by single phase AC supply.

Group B

7. To plot the V-I Characteristics of P-N Junction diode forward characteristic
8. Study of BJT as a Switch a) Determination of parameters in cut off region, b) Determination of parameters in saturation region.
9. To plot the V-I Characteristics of JFET. a) drain characteristic b) transfer characteristic
10. To plot the characteristics of Light Emitting Diode (LED)
11. To plot V-I characteristics of SCR a) To plot forward characteristic of SCR. b) To determine VBO, IL & IH of SCR
12. Implementation of any Boolean expression using LOGIC GATES. a) Simplification of Boolean expression, b) Implementation using Basic gates and Universal gates

Text Books:

1. B. L. Theraja and A. K. Theraja, "A Text book of Electrical Technology - Vol-I and Vol-II". S. Chand, 1st Edition, 2001.
2. K. A. Krishnamurty, M. R. Raghuvver, "Electrical and Electronics Engineering for Scientists and Engineers," Willey Eastern Limited.
3. J. B. Gupta, "A Course in Electrical Power", S. K. Kataria and Sons, 12th Edition, 2002.
4. R. S. Sedha, "Applied Electronics", S. Chand Publication
5. V.K. Mehta, "Principles of Electronics", S. Chand Publications

Reference Books:

1. V. N. Mittal, Arvind Mittal, "Basic Electrical Engineering", Tata McGraw Hill publishing co. ltd. New Delhi
2. D. P. Kothari, I.J Nagrath, "Basic Electrical Engineering", Tata McGraw Hill
3. M. S. Naidu, S.Kamakshaiyah, "Introduction to Electrical Engineering", Tata McGraw Hill.
4. P. Tiwari, "Basic Electrical Engineering", New Age Publication.
5. Vincent Del Toro, "Electrical Engineering Fundamentals", Pearson
6. R. P. Jain, "Modern Digital Electronics" McGraw Hill Education (India) Private Limited, Fourth Edition, 2017. B. L. Theraja, "Applied Electronics" S. Chand Publication
7. A.P. Malvino, "Electronics Principles" TMH Publications.

Guide lines for ICA:

Students must submit ICA in the form of journal. Each assignment should be well documented. Faculty in charge will assess the assignments continuously and grade or mark each assignment on completion date declared for each assignments.

Guidelines for ESE:

ESE will be based on the laboratory assignments submitted by the students in the form of journal.

Programming for Problem Solving Lab					
LAB COURSE OUTLINE					
Course Title:	Programming for Problem Solving (Lab)	Short Title:	PPL (Lab)	Course Code:	
Course description:					
This course provides students with a comprehensive study of the C programming language with program design and problem solving. This course focuses on Programming topics include control structures, functions, arrays, pointers, and file I/O.					
Laboratory	Hours/week	No. of weeks	Total hours	Semester credits	
	02	14	28	1	
End Semester Exam (ESE) Pattern:			Oral (OR)		
Prerequisite course(s):					
11th Physics, 12th Physics					
Course objectives:					
1. Learn the fundamentals, structure and syntax of C Language. 2. Write simple programs in C Language.					
Course outcomes:					
Upon successful completion of lab Course, student will be able to:					
1. Understand the fundamentals of C programming. 2. Choose the loops and decision making statements to solve the problem. 3. Use functions to solve the given problem. 4. Implement different Operations on arrays. 5. Understand strings and structures. 6. Understand the usage of pointers.					
LAB COURSE CONTENT					
Programming for Problem Solving (Lab)		Semester:		I or II	
Teaching Scheme:		Examination scheme			
Practical:	2 hours/week	End semester exam (ESE):		25 marks	
		Internal Continuous Assessment (ICA):		25 marks	
GROUP - A					
Concerned faculty member will suitably frame FIVE assignments, ONE from each UNIT of the concerned theory subject, each assignment of 20 questions from unsolved exercises of Text Books as given below. The questions should be in the nature of multiple choices, TRUE / FALSE, output of a program, identify errors in a program etc. These assignments should be performed in the lab and for hands on practice.					
GROUP - B					
Concerned faculty member should suitably frame FIVE laboratory assignments from the following list.					
1. Write a C program to find area of circle, triangle, rectangle, square using switch statement.					
2. Write a C program to find the sum of a series (looping).					
3. Write a C program to accept a string and reverse it without using library functions. Display the original and reversed string. (String handling).					
4. Write a C program that uses functions to perform the following string operations using					

function and pointers: i) To insert a sub-string in to given main string from a given position.

ii) To delete n Characters from a given position in a given string.

5. Write a C program to read 'N' elements into an array and compute the sum of all the elements stored in an array using pointer. (Arrays and pointers).

6. Write a C program to read a matrix of order (M *N) and (P * Q) and compute the addition and multiplication of two matrices. (Passing matrix to functions).

7. Write a C program to read 'N' students information and display the information with appropriate headings, where each student information consists of roll number, Name, total marks scored etc. (Structure handling).

Note: Use of Open Source Software/Tool/Technology is recommended for laboratory assignments of concern subject.

Text Books:

1. Yashavant Kanetkar, Test Your C Skills , , BPB Publication ,5th Edition

2.Yashavant Kanetkar, Let Us C by , BPB Publication, 14th Edition

Reference Books:

1. E Balagurusamy, Programming in ANSIC C by, Tata McGraw Hill, 4th Edition

2. K. R. Venugopal and S. R. Prasad, Mastering C, Tata McGraw Hill, 2011, 2nd Edition

3. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, PHI, 2nd Edition

4. Paul Deitel and Harvey Deitel, C How to Program, Pearson, 8th Edition

5. R.S. Salaria, Computer concepts and Programming in C, Khanna Publication

Guide lines for ICA:

Students must submit ICA in the form of journal. Each assignment should be well documented. Faculty in charge will assess the assignments continuously and grade or mark each assignment on completion date declared for each assignments.

Guidelines for ESE:

ESE will be based on the laboratory assignments submitted by the students in the form of journal.

Chemistry Lab					
LAB COURSE OUTLINE					
Course Title:	Chemistry (Lab)	Short Title:	CHY (Lab)	Course Code:	
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 can use this knowledge and apply in various branches of engineering as required.					
Laboratory	Hours/week	No. of weeks	Total hours	Semester credits	
	02	14	28	1	
End Semester Exam (ESE) Pattern:					
Prerequisite course(s):					
11 th &12 th Chemistry, Different laws, basic principles and theories.					
Course 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.					
<ul style="list-style-type: none"> To impart knowledge of basic concepts in chemistry and implementation to various engineering fields. To provide the knowledge and methodology necessary for solving problems in the field of engineering. 					
Course outcomes:					
Upon successful completion of lab Course, student will be able to:					
<ul style="list-style-type: none"> The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering. The students will learn to: <ul style="list-style-type: none"> Estimate rate constants of reactions from concentration of reactants/products as a function of time Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc Synthesize a small drug molecule and analyse a salt sample . 					
LAB COURSE CONTENT					
Chemistry (Lab)			Semester:	I or II	
Teaching Scheme:			Examination scheme		
Practical:	2 hours/week				
Internal Continuous Assessment (ICA):				25 marks	
Choice of 10-12 experiments from the following:					
<ul style="list-style-type: none"> Determination of surface tension and viscosity Thin layer chromatography Ion exchange column for determination of hardness of water Determination of chloride content of water Colligative properties using freezing point depression Determination of the rate constant of a reaction Determination of cell constant and conductance of solutions Potentiometry - determination of redox potentials and emfs Synthesis of a polymer/drug Saponification/acid value of an oil Chemical analysis of a salt 					

<ul style="list-style-type: none"> • Lattice structures and packing of spheres • Models of potential energy surfaces • Chemical oscillations- Iodine clock reaction • Determination of the partition coefficient of a substance between two immiscible liquids • Adsorption of acetic acid by charcoal • Use of the capillary viscosimeters to demonstrate the isoelectric point as the pH of minimum viscosity for gelatin sols and/or coagulation of the white part of egg .
Text Books
1. Tembe, Kamaluddin and Krishnan, Engineering Chemistry, (NPTEL Web-book)
Reference Books:
<ol style="list-style-type: none"> 1. B. H. Mahan University chemistry, Pearsons Publication, 4th edition 2. M. J. Sienko and R. A. Plane, Chemistry: Principles and Applications, 3. C. N. Banwell, Fundamentals of Molecular Spectroscopy, Mcgraw Higher Ed., 4th edition. 4. P. W. Atkins, Physical Chemistry, Oxford University Press, 7th edition.
Guide lines for ICA:
Students must submit ICA in the form of journal. Each assignment should be well documented. Faculty in charge will assess the assignments continuously and grade or mark each assignment on completion date declared for each assignments.
Guidelines for ESE:
ESE will be based on the laboratory assignments submitted by the students in the form of journal.

Engineering Graphics Lab				
LAB COURSE OUTLINE				
Course Title:	Engineering Graphics (Lab)	Short Title:	EG (Lab)	Course Code:
Course description:				
Engineering Graphics is the language of engineers. The concepts of Engineering Graphics are used to develop, express the ideas, and convey the instructions which are used to carry out jobs in the field Engineering. The course illustrates the techniques of graphics in actual practice. This preliminary course aims at building a foundation for the further course in drawing and other allied subjects. This subject is useful in developing drafting and sketching skills of students.				
Laboratory	Hours/week	No. of weeks	Total hours	Semester credits
	02	14	28	01
End Semester Exam (ESE) Pattern:		Oral (OR)		
Prerequisite course(s):				
Course objectives:				
This course objectives are -				
<ol style="list-style-type: none"> 1. To design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability. 2. To communicate effectively. 3. To use the techniques, skills, and modern engineering tools necessary for engineering Practice. 				
Course outcomes:				
Upon successful completion of lab Course, student will be able to:				
All phases of manufacturing or construction require the conversion of new ideas and design concepts into the basic line language of graphics.				
The student will learn :				
<ol style="list-style-type: none"> 1. Introduction to engineering design and its place in society 2. Exposure to the visual aspects of engineering design 3. Exposure to engineering graphics standards 4. Exposure to solid modeling. 				
LAB COURSE CONTENT				
Engineering Graphics Lab		Semester:	I or II	
Teaching Scheme:		Examination scheme		
Practical:	2 hours/week	End semester exam (ESE):	25 marks	
		Internal Continuous Assessment (ICA):	25 marks	
Sheet No. 01 Lines, Dimensioning and Scales. (04 Hrs) Sheet No. 02 Engineering curves - Three different curves are to be draw using any one method. (04 Hrs) Sheet No. 03 Projections of Lines and Planes - Two problems on projection of lines and two problems on projection of planes (04 Hrs). Sheet No. 04 Projection of solids and Development of Surfaces (Two Problems on each) - Two problems on two different solids,				

- a) axis of solid inclined to HP and parallel to VP and
- b) Axis of solid inclined to VP and parallel to HP. (04 Hrs)

Sheet No. 05 Orthographic projections - Two objects by first / Third angle projection method, Full orthographic views, Sectional orthographic views (06 Hrs)

Sheet No. 06 Isometric projection - Isometric views of two different objects, Isometric projection of two different objects. (04 Hrs)

Text Books:

1. Venugopal K and Prabhu Raja V(2015), "Engineering Graphics", New AGE International Publishers.
2. Narayana.K.L& P Kanniah(2008).Text book on "Engineering Drawing. SciTech Publication.

Reference Books:

1. N.D. Bhat and V.M. Panchal, Engineering Graphics, Charotar Publishers 2013
2. Agrawal B &Agrawal B.C (2008) Engineering Graphics, TMH Publication.

Guide lines for ICA:

ICA shall be based on continuous evaluation of student performance throughout semester and drawing sheets submitted by the student in the form of journal.

Guidelines for ESE:

ESE will be based on the laboratory assignments submitted by the students in the form of journal.

Workshop Practices LAB					
LAB COURSE OUTLINE					
Course Title:	Workshop Practices (Lab)	Short Title:	WP (Lab)	Course Code:	
Course description:					
This course covers the basic knowledge of different manufacturing methods like sand casting, dies casting, metal casting, forming, machining, joining, CNC machining, additive manufacturing and advanced manufacturing methods. It also covers the fundamentals of fitting operations, power tools, knowledge of electrical & electronics, carpentry tools and equipment, plastic molding, glass cutting, arc welding, gas welding and brazing.					
Laboratory	Hours/week	No. of weeks	Total hours	Semester credits	
	02	14	28	02	
End Semester Exam (ESE) Pattern:			Oral (OR)		
Prerequisite course(s):					
12 th Physics, mathematics, basic knowledge of drawing					
Course objectives:					
<ol style="list-style-type: none"> 1. To study the basics of metal machining. 2. To study the different cutting tool materials and types & geometry of cutting tools. 3. To learn introductory concepts of additive manufacturing. 4. To understand basic manufacturing processes like casting and welding and learn various aspects of casting methods and welding methods. 5. To know about the applications of advanced manufacturing processes. 6. To understand basics of electrical & electronics, carpentry joints, tools equipment, fitting operations, tools, equipment. 7. To understand concepts of plastic molding and glass cutting. 8. To get the knowledge of brazing 					
Course outcomes:					
Upon successful completion of lab Course, student will be able to:					
<ol style="list-style-type: none"> 1. Students will be able to fabricate components with their own hands. 2. Get practical knowledge of the dimensional accuracies and dimensional tolerances possible 3. with different manufacturing processes. 4. Assemble different components, they will be able to produce small devices of their interest. 					
LAB COURSE CONTENT					
Workshop Practices LAB			Semester:	I or II	
Teaching Scheme:			Examination scheme		
Practical:	2 hours/week	End semester exam (ESE):		25 marks	
			Internal Continuous Assessment (ICA):	25 marks	
Note: - Workshop manual should consist of minimum seven activities from the following list of practicals.					
Students should practice and prepare a job, which consist of following activities in different shops-					
1. Machine shop:					
i) Demonstration of lathe machine (different parts, different operations, different type of cutting tools)					
ii) One job Practice of Facing, Plane Turning, step turning, taper turning, knurling , parting, external or internal thread cuttings, drilling.					

- iii) Demonstration of milling machine.
- iv) One job Practice of Keyway milling using milling machine.
- v) One job Practice of Spur gear cutting using milling machine.

2. Smithy Shop:

- i) Demonstration of smithy tools & equipment.
- ii) One job Practice of S shape or Hook shape involving bending, flattening operations.

3. Foundry Shop:

- i) Demonstration of foundry tools, patterns, ingredients of molding sand.
- ii) Demonstration of preparation of mold using split pattern and casting of the same.

4. Fitting Shop:

- i) Demonstration of different hand operated power tools, uses and their applications.
- ii) One job Practice of T shape and U shape workpiece as per the given dimensions, which contains: filing, drilling and grinding.

5. Carpentry Shop:

- i) Demonstration of Carpentry Tools, Equipment and different joints.
- ii) One job Practice of Cross Half lap joint or Half lap Dovetail joint.

6. House Wiring:

- i) Introduction to House wiring, different types of cables. Types of power supply, types of bulbs, parts of tube light, Electrical wiring symbols.
- ii) 2-phase, 3-phase electric supply, earthing, Electric safety.

7. Welding Shop:

- i) Demonstration of welding tools, welding joints, symbols and welding equipment (Gas and Arc welding)
- ii) Selection of welding electrode and current, and demonstration of brazing.
- iii) One job Practice of Lap Joint by arc welding and gas welding.

8. CNC Shop:

- i) Demonstration of CNC lathe machine and CNC milling machine.
- ii) CNC part programming.
- iii) Demonstration of different operations like facing, turning, step turning, taper turning etc. on CNC lathe machine.

Note: - Candidates are required to finish the job to the following limits.

Machine Shop: ± 0.5 mm , Fitting Shop: ± 0.5 mm, Carpentry Shop : ± 2 mm, Smithy Shop: ± 2 mm, Welding Shop: ± 1 mm.

Text Books:

1. Hajra choudhury S. K., Hajra Choudhury A. K and Nirjhar Roy “Elements of Workshop Technology” Vol.1 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.

Reference Books:

1. Kalpakjian S. and Steven S. Schmid, “Manufacturing Engineering and Technology” 4th edition, Perason Education India Edition, 2002.
2. Gowri P. hariharan and A. Suresh Babu, “ Manufacturing Technology – I” Perason education, 2008
3. Roy A. Lindberg, “Processes and Materials of manufacture”, 4th Edition, Prentice hall India, 1998.
4. Rao P. N, “Manufacturing Technology”, Vol. I and Vol. II. Tata McGraw-Hill house, 2017.

Guide lines for ICA:

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on completion date declared for each assignments.

Guidelines for ESE:

ESE will be based on the laboratory assignments submitted by the students in the form of journal.

English Lab							
LAB COURSE OUTLINE							
Course Title:	English(Lab)			Short Title:	ENG (Lab)	Course Code:	
Course description:							
The Communicative English Lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations and contexts.							
Laboratory	Hours/week	No. of weeks	Total hours	Semester credits			
	02	14	28	01			
End Semester Exam (ESE) Pattern:				<i>Oral (OR)</i>			
Prerequisite course(s):							
11 th & 12 th English							
Course objectives:							
1. To make students recognize the accents of English through Audio-Visual aids.							
2. To help students build their confidence and help overcome their inhibitions and self-Consciousness while speaking in English. The focus will be on fluency.							
3. To familiarize the students with communicative English.							
Course outcomes:							
Upon successful completion of lab Course, student will be able to:							
1. Students will be sensitized towards recognition of English sound pattern.							
2. The fluency in speech will be enhanced.							
LAB COURSE CONTENT							
English (Lab)			Semester:	I or II			
Teaching Scheme:			Examination scheme				
Practical:	2 hours/week		End semester exam (ESE):			25 marks	
			Internal Continuous Assessment (ICA):			25 marks	
<p>The following course content is prescribed for the English Language Lab based on Unit-6 of AICTE Model Curriculum 2018-19 for B.E First Year.. This unit involves interactive practice sessions in Language Lab .Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.</p> <ul style="list-style-type: none"> • Interactive Practice Sessions in Language Lab: <ol style="list-style-type: none"> 1. Listening Comprehension: Understand: Listening Skill- Its importance – Purpose- Barriers of Listening. Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants. 2. Pronunciation, Intonation, Stress and Rhythm: Understand: Word Stress & Sentence Stress , Intonation and rhythm Practice: Basic Rules of Word Stress & Sentence Stress 3. Common Everyday Situations: Conversations and Dialogues: Understand: Verbal – Non-verbal Communication. Practice: Situational Dialogues – Role-Play- Expressions in Various Situations – Making Requests and Seeking Permissions 4. Communication at Workplace: Understand : Communication at Workplace 							

<p>Practice: Communication at Workplace</p> <p>5. Interviews: Understand: Interview Skills. Practice: Mock Interviews.</p> <p>6. Introducing oneself & Introducing others: Understand : Introduction Practice: Introducing oneself & Introducing others</p>
Text Book
<ol style="list-style-type: none"> 1. Raymond Murrphy, Essential English Grammar, Cambridge University Press, 2nd edition 2. Rajinder Pal & PremLata , English Grammar &Composition, Sultan chand Publication
Reference Books:
<ol style="list-style-type: none"> 1. Michael Swan, Practical English Usage. OUP, 1995. 2. F.T. Wood. Macmillan Remedial English Grammar..2007 3. William Zinsser, On Writing Well.. Harper Resource Book. 2001 4. Hamp-Lyons and Ben Heasley. Study Writing. Liz Cambridge University Press. 2006. 5. Sanjay Kumar and PushpLata. Communication Skills, Oxford University Press. 2011. 6. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press
Guide lines for ICA:
Students must submit ICA in the form of journal. Each assignment should be well documented. Faculty in charge will assess the assignments continuously and grade marks for each assignment on completion date declared for each assignments.
Guidelines for ESE:
ESE will be based on the laboratory assignments submitted by the students in the form of journal.

MATHEMATICS-II					
COURSE OUTLINE					
Course Title:	Mathematics -II	Short Title:	M-II	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	14	42	4	
Tutorial	01	14	14		
Prerequisite course(s): 11 th & 12 th mathematics					
Course objectives:					
The objective of this course is to familiarize the prospective engineers with techniques in Multivariate integration, ordinary and partial differential equations and complex variables. It aims to equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines					
Course outcomes:					
After successful completion of this course the student will be able to:					
<ol style="list-style-type: none"> 1) Use mathematical tools needed in evaluating multiple integrals and their usage. 2) Apply effective mathematical tools for the solutions of differential equations that model physical processes. 3) Use tools of differentiation and integration of functions of a complex variable that are used in various techniques dealing engineering problems. 					
COURSE CONTENT					
Mathematics -II		Semester:		II	
Teaching Scheme:		Examination scheme			
Lectures:	3 hours/week	End semester exam (ESE):		60 marks	
Tutorial	1 hours/week	Duration of ESE:		03 hours	
		Internal Sessional Exams (ISE):		40 marks	
Unit-I:		No. of Lectures: 8 Hours		Marks: 12	
First order ordinary differential equations: Exact equations, Integrating Factor, Equations reducible to exact, linear and Bernoulli's equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.					
Unit-II:		No. of Lectures: 08 Hours		Marks: 12	
Linear Differential Equations with constant coefficients; Linear differential equations with constant coefficients, Method to find Particular Integral by shortcut method, method of variation of parameters, Cauchy-Euler equation. Legendres Equations.					
Unit-III:		No. of Lectures: 08 Hours		Marks: 12	
Function of Complex Variable : Differentiation, Cauchy-Riemann equations, analytic functions, harmonic functions, finding harmonic conjugate; zeros of analytic functions, singularities, Cauchy Integral formula (without proof), Cauchy Residue theorem(without proof)					
Unit-IV:		No. of Lectures: 08 Hours		Marks: 12	
Numerical methods:- Solution of Ordinary differential equations: by Taylor's series and Picard's					

Method. Runge-Kutta method of fourth order for solving first order equations.		
Numerical integration: Trapezoidal rule and Simpson's 1/3rd and 3/8 rules.		
Unit-V:	No. of Lectures: 08 Hours	Marks: 12
Multivariable Calculus (Integration):		
Double integrals (limits Given and limits not given) by Cartesian and Polar coordinates. Triple integration by spherical polar coordinates. Applications: areas and volumes.		
Text Books :		
<ol style="list-style-type: none"> 1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008. 2. H.K.DASS "Advance Engineering Mathematics" S. Chand publications. 3. Ravish R. Singh, Mukul Bhatt "Engineering Mathematics A Tutorial Approach. Tata McGrawHill Education Private Limited. New Delhi 		
Reference Books:		
<ol style="list-style-type: none"> 1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002. 2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006. 3. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edn., Wiley India, 2009. 4. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984. 5. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995. 6. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed., McGrawHill, 2004. 7. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010 		

NORTH MAHARASHTRA UNIVERSITY,

JALGAON (M.S.)

**Bachelor of Engineering
(Biotechnology Engineering)**

Faculty of Science and Technology



**'A' Grade
NAAC Re-Accredited
(3rd Cycle)**

SYLLABUS STRUCTURE

(As per AICTE Guidelines)

W.E.F. 2018 – 19

Subject Group Code and Subject Groups

Sr. No.	GROUP	Category	Breakup of Credits (Total 160)
1	A	Humanities and Social Sciences including Management Courses (HSMC)	12
2	B	Basic Science Courses (BSC)	25
3	C	Engineering Science Courses including workshop, drawing, basics of electrical/mechanical/computer etc. (ESC)	24
4	D	Professional Core Courses (PCC)	48
5	E	Professional Elective Courses relevant to chosen specialization/branch (PEC)	18
6	F	Open subjects – Electives from other technical and /or emerging subjects (OEC)	18
7	G	Project work, seminar and internship in industry or appropriate work place/ academic and research institutions in India/abroad (PROJ)	15
8	H	Mandatory Courses (MC) [Environmental Sciences, Induction program, Indian Constitution, Essence of Indian Traditional Knowledge]	
Total			160

Syllabus Structure for First Year Engineering (Semester – I) (Mechanical, Auto, Civil, Chemical, Biotech.) (w.e.f. 2018 – 19)

(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Chemistry	B	3	1	-	4	40	60	-	-	100	4
Mathematics - I	B	3	1	-	4	40	60	-	-	100	4
Engineering Graphics	C	3	-	-	3	40	60	-	-	100	3
English	A	3	-	-	3	40	60	-	-	100	3
Chemistry Lab	B	-	-	2	2	-	-	25	-	25	1
Engineering Graphics Lab	C	-	-	2	2	-	-	25	25(OR)	50	1
English Lab	A	-	-	2	2	-	-	25	25(OR)	50	1
Workshop Practices	C	1	-	2	3	-	-	25	25(OR)	50	2
Induction Program*	H	-	-	-	-	-	-	-	-	-	0
		13	2	8	23	160	240	100	75	575	19

* 3-week long Induction Program for students entering the institution, right at the start.

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Syllabus Structure for First Year Engineering (Semester – II) (Mechanical, Auto, Civil, Chemical, Biotech.)) (w.e.f. 2018 – 19)

(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Physics	B	3	1	-	4	40	60	-	-	100	4
Mathematics - II	B	3	1	-	4	40	60	-	-	100	4
Basic Electrical & Electronics Engineering	C	3	1	-	4	40	60	-	-	100	4
Programming for Problem Solving	C	3	-	-	3	40	60	-	-	100	3
Physics Lab	B	-	-	2	-	-	-	25	-	25	1
Basic Electrical & Electronics Engineering Lab	C	-	-	2	-	-	-	25	25(OR)	50	1
Programming for Problem Solving Lab	C	-	-	2	-	-	-	25	25(OR)	50	1
		12	3	6	21	160	240	75	50	525	18

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Syllabus Structure for Second Year Engineering (Semester – III) (Biotechnology) (w.e.f. 2019 – 20)

(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Biology	B	3	1	-	4	40	60	-	-	100	4
Bioprocess Calculations	C	3	-	-	3	40	60	-	-	100	3
Unit Operations	C	3	-	-	3	40	60	-	-	100	3
Microbiology	D	3	-	-	3	40	60	-	-	100	3
Bioprocess Industrial Economics & Management	A	3	-	-	3	40	60	-	-	100	3
LAB Unit Operations	C	-	-	2	2	-	-	25	25(OR)	50	1
LAB Microbiology	D	-	-	2	2	-	-	25	25(PR)	50	1
LAB Good Manufacturing Practices	D	1	-	2	3	-	-	25	25(OR)	50	2
		16	1	6	23	200	300	75	75	650	20

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Syllabus Structure for Second Year Engineering (Semester – IV) (Biotechnology) (w.e.f. 2019 – 20)

(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Biostatistics	B	3	1	-	4	40	60	-	-	100	4
Process Heat Transfer	C	3	-	-	3	40	60	-	-	100	3
Immunology	D	3	-	-	3	40	60	-	-	100	3
Biochemistry	D	3	-	-	3	40	60	-	-	100	3
IPR& Entrepreneurship	A	3	-	-	3	40	60	-	-	100	3
Process Heat Transfer		-	-	2	2	-	-	25	-		1
LAB Immunology		-	-	2	2	-	-	25	25(PR)	50	1
LAB Biochemistry		-	-	2	2	-	-	25	25(PR)	50	1
LAB- Environmental Biotechnology	D	1	-	2	3	-	-	-	25(OR)	50	2
Environmental Science	H	-	-	-	-	-	-	-	-	-	
		16	1	8	25	200	300	75	75	650	21

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Syllabus Structure for Third Year Engineering (Semester – V) (Biotechnology) (w.e.f. 2020 – 21)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Molecular Biology	D	3	-	-	3	40	60	-	-	100	3
Reaction Engineering	D	3	-	-	3	40	60	-	-	100	3
Enzyme Engineering	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course –I	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – I	F	3	-	-	3	40	60	-	-	100	3
LAB Molecular Biology		-	-	2	2	-	-	25	25(OR)	50	1
LAB Reaction Engineering		-	-	2	2	-	-	25	25(OR)	50	1
LAB- Pharmaceutical Biotechnology	D	-	-	2	2	-	-	25	25(OR)	50	1
Minor Project (Stage-I)	G	-	-	6	6	-	-	50	-	50	3
Constitution of India		-	-	-	-	-	-	-	-	-	0
		15	0	12	27	200	300	125	75	700	21

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Professional Elective Course – I		Open Elective Course – I	
1		1	
2		2	
3		3	
4		4	

**Syllabus Structure for Third Year Engineering (Semester – VI) (Biotechnology) (w.e.f. 2020 – 21)
(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Genetic Engineering	D	3	-	-	3	40	60	-	-	100	3
Mass Transfer	D	3	-	-	3	40	60	-	-	100	3
Bioprocess Engineering	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – II	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – II	F	3	-	-	3	40	60	-	-	100	3
LAB Genetic Engineering		-	-	2	2	-	-	25	25(OR)	50	1
LAB Mass Transfer		-	-	2	2	-	-	25	25(OR)	50	1
LAB Bioprocess Engineering		-	-	2	2	-	-	25	-	25	1
Minor Project	G	-	-	6	6	-	-	50	25(OR)	75	3
		15	-	12	27	200	300	125	75	700	21

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Professional Elective Course – II		Open Elective Course – II	
1		1	
2		2	
3		3	
4		4	

Note: Every student should undergo Summer Internship during Summer Vacation of at least THREE weeks duration. Credits for Summer Internship shall be included in Project (Stage – I) of Semester – VII.

Syllabus Structure for Fourth Year Engineering (Semester – VII) (Biotechnology) (w.e.f. 2021 – 22)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Bioinformatics	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – III	E	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – IV	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – III	F	3	-	-	3	40	60	-	-	100	3
LAB Bioinformatics	D	-	-	2	2			25	25(PR)	50	1
LAB Plant Tissue Culture	D	1	-	2	3	-	-	25	25(OR)	50	2
Project (Stage – I)	G		-	12	12	-	-	50	50(OR)	100	6
Essence of Indian Traditional Knowledge		-	-	-	-	-	-	-	-	-	0
		13	-	16	29	160	240	100	100	600	21

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Professional Elective Course – III		Professional Elective Course – IV		Open Elective Course – III	
1		1		1	
2		2		2	
3		3		3	
4		4		4	

**Syllabus Structure for Fourth Year Engineering (Semester – VIII) (Biotechnology) (w.e.f. 2021 – 22)
(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Bioprocess Industries	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – V	E	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – VI	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – IV	F	3	-	-	3	40	60	-	-	100	3
LAB Downstream Processing	D	2	-	2	4	-	-	25	25(OR)	50	3
LAB Bioprocess Industries	D	-	-	2	2	-	-	25	25(OR)	50	1
Project	G	-	-	6	6	-	-	50	50(OR)	100	3
		14	-	12	24	160	240	100	100	600	19

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Professional Elective Course – V		Professional Elective Course – VI		Open Elective Course – IV	
1		1		1	
2		2		2	
3		3		3	
4		4		4	

NORTH MAHARASHTRA UNIVERSITY,

JALGAON (M.S.)

Bachelor of Engineering

(Chemical Engineering)

Faculty of Science and Technology



**'A' Grade
NAAC Re-Accredited
(3rd Cycle)**

SYLLABUS STRUCTURE

(As per AICTE Guidelines)

W.E.F. 2018 – 19

Subject Group Code and Subject Groups

Sr. No.	GROUP	Category	Breakup of Credits (Total 160)
1	A	Humanities and Social Sciences including Management Courses (HSMC)	10
2	B	Basic Science Courses (BSC)	26
3	C	Engineering Science Courses including workshop, drawing, basics of electrical/mechanical/computer etc. (ESC)	26
4	D	Professional Core Courses (PCC)	53
5	E	Professional Elective Courses relevant to chosen specialization/branch (PEC)	18
6	F	Open subjects – Electives from other technical and /or emerging subjects (OEC)	12
7	G	Project work, seminar and internship in industry or appropriate work place/ academic and research institutions in India/abroad (PROJ)	15
8	H	Mandatory Courses (MC) [Environmental Sciences, Induction program, Constitution of India, Essence of Indian Traditional Knowledge]	
Total			160

**Syllabus Structure for First Year Engineering (Semester – I) (Mechanical, Auto, Civil, Chemical, BioTech) wef 2018 – 19
(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Chemistry	B	3	1	-	4	40	60	-	-	100	4
Mathematics – I	B	3	1	-	4	40	60	-	-	100	4
Engineering Graphics	C	3	-	-	3	40	60	-	-	100	3
English	A	3	-	-	3	40	60	-	-	100	3
Chemistry Lab	B	-	-	2	2	-	-	25	-	25	1
Engineering Graphics Lab	C	-	-	2	2	-	-	25	25	50	1
English Lab	A	-	-	2	2	-	-	25	25	50	1
Workshop Practices	C	1	-	2	3	-	-	25	25	50	2
		13	2	8	23	160	240	100	75	575	19

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

**Syllabus Structure for First Year Engineering (Semester – II) (Mechanical, Auto, Civil, Chemical, Bio Tech) wef 2018 – 19
(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Physics	B	3	1	-	4	40	60	-	-	100	4
Mathematics – II	B	3	1	-	4	40	60	-	-	100	4
Basic Electrical & Electronics Engineering	C	3	1	-	4	40	60	-	-	100	4
Programming for Problem Solving	C	3	-	-	3	40	60	-	-	100	3
Physics Lab	B	-	-	2	2	-	-	25	-	25	1
Basic Electrical and Electronics Engineering Lab	C	-	-	2	2	-	-	25	25	50	1
Programming for Problem Solving Lab	C	-	-	2	2	-	-	25	25	50	1
Induction Program	H	-	-	-	-	-	-	-	-	-	0
		12	3	6	21	160	240	75	50	525	18

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Syllabus Structure for Second Year Engineering (Semester – III) Chemical Engineering (w.e.f. 2019 – 20)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Industrial Chemistry	B	3	1	-	4	40	60	-	-	100	4
Thermodynamics-I	C	3	-	-	3	40	60	-	-	100	3
Engineering and Solid Mechanics	C	3	-	-	3	40	60	-	-	100	3
Fluid Mechanics	D	3	-	-	3	40	60	-	-	100	3
Industrial Organization and Management	A	3	-	-	3	40	60	-	-	100	3
Thermodynamics-I Lab	C	-	-	2	2	-	-	25	25 (OR)	50	1
Fluid Mechanics Lab	D	-	-	2	2			25	25 (OR)	50	1
Chemical Engineering Lab-I	D	1	-	2	3	-	-	25	25 (PR)	50	2
		16	1	6	23	200	300	75	75	650	20

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Syllabus Structure for Second Year Engineering (Semester – IV) Chemical Engineering (w.e.f. 2019 – 20)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Biology	B	3	1	-	4	40	60	-	-	100	4
Material Science	C	3	-	-	3	40	60	-	-	100	3
Thermodynamics - II	D	3	-	-	3	40	60	-	-	100	3
Material and Energy Balance Computations	D	3	-	-	3	40	60	-	-	100	3
Project Management and Entrepreneurship	A	3	-	-	3	40	60	-	-	100	3
Material Science Lab	C	-	-	2	2	-	-	-	-	-	1
Thermodynamics – II Lab	D	-	-	2	2	-	-	25	25 (OR)	50	1
Material and Energy Balance Computations Lab	D	-	-	2	2	-	-	25	25 (OR)	50	1
Chemical Engineering Lab-II	D	1	-	2	3	-	-	25	25 (PR)	50	2
Environmental Studies	H	-	-	-	-	-	-	-	-	-	-
		16	1	8	25	200	300	75	75	650	21

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

**Syllabus Structure for Third Year Engineering (Semester – V) Chemical Engineering (w.e.f. 2020 – 21)
(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Mass Transfer-I	D	3	-	-	3	40	60	-	-	100	3
Chemical Reaction Engineering-I	D	3	-	-	3	40	60	-	-	100	3
Particle and Fluid-Particle Processing	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – I	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – I	F	3	-	-	3	40	60	-	-	100	3
Mass Transfer-II Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
Chemical Reaction Engineering-II Lab	D	-	-	2	2	-	-	25	25 (OR)	50	1
Chemical Engineering Lab-III	D	-	-	2	2	-	-	25	25 (OR)	50	1
Minor Project (Stage - I)	G	-	-	6	6	-	-	50	-	50	3
Constitution of India		-	-								-
		15	0	12	27	200	300	125	75	700	21

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Professional Elective Course – I	Open Elective Course – I

Syllabus Structure for Third Year Engineering (Semester – VI) Chemical Engineering (w.e.f. 2020 – 21)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Mass Transfer-II	D	3	-	-	3	40	60	-	-	100	3
Chemical Reaction Engineering-II	D	3	-	-	3	40	60	-	-	100	3
Heat Transfer	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – II	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – II	F	3	-	-	3	40	60	-	-	100	3
Mass Transfer-II Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
Chemical Reaction Engineering-II Lab	D	-	-	2	2	-	-	25	25 (OR)	50	1
Heat Transfer Lab	D	-	-	2	2	-	-	25	-	25	1
Minor Project	G	-	-	6	6	-	-	50	25 (OR)	75	3
		15	0	12	27	200	300	125	75	700	21

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Professional Elective Course – II	Open Elective Course – II

Note: Every student should undergo Summer Internship during Summer Vacation of at least THREE weeks duration. Credits for Summer Internship shall be included in Project (Stage – I) of Semester – VII.

Syllabus Structure for Fourth Year Engineering (Semester – VII) Chemical Engineering(w.e.f. 2021 – 22)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Process Control	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – III	E	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – IV	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – III	F	3	-	-	3	40	60	-	-	100	3
Process Control Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
(LAB) Instrumentation and Control Lab	D	1	-	2	3	-	-	25	25 (OR)	50	2
Project (Stage - I)	G	-	-	12	12	-	-	50	50 (OR)	100	6
Essence of Indian Traditional Knowledge		-	-	-	-	-	-	-	-	-	-
		13		16	29	160	240	100	100	600	21

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Professional Elective Course – III	Professional Elective Course – IV	Open Elective Course – III

**Syllabus Structure for Fourth Year Engineering (Semester – VIII) Chemical Engineering (w.e.f. 2021 – 22)
(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Process Technology and Economics	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – V	E	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – VI	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – IV	F	3	-	-	3	40	60	-	-	100	3
Process Technology and Economics Lab	D	-	-	2	2	-	-	25	25 (OR)	50	1
(LAB) Design and Simulation	D	2	-	2	4	-	-	25	25 (PR)	50	3
Project	G		-	6	6	-	-	50	50 (OR)	100	3
		14	0	10	24	160	240	100	100	600	19

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Professional Elective Course – V	Professional Elective Course – VI	Open Elective Course – IV

As per AICTE guidelines

Subject Group Code and Subject Groups

Sr. No.	GROUP	Category	Breakup of Credits (Total 160)	
1	A	Humanities and Social Sciences including Management Courses (HSMC)	12	10
2	B	Basic Science Courses (BSC)	25	26
3	C	Engineering Science Courses including workshop, drawing, basics of electrical/mechanical/computer etc. (ESC)	24	26
4	D	Professional Core Courses (PCC)	48	53
5	E	Professional Elective Courses relevant to chosen specialization/branch (PEC)	18	18
6	F	Open subjects – Electives from other technical and /oremerging subjects (OEC)	18	12
7	G	Project work, seminar and internship in industry or appropriate work place/ academic and research institutions in India/abroad (PROJ)	15	15
8	H	Mandatory Courses (MC) [Environmental Sciences, Induction program, Indian Constitution, Essence of Indian Traditional Knowledge]	(non-credit)	
Total			160	160

As per AICTE guidelines

Syllabus Structure for First Year Engineering (Semester – I) (Mechanical, Auto, Civil, Chemical, BioTech) wef 2018 – 19

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Chemistry	B	3	1	-	4	40	60	-	-	100	4
Mathematics – I	B	3	1	-	4	40	60	-	-	100	4
Engineering Graphics	C	3	-	-	3	40	60	-	-	100	3
English	A	3	-	-	3	40	60	-	-	100	3
Chemistry Lab	B	-	-	2	2	-	-	25	-	25	1
Engineering Graphics Lab	C	-	-	2	2	-	-	25	25	50	1
English Lab	A	-	-	2	2	-	-	25	25	50	1
Workshop Practices	C	1	-	2	3	-	-	25	25	50	2
		13	2	8	23	160	240	100	75	575	19

As per AICTE guidelines

Syllabus Structure for First Year Engineering (Semester – II) (Mechanical, Auto, Civil, Chemical, Bio Tech) wef 2018 – 19

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Physics	B	3	1	-	4	40	60	-	-	100	4
Mathematics – II	B	3	1	-	4	40	60	-	-	100	4
Basic Electrical & Electronics Engineering	C	3	1	-	4	40	60	-	-	100	4
Programming for Problem Solving	C	3	-	-	3	40	60	-	-	100	3
Physics Lab	B	-	-	2	2	-	-	25	-	25	1
Basic Electrical and Electronics Engineering Lab	C	-	-	2	2	-	-	25	25	50	1
Programming for Problem Solving Lab	C	-	-	2	2	-	-	25	25	50	1
Induction Program	H	-	-	-	-	-	-	-	-	-	0
		12	3	6	21	160	240	75	50	525	18

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

As per AICTE guidelines

Syllabus Structure for Second Year Engineering (Semester – III) (Civil) wef 2019 – 20

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical /Oral		Total	
						ISE	ESE	ICA	ESE		
Biology	B	3	1	-	4	40	60	-	-	100	4
Mechanics	C	3	-	-	3	40	60	-	-	100	3
Energy Science and Engineering	C	3	-	-	3	40	60	-	-	100	3
Surveying & Geomatics	D	3	-	-	3	40	60	-	-	100	3
Introduction to Civil Engineering	A	3	-	-	3	40	60	-	-	100	3
Mechanics Lab	C	-	-	2	2	-	-	25	25 OR	50	1
Surveying and Geomatics Lab	D	-	-	2	2	-	-	25	25 PR	50	1
Material, Testing & Evaluation I Lab	D	1	-	2	3	-	-	25	25 OR	50	2
		16	1	6	23	200	300	75	75	650	20

As per AICTE guidelines

Syllabus Structure for Second Year Engineering (Semester – IV) (Civil) wef 2019 – 20

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical/Oral		Total	
						ISE	ESE	ICA	ESE		
Mathematic III	B	3	1	-	4	40	60	-	-	100	4
Computer Aided Civil Engineering Drawing	C	3	-	-	3	40	60	-	-	100	3
Introduction to Fluid Mechanics	D	3	-	-	3	40	60	-	-	100	3
Introduction to Solid Mechanics	D	3	-	-	3	40	60	-	-	100	3
Civil Engineering – Societal & Global Impact	A	3	-	-	3	40	60	-	-	100	3
Computer Aided Civil Engineering Lab	C	-	-	2	2	-	-	-	-	-	1
Introduction to Fluid Mechanics Lab	D	-	-	2	2	-	-	25	25 OR	50	1
Material, Testing & Evaluation II	D	-	-	2	2	-	-	25	25 OR	50	1
Engineering Geology	D	1	-	2	3	-	-	25	25 PR	50	2
Environmental Science	H	-	-	-	-	-	-	-	-	-	-
		16	1	8	25	200	300	75	75	650	21

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

As per AICTE guidelines

Syllabus Structure for Third Year Engineering (Semester – V) (Civil) wef 2020 – 21

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical/Oral		Total	
						ISE	ESE	ICA	ESE		
Mechanics of Materials	D	3	-	-	3	40	60	-	-	100	3
Hydraulic Engineering	D	3	-	-	3	40	60	-	-	100	3
Geotechnical Engineering	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – 1	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – 1	F	3	-	-	3	40	60	-	-	100	3
Hydraulic Engineering LAB	D	-	-	2	2	-	-	25	25 OR	50	1
Geotechnical Engineering LAB	D	-	-	2	2	-	-	25	25 OR	50	1
Disaster preparedness & Planning Management (LAB)	D	-	-	2	2	-	-	25	25 OR	50	1
Minor Project Stage I	G	-	-	6	6	-	-	50	-	50	3
Constitution of India	-	-	-	-	-	-	-	-	-	-	0
		15	0	12	27	200	300	125	75	700	21

Note: There must be minimum four alternatives given for professional elective courses. The same must be minimum three for open elective course.

As per AICTE guidelines

Syllabus Structure for Third Year Engineering (Semester – VI) (Civil) wef 2020 – 21

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical/Oral		Total	
						ISE	ESE	ICA	ESE		
Structural Engineering	D	3	-	-	3	40	60	-	-	100	3
Environmental Engineering	D	3	-	-	3	40	60	-	-	100	3
Transportation Engineering	D	3	-	-	3	40	60	-	-	100	3
Professional Elective course II	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course II	F	3	-	-	3	40	60	-	-	100	3
Structural Engineering Lab	D	-	-	2	2	-	-	25	25 OR	50	1
Environmental Engineering Lab	D	-	-	2	2	-	-	25	25 OR	50	1
Transportation Engineering	D	-	-	2	2	-	-	25	-	25	1
Minor Project Stage II	G	-	-	6	6	-	-	50	25 OR	75	3
		15		12	27				75	700	21

Note:

1. There must be minimum four alternatives given for professional elective courses. The same must be minimum three for open elective course.
2. Note: Every student should undergo Summer Internship during Summer Vacation of at least THREE weeks duration. Credits for Summer Internship shall be included in Project (Stage – I) of Semester – VII.

As per AICTE guidelines

Syllabus Structure for Fourth Year Engineering (Semester – VII) wef 2021 – 22

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical/Oral		Total	
						ISE	ESE	ICA	ESE		
Hydrology & Water Resources Engineering	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course III	E	3	-	-	3	40	60	-	-	100	3
Professional Elective Course IV	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course III	F	3	-	-	3	40	60	-	-	100	3
Hydrology & Water Resources Engineering LAB	D	-	-	2	2	-	-	25	25 OR	50	1
Construction Engineering & Management (LAB)	D	1	-	2	3	-	-	25	25 OR	50	2
Major Project Stage I	G	-	-	12	12	-	-	50	50 OR	100	6
Essence of India Traditional Knowledge		-	-	-	-	-	-	-	-	-	0
		13		16	29	160	240	100	100	600	21

Note: There must be minimum four alternatives given for professional elective courses. The same must be minimum three for open elective course.

As per AICTE guidelines

Syllabus Structure for Fourth Year Engineering (Semester – VIII) (Civil) wef 2021 – 22

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical/Oral		Total	
						ISE	ESE	ICA	ESE		
Engineering Economy, Estimation & Costing	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course V	E	3	-	-	3	40	60	-	-	100	3
Professional Elective Course VI	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course IV	F	3	-	-	3	40	60	-	-	100	3
Engineering Economy, Estimation & Costing LAB	D	-	-	2	2	-	-	25	25 OR	50	1
Remote sensing (LAB)	D	2	-	2	4	-	-	25	25 OR	50	3
Major Project Stage II	G	-	-	6	6	-	-	50	50 OR	100	3
		14	0	12	24	160	240	100	100	600	19

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Note: There must be minimum four alternatives given for professional elective courses. The same must be minimum three for open elective course.

As per AICTE guidelines

NORTH MAHARASHTRA UNIVERSITY,

JALGAON (M.S.)

Bachelor of Engineering

(Computer Engineering)

Faculty of Science and Technology



**'A' Grade
NAAC Re-Accredited
(3rd Cycle)**

SYLLABUS STRUCTURE

(As per AICTE Guidelines)

W.E.F. 2018 – 19

Subject Group Code and Subject Groups

Sr. No.	GROUP	Category	Breakup of Credits
1	A	Humanities and Social Sciences including Management Courses (HSMC)	10
2	B	Basic Science Courses (BSC)	26
3	C	Engineering Science Courses including workshop, drawing, basics of electrical/mechanical/computer etc. (ESC)	26
4	D	Professional Core Courses (PCC)	53
5	E	Professional Elective Courses relevant to chosen specialization/branch (PEC)	18
6	F	Open subjects – Electives from other technical and /or emerging subjects (OEC)	12
7	G	Project work, seminar and internship in industry or appropriate work place/ academic and research institutions in India/abroad (PROJ)	15
8	H	Mandatory Courses (MC) [Environmental Sciences, Induction program, Indian Constitution, Essence of Indian Traditional Knowledge]	
Total			160

Syllabus Structure for First Year Engineering (Semester – I) (Computer, IT, Electrical, E & TC, Instrumentation) (w.e.f. 2018 – 19)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Physics	B	3	1	-	4	40	60	-	-	100	4
Mathematics - I	B	3	1	-	4	40	60	-	-	100	4
Basic Electrical & Electronics Engineering	C	3	1	-	4	40	60	-	-	100	4
Programming for Problem Solving	C	3	-	-	3	40	60	-	-	100	3
Physics Lab	B	-	-	2	2	-	-	25	-	25	1
Basic Electrical & Electronics Engineering Lab	C	-	-	2	2	-	-	25	25 (OR)	50	1
Programming for Problem Solving Lab	C	-	-	2	2	-	-	25	25 (OR)	50	1
Induction Program*	H	-	-	-	-	-	-	-	-	-	-
		12	3	6	21	160	240	75	50	525	18

* 3-week long Induction Program for students entering the institution, right at the start.

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Syllabus Structure for First Year Engineering (Semester – II) (Computer, IT, Electrical, E & TC, Instrumentation) (w.e.f. 2018 – 19)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Chemistry	B	3	1	-	4	40	60	-	-	100	4
Mathematics – II	B	3	1	-	4	40	60	-	-	100	4
Engineering Graphics	C	3	-	-	3	40	60	-	-	100	3
English	A	3	-	-	3	40	60	-	-	100	3
Chemistry Lab	B	-	-	2	2	-	-	25	-	25	1
Engineering Graphics Lab	C	-	-	2	2	-	-	25	25 (OR)	50	1
English Lab	A	-	-	2	2	-	-	25	25 (OR)	50	1
Workshop Practices	C	1	-	2	3	-	-	25	25 (OR)	50	2
		13	2	8	23	160	240	100	75	575	19

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Syllabus Structure for Second Year Engineering (Semester – III) (Computer, IT) (w.e.f. 2019 – 20)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Mathematics – III	B	3	1	-	4	40	60	-	-	100	4
Signals and Systems	C	3	-	-	3	40	60	-	-	100	3
Analog Electronic Circuits	C	3	-	-	3	40	60	-	-	100	3
Discrete Mathematics	D	3	-	-	3	40	60	-	-	100	3
Organizational Behavior	A	3	-	-	3	40	60	-	-	100	3
Analog Electronic Circuits Lab	C	-	-	2	2	-	-	25	25 (PR)	50	1
Discrete Mathematics Lab	D	-	-	2	2			25	25 (PR)	50	1
Object Oriented Programming Lab	D	1	-	2	3	-	-	25	25 (PR)	50	2
		16	1	6	23	200	300	75	75	650	20

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Syllabus Structure for Second Year Engineering (Semester – IV) (Computer, IT) (w.e.f. 2019 – 20)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Biology	B	3	1	-	4	40	60	-	-	100	4
Digital Electronics	C	3	-	-	3	40	60	-	-	100	3
Data structure & Algorithms	D	3	-	-	3	40	60	-	-	100	3
Computer Organization & Architecture	D	3	-	-	3	40	60	-	-	100	3
Finance & Accounting	A	3	-	-	3	40	60	-	-	100	3
Digital Electronics Lab	C	-	-	2	2	-	-	-	-	-	1
Data structure & Algorithms Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
Computer Organization & Architecture Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
IT Workshop	D	1	-	2	3	-	-	25	25 (PR)	50	2
Environmental Studies	H	-	-	-	-	-	80	20	-	-	-
		16	1	8	25	200	300	75	75	650	21

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Syllabus Structure for Third Year Engineering (Semester – V) (Computer) (w.e.f. 2020 – 21)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Database Management Systems	D	3	-	-	3	40	60	-	-	100	3
Design and Analysis of Algorithms	D	3	-	-	3	40	60	-	-	100	3
Formal Language, Automats and Compiler	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – 1	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – I	F	3	-	-	3	40	60	-	-	100	3
Database Management Systems Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
Design and Analysis of Algorithms Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
Web Programming Language Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
Minor Project (Stage – I)	G	-	-	6	6	-	-	50	-	50	3
Constitution of India	H	-	-	-	-	-	-	-	-	-	-
		15	0	12	27	200	300	125	75	700	21

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Professional Elective Course – I		Open Elective Course – I	
1		1	
2		2	
3		3	
4		4	

Syllabus Structure for Third Year Engineering (Semester – VI) (Computer) (w.e.f. 2020 – 21)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Operating Systems	D	3	-	-	3	40	60	-	-	100	3
Computer Networks	D	3	-	-	3	40	60	-	-	100	3
Software Engineering	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – II	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – II	F	3	-	-	3	40	60	-	-	100	3
Operating Systems Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
Computer Networks	D	-	-	2	2	-	-	25	25 (PR)	50	1
Software Engineering Lab	D	-	-	2	2	-	-	25	-	25	1
Minor Project	G	-	-	6	6	-	-	50	25 (OR)	75	3
		15	0	12	27	200	300	125	75	700	21

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Professional Elective Course – II		Open Elective Course – II	
1		1	
2		2	
3		3	
4		4	

Note: Every student should undergo Summer Internship during Summer Vacation of at least THREE weeks duration. Credits for Summer Internship shall be included in Project (Stage – I) of Semester – VII.

Syllabus Structure for Fourth Year Engineering (Semester – VII) (Computer) (w.e.f. 2021 – 22)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Compiler Design	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – III	E	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – IV	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – III	F	3	-	-	3	40	60	-	-	100	3
Compiler Design Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
Advanced Technology Lab - 1	D	1	-	2	3	-	-	25	25 (OR)	50	2
Project (Stage – I)	G	-	-	12	12	-	-	50	50 (OR)	100	6
Essence of Indian Traditional Knowledge	H	-	-	-	-	-	-	-	-	-	-
		13		16	29	160	240	100	100	600	21

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Professional Elective Course – III		Professional Elective Course – IV		Open Elective Course – III	
1		1		1	
2		2		2	
3		3		3	
4		4		4	

Syllabus Structure for Fourth Year Engineering (Semester – VIII) (Computer) (w.e.f. 2021 – 22)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Cryptography and Network Security	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – V	E	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – VI	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – IV	F	3	-	-	3	40	60	-	-	100	3
Cryptography and Network Security Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
Advanced Technology Lab - II	D	2	-	2	4	-	-	25	25 (OR)	50	3
Project	G		-	6	6	-	-	50	50 (OR)	100	3
		14	0	10	24	160	240	100	100	600	19

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Professional Elective Course – V		Professional Elective Course – VI		Open Elective Course – IV	
1		1		1	
2		2		2	
3		3		3	
4		4		4	

NORTH MAHARASHTRA UNIVERSITY,

JALGAON (M.S.)

Bachelor of Engineering

(Electrical Engineering)

Faculty of Science and Technology



**'A' Grade
NAAC Re-Accredited
(3rd Cycle)**

SYLLABUS STRUCTURE

(As per AICTE Guidelines)

W.E.F. 2018 – 19

Subject Group Code and Subject Groups

Sr. No.	GROUP	Category	Breakup of Credits
1	A	Humanities and Social Sciences including Management Courses (HSMC)	10
2	B	Basic Science Courses (BSC)	26
3	C	Engineering Science Courses including workshop, drawing, basics of electrical/mechanical/computer etc. (ESC)	26
4	D	Professional Core Courses (PCC)	53
5	E	Professional Elective Courses relevant to chosen specialization/branch (PEC)	18
6	F	Open subjects – Electives from other technical and / or emerging subjects (OEC)	12
7	G	Project work, seminar and internship in industry or appropriate work place/ academic and research institutions in India/abroad (PROJ)	15
8	H	Mandatory Courses (MC) [Environmental Sciences, Induction program, Constitution of Indian, Essence of Indian Traditional Knowledge]	
Total			160

Syllabus Structure for First Year Engineering (Semester – I) (w. e. f. 2018 – 19)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Physics	B	3	1	-	4	40	60	-	-	100	4
Mathematics - I	B	3	1	-	4	40	60	-	-	100	4
Basic Electrical & Electronics Engineering	C	3	1	-	4	40	60	-	-	100	4
Programming for Problem Solving	C	3	-	-	3	40	60	-	-	100	3
Physics Lab	B	-	-	2	2	-	-	25	-	25	1
Basic Electrical & Electronics Engineering Lab	C	-	-	2	2	-	-	25	25(OR)	50	1
Programming for Problem Solving Lab	C	-	-	2	2	-	-	25	25(OR)	50	1
Induction Program	H	-	-	-	-	-	-	-	-	-	-
		12	3	6	21	160	240	75	50	525	18

ISE: Internal Sessional Examination ESE: End Semester Examination ICA: Internal Continuous Assessment

* **3-week long Induction Program for students entering the institution, right at the start.**

Syllabus Structure for First Year Engineering (Semester – II) (w. e. f. 2018 – 19)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Chemistry	B	3	1	-	4	40	60	-	-	100	4
Mathematics – II	B	3	1	-	4	40	60	-	-	100	4
Engineering Graphics	C	3	-	-	3	40	60	-	-	100	3
English	A	3	-	-	3	40	60	-	-	100	3
Chemistry Lab	B	-	-	2	2	-	-	25	-	25	1
Engineering Graphics Lab	C	-	-	2	2	-	-	25	25(OR)	50	1
English Lab	A	-	-	2	2	-	-	25	25(OR)	50	1
Workshop Practices	C	1	-	2	3	-	-	25	25(OR)	50	2
		13	2	8	23	160	240	100	75	575	19

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Syllabus Structure for Second Year Engineering (Semester – III) (Electrical) (w. e. f. 2019 – 20)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Mathematics – III	B	3	1	-	4	40	60	-	-	100	4
Engineering Mechanics	C	3	-	-	3	40	60	-	-	100	3
Electrical Circuit Analysis	C	3	-	-	3	40	60	-	-	100	3
Electrical Machine-I	D	3	-	-	3	40	60	-	-	100	3
Industrial Organization and Management	A	3	-	-	3	40	60	-	-	100	3
Electrical Circuit Analysis Lab	C	-	-	2	2	-	-	25	25(PR)	50	1
Electrical Machine-I Lab	D	-	-	2	2	-	-	25	25(PR)	50	1
Electrical Workshop Laboratory	D	1	-	2	3	-	-	25	25(OR)	50	2
		16	1	6	23	200	300	75	75	650	20

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Syllabus Structure for Second Year Engineering (Semester – IV) (Electrical) (w. e. f. 2019 – 20)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Biology	B	3	1	-	4	40	60	-	-	100	4
Electrical Engineering Materials	C	3	-	-	3	40	60	-	-	100	3
Analog and Digital Electronics	D	3	-	-	3	40	60	-	-	100	3
Electrical Machine-II	D	3	-	-	3	40	60	-	-	100	3
Entrepreneurship Development	A	3	-	-	3	40	60	-	-	100	3
Electrical Engineering Materials Lab	C	-	-	2	2	-	-	-	-	-	1
Analog and Digital Electronics Lab	D	-	-	2	2	-	-	25	25(PR)	50	1
Electrical Machine-II Lab	D	-	-	2	2	-	-	25	25(PR)	50	1
Measurement and Instrumentation Laboratory	D	1	-	2	3	-	-	25	25(OR)	50	2
Environmental Studies*	H	-	-	-	-	-	80	20	-	100	-
		16	1	8	25	200	300	75	75	650	21

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Syllabus Structure for Third Year Engineering (Semester – V) (Electrical) (w. e. f. 2020 – 21)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Power Electronics	D	3	-	-	3	40	60	-	-	100	3
Power System-I	D	3	-	-	3	40	60	-	-	100	3
Electromagnetic Field	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – I	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – I	F	3	-	-	3	40	60	-	-	100	3
Power Electronics Lab	D	-	-	2	2	-	-	25	25(PR)	50	1
Power System-I Lab	D	-	-	2	2	-	-	25	25(OR)	50	1
Electronics Design Laboratory	D	-	-	2	2	-	-	25	25(OR)	50	1
Minor Project	G	-	-	6	6	-	-	50	-	50	3
Constitution of India		-	-								-
		15	0	12	27	200	300	125	75	700	21

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Professional Elective Course – I		Open Elective Course – I	
1		1	
2		2	
3		3	
4		4	

Syllabus Structure for Third Year Engineering (Semester – VI) (Electrical) (w. e. f. 2020 – 21)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Control System	D	3	-	-	3	40	60	-	-	100	3
Microprocessor and Microcontroller	D	3	-	-	3	40	60	-	-	100	3
Power System-II	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – II	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – II	F	3	-	-	3	40	60	-	-	100	3
Control System Lab	D	-	-	2	2	-	-	25	25(OR)	50	1
Microprocessor and Microcontroller Lab	D	-	-	2	2	-	-	25	25(PR)	50	1
Power System-II Lab	D	-	-	2	2	-	-	25	-	25	1
Minor Project (Stage -I)	G	-	-	6	6	-	-	50	25(OR)	75	3
		15	0	12	27	200	300	125	75	700	21

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Professional Elective Course – II		Open Elective Course – II	
1		1	
2		2	
3		3	
4		4	

Note: Every student should undergo Summer Internship during Summer Vacation of at least THREE weeks duration. Credits for Summer Internship shall be included in Project (Stage – I) of Semester – VII.

Syllabus Structure for Fourth Year Engineering (Semester – VII) (Electrical) (w. e. f. 2021 – 22)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Power System Protection	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course -III	E	3	-	-	3	40	60	-	-	100	3
Professional Elective Course -IV	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – III	F	3	-	-	3	40	60	-	-	100	3
Power System Protection Lab	D	-	-	2	2	-	-	25	25(PR)	50	1
High Voltage Laboratory	D	1	-	2	3	-	-	25	25(OR)	50	2
Project (Stage -I)	G	-	-	12	12	-	-	50	50(OR)	100	6
Essence of Indian Traditional Knowledge		-	-	-	-	-	-	-	-	-	-
		13		16	29	160	240	100	100	600	21

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Professional Elective Course – III		Professional Elective Course – IV		Open Elective Course – III	
1		1		1	
2		2		2	
3		3		3	
4		4		4	

Syllabus Structure for Fourth Year Engineering (Semester – VIII) (Electrical) (w. e. f. 2021 – 22)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Electrical Drives	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course - V	E	3	-	-	3	40	60	-	-	100	3
Professional Elective Course -VI	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course - IV	F	3	-	-	3	40	60	-	-	100	3
Electrical Drives Lab	D	-	-	2	2	-	-	25	25(PR)	50	1
Computer Aided Power System Analysis Laboratory	D	2	-	2	4	-	-	25	25(OR)	50	3
Project	G		-	6	6	-	-	50	50(OR)	100	3
		14	0	10	24	160	240	100	100	600	19

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Professional Elective Course – V		Professional Elective Course – VI		Open Elective Course – IV	
1		1		1	
2		2		2	
3		3		3	
4		4		4	

NORTH MAHARASHTRA UNIVERSITY,

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Bachelor of Engineering

(Electronics and Telecommunication Engineering)

Faculty of Science and Technology



**'A' Grade
NAAC Re-Accredited
(3rd Cycle)**

SYLLABUS STRUCTURE

(As per AICTE Guidelines)

W.E.F. 2018 – 19

Subject Group Code and Subject Groups

Sr. No.	GROUP	Category	Breakup of Credits (Total 160)
1	A	Humanities and Social Sciences including Management Courses (HSMC)	10
2	B	Basic Science Courses (BSC)	26
3	C	Engineering Science Courses including workshop, drawing, basics of electrical/mechanical/computer etc. (ESC)	26
4	D	Professional Core Courses (PCC)	53
5	E	Professional Elective Courses relevant to chosen specialization/branch (PEC)	18
6	F	Open subjects – Electives from other technical and /or emerging subjects (OEC)	12
7	G	Project work, seminar and internship in industry or appropriate work place/ academic and research institutions in India/abroad (PROJ)	15
8	H	Mandatory Courses (MC) [Environmental Sciences, Induction program, Indian Constitution, Essence of Indian Traditional Knowledge]	
Total			160

**Syllabus Structure for First Year Engineering (Semester – I) (Computer, IT, Electrical, E & TC, Instrumentation) (w.e.f. 2018 – 19)
(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Physics	B	3	1	-	4	40	60	-	-	100	4
Mathematics - I	B	3	1	-	4	40	60	-	-	100	4
Basic Electrical & Electronics Engineering	C	3	1	-	4	40	60	-	-	100	4
Programming for Problem Solving	C	3	-	-	3	40	60	-	-	100	3
Physics Lab	B	-	-	2	2	-	-	25	-	25	1
Basic Electrical & Electronics Engineering Lab	C	-	-	2	2	-	-	25	25(OR)	50	1
Programming for Problem Solving Lab	C	-	-	2	2	-	-	25	25(OR)	50	1
Induction Program*	H	-	-	-	-	-	-	-	-	-	-
		12	3	6	21	160	240	75	50	525	18

* 3-week long Induction Program for students entering the institution, right at the start.

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Syllabus Structure for First Year Engineering (Semester – II) (Computer, IT, Electrical, E & TC, Instrumentation) (w.e.f. 2018 – 19)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Chemistry	B	3	1	-	4	40	60	-	-	100	4
Mathematics – II	B	3	1	-	4	40	60	-	-	100	4
Engineering Graphics	C	3	-	-	3	40	60	-	-	100	3
English	A	3	-	-	3	40	60	-	-	100	3
Chemistry Lab	B	-	-	2	2	-	-	25	-	25	1
Engineering Graphics Lab	C	-	-	2	2	-	-	25	25(OR)	50	1
English Lab	A	-	-	2	2	-	-	25	25(OR)	50	1
Workshop Practices	C	1	-	2	3	-	-	25	25(OR)	50	2
		13	2	8	23	160	240	100	75	575	19

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Syllabus Structure for Second Year Engineering (Semester – III) (E & TC) (w.e.f. 2019 – 20)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorials 1 Hrs / week	Practicals 1 Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Mathematics-III	B	3	1	-	4	40	60	-	-	100	4
Electrical Machines	C	3	-	-	3	40	60	-	-	100	3
Solid State Devices and Circuits	C	3	-	-	3	40	60	-	-	100	3
Digital System Design	D	3	-	-	3	40	60	-	-	100	3
Industrial Organization and Management	A	3	-	-	3	40	60	-	-	100	3
Programming Language-I Lab	C	-	-	2	2	-	-	25	25(PR)	50	1
Digital System Design Lab	D	-	-	2	2			25	25(PR)	50	1
Electronic Devices and Circuits Lab	D	1	-	2	3	-	-	25	25(PR)	50	2
		16	1	6	23	200	300	75	75	650	20

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Syllabus Structure for Second Year Engineering (Semester – IV) (E & TC) (w.e.f. 2019 – 20)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Biology	B	3	1	-	4	40	60	-	-	100	4
Network and Lines	C	3	-	-	3	40	60	-	-	100	3
Analog and Digital Communication	D	3	-	-	3	40	60	-	-	100	3
Analog Circuits	D	3	-	-	3	40	60	-	-	100	3
Enter. Development program	A	3	-	-	3	40	60	-	-	100	3
Electronics Workshop	C	-	-	2	2	-	-	-	-	-	1
Analog and Digital Communication Lab	D	-	-	2	2	-	-	25	25(PR)	50	1
Analog Circuit Lab	D	-	-	2	2	-	-	25	25(PR)	50	1
Electronics Network Lab	D	1	-	2	3	-	-	25	25(PR)	50	2
*Environment Studies	H	-	-	-	-	20	80	-	-	-	-
		16	1	8	25	200	300	75	75	650	21

***Only for directly admitted students for second year after Diploma.**

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Syllabus Structure for Third Year Engineering (Semester – V) (E&TC) (w.e.f. 2020 – 21)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Microcontrollers	D	3	-	-	3	40	60	-	-	100	3
Electromagnetic Waves	D	3	-	-	3	40	60	-	-	100	3
Signals and System	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – I	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – I	F	3	-	-	3	40	60	-	-	100	3
Microcontrollers Lab	D	-	-	2	2	-	-	25	25(PR)	50	1
Signals and System Lab	D	-	-	2	2	-	-	25	25(PR)	50	1
Power Devices and Circuits Lab	D	-	-	2	2	-	-	25	25(PR)	50	1
Mini Project (Stage-I)	G	-	-	6	6	-	-	50	-	50	3
Constitution of Indian		-	-								-
		15	0	12	27	200	300	125	75	700	21

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Professional Elective Course – I	Open Elective Course – I

**Syllabus Structure for Third Year Engineering (Semester – VI) (E&TC) (w.e.f. 2020 – 21)
(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Control System	D	3	-	-	3	40	60	-	-	100	3
Electronic Measurement	D	3	-	-	3	40	60	-	-	100	3
Electronics Design	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – II	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – II	F	3	-	-	3	40	60	-	-	100	3
Electronics Design Lab	D	-	-	2	2	-	-	25	25(PR)	50	1
Elect. Measurement Lab	D	-	-	2	2	-	-	25	25(PR)	50	1
Control system Lab	D	-	-	2	2	-	-	25	-	25	1
Minor Project	G	-	-	6	6	-	-	50	25(OR)	75	3
		15	0	12	27	200	300	125	75	700	21

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Professional Elective Course – II	Open Elective Course – II

Note: Every student should undergo Summer Internship during Summer Vacation of at least THREE weeks duration. Credits for Summer Internship shall be included in Project (Stage – I) of Semester – VII.

Syllabus Structure for Fourth Year Engineering (Semester – VII) (E&TC) (w.e.f. 2021 – 22)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Computer Network	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – III	E	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – IV	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – III	F	3	-	-	3	40	60	-	-	100	3
Communication Lab-I	D	-	-	2	2	-	-	25	25(PR)	50	1
Computer Network Lab	D	1	-	2	3	-	-	25	25(PR)	50	2
Project stage -I	G	-	-	12	12	-	-	50	50(OR)	100	6
Essence of Indian Traditional Knowledge		-	-	-	-	-	-	-	-	-	-
		13		16	29	160	240	100	100	600	21

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Professional Elective Course – III	Professional Elective Course – IV	Open Elective Course – III

Syllabus Structure for Fourth Year Engineering (Semester – VIII) (E&TC) (w.e.f. 2021 – 22)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Digital Signal Processing	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course –V	E	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – VI	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – IV	F	3	-	-	3	40	60	-	-	100	3
Communication Lab-II	D	-	-	2	2	-	-	25	25(PR)	50	1
PCC (Lab)	D	2	-	2	4	-	-	25	25(OR)	50	3
Project	G		-	6	6	-	-	50	50(OR)	100	3
		14	0	10	24	160	240	100	100	600	19

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Professional Elective Course – V	Professional Elective Course – VI	Open Elective Course – IV

NORTH MAHARASHTRA UNIVERSITY,

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**'A' Grade
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SYLLABUS STRUCTURE

(As per AICTE Guidelines)

W.E.F. 2018 – 19

Subject Group Code and Subject Groups

Sr. No.	GROUP	Category	Breakup of Credits
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2	B	Basic Science Courses (BSC)	26
3	C	Engineering Science Courses including workshop, drawing, basics of electrical/mechanical/computer etc. (ESC)	26
4	D	Professional Core Courses (PCC)	53
5	E	Professional Elective Courses relevant to chosen specialization/branch (PEC)	18
6	F	Open subjects – Electives from other technical and /or emerging subjects (OEC)	12
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8	H	Mandatory Courses (MC) [Environmental Sciences, Induction program, Indian Constitution, Essence of Indian Traditional Knowledge]	
Total			160

Syllabus Structure for First Year Engineering (Semester – I) (Computer, IT, Electrical, E & TC, Instrumentation) (w.e.f. 2018 – 19)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Physics	B	3	1	-	4	40	60	-	-	100	4
Mathematics - I	B	3	1	-	4	40	60	-	-	100	4
Basic Electrical & Electronics Engineering	C	3	1	-	4	40	60	-	-	100	4
Programming for Problem Solving	C	3	-	-	3	40	60	-	-	100	3
Physics Lab	B	-	-	2	2	-	-	25	-	25	1
Basic Electrical & Electronics Engineering Lab	C	-	-	2	2	-	-	25	25 (OR)	50	1
Programming for Problem Solving Lab	C	-	-	2	2	-	-	25	25 (OR)	50	1
Induction Program*	H	-	-	-	-	-	-	-	-	-	-
		12	3	6	21	160	240	75	50	525	18

* 3-week long Induction Program for students entering the institution, right at the start.

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Syllabus Structure for First Year Engineering (Semester – II) (Computer, IT, Electrical, E & TC, Instrumentation) (w.e.f. 2018 – 19)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Chemistry	B	3	1	-	4	40	60	-	-	100	4
Mathematics – II	B	3	1		4	40	60	-	-	100	4
Engineering Graphics	C	3	-	-	3	40	60	-	-	100	3
English	A	3		-	3	40	60	-	-	100	3
Chemistry Lab	B	-	-	2	2	-	-	25	-	25	1
Engineering Graphics Lab	C	-	-	2	2	-	-	25	25 (OR)	50	1
English Lab	A	-	-	2	2	-	-	25	25 (OR)	50	1
Workshop Practices	C	1	-	2	3	-	-	25	25 (OR)	50	2
		13	2	8	23	160	240	100	75	575	19

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Syllabus Structure for Second Year Engineering (Semester – III) (Computer, IT) (w.e.f. 2019 – 20)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Mathematics – III	B	3	1	-	4	40	60	-	-	100	4
Signals and Systems	C	3	-	-	3	40	60	-	-	100	3
Analog Electronic Circuits	C	3	-	-	3	40	60	-	-	100	3
Discrete Mathematics	D	3	-	-	3	40	60	-	-	100	3
Organizational Behavior	A	3	-	-	3	40	60	-	-	100	3
Analog Electronic Circuits Lab	C	-	-	2	2	-	-	25	25 (PR)	50	1
Discrete Mathematics Lab	D	-	-	2	2			25	25 (PR)	50	1
Object Oriented Programming Lab	D	1	-	2	3	-	-	25	25 (PR)	50	2
		16	1	6	23	200	300	75	75	650	20

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Syllabus Structure for Second Year Engineering (Semester – IV) (Computer, IT) (w.e.f. 2019 – 20)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Biology	B	3	1	-	4	40	60	-	-	100	4
Digital Electronics	C	3	-	-	3	40	60	-	-	100	3
Data structure & Algorithms	D	3	-	-	3	40	60	-	-	100	3
Computer Organization & Architecture	D	3	-	-	3	40	60	-	-	100	3
Finance & Accounting	A	3	-	-	3	40	60	-	-	100	3
Digital Electronics Lab	C	-	-	2	2	-	-	-	-	-	1
Data structure & Algorithms Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
Computer Organization & Architecture Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
IT Workshop	D	1	-	2	3	-	-	25	25 (PR)	50	2
Environmental Studies	H	-	-	-	-	-	80	20	-	-	-
		16	1	8	25	200	300	75	75	650	21

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

**Syllabus Structure for Third Year Engineering (Semester – V) (Information Technology) (w.e.f. 2020 – 21)
(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Database Management Systems	D	3	-	-	3	40	60	-	-	100	3
Design and Analysis of Algorithms	D	3	-	-	3	40	60	-	-	100	3
Formal Language, Automats and Compiler	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – I	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – I	F	3	-	-	3	40	60	-	-	100	3
Database Management Systems Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
Design and Analysis of Algorithms Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
Web Programming Language Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
Minor Project (Stage – I)	G	-	-	6	6	-	-	50	-	50	3
Constitution of India	H	-	-	-	-	-	-	-	-	-	-
		15	0	12	27	200	300	125	75	700	21

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Professional Elective Course – I		Open Elective Course – I	
1		1	
2		2	
3		3	
4		4	

Syllabus Structure for Third Year Engineering (Semester – VI) (Information Technology) (w.e.f. 2020 – 21)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Operating Systems	D	3	-	-	3	40	60	-	-	100	3
Computer Networks	D	3	-	-	3	40	60	-	-	100	3
Software Engineering	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – II	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – II	F	3	-	-	3	40	60	-	-	100	3
Operating Systems Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
Computer Networks	D	-	-	2	2	-	-	25	25 (PR)	50	1
Software Engineering Lab	D	-	-	2	2	-	-	25	-	25	1
Minor Project	G	-	-	6	6	-	-	50	25 (OR)	75	3
		15	0	12	27	200	300	125	75	700	21

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Professional Elective Course – II		Open Elective Course – II	
1		1	
2		2	
3		3	
4		4	

Note: Every student should undergo Summer Internship during Summer Vacation of at least THREE weeks duration. Credits for Summer Internship shall be included in Project (Stage – I) of Semester – VII.

**Syllabus Structure for Fourth Year Engineering (Semester – VII) (Information Technology) (w.e.f. 2021 – 22)
(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Compiler Design	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – III	E	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – IV	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – III	F	3	-	-	3	40	60	-	-	100	3
Compiler Design Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
Advanced Technology Lab - I	D	1	-	2	3	-	-	25	25 (OR)	50	2
Project (Stage – I)	G	-	-	12	12	-	-	50	50 (OR)	100	6
Essence of Indian Traditional Knowledge	H	-	-	-	-	-	-	-	-	-	-
		13		16	29	160	240	100	100	600	21

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Professional Elective Course – III		Professional Elective Course – IV		Open Elective Course – III	
1		1		1	
2		2		2	
3		3		3	
4		4		4	

**Syllabus Structure for Fourth Year Engineering (Semester – VIII) (Information Technology) (w.e.f. 2021 – 22)
(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Cryptography and Network Security	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – V	E	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – VI	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – IV	F	3	-	-	3	40	60	-	-	100	3
Cryptography and Network Security Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
Advanced Technology Lab - II	D	2	-	2	4	-	-	25	25 (OR)	50	3
Project	G		-	6	6	-	-	50	50 (OR)	100	3
		14	0	10	24	160	240	100	100	600	19

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Professional Elective Course – V		Professional Elective Course – VI		Open Elective Course – IV	
1		1		1	
2		2		2	
3		3		3	
4		4		4	

NORTH MAHARASHTRA UNIVERSITY,

JALGAON (M.S.)

Bachelor of Engineering

Mechanical Engineering

Faculty of Science and Technology



'A' Grade
NAAC Re-Accredited
(3rd Cycle)

Syllabus Structure

(As per AICTE Guidelines)

w.e.f. 2018 – 19

Subject Group Code and Subject Groups

Sr. No.	GROUPS	Category	Breakup of Credits (Total 160)	
1	A	Humanities and Social Sciences including Management Courses (HSMC)	12	10
2	B	Basic Science Courses (BSC)	25	26
3	C	Engineering Science Courses including workshop, drawing, basics of electrical/mechanical/computer etc. (ESC)	24	26
4	D	Professional Core Courses (PCC)	48	53
5	E	Professional Elective Courses relevant to chosen specialization/branch (PEC)	18	18
6	F	Open subjects – Electives from other technical and /or emerging subjects (OEC)	18	12
7	G	Project work, seminar and internship in industry or appropriate work place/ academic and research institutions in India/abroad (PROJ)	15	15
8	H	Mandatory Courses (MC) [Environmental Sciences, Induction program, Indian Constitution, Essence of Indian Traditional Knowledge]	(non-credit)	
Total			160	160

Syllabus Structure for First Year Engineering (Semester – I) (Mechanical, Auto, Civil, Chemical, BioTech) (w.e.f. 2018 – 19) (As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Chemistry	B	3	1	--	4	40	60	--	--	100	4
Mathematics – I	B	3	1	--	4	40	60	--	--	100	4
English	C	3	--	--	3	40	60	--	--	100	3
Engineering Graphics	C	3	--	--	3	40	60	--	--	100	3
Workshop Practices	C	1	--	2	3	--	--	25	25(OR)	50	2
Chemistry Lab	B	--	--	2	2	--	--	25	--	25	1
English Lab	C	--	--	2	2	--	--	25	25(OR)	50	1
Engineering Graphics Lab	C	--	--	2	2	--	--	25	25(OR)	50	1
Induction Program	H	--	--	--	--	--	--	--	--	--	0
		13	2	8	23	160	240	100	75	575	19

* 3-week long Induction Program for students entering the institution, right at the start.

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Syllabus Structure for First Year Engineering (Semester – II) (Mechanical, Auto, Civil, Chemical, BioTech) (w.e.f. 2018 – 19) (As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Physics	B	3	1	--	4	40	60	--	--	100	4
Mathematics – II	B	3	1	--	4	40	60	--	--	100	4
Basic Electrical & Electronics Engineering	C	3	1	--	4	40	60	--	--	100	4
Programming for Problem Solving	A	3	--	--	3	40	60	--	--	100	3
Physics Lab	B	--	--	2	2	--	--	25	--	25	1
Basic Electrical & Electronics Engineering Lab	C	--	--	2	2	--	--	25	25(OR)	50	1
Programming for Problem Solving Lab	A	--	--	2	2	--	--	25	25(OR)	50	1
		12	3	6	21	160	240	75	50	525	18

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Syllabus Structure for Second Year Engineering (Semester – III) (Mechanical Engineering) (w.e.f. 2019 – 20) (As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Biology	B	3	1	--	4	40	60	-	-	100	4
Engineering Mechanics	C	3	--	--	3	40	60	-	-	100	3
Electrical Drives and Controls	C	3	--	-	3	40	60	--	--	100	3
Thermodynamics	D	3	--	-	3	40	60	--	--	100	3
Industrial Psychology	A	3	--	--	3	40	60	-	-	100	3
Electrical Drives and Controls Lab	C	--	--	2	2	--	--	25	25(OR)	50	1
Thermodynamics Lab	D	--	--	2	2	--	--	25	25(OR)	50	1
Computer Graphics Lab	D	1	--	2	3	-	-	25	25(PR)	50	2
		16	1	6	23	200	300	75	75	650	20

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Syllabus Structure for Second Year Engineering (Semester – IV) (Mechanical Engineering) (w.e.f. 2019 – 20) (As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Mathematics – III	B	3	1	--	4	40	60	--	--	100	4
Introduction to Engineering Design Principles	C	3	--	--	4	40	60	--	--	100	3
Applied Thermodynamics	D	3	1	--	3	40	60	--	--	100	4
Fluid Mechanics and Fluid Machines	D	3	--	--	3	40	60	--	--	100	3
Industrial Economics	A	3	--	--	3	40	60	--	--	100	3
Applied Thermodynamics Lab	D	--	--	2	2	--	--	25	25(OR)	50	1
Fluid Mechanics and Fluid Machines Lab	D	--	--	2	2	--	--	25	25(OR)	50	1
Metrology and Quality Control Lab	D	1	--	2	3	-	-	25	25(OR)	50	2
Environmental Science	H	--	--	--	--	--	--	--	--	--	0
		16	2	6	24	200	300	75	75	650	21

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Syllabus Structure for Third Year Engineering (Semester – V) (Mechanical Engineering) (w.e.f. 2020 – 21) (As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Heat Transfer	D	3	--	--	3	40	60	--	--	100	3
Manufacturing Processes	D	3	--	--	3	40	60	--	--	100	3
Strength of Materials	D	3	--	--	3	40	60	--	--	100	3
Machine Drawing Lab	D	--	--	2	2	-	-	25	25(OR)	50	1
Heat Transfer Lab	D	--	--	2	2	--	--	25	25(OR)	50	1
Manufacturing Processes Lab	D	--	--	2	2	--	--	25	25(OR)	50	1
Professional Elective Course – I	E	3	--	--	3	40	60	-	-	100	3
Open Elective Course – I	F	3	--	--	3	40	60	-	-	100	3
Minor Project – I (Stage –I)	G	--	--	6	6	-	-	50	-	50	3
MC-III – Constitution of India	H	--	--	--	--	--	--	--	--		0
		15	0	12	27	200	300	125	75	700	21

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Professional Elective Course – I	Open Elective Course – I

Syllabus Structure for Third Year Engineering (Semester – VI) (Mechanical Engineering) (w.e.f. 2020 – 21) (As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Kinematics and Theory of Machines	D	3	--	--	3	40	60	--	--	100	3
Manufacturing Technology	D	3	--	--	3	40	60	--	--	100	3
Material Engineering	D	3	--	--	3	40	60	--	--	100	3
Professional Elective Course – II	E	3	--	--	3	40	60	-	-	100	3
Open Elective Course – II	F	3	--	--	3	40	60	-	-	100	3
Kinematics and Theory of Machines Lab	D	--	--	2	2	--	--	25	25(OR)	50	1
Manufacturing Technology Lab	D	--	--	2	2	--	--	25	25(OR)	50	1
Material Engineering Lab	D	--	--	2	2	--	--	25	-	25	1
Minor Project	G	--	--	6	6	-	-	50	25(OR)	75	3
		15	--	12	27	200	300	125	75	700	21

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Professional Elective Course – II	Open Elective Course – II

NOTE: Note: Every student should undergo Summer Internship during Summer Vacation of at least THREE weeks duration. Credits for Summer Internship shall be included in Project (Stage – I) of Semester – VII.

Syllabus Structure for Fourth Year Engineering (Semester – VII) (Mechanical Engineering) (w.e.f. 2021 – 22) (As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme			Total	Evaluation Scheme				Credits	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week		Theory		Practical			Total
						ISE	ESE	ICA	ESE		
Design of Machine Elements & Transmission Systems	D	3	--	--	3	40	60	--	--	100	3
Professional Elective Course – III	E	3	--	--	3	40	60	-	-	100	3
Professional Elective Course – IV	E	3	--	--	3	40	60	-	-	100	3
Open Elective Course – III	F	3	--	--	3	40	60	-	-	100	3
Design of Machine Elements & Transmission Systems Lab	D	--	--	2	2	--	--	25	25(OR)	50	1
Computer Aided Design Lab	D	1	--	2	3	-	-	25	25(OR)	50	2
Project (Stage – I)	G	--	--	12	12	-	-	50	50(OR)	100	6
Essence of Indian Traditional Knowledge	H	--	--	--	--	--	--	--	--	--	0
		13	--	16	29	160	240	100	100	600	21

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Professional Elective Course – III	Professional Elective Course – IV	Open Elective Course – III

Syllabus Structure for Fourth Year Engineering (Semester – VIII) (Mechanical Engineering) (w.e.f. 2021 – 22) (As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Refrigeration and Air Conditioning	D	3	--	--	3	40	60	--	--	100	3
Refrigeration and Air Conditioning Lab	D	--	--	2	2	--	--	25	25(OR)	50	1
Finite Element Analysis & Simulation Techniques Lab	D	2	--	2	4	-	-	25	25(OR)	50	3
Professional Elective Course – V	E	3	--	--	3	40	60	-	-	100	3
Professional Elective Course – VI	E	3	--	--	3	40	60	-	-	100	3
Open Elective Course – IV	F	3	--	--	3	40	60	-	-	100	3
Project	G	--	--	6	6	-	-	50	50(OR)	100	3
		14	--	10	24	160	240	100	100	600	19

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Professional Elective Course – V	Professional Elective Course – VI	Open Elective Course – IV



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

(NAAC 'A' Grade Accredited with CGPA 3.14 - 2ND Cycle)

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Mandatory Disclosure

Part-III

January - 2023



**KAVAYITRI BAHINABAI
CHAUDHARI NORTH MAHARASHTRA
UNIVERSITY, JALGAON**



**MASTER OF COMPUTER APPLICATIONS
(MCA)**

(at University Campus under Academic Flexibility w.e.f. 2020-21)

(w.e.f. Academic Year 2020-21)

Summary of Distribution of Credits under CBCS Scheme for M.C.A. at School of Computer Sciences

[at University Campus under Academic Flexibility w.e.f. 2020-21]

Sr. No.	Type of course	Sem I	Sem II	Sem III	Sem IV
01	Core	22	22	16	-
02	Skill based	06	06	06	-
03	School Elective	-	-	06	-
04	Project	-	-	-	12
05	Audit	02	02	02	-
06	Total Credits	30	30	30	12

Subject Type	Core	Skill based	School Elective	Project	Audit	Total
Credits	60	18	06	12	06	102

Total Credits = 102

**Kavayitri Bahinabai Chaudhari North Maharashtra University,
Jalgaon**

School of Computer Sciences

M. C.A. (w. e. f. A. Y. 2020 -2021)

Course credit scheme

Semester	(A) Core Courses			(B) Skill Based / Elective Course			(C) Audit Course (No weightage in CGPA)			Total Credits (A+B+C)
	No. of Courses	Credits (T+P)	Total Credits	No. of Courses	Credits (T+P)	Total Credits	No. of Courses	Credits (Pract.)	Total Credits	
I	4	16 + 6	22	1	4 + 2	6	1	2	2	30
II	4	16 + 6	22	1	4 + 2	6	1	2	2	30
III	4	16 + 6	22	1	4 + 2	6	1	2	2	30
IV	1	12	12	-	-	-	-	-	-	12
Total Credits	72			24			6			102

(T, Theory; P, Practical)

Structure of Curriculum

		First Year				Second Year				Total Credit Value	
		Semester I		Semester II		Semester III		Semester IV			
		Credit	Course	Credit	Course	Credit	Course	Credit	Course		
(A)	Prerequisite and Core Courses										
		Theory	16	4	16	4	16	4	-	-	44
		Practical	6	3	6	3	6	3	-	-	16
		Project(Industrial Training)	-	-	-	-	-	-	12	1	12
(B)	Skill Based / Subject Elective Courses										
		Theory	4	1	4	1	4	1	-	-	16
		Practical	2	1	2	1	2	1	-	-	08
(C)	Audit Course (No weightage in CGPA calculations)										
1	Practicing Cleanliness	2	1	-	-	-	-	-	-	2	
2	Personality & and Cultural Development Related Course	-	-	2	1	-	-	-	-	2	
3	Technology Related + Value Added Course	-	-	-	-	2	1	-	-	2	
4	Professional /Social + Value added course	-	-	-	-	-	-	-	-		
	Total Credit Value	30	10	30	10	30	10			102	

List of Audit Courses (Select any ONE course of Choice from Semester II and Semester III)

Semester I (Compulsory)		Semester II (Choose One)		Semester III (Choose One)	
		Personality and Cultural Development		Technology + Value Added Course	
Course Title		Course Title		Course Title	
AC-101	Practicing Cleanliness	AC-201 (A)	Soft Skills	AC-301(A)	Computer Skills
		AC-201 (B)	Sport Activities	AC-301(B)	Cyber Security
		AC-201 (C)	Yoga	AC-301(C)	Linux (Spoken Tutorial Course)
		AC-201 (D)	Music	AC-301(D)	Advance C++ (Spoken Tutorial Course)

Semester-wise Course Structure of M.C.A. I (w.e.f. A Y 2020-2021)

Semester I

Total Credit for Semester I: 30 (T = Theory: 16; P = Practical: 6; Skill Based: 6; Audit Course:2)

	Course Type	Title of the Course	Contact Hours/Week			Distribution of Marks for Examination					Credits
			T	P	Total	Internal		External		Total	
						T	P	T	P		
CA-101	Core	Database Management System (DBMS)	04	-	04	40	-	60	-	100	04
CA-102	Core	Operating Systems	04	-	04	40	-	60	-	100	04
CA-103	Core	Fundamentals of Artificial Intelligence	04	-	04	40	-	60	-	100	04
CA-104(A)	Core	Computer Programming and Problem Solving	04	-	04	40	-	60	-	100	04
CA-104(B)		Web Programming									
CA-105(A)	Skill Based	Java Programming (Core Java)	04	-	04	40	-	60	-	100	04
CA-105(B)		Object Oriented Programming using C++									
CA LAB-I	Core	LAB on DBMS	-	02	02	-	20	-	30	50	02
CA LAB-II	Core	LAB on OS (Linux)	-	02	02	-	20	-	30	50	02
CA LAB-III(A)	Core	LAB on COPS		02	02	-	20	-	30	50	02
CA LAB-III(B)		LAB on Web Programming									
CA LAB-IV(A)	Skill Based	LAB on Java Programming		02	02	-	20	-	30	50	02
CA LAB-IV(B)		LAB on C++ Programming									
AC-101	Audit Course	Practicing Cleanliness	-	02	02	-	100	-	-	100	02

Semester II

Total Credit for Semester II: 30 (T = Theory: 16; P = Practical: 6; Skill Based: 6; Audit Course:2)

	Course Type	Title of the Course	Contact Hours/Week			Distribution of Marks for Examination					Credits
			T	P	Total	Internal		External		Total	
						T	P	T	P		
CA-201	Core	Advanced Software Development Methodologies	04	-	04	40	-	60	-	100	04
CA-202	Core	Mathematical Foundations of Computer: Science	04	-	04	40	-	60	-	100	04
CA-203	Core	Data Structures and Algorithms	04	-	04	40	-	60	-	100	04
CA-204(A)	Core	Machine Learning	04	-	04	40	-	60	-	100	04
CA-204(B)		Digital Image Processing & Computer Vision									
CA-205(A)	Skill Based	Advanced Java (Technologies)	04	-	04	40	-	60	-	100	04
CA-205(B)		Python Programming									
CA LAB-V	Core	LAB on Advanced Software Development Methodologies	-	02	02	-	20	-	30	50	02
CA LAB-VI	Core	LAB on Data Structures and Algorithms	-	02	02	-	20	-	30	50	02
CA LAB-VII(A)	Core	LAB on Machine Learning		02	02	-	20	-	30	50	02
CA LAB-VII(B)		LAB on Digital Image Processing & Computer Vision									
CA LAB-VIII(A)	Skill Based	LAB on Advanced Java (Technologies)		02	02	-	20	-	30	50	02
CA LAB-VIII(B)		LAB on Python programming									
AC-201	Audit Course	Personality and Cultural Development	-	02	02	-	100	-	-	100	02

Semester-wise Course Structure of M.C.A. II (w.e.f. A Y 2020-2021)

Semester III

Total Credit for Semester I: 30 (T = Theory: 16; P = Practical: 6; Skill Based: 6; Audit Course:2)

	Course Type	Title of the Course	Contact Hours/Week			Distribution of Marks for Examination					Credits
			T	P	Total	Internal		External		Total	
						T	P	T	P		
CA-301	Core	Compiler Construction	04	-	04	40	-	60	-	100	04
CA-302	Core	Design and Analysis of Algorithms	04	-	04	40	-	60	-	100	04
CA-303	Core	High Performance Computing Paradigms and Applications	04	-	04	40	-	60	-	100	04
CA-304(A)	Core	Natural Language Processing	04	-	04	40	-	60	-	100	04
CA-304(B)		AI in Practice with Python									
CA-304(C)		Data Analytics	04	-	04	40	-	60	-	100	04
CA-305(A)	Skill Based	Mobile Application Development (Android Programming)	04	-	04	40	-	60	-	100	04
CA-305(B)		Microsoft .Net Technologies									
CA-305(C)		Ruby on Rails									
CA LAB-IX	Core	LAB on Design and Analysis of Algorithms	-	02	02	-	20	-	30	50	02
CA LAB-X	Core	Lab on High Performance Computing Paradigms and Applications	-	02	02	-	20	-	30	50	02
CA LAB-XI(A)	Core	Lab on Natural Language Processing									
CA LAB-XI(B)		Lab on AI Practice using Python		02	02	-	20	-	30	50	02
CA LAB-XI(C)		Lab on Data Analytics									
CA LAB-XII(A)	Skill Based	Lab on Android Programming									
CA LAB-XII(B)		Lab on Microsoft .Net Technologies		02	02	-	20	-	30	50	02
CA LAB-XII(C)		Lab on Ruby on Rails									
AC-301	Audit Course	Technology + Value Added Course	-	02	02	-	100	-	-	100	02

Semester IV

Total Credit for Semester IV: 12

	Course Type	Title of the Course	Contact Hours/Week	Distribution of Marks for Examination			Credits
				Internal	External	Total	
CA-401	Project	Full time Industrial Training	Students contact to teachers through E-mail, AView Software and other ICT technologies throughout the Semester	-	300	300	12

Program at a Glance

Name of the program (Degree)	:	Master in Computer Applications (MCA)
Faculty	:	Science and Technology
Duration of the Program	:	Two years (four semesters)
Medium of Instruction and Examination	:	English
Examination Pattern	:	60% (External Assessment) + 40% (Internal Assessment)
Passing Standard	:	Separate Passing for internal as well as external assessment (40%).
Evaluation mode	:	CGPA
Total Credits of the program	:	102 (102 core credits including 12 credits of project/dissertation, 18 skill enhancement credits, 24 subject elective credits and 06 audit credits)

Programme Specific Objectives:

- Prepare students to become computer professionals with comprehensive knowledge and skills to produce software for emerging requirement
- Prepare students to become continuous learner with aptitude for teaching and research with societal focus
- Prepare students who will achieve peer-recognition, as an individual or in a team; through demonstration of good analytical, design and implementation skills.

Semester-I

<i>Course Code: CA-101</i>	Database Management System (DBMS)	<i>Clock Hours: 60 Total Marks: 100</i>
<p>Course Objectives:</p> <ol style="list-style-type: none"> 1) Introduction to the basic concepts of database management systems, learning to design databases using ER modelling, and decomposing data based on functional dependencies 2) Understand Relational databases, SQL, Transaction management, Query processing, concurrency control and recovery system. 3) Describe and discuss selected advanced database topics such as distributed database and XML and Web data. 		
Unit-I	[05]	Max Marks:08
<p>Introduction: Database system application and purpose, Characteristics of DBMS, Database Users, 1-tier, 2-tier and 3-tier architecture of DBMS along with its advantages, Levels of Database Architecture, Data Models, Data-schemas and instances, Data Independence, Role and responsibilities of DBA.</p>		
Unit-II	[10]	Max Marks:12
<p>Database Design and E-R Model: Overviews of Database Design, ER Modelling concepts, ER Diagrams, Reduction to Relational Schemas, Extended ER Features, Alternative notations for Modelling, Cardinality constraints, Atomic Domains and 1NF, Decomposition using Functional Dependencies (BCNF, 3NF and 4NF).</p>		
Unit-III	[12]	Max Marks:20
<p>Relational Databases: Structure of Relational Databases, Database Schemas, Keys, Schema diagrams, Relational Query Languages, Relational Operation. Overview of SQL, SQL Data Definition, Basic Structure of SQL Queries, Basic Operations, Set Operations, Null Values, Aggregate Functions, Nested Sub queries, Modification of Databases. Join Expressions, Views, Transactions, Integrity Constraints, SQL data types and Schemas, Authorization, Accessing SQL from Programming Languages, Overview of Dynamic SQL and SQL CLI. Functions and Procedures, Triggers. The relational Algebra fundamental and extended Operations. Tuple and Domain Relational Calculus.</p>		
Unit-IV	[10]	Max Marks:22
<p>Transaction Management and Query Processing: Transaction Concept, Model, Storage Structure, Atomicity and Durability, Isolation, Levels of Isolation, Overview of Query Processing, Measuring Query Cost, Selection Operation, Sorting, Join Operation, Other Operations and Evaluation of Expression. Overview of Query Optimization, Transformation of Relational Expression, Choice of Evaluation Plan.</p>		
Unit-V	[10]	Max Marks:16
<p>Concurrency Control and Recovery System: Lock based Protocol, Timestamp based Protocol, Validation based Protocol, Deadlock Handling, Failure Classification, Storage, Recovery and Atomicity, Recovery Algorithms, Buffer Management, Early lock release and logical undo operations, Remote Backup Systems. Case study: ARIES</p>		
Unit-VI	[13]	Max Marks:22
<p>Advanced Topics in Databases: Introduction to Object Databases: Shortcomings of Relational Data Model, The Conceptual Object Data Model, Objects in SQL:1999 and SQL:2003. Introduction to XML and Web Data: Semi-structured Data, Overview of XML, XML Data Definitions, XML Schema, XML Data Manipulation: XQuery, XPath Query Languages: XPath and SQL/XML.</p>		

Distributed Databases: Overview, Homogeneous and Heterogeneous Databases, Distributed Data Storage, Distributed Transactions, Commit Protocols, Concurrency Control, Cloud based Databases.

References:

[1] Michael Kifer, Arthur Bernstein, P.M, Lewis and P.K. Panigrahi (2011), “Database Systems: An Application Oriented Approach”, Second Edition, Pearson Education, 2011, ISBN: 9788131703748.
 [2] C. J .Date, A. Kannan and S. Swamynathan (2006), “An Introduction to Database Systems”, Eighth Edition, Pearson Education, 2006, ISBN:978-81-7758-556-8
 [3] Silberschatz, H.F.Korth, and S.Sudarshan (2011), “Database System Concepts”, TMH Publications, Sixth Edition, 2011, ISBN: 978-007-132522-6.
 [4] Ramez Elmasri, Shamkant B. Navathe (2011), “Fundamentals of Database Systems” Seventh Edition, Pearson Education, 2011, ISBN: 978-0-13-397077-7.

Course Outcome:

After completion of this course students shall be able to-

1. Apply the relational model, specify integrity constraints, and explain how to create a relational database using an ER diagram and normalization techniques.
2. Apply SQL to create, query and manipulate relational databases.
3. Determine partitioning and distribution of data across networked nodes of a DBMS and data optimization in a distributed environment.

Course Code: CA-102	Operating Systems	<i>Clock Hours: 60</i> <i>Total Marks: 100</i>
Course Objectives:		
<ol style="list-style-type: none"> 1) To get acquainted with the main components of an OS, and study concepts like system calls, processes management, threads, scheduling, synchronization, deadlocks, memory management, IO management. 2) To understand the working of an OS as a resource manager, file system manager, process manager, memory manager and I/O manager and methods used to implement the different parts of OS 3) To study the need for special purpose operating systems with the advent of new emerging technologies 		
Unit-I	[04]	Max Marks:08
Introduction: review of computer organization, introduction to popular operating systems like UNIX, Windows, etc., OS structure, system calls, functions of OS, evolution of Oss.		
Unit-II	[03]	Max Marks:06
Computer organization interface: using interrupt handler to pass control between a running program and OS.		
Unit-III	[08]	Max Marks:12
Concept of a process: states, operations with examples from UNIX (fork, exec), Process scheduling, interprocess communication (shared memory and message passing), UNIX signals.		
Unit-IV	[04]	Max Marks:06
Threads: multithreaded model, scheduler activations, examples of threaded programs.		
Unit-V	[06]	Max Marks:10
Scheduling: multi-programming and time sharing, scheduling algorithms, multiprocessor scheduling, thread scheduling (examples using POSIX threads).		
Unit-VI	[08]	Max Marks:12

Process synchronization: critical sections, classical two process and n-process solutions, hardware primitives for synchronization, semaphores, monitors, classical problems in synchronization (producer-consumer, readers-writer, dining philosophers, etc.).		
Unit-VII	[06]	Max Marks:10
Deadlocks: modelling, characterization, prevention and avoidance, detection and recovery.		
Unit-VIII	[07]	Max Marks:12
Memory management: with and without swapping, paging and segmentation, demand paging, virtual memory, page replacement algorithms, working set model, implementations from operating systems such as UNIX. Current Hardware support for paging: e.g., Pentium/ MIPS processor etc.		
Unit-IX	[07]	Max Marks:12
Secondary storage and Input/Output: device controllers and device drivers, disks, scheduling algorithms, file systems, directory structure, device controllers and device drivers, disks, disk space management, disk scheduling, NFS, RAID, other devices. Operations on them, UNIX FS, UFS protection and security, NFS		
Unit-X	[04]	Max Marks:06
Protection and security: Illustrations of security model of UNIX and other Oss. Examples of attacks.		
Unit-XI	[03]	Max Marks:06
Epilogue: Pointers to advanced topics (distributed OS, multimedia OS, embedded OS, real-time OS, OS for multiprocessor machines).		
All above topics shall be illustrated using UNIX as case-studies.		
References:		
1. 1 Abraham Silberschatz, Peter B. Galvin, Greg Gagne (2009), Operating System Concepts, 8 th Ed., John Wiley ISBN 0-471-69466-5.		
2. William Stallings (2014), Operating Systems: Internals and Design Principles. Pearson, 8 th Ed. ISBN-13: 978-0-13-230998-1		
3. AS Tanenbaum (2009), Modern Operating Systems, 3 rd Ed., Pearson. ISBN: 0135013011		
4. AS Tanenbaum, AS Woodhull (2006), Operating Systems Design and Implementation, 3 rd Ed., Prentice Hall ISBN-10: 0131429388		
5. M. J. Bach (1986), Design of the Unix Operating System, Prentice Hall of India ISBN0. -13-201757-1 025		
Course Outcome:		
After completion of this course, students shall be able to:		
1) Analyse design aspects and data structures/policies/algorithms used for file subsystem, memory subsystem, process subsystem and i/o subsystem of Unix OS.		
2) Differentiate between threads and processes and compare different processor scheduling algorithms		
3) Identify the need to create the advance and special purpose operating system.		

Course Code: CA-103	Fundamentals of Artificial Intelligence	Clock Hours: 60 Total Marks: 100
Course Objectives:		
1) Gain a historical perspective of AI and its foundations.		
2) Study the concepts of Artificial Intelligence and investigate applications of AI techniques in intelligent agents		

3) Learn various peculiar search strategies used in AI and use of them in solving problems using Artificial Intelligence.		
Unit-I	[08]	Max Marks:10
What is AI?: Overview and Historical Perspective, Turing test, Physical Symbol Systems and the scope of Symbolic AI, AI Agents.		
Unit-II	[06]	Max Marks:10
Uninformed Search: State Space Representation, Depth First Search, Breadth First Search, DFID.		
Unit-III	[08]	Max Marks:12
Informed Search: Best First Search, Hill Climbing, Beam Search, Tabu Search.		
Unit-IV	[08]	Max Marks:15
Randomized Search: Simulated Annealing, Genetic Algorithms, Ant Colony Optimization.		
Unit-V	[08]	Max Marks:12
Problem Decomposition: Goal Trees, AO*, Rule Based Systems, Rete Net.		
Unit-VI	[06]	Max Marks:12
Game Playing: Minimax Algorithm, AlphaBeta Algorithm, SSS*.		
Unit-VII	[08]	Max Marks:14
Mathematical Logic and Inferences: Propositional Logic, First Order Logic, Soundness and Completeness, Forward and Backward chaining.		
Unit-VIII	[08]	Max Marks:15
Planning: Domains, Forward and Backward Search, Goal Stack Planning, Plan Space Planning, Graphplan,		
References:		
<ol style="list-style-type: none"> 1. Deepak Khemani (2013). A First Course in Artificial Intelligence, McGraw Hill Education (India). 2. Elaine Rich and Kevin Knight (1991). Artificial Intelligence, Tata McGraw Hill. 3. Stuart Russell and Peter Norvig (2009). Artificial Intelligence: A Modern Approach, 3rd Edition, Prentice Hall. 		
Course Outcome:		
After completion of this course students shall be able to-		
<ol style="list-style-type: none"> 1) Identify problems that are amenable to solution by AI methods. 2) Identify appropriate AI methods to solve a given problem. 3) Design smart system using different informed search / uninformed search or heuristic approaches. 		
Course Code: CA-104(A)	Computer Programming and Problem Solving	Clock Hours: 60 Total Marks: 100
Course Objectives:		
<ol style="list-style-type: none"> 1) To introduce the foundations of computing, programming and problem-solving. 2) To develop logical ability for problem-solving. 3) To develop basic programming skills necessary for coding. 		
Unit-I	[10]	Max Marks:16
Introduction to problem solving		
Problem solving aspect, Designs(top down and bottom up, functional programming, data storage and manipulations, classic puzzles, general problem solving techniques, expressing using charts, algorithms, introduction to pseudocode.		
Unit-II	[10]	Max Marks:18
Solving Problems with iterations verses Recursion		

Iterations: Review, problem solving with iterations, Review of Recursion Fundamentals, Head and Tail Recursion, Applying to Dynamic Data Storage, Recursion and Binary Trees, Wrapper Functions, When to Choose Recursion, Converting recursion to iterative.		
Unit-III	[12]	Max Marks: 20
Solving Problems with Vector and Matrices Review of Array Fundamentals, Store, Copy, Retrieval and Search, Sort, Compute Statistics, Solving Problems with Arrays, Finding the Mode, Refactoring, Arrays of Fixed Data, Non-scalar Arrays , Multidimensional Arrays, Deciding When to Use Arrays.		
Unit-IV	[12]	Max Marks: 18
Solving Problems with Dynamic Memory Benefits of using dynamic memory , Runtime-Sized Data Structures, Resizable Data Structures, Memory Sharing, When to Use dynamic memory, The Stack and the heap memory Memory Size and its Lifetime, Variable-Length Strings, Solving Pointer Problems, Linked representations		
Unit-V	[08]	Max Marks: 14
Structural approach verses object oriented approach Introduction to object oriented paradigms, Components of Structural approach and object oriented approach, Structural approach verses object oriented approach		
Unit-VI	[08]	Max Marks: 14
Solving Problems with code reuse Good Reuse and Bad Reuse, Review of Component Fundamentals, Code Block and algorithms, Abstract Data Types, Patterns, Libraries, Building Component Knowledge		
References: 1. R. J. Dromey, "How to solve it by Computer" Prentice-Hall ISBN 978-0134340012 2. V. Anton Spraul "Think Like a Programmer: An Introduction to Creative Problem Solving", No Starch Press, Inc. ISBN: 978-1593274245 3. Subhashis Banerjee, S. Arun-Kumar, D. Dubhashi: Introduction to Computer Science. Manuscript. 4. Structure and Interpretation of Computer Programs by Harold Abelson and Gerald Sussman with Julie Sussman, MIT Press, 1985.		
Course Outcome: After completion of this course students shall be able to- 1) Design blocks of the problems. 2) Build logic for solving new problems on paper. 3) Model the logic as code.		

Course Code: CA-104(B)	Web Programming	Clock Hours: 60 Total Marks: 100
Course Objectives: 1) To understand web designing using HTML/CSS. 2) To use JavaScript for scripting. 3) To understand staic/dynamic API using JSON/JQuery/AngularJS.		
Unit-I	[10]	Max Marks: 16
HTML: Introduction to HTML, Doctype, Namespace, Meta Tag, Script Tag, Images, Tables, Div, Paragraph, Span, Pre Tags, Anchor Links and Named Anchors, Line Breaks and Horizontal Lines. Lists, Object Tag, Iframe Tag, Form Tag, Form Tag, POST and GET Method, Fieldset and Legend,		

Text input, Text area, Checkbox and Radio Button, Dropdown, List, File Upload and Hidden Fields, Submit, Image, Normal, Reset Button, Creating a Live Website with Form		
CSS: Introduction to CSS 2.1, CSS Selectors: Universal Selector, ID Selector, Tag Selector, Class Selector, Sub Selector, CSS Properties: Type Properties, Background Properties, Block Properties, Box Properties, List Properties, Border Properties, Positioning Properties, Conversion of Table to CSS Layout, CSS Menu Design (Horizontal, Vertical), External and Inline CSS, Introduction to CSS 3, New CSS 3 Selectors, New CSS3 Properties, CSS Gradients, Opacity Property, ,Transition effect, Transform effect, Animation effects, Css Media Queries, Creating a Live Website with CSS		
HTML 5: Introduction to HTML5, XHTML vs HTML5, Features of HTML5, HTML5 DocType, New Structure Tags, Section, Nav , Article, Aside, Header, Footer, New Media Tags, Canvas and Svg Tag, Introduction to HTML5 Forms, voice search		
JavaScript: Introduction to JavaScript, Variable, statements, Operators, Comments, constructs, Functions, expressions, JavaScript console, Scope, Events, Strings, String Methods, Numbers, Number Methods, Dates, Date Formats, Date Methods, Arrays, Loops Object Prototypes, Object Oriented Programming, JavaScript Validations, Security in Java Script		
Unit-II	[10]	Max Marks:18
Bootstrap :Introduction to Responsive Web Design, Overview of Bootstrap, Need to use Bootstrap, Bootstrap Grid System, Grid Classes, Basic Structure of a Bootstrap Grid, Typography, Tables, Images, Jumbotron, Wells, Alerts, Buttons, Button Groups, Badges/Labels, Progress Bars, Pagination, List Groups, Panels, Dropdowns, Collapse, Tabs/Pills, Navbar, Forms, Inputs, Bootstrap Grids, Grid System, Stacked/Horizontal, Bootstrap Themes, Templates		
Unit-III	[12]	Max Marks:20
AngularJS: Introduction to AngularJS, Structuring AngularJS application, MVC in AngularJS, AngularJS routing, AngularJS services		
Unit-IV	[12]	Max Marks:18
JQuery: Basics of jQuery, jquery selection and events, jQuery Effects, jquery traversal and manipulation, Data attributes and templates, jQuery Plugins, JQuery / Google Web Toolkit		
Unit-V	[08]	Max Marks:14
Node.js: Node.js: Introduction to Node.js, Node modules, Developing node.js web application, Event-driven I/O server-side JavaScript, Express: Introduction to Express, First Express Application, Application, Request and Response Objects, Implementing MVC Pattern, Express application configuration, Rendering Views.		
Unit-VI	[08]	Max Marks:14
JSON: Introduction, Need of JSON, JSON Syntax Rules, JSON Data - a Name and a Value, JSON Objects, JSON Arrays, JSON Uses JavaScript Syntax, JSON Files, JSON & Security Concerns, Cross Site Request Forgery (CSRF), Injection Attacks ,Responsive Web Design		
References:		
<ol style="list-style-type: none"> 1. HTML, CSS, & JavaScript for Dummies. Tittel, E., Holland, E., Minnick, C. (2018). John Wiley & Sons. 2. HTML5 Programmer's Reference. Reid, J. (2015). Apress. 3. Bootstrap: Responsive Web Development. Spurlock, J. (2013). O'Reilly Media. 4. Professional AngularJS. Karpov, V., Netto, D. (2015). Wiley. 5. Web Development with JQuery. York, R. (2015). Wiley. 6. Professional Node.js: Building Javascript Based Scalable Software. Teixeira, P. (2012). Wiley. 7. Beginning JSON. Smith, B. (2015). Apress. 		

Course Outcome:

After completion of this course students shall be able to-

- 1) Design the web applications/sites
- 2) Apply dynamic paging using AngularJS/JSON/JQuery..
- 3) Use Javascript/Node.JS to make design and scripting.

Course Code: CA-105(A)	Java Programming (Core Java)	Clock Hours: 60 Total Marks: 100
Course Objectives:		
<ol style="list-style-type: none"> 1. Understand Fundamental concepts of object oriented programming using Java technology. 2. Java applications development using polymorphism, inheritance, interfaces and inner classes and multi-threading. 3. GUI applications and event driven applications development. 		
Unit-I	[08]	Max Marks:5
An Introduction to Java: History of Java, Features of Java (Java Buzz words), Obtaining Java Environment, Setting up Java Environment, Structure of the Java Program, Creating a Source File, Compiling the Source File into a .class file, Executing the Program, The Java Virtual Machine, Comments, Data types, variables, Keywords, Operators, Control Structures, Arrays		
Unit-II	[08]	Max Marks:10
Introduction to OOPs: OOPs concepts, Predefined classes(String, StringBuffer), type casting, wrapper classes, Input and Output, User defined class, object creation and initialization, finalize() method, static fields and methods, this keyword, Access specifier Inner class		
Unit-III	[10]	Max Marks:20
Inheritance, Polymorphism and interfaces: Dynamic Polymorphism (Method Overloading and Method Overriding), Static Polymorphism, final keyword, Superclass, Subclass, super keyword, Abstract classes, Methods with a Variable Number of Parameters, Enumeration Classes, Interfaces, Reflection		
Unit-IV	[10]	Max Marks:20
Multithreading and Exceptions: Creating Thread, Multi-Tasking using Threads, Thread Synchronization or Thread Safe, Thread Class Methods , Thread Communication, Thread Properties, ThreadGroup, Thread States (Life-Cycle of a Thread), Exception handling (try, catch, finally), throws clause, throw clause, Types of Exceptions(built-in, user defined), Assertions		
Unit-V	[14]	Max Marks:25
Graphics Programming and event handling : Introduction to swing and awt, Creating a Frame, Positioning a Frame, Displaying Information in a Component, Working with 2D Shapes, Color, Special Fonts for Text, JComponent class Methods, Creating Components in Swing (PushButton, Label, JComboBox Class , JList Class, JMenu Class), Layout Manager (Flow Layout, Border Layout, Card Layout, Grid Layout, GridBag Layout), Basics of Event Handling, Listeners and Listener Methods, Mouse Events, Keyboard Events, AWT Event Hierarchy		
Unit-VI	[10]	Max Marks:20
Streams, Files and JDBC: Input and output stream, Reading and Writing Binary Data, Reading and Writing text Data, File Management(File Class), The Design of JDBC, JDBC Configuration, Executing SQL Statements, Query Execution Scrollable and Updatable Result Sets, Row Sets, Metadata, Transactions, Packages.		
References:		

- 1] Horstman Cay, Cornell Gary, Core Java™2, Vol. 1&2, Seventh Edition, Pearson education.
- 2] Herbert Schildt, The Complete Reference, Seventh Edition, Tata McGraw-Hill.
- 3] Steven Holzner, JAVA 2 Programming Black Book, Wiley India.
- 4] Ivor Horton, Beginning Java 2, JDK 5 Ed, Wiley India.

Course Outcome:

After completion of this course students shall be able to -

1. Create Java application development using polymorphism, inheritance, and inner classes.
2. Develop GUI interface and event driven applications.
3. Manipulate databases through java application.

Course Code: CA-105(B)

**Object Oriented Programming
using C++**

**Clock Hours: 60
Total Marks: 100**

Course Objectives:

The objectives of the course are:

- 1) To familiarize the Object-Oriented Programming (OOP) concepts, such as abstraction, encapsulation, instances, initializations, polymorphism, overloading, inheritance etc.
- 2) To write programs to solve problems using generic programming constructs such as templates and using standard template library.
- 3) To understand and know the importance of pointers and learn file handling and exception handling in real-world problems.

Unit-I

[15]

Max
Marks: **15**

Fundamentals:

Object-Oriented Programming (OOP): Need, Object Oriented Programming Paradigm, Benefits of OOP, C++ as object-oriented programming language.

C++ programming Basics: Data types, Enumerations, Arrays, Strings, Pointers and references, Control structures.

Functions: Function prototypes, parameter lists and return values, default values, global scoping, referencing, the 'const' keyword, referencing of strings, constant pointers, inline functions, static functions, function overloading, friend functions.

OOP Concepts: The 'Struct' keyword, Functions within structures, Data encapsulation and classes, 'this' pointer, Constructors and Destructors, Overloading constructors, Copy Constructor, Assignment and Copy Initialization, Methods and their return values, Objects and Memory requirements, Static Class members, friend class.

Unit-II

[10]

Max
Marks: **10**

Inheritance:

Base Class and derived Class, access specifiers, Constructor and Destructor in Derived Class, Virtual destructor, Protected members, Overriding member functions, Public and Private Inheritance, Multiple Inheritance, Ambiguity in Multiple Inheritance, Composition, Nested Classes.

Unit-III

[10]

Max
Marks: **20**

Polymorphism:

Operator Overloading: concept of overloading, Overloading Unary Operators, Overloading Binary Operators, Data Conversion, Type casting (implicit and explicit), Keywords 'explicit' and

<p>'mutable'. <i>Pointers</i>- indirect ion Operators, Memory Management: new and delete, Pointers to Objects. <i>Virtual Functions</i>: concept, pure virtual functions and abstract classes, arrays in polymorphism, late binding, Function pointers, Debugging Pointers, Dynamic Pointers, smart pointers.</p>		
Unit-IV	[10]	Max Marks: 20
<p>Files and Streams: Data hierarchy, Stream Classes, Stream Errors, Disk File I/O with Streams, File Pointers, and Error Handling in File I/O, File I/O with Member Functions, Overloading the Extraction and Insertion Operators, memory as a Stream Object, Command-Line Arguments, Printer output.</p>		
Unit-V	[10]	Max Marks: 20
<p>Templates and Exception Handling: <i>Templates</i>: Function templates, Template specialization, Class templates, Non-type parameters for templates, template, and inheritance, The typename and export keywords. <i>Exception Handling</i>: Other error handling techniques, Exceptions, Exception handling in C++, rethrowing an exception, exception specifications, processing unexpected exceptions, stack unwinding, exception handling in constructors, destructors.</p>		
Unit-VI	[05]	Max Marks: 15
<p>Standard Template Library (STL): <i>Introduction to STL</i>: Containers, algorithms, adaptors, and iterators, <i>Containers</i>: Sequence container and associative containers, <i>Adaptors</i>: container adaptors, iterator adaptors, <i>Algorithms</i>: basic searching and sorting algorithms, min-max algorithm, set operations, <i>Iterators</i>: input, output, forward, bidirectional and random access.</p>		
<p>References: 1] Robert Lafore, Object-Oriented Programming in C++, fourth edition, Sams Publishing, ISBN:0672323087. 2] Bjarne Stroustrup, The C++ Programming language, Third edition, Pearson Education ISBN 0-201-88954-4. 3] Meeta Gandhi, Tilak Shetty, RajivShah, Vijay Mukhi's The 'C' Odyssey C++ and Graphics-The future of C, BPB publications, First Edition</p>		
<p>Course Outcome: After completion of this course students shall be able to-</p> <ol style="list-style-type: none"> 1. Understand and use the basic programming constructs of C++ and manipulate various C++ datatypes, such as arrays, strings, and pointers. 2. Manage memory appropriately using proper allocation/deallocation procedures. 3. Write small-scale C++ programs using the above skills. 		

Course Code: CA LAB-I	LAB on DBMS	Total Marks: 50
<p>Course Objectives:</p> <ol style="list-style-type: none"> 1) Provides foundation knowledge in database concepts, technology and practice to prepare students into expert database application developers. 2) Strong practice in SQL programming through a variety of database problems. 3) Develop database applications using front-end tools and back-end DBMS. 		
<ol style="list-style-type: none"> 1. Creating database tables and using data types. <ul style="list-style-type: none"> • Create table , Modify table, Drop table 		

2. Practical Based on Data Manipulation.
 - Adding/Modify/Delete data using Insert/ Update/ Delete
3. Practical Based on Implementing the Constraints.
 - NULL and NOT NULL, Primary Key Constraint, Foreign Key Constraint
 - Unique Constraint, Check Constraint, Default Constraint
4. Practical for Retrieving Data Using following clauses.
 - Simple select clause
 - Accessing specific data with Where Clause
 - Ordered By/ Distinct/Group By Clause
5. Practical Based on Aggregate Functions.
 - AVG, COUNT, MAX, MIN, SUM, CUBE
6. Practical Based on implementing all String functions.
7. Practical Based on implementing Date and Time Functions.
8. Practical Based on implementing use of UNION, INTERSECTION, SET DIFFERENCE.
9. Implement Nested Queries & all types of JOIN operation.
10. Practical Based on performing different operations on a view.
11. Practical Based on implementing use of Procedures.
12. Practical Based on implementing use of Triggers
13. Practical Based on implementing Cursor.
14. Demonstrate Database connectivity with front end tools like – VB.NET, C#.NET, JAVA etc.
15. Practical based on creating Data Reports.
- 16 Design entity relationship models for a business problem and develop a normalized database structure

Course Outcome:
 After completion of this course students shall be able to-

- 1) Design and implement a database schema for a given problem-domain
- 2) Create and maintain tables using PL/SQL, Populate and query a database using SQL DML/DDI commands and programming PL/SQL including stored procedures, stored functions, cursors, triggers.
- 3) Application development using PL/SQL & front-end tools.

Course Code: CA LAB-II	LAB on OS (Linux)	Total Marks: 100
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Course Objectives:

- 1) To understand the Installation of Linux system.
- 2) To understand and make effective use of Linux utilities and shell scripting language to solve problems.
- 3) To know basics of system administration tasks, installation, configuration and administration of internet servers.

1. Demonstration on Installation of Linux system
 Direct Installation; Partitioning the Hard drive for Linux, Using Live CD, Virtual Machine, init and run levels
2. Linux Commands and Shell Programming
 Creating Users Accounts and Groups, Starting and Stopping Services, Files and File System (File Types and Permissions, Links, Size and Space, Date and Time), Working with Files: Reading Files, Searching for files, Copying, Moving, Renaming, Deleting, Linking, and Editing Files,

Other Commands: ls, rm, rmdir, pwd, more ,less. grep, sort, cat, head, tail, wc, tee, ps, top, tar, unzip, nice, kill, netstat, Disk related commands, checking disk free spaces
 read command, conditional and looping statements, case statements, parameter passing and arguments, Shell variables, system shell variables, shell keywords, Shell programs for performing various tasks (List to be given by the course instructor)

3. System Administration

Managing user accounts-adding & deleting users, changing permissions and ownerships, Creating and managing groups, modifying group attributes, Temporary disable user's accounts, creating and mounting file system, checking and monitoring system performance file security & Permissions, becoming super user using su; Getting system information Backup and restore files, reconfiguration hardware with kudzu, installing and removing packages in Linux. X-Windows administration

4. Installation, Configuration and Administration of Internet Servers

- Simple LAN
- Proxy server(Squid), DNS server(BIND)
- Mail server
- Web server(Apache)
- File server(Samba)
- DHCP server
- SSH server and client

FTP server and client

Course Outcomes:

After completion of this course students shall be able to-

- 1) Implement the Installation of Linux system.
- 2) Understand the basic commands of Linux operating system and can write shell scripts.
- 3) Implement system administration tasks, installation, configuration and administration of internet servers.

<i>Course Code:</i> CA LAB-III(A)	LAB on Computer Programming and Problem Solving(COPS)	<i>Total Marks: 50</i>
<p>Course Objectives:</p> <ol style="list-style-type: none"> 1) To represent the problems using mechanism like charts. 2) To express logic as an algorithm. 3) To convert logic in programs. 		
<p>Laboratory Requirements: OS: Windows/Linux, Programming Language: Any programming language Instructions</p> <ul style="list-style-type: none"> • All practical assignments must be designed on paper, logic should be demonstrated and pseudocode is to be written. • No barrier of programming language for code conversion of the assignments. • Problems and puzzles in theory are the assignments for the followings. 		

<ol style="list-style-type: none"> 1. Simple exercises and examples to introduce to the computing environment and usage. 2. Simple exercises and examples of functional programming 3. Puzzle solving using iterations 4. Problem solving using recursion 5. Programming for vectors and multidimensional data 6. Dynamic memory and problem solving. 7. Assignments on Solving Problems with code reuse 		
<p>Course Outcome: After completion of this course students shall be able to-</p> <ol style="list-style-type: none"> 1) Construct logic for the problems. 2) Write algorithms and able to draw logic on paper. 3) Write code for the logic developed. 		
Course Code: CA LAB-III(B)	LAB on Web Designing	Total Marks: 50
<p>Course Objectives:</p> <ol style="list-style-type: none"> 1) To work in web designing using HTML/CSS. 2) To use Bootstrap for designing. 3) To design dynamically using JSON/JQuery/AngularJS. 		
<ol style="list-style-type: none"> 1. Design a website with HTML Form. 2. Design a website using CSS 2.1 and CSS3. 3. Design a website with HTML5. 4. Design a dynamic web form with validations using JavaScript. 5. Design a website with Bootstrap. 6. Design a dynamic website with AngularJS. 7. Demonstrate the use of jQuery in a website. 8. Demonstrate the use of Node.js in a website. 9. Demonstrate the use of JSON in a website. 10. Design a dynamic website using demonstrating the web technologies (HTML, JavaScript, Bootstrap, Angular JS, JQuery). 		
<p>Course Outcome: After completion of this course students shall be able to-</p> <ol style="list-style-type: none"> 1) Develop Web site/App. 2) Use Bootstrap/Javascript to make design and scripting. 3) Make Web site dynamic using AngularJS/JSON/JQurey. 		
Course Code: CA LAB-IV(A)	: LAB on Java Programming	Total Marks: 50
<p>Course Objectives:</p> <ol style="list-style-type: none"> 1) Programming using inner classes and inheritance, polymorphism and interfaces 2) Use various swing components and handle several events in the development of GUI applications 3) Use JDBC and package creation 		
<ol style="list-style-type: none"> 1] Write a program that demonstrate program structure of java with use of arithmetical and logical implementation. 		

- 2] Write a program that demonstrate string operations using String and StringBuffer class.
- 3] Write a program that demonstrate inner class and static fields.
- 4] Write a program that demonstrate inheritance, polymorphism.
- 5] Write a program that demonstrate 2D shapes on frames.
- 6] Write a program that demonstrate color and fonts.
- 7] Write a program to illustrate use of various swing components.
- 8] Write a program that demonstrate use of dialog box and menus.
- 9] Write a program that demonstrate event handling for various types of events.
- 10] Write a program to illustrate multithreading.
- 11] Write a program to illustrate exception handling.
- 12] Write a program to demonstrate use of File class.
- 13] Write a program that demonstrate JDBC on application.
- 14] Write a program that demonstrate package creation and use in program.

Course Outcome:

After completion of this course students shall be able to-

- 1) Write java programmes using inner classes and static fields in implementation of Java application
- 2) Develop Java application for GUI development and event handling.
- 3) Develop database application using JDBC.

<i>Course Code: CA LAB-IV(B)</i>	LAB on C++ Programming	<i>Total Marks: 50</i>
<p>Course Objectives:</p> <ol style="list-style-type: none"> 1) Apply object-oriented approaches to software problems in C++ 2) Apply exception handling techniques to software problems in C++ 3) Apply generic programming approaches using templates and efficiently use standard template library in software development 		
<ol style="list-style-type: none"> 1. Write program to demonstrate class, use of constructor, constructor overloading and destructor. 2. Write program to demonstrate use of arrays, strings, pointers, constants, and references. 3. Write program to demonstrate use of operator overloading. 4. Write program(s) to demonstrate use of inheritance. 5. Write program to demonstrate use of compile time and runtime polymorphism. 6. Write program to demonstrate use of friend function and friend class. 7. Write program to demonstrate use of virtual class. 8. Write program to demonstrate use of static data member and static member function. 9. Write program to demonstrate file handling. 10. Write program to demonstrate use of function templates. 11. Write program to demonstrate use of class templates. 12. Write program to demonstrate use of exception handling. 13. Write program to demonstrate command line arguments. 14. Write program(s) to demonstrate use of STL. 		
<p>Course Outcome:</p> <p>After completion of this course students shall be able to-</p> <ol style="list-style-type: none"> 1) Develop logic of a program for solving real time problems and isolate and fix common errors in C++ programs 		

- 2) Understand the object-oriented approach for the program development and make use of the OOP concepts (data abstraction, encapsulation, polymorphism, overloading, and inheritance) of C++ appropriately in problem solving.
- 3) Create applications using the STL library.

Semester-II

<i>Course Code: CA-201</i>	Advanced Software Development Methodologies	<i>Clock Hours: 60 Total Marks: 100</i>
<p>Course Objectives: The objectives of the course are:</p> <ol style="list-style-type: none"> 1) To introduce git for software development 2) To learn the principles and practices associated with each of the agile development methods. 3) To apply the principles and practices of agile software development on a project of interest and relevance to the student. 		
Unit-I	[10]	Max Marks: 16
Git & Version Control: Basic Concepts, Environment setup, Life Cycle, Branches & Merging, working with local repository and Remote Repository.		
Unit-II	[10]	Max Marks: 18
Agile Methodology: Introduction, software development with agile, traditional model vs agile model, agile methods classification, manifesto and principles, project management, team interactions, ethics in teams, agility in design and testing, documentations, agile drivers, capabilities and values.		
Unit-III	[12]	Max Marks: 20
Agile Processes: Lean production - SCRUM, Crystal, Feature Driven Development, Adaptive Software Development, and Extreme Programming: Method overview, lifecycle, work products, roles and practices.		
Unit-IV	[12]	Max Marks: 18
Agility And Knowledge Management: Agile information systems, decision making, knowledge management, institutional knowledge evolution cycle, development, acquisition, refinement, distribution, deployment, leveraging, knowledge management in software engineering, managing software knowledge, challenges of migrating to agile methodologies, agile knowledge sharing, story-cards and Story-card Maturity Model (SMM).		
Unit-V	[08]	Max Marks: 14
Agility and Requirements Engineering: Impact of agile processes, current practices, variance, requirement engineering, managing unstable requirements, requirements elicitation, abstraction model, requirements management in agile environment, requirements prioritization, requirements modeling and generation, concurrency.		
Unit-VI	[08]	Max Marks: 14
Agility and Quality Assurance: Agile Interaction Design and product development, Agile Metrics and Feature Driven Development (FDD), Financial and Production Metrics in FDD, Quality Assurance with Agile approach, Test Driven Development, Pair programming, Global Software Development.		
<p>References:</p> <ol style="list-style-type: none"> 1. Robert C. Martin ,Agile Software Development, Principles, Patterns, and Practices Alan Apt Series. 2. Succeeding with Agile : Software Development Using Scrum, Pearson. 3. www.github.com 		
<p>Course Outcome: After completion of this course students shall be able to-</p> <ol style="list-style-type: none"> 1. Use git for software development and deployment. 2. Apply a thorough understanding of Agile principles and specific practices. 3. Judge, craft and evaluate appropriate adaptations to existing practices or processes depending upon analysis of typical problems. 		

<i>Course Code: CA-202</i>	Mathematical Foundations of Computer Science	<i>Clock Hours: 60 Total Marks: 100</i>
Course Objectives: The objectives of the course are: <ol style="list-style-type: none"> 1. To build the foundation of computer algorithms using mathematical base. 2. To apply statistical measures on the data and represent it graphically. 3. To relate practical examples to the probability theory and probability distributions to build the foundation for machine learning. 		
Unit-I	[10]	Max Marks:20
Induction and Recursion: Mathematical Induction, Strong Induction and Well Ordering, Recursive Algorithms, Program Correctness, The Basics of Counting, The Pigeonhole Principle, Permutations and Combinations.		
Unit-II	[15]	Max Marks:20
Advance Counting Techniques: Recursive Relations, The Towers of Hanoi, Merge Sort, Linear Recurrences, Solving Linear Recurrence Relations, Divide-and-Conquer Recurrences, Divide-and-Conquer Algorithms and Recurrence Relations, Generating Functions, Inclusion-Exclusion, Applications of Inclusion-Exclusion.		
Unit-III	[10]	Max Marks:15
Statistics: Population, sample, parameters, and statistics: definition, types, applications, Data Presentation: Classification of data, Frequency distribution, Cumulative and Relative frequency distribution, Descriptive Statistics: mean, median, mode, range, quartile deviation, standard deviation, variance, Graphical statistics		
Unit-IV	[10]	Max Marks:15
Probability: Making decisions under uncertainty, Classical definition of Probability, Events and their Outcomes, Rules of Probability, Probability axioms, Joint and Conditional probability, independence, and Bayes theorem,		
Unit-V	[10]	Max Marks:20
Probability Distributions: Random variables (discrete and continuous), Probability mass function, Distributions: Binomial, Poisson, Probability density function, Distributions: Uniform, Exponential, Normal.		
Unit-VI	[05]	Max Marks:10
Stochastic Processes: Definitions and classifications of Stochastic Processes, discrete and continuous Markov models, Chapman-Kolmogorov equation.		
References: <ol style="list-style-type: none"> 1. Kenneth H. Rosen, Discrete Mathematics, and its Applications 6th Ed, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2007 ISBN 10: 0070681880 2. Michael Baron (2014) Probability and Statistics for Computer Scientists Second Edition, CRC press. ISBN: 978-1-4822-1410-9 3. Goon A.M., Gupta M.K., Dasgupta. B. (2001), Fundamentals of Statistics, Volume I and II, World Press, Calcutta. 4. Ross, S. (2005). Introduction to Probability Models, (6th Ed. Academic Press). ISBN978-0-12-375686-2 		

5. Medhi, J. (1994). Stochastic Processes, (2nd Ed. New Age Publisher) ISBN : 978-93-86286-48-2

Course Outcome:

After completion of this course students shall be able to-

1. Identify, formulate, and develop solutions to computational challenges.
2. Analyze the behavior of the data, model the data using statistical measures and represent it graphically on paper without using available computerized tools.
3. Apply mathematical foundations, probability theory in the modeling and design of computational systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.

Course Code: CA-203	Data Structures and Algorithms	<i>Clock Hours: 60</i> <i>Total Marks: 100</i>
Course Objectives:		
<ol style="list-style-type: none"> 1) To impart the basic concepts of data structures and algorithms 2) To understand basic concepts about array, stacks, queues, linked lists, trees and graphs and advance topics like AVL Trees, BTrees, B* and B+ Trees 3) To understand concepts about searching, sorting and hashing techniques 		
Unit-I	[08]	Max Marks:06
Introduction to Data Structures and Algorithms: Algorithmic Notation: Format Conventions, Statement and Control Structures. Time and Space Analysis: Data types and Abstract data types, Types of Data structures; Primitive, Non primitive, Linear and Nonlinear Data structures		
Unit-II	[08]	Max Marks:15
Array: Storage representation, operations and applications (Polynomial addition and subtraction) Stack: operations and applications (infix, postfix and prefix expression handling), Queue: operations and applications, Circular Queues: operations and applications, Concept of Double ended Queue and Priority Queue, Linked representation of stack and queue.		
Unit-III	[10]	Max Marks:12
Linked Lists: Operations and Applications of Linear linked list (Polynomial addition and subtraction), Circular linked list and Doubly linked list.		
Unit-IV	[11]	Max Marks:21
Trees: Binary Trees, Binary Tree: Representations, Operations (insert/delete), Traversal (inorder, preorder, postorder, level order), Threaded Binary Tree, Search Trees: AVL Tree, single and double rotations, M-Way Search Tree (definition), B-Trees: insertion and deletion operation		
Unit-V	[11]	Max Marks:18
Graphs and Their Applications: Representation (Matrix/Adjacency) and Traversal (Depth First Search/Breadth First Search), Spanning Trees, Minimal Spanning Tree (Prim's and Kruskals's algorithm), Shortest Paths and All Pair Shortest Path: Dijkstra's, Floyd-Warshall Algorithms.		
Unit-VI	[12]	Max Marks:18
Hash Table: Hash Function, Collision and its Resolution, Separate Chaining, Open Addressing (linear probing, quadratic probing, double hashing), Rehashing, Extendible Hashing Searching: Linear Search and Binary Search (array/binary tree). Sorting: General Background, Sorting Techniques: Bubble Sort, Insertion Sort, Selection Sort, Quicksort, Mergesort, Heapsort and Radix Sort.		
References:		

1. Tremblay, J. & Sorenson, P.G., (2001), An Introduction to Data Structures with Application, Mcgraw Hill India, ISBN: 978-0074624715, 0074624717
2. Langsam, Y., Augenstein, M.J. & Tenenbaum A.M., (2015), Data Structures using C and C++, 2nd Edition, Pearson Education ISBN: 978-9332549319, 9332549311
3. Balagurusamy, E., (2013), Data Structures using C, 1st Edition, Mcgraw Hill Education, ISBN: 978-1259029547, 1259029549
4. Weiss, M.A., (2002), Data Structures and Algorithm Analysis in C, 2nd Edition, Pearson India, ISBN: 978-8177583588, 8177583581
5. Horowitz, E., Sartaj S. & Mehta, D. (2008), Fundamentals of Data Structures in C++, Universities Press ISBN: 978-8173716065, 8173716064
6. Lafore, R., (2003), Data Structures & Algorithms in Java, 2nd Edition, Pearson India, ISBN: 978-8131718124, 8131718123
7. Kruse, R., Tondo, C.L., Leung B., & Mogalla S, (2006), Data Structures and Program Design in C, Pearson India, ISBN: 978-8177584233.

Course Outcome:

After completion of this course students shall be able to-

- 1) Understand the concept of Dynamic memory management, data types, algorithms, Big O notation.
- 2) Understand data structures such as arrays, linked lists, stacks and queues, graphs, trees and hash tables.
- 3) Solve problem involving graphs, trees and apply different sorting and searching algorithms.

Course Code: CA-204(A)	Machine Learning	Clock Hours: 60 Total Marks: 100
Course Objectives: The objectives of the course are:		
<ol style="list-style-type: none"> 1) The course gives understanding of fundamentals of Machine Learning such as its types, applications and other preliminaries. 2) Course gives fair idea about all important techniques of Machine Learning such as Classification, Regression and Clustering. 3) It also introduces Neural Network model and its applications to Machine Learning and touching Deep Learning. 		
Unit-I	[08]	Max Marks: 10
Introduction: Basic definitions, types of learning, hypothesis space and inductive bias, evaluation, cross-validation		
Unit-II	[08]	Max Marks: 15
Regression(Linear, Lasso, Ridge), Decision trees, overfitting		
Unit-III	[09]	Max Marks: 15
Instance based learning, Feature reduction, Collaborative filtering-based recommendation		
Unit-IV	[08]	Max Marks: 15
Probability and Bayes learning		
Unit-V	[09]	Max Marks: 15
Logistic Regression, Support Vector Machine, Kernel function and Kernel SVM		
Unit-VI	[09]	Max Marks: 15

Neural network: Perceptron, multilayer network, backpropagation, introduction to deep neural network		
Unit-VII	[09]	Max Marks: 15
Clustering: k-means, adaptive hierarchical clustering, Gaussian mixture model		
References:		
1] Tom Mitchell (1997). Machine Learning. First Edition, McGraw- Hill.		
2] Ethem Alpaydin (2009). Introduction to Machine Learning Edition 2. The MIT Press.		
Course Outcome:		
After completion of this course students shall be able to-		
1. Acquire in-depth knowledge of various facets of Machine Learning methods/techniques and algorithms.		
2. Envisage practical application of Machine Learning to Business and Research Computational problems.		
3. Use knowledge of Machine Learning for product/service development.		

Course Code: CA-204(B)	Digital Image Processing & Computer Vision	Clock Hours: 60 Total Marks: 100
Course Objectives:		
1) The fundamental knowledge and basic technical competence in the field of Computer Graphics and Digital Image Processing.		
2) Give an in-depth knowledge about 2D and 3D transformation algorithms.		
3) Provide awareness about the current technologies and issues specific to Digital Image Enhancement, Restoration, Segmentation, Color Image Processing, and Morphological Image Processing.		
Unit-I Introduction to Digital Image Processing & Applications	[08]	Max Marks:12
Digital Image Processing. Applications of Digital Image Processing, Fundamental Steps in Digital Image Processing, Components of an Image Processing System, Image Sensing and Acquisition. Image Sampling and Quantization. Some Basic Relationships Between Pixels.		
Unit-II Image Enhancement	[10]	Max Marks:18
Background, Some Basic Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic/Logic Operations, Basics of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters, Combining Spatial Enhancement Methods, Introduction to the Fourier Transform and the Frequency Domain, Smoothing Frequency-Domain Filters, Sharpening Frequency Domain Filters, Homomorphic Filtering.		
Unit-III Color Image Processing	[4]	Max Marks:10
Color Fundamentals, Color Models, Pseudocolor Image Processing, Basics of Full-Color Image Processing, Color Transformations, Smoothing and Sharpening.		
Unit-IV Introduction to computer vision	[10]	Max Marks: 15
Role of Artificial intelligence and image processing in Computer Vision, Industrial Machine Vision applications, System architecture. Visual Sensors: Camera sensors: RGB, IR, Kinect sensor, Camera interfaces and video standards, Characteristics of camera sensors commercially available cameras. Camera Calibration: Interior, exterior calibration and rectification using Tsai's Calibration method.		
Unit-V Basics of video processing	[10]	Max Marks:15
Stereo – Epi-polar geometry, correspondence, triangulation, Disparity maps, Background subtraction techniques – frame differencing, Gaussian Mixture Modelling (GMM), Object localization and processing: Contours, edges, lines, skeletons.		

Unit-VI Object Recognition	[8]	Max Marks: 12
Object Modeling, Bayesian Classification, Feature Selection and Boosting, Scene and Object Discrimination.		
Unit-VII Motion and Tracking	[10]	Max Marks: 18
Motion detection and tracking of point features, optical flow, SURF, SIFT. Tracking- Kalman filter, Particle Filter, Comparison of deterministic and probabilistic methods condensation, tracking humans, multi-frame reconstruction under affine and perspective projection geometry.		
References:		
1. R.C.Gonzalez & R.E.Woods, Digital Image Processing, Pearson Education, 3rd edition, ISBN. 13:978-0131687288		
2. S. Jayaraman Digital Image Processing TMH (McGraw Hill) publication, ISBN-13:978-0-07-0144798		
3. Gonzalez, Woods & Steven, Digital Image Processing using MATLAB, Pearson Education, ISBN-13:978-0130085191		
4. Richard Szeliski, Computer Vision: Algorithms and Applications, Springer-Verlag London Limited 2011.		
5. Computer Vision: A Modern Approach, D. A. Forsyth, J. Ponce, Pearson Education, 2003.		
Course Outcome:		
After completion of this course students shall be able to-		
1. Develop scientific and strategic approach to solve complex problems in the domain of Computer Graphics and Digital Image Processing; expose students to Open Source Image Processing software (OpenCV or Scilab etc)		
2. Demonstrate various algorithms for scan conversion and filling of basic primitives objects and their comparative analysis and applied 2-D and 3-D geometric transformations, viewing and clipping on graphical objects.		
3. Use the Mathematics for digital image representation, image acquisition, image transformation, image enhancement and restoration.		

Course Code: CA-205(A)	Advanced Java (Technologies)	Clock Hours: 60 Total Marks: 100
Course Objectives:		
The objectives of the course are:		
1) To become familiar with the advanced features of Java Language as generic programming, collection framework.		
2) To understand RMI technology and concept of reusable components using JavaBeans and EJB.		
3) To understand Java Servlets, Java server Pages (JSP) technology and Strut & Hibernate technology		
Unit-I	[06]	Max Marks:10
Generic programming: Generic Class, Generic Method, Generic Interface; The Collection framework: Collection Object, Retrieving elements from Collection, HashSet Class, LinkedHashSet Class, Stack Class, LinkedList Class, ArrayList Class, Vector Class, HashMap		

Class , Arrays Class; Object Wrappers and Autoboxing; Distributed Computing: Remote Method Invocation- Introduction, Architecture, RMI Object services, stub and Skeleton, Steps of developing an RMI system		
Unit-II	[10]	Max Marks:10
Java Bean: Concepts, Writing process, Applications, Properties and Events, Property Editors, Customizer , Persistence; Enterprise JavaBeans: Introduction, Specification, Architecture, Container, Types, Life cycle, Applications		
Unit-III	[12]	Max Marks:20
Servlets: Concepts, Architecture, Servlet Container Writing Process, API, Life Cycle, Hierarchy, ServletConfig, ServletContext, Programming and deployment, Servlet and HTML Form, Session Management, JDBC ;		
Unit-IV	[10]	Max Marks:20
Java Server Pages: Introduction, JSP Containers, Architecture, JSP and Servlets. Life Cycle of JSP Page, JSP Processing, JSP Application Design with MVC, Setting Up the JSP Environment, JSP Directives, JSP Action, JSP Implicit Objects, JSP Form Processing, JSP Session and Cookies Handling, JSP Session Tracking JSP Database Access, JSP Standard Tag Libraries, JSP Custom Tag, JSP Expression Language, JSP Exception Handling.		
Unit-V	[10]	Max Marks:20
MVC: Introduction different types of logic in Java based Web Application, Advantages and Disadvantages of MVC Architecture, MVC pattern Layer: Model, View and Controller. Strut: Introduction, Understanding Scopes, Custom Tags, The MVC Design Pattern, Simple Validation, Processing Business Logic, Basic Struts Tags, Configuring Struts, validation framework.		
Unit-VI	[12]	Max Marks:20
Overview of Hibernate, Hibernate Architecture, Hibernate Mapping Types, Hibernate O/R Mapping, Hibernate Annotation, Hibernate Query Language.		
References:		
1. Beginning Apache Struts From Novice to Professional, by Arnold Doray by Apress ISBN: 978-1-59059-604-3		
2. Professional Hibernate, by Eric Pugh, Joseph D. Gradecki by Wiley Publishing, Inc., ISBN: 0-7645-7677-1		
4. Gary Cornell and Cay S. Horstmann, "Core Java Vol 1 and Vol 2", Sun Microsystems Press, Eight Edition.		
5. SoumadipGhosh, "Web Technology with Advanced Java", University Science Press, ISBN:978-93-80856-78-0.		
Course Outcome:		
After completion of this course students shall be able to -		
1. Develop applications using advanced features of Java Language, RMI, JavaBeans and EJB.		
2. Use Java Servlets, JSP to develop web applications		
3. Use Strut and Hibernate in development of dynamic web applications.		

Course Code: CA-205(B)	Python Programming	Clock Hours: 60 Total Marks: 100
Course Objectives:		
<p>1) Introduce to python programming: data types, operators, conditional and logical statements, control structures, writing user defined functions and file handling. To introduce to OOP through python, regular expressions, exception handling and GUI constructs for web.</p> <p>3) To study advance topics in python viz., lambda functions, functional programming tools, using and configuring modules etc.</p>		
Unit-I	[12]	Max Marks:15
<p>The Python Programming, Features, Application, Variables, Identifier, Identifier Naming, Data Types, Comments in Python, Keywords, Literals, Type conversion, Functions, operators and its types, Order of Operations, Expressions, Scope of Variables, Functions, Defining Functions, Calling Functions, passing arguments in function, call by reference in python, Types of Arguments: required arguments, Formal Arguments, Default Arguments, Variable-length Arguments, Keyword Arguments, Built-in Functions, Decision Making: if statement, If. else statement, Chained conditionals, Loops: For loop, While loop, Loop control statements: break, continue, pass, Nested loop, Using else with for loop, Using else with while loop</p>		
Unit-II	[08]	Max Marks:15
<p>Strings: Creating string, indexing and splitting, accessing values in strings, reassigning strings, deleting string, Working with the Characters of a String, string operators, string formatting, Built-in String Methods, Length, The Slice Operator, String Comparison, Lists: Accessing Elements in list, list length, List Slices, list methods, list slices, List Membership, Concatenation and Repetition, Objects and References, Aliasing and Copying, Cloning Lists, list loop, mutability, List Deletion, Objects and References, aliasing and, cloning list, list as parameters, List Membership, Concatenation and Repetition, Append versus Concatenate Lists, Tuples: creating Tuple, Tuple indexing and slicing, Deleting Tuple, Tuple operations and built-in functions, List Vs Tuple, Tuples and Mutability, Tuple Assignment, Tuples as arguments, Tuples as Return Values.</p>		
Unit-III	[12]	Max Marks:20
<p>Dictionaries, Accessing the dictionary values, Adding dictionary values, Operations on Dictionary, Dictionary Methods, Built-in Dictionary methods, Iterating Dictionary, Dictionary Keys, Aliasing and Copying, Opening a file, The close() method, The with statement, Writing the file, Read file through for loop, Read Lines of the file, Creating a new file, File Pointer positions, Modifying file pointer position, Removing the file, Creating the new directory, Changing the current working directory, Deleting directory, The file related methods, Python Class and Objects, Creating classes in Python, Creating an instance of the class, Python Constructor, Types of Constructors, Python built-in class functions, Inheritance, Overloading Methods, Overriding methods, Data Hiding, Search Algorithms, Sorting Algorithms, Hash Tables</p>		
Unit-IV	[08]	Max Marks:15
<p>Regular Expressions, Exceptions, Standard Exceptions, Exceptions Syntax, The try/except/else Statement, The try/finally Statement, Unified try/except/finally, The raise Statement, The assert Statement, with/as Context Managers String-Based Exceptions, Class-Based Exceptions, General raise Statement Forms, Nesting Exception Handlers, Exception Idioms, Exception Design Tips. Catch All Exceptions, Catch A Specific Exception, Catch Multiple Specific Exceptions, Clean-up After Exceptions, GUI Programming using TKinter.</p>		
Unit-V	[12]	Max Marks:20
<p>Advance Function Topics: Anonymous Function Lambda, Mapping Functions over Sequences: map, Functional Programming Tools: filter and reduce, List Comprehensions Revisited:</p>		

Mappings. Modules: Python Program Architecture, Module Creation, Module usage, Module Namespaces, Reloading Modules, Module Packages. Data Hiding in Modules, Enabling Future Language Features, Mixed Usage Modes, Changing the Module Search Path, The import as Extension, Relative Import Syntax, Module Design Concepts.

Unit-VI

[08] Max Marks: 15

Python MySQL: Environment setup, Database Connection, Creating New Database, Creating Tables, Insert Operation, Read Operation, Update Operation, Join Operation, Performing Transactions, Simple Flask Operation, Simple Django Framework.

References:

1. John V Guttag (2013), Introduction to Computation and Programming Using Python, Prentice Hall of India, 2013, ISBN: 9780262525008
2. R. Nageswara Rao(2016), Core Python Programming, Dreamtech Press, 2016, ISBN-13: 9789351199427
3. Wesley J. Chun(2006), Core Python Programming – Second Edition, Prentice Hall, ISBN-13: 978-0132269933, ISBN-10: 0132269937
4. Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser(2013), Data Structures and Algorithms in Python”, Wiley, 2013, ISBN : 978-1-118-54958-2, ISBN : 978-1-118-29027-9(HardCover)
5. Kenneth A. Lambert(2011), Fundamentals of Python – First Programs, CENGAGE Publication, 2011, ISBN 1111822700, ISBN 9781111822705
6. Luke Sneeringer(2015), Professional Python, Wiley Inc.,2015, ISBN: 1119070856
7. Mark Lutz (2007), Learning Python, 3rd Edition, O’Reilly Media, Inc., 2007, ISBN-13: 978-0-596-51398- 6, ISBN-10: 0-596-51398-4

Course Outcome:

After completion of this course students shall be able to-

- 1) Use lists, tuples, dictionaries, strings and files efficiently for solving real world problems.
- 2) Implement the concepts of object-oriented programming using python.
- 3) Develop modules, packages and GUI based programming for web.

<i>Course Code: CA LAB-V</i>	CA LAB-V: LAB on Advanced Software Development Methodologies	<i>Total Marks: 50</i>
<p>Course Objectives:</p> <ol style="list-style-type: none"> 1) To setup GitHub and use git. 2) To understand agile process. 3) To use agile methodology. 		
<p>Practical’s on Git</p> <ol style="list-style-type: none"> 1. Set up a GitHub account and send an email message to friend telling to your friend about the account. 2. Clone the repository at https://github.com/KBCNMU. 3. Use git add to add that file to the repository. Use git commit to commit your change. 4. Use git push to send your change to the primary repository. Look online to see if your change has been pushed. 5. Use git pull to get your partners change into your repository. Verify that you have the new file. 		

6. Use git log or git log | less to see a list of changes to the repository.
7. Use git branch to create a new branch and git checkout to switch to the branch.
8. Use git merge to merge you changes to the primary branch.
9. Demonstrate the use of git diff command

Practical's on Agile

Develop a mini project using any technology. Document the process Agile methodology.

Course Outcome:

After completion of this course students shall be able to-

- 1) Use GitHub and make repository using Git.
- 2) Apply agile software development process.
- 3) Develop a project using agile methodology.

Course Code: CA Lab-VI	LAB on Data Structures and Algorithms	Total Marks: 50
Course Objectives:		
<ol style="list-style-type: none"> 1) Solve real-world problems by reasoning about data structure choices, choose appropriate implementations. 2) To make the students write various programs and ADTS for all data structures. 3) Students will learn to write, debug, and test large programs systematically. 		
Implementation of programs based on the following		
<ul style="list-style-type: none"> • Arrays • Multidimensional Arrays, Matrices • Stacks, Polish Notation • Queues • Deques • Linear Linked List, Circular Linked List, Doubly Linked List • Polynomial Addition/Subtraction 		
Implementation of programs based on Trees		
<ul style="list-style-type: none"> • Binary Search Tree • In-order, Pre-order and Post-order Traversals • Heap Tree 		
Implementation of programs based on Graphs		
<ul style="list-style-type: none"> • Depth First Traversal • Breadth First Traversal • Obtaining Shortest Path (Dijkstra and Floyd-Warshall) • Minimum spanning tree (Kruskal and Prim) 		
Implementation of programs for Hash Table, Searching and Sorting techniques		
<ul style="list-style-type: none"> • Hash Table • Linear and Binary Search (using array) • Bubble sort • Selection sort • Insertion sort • Radix sort • Quick sort • Merge sort • Heap sort 		
Course Outcome:		
After completion of this course students shall be able to-		

- 1) Develop solutions for a range of problems using procedure oriented / object-oriented programming.
- 2) Choose the appropriate data structure and algorithm design method for a specified application.
- 3) Apply practical knowledge on the applications of data structures.

Course Code: CA LAB-VII(A):	LAB on Machine Learning	Total Marks: 50
Course Objectives:		
The objectives of the course are:		
<ol style="list-style-type: none"> 1. Make use of Data sets in implementing the machine learning algorithms 2. Implement various ML algorithms for Classification clustering, regression using a programming language of your choice preferably Python, R-Programming etc. 3. Implement the machine learning concepts and algorithms in any suitable language of choice. 		
<ol style="list-style-type: none"> 1. Implement the Find-S Inductive Learning algorithm. 2. Implement the Candidate-Elimination Inductive Learning algorithm. 3. Write a program to implement Decision tree using Python/R/Programming language of your choice 4. Write program to calculate popular attribute selection measures (ASM) like Information Gain, Gain Ratio, and Gini Index etc. for decision tree. 5. Implement simple KNN using Euclidean distance in python. 6. Write a program to implement k-Nearest Neighbour algorithm to classify the iris dataset. Print both correct and wrong predictions. Java/Python ML library classes can be used for this problem. 7. Write a program to implement the naïve Bayesian classifier for a sample training dataset stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets. 8. Write a Program for Confusion Matrix and calculate Precision, Recall, F-Measure. 9. Write program for linear regression and find parameters like Sum of Squared Errors (SSE), Total Sum of Squares (SST), R^2, Adjusted R^2 etc. 10. Implementing Agglomerative Clustering in python 11. Write a Program for Fuzzy c-means clustering in python. 12. Implement the non-parametric Locally Weighted Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs. 13. Build an Artificial Neural Network by implementing the Backpropagation algorithm and test the same using appropriate data sets. 		
References:		
<ol style="list-style-type: none"> 1] Tom Mitchell (1997). Machine Learning. First Edition, McGraw- Hill. 2] Ethem Alpaydin (2009). Introduction to Machine Learning Edition 2. The MIT Press. 3] Dipanjan Sarkar, Raghav Bali, and Tushar Sharma, “ Practical Machine Learning with Python” A Problem-Solver’s Guide to Building Real-World Intelligent Systems, ISBN-13 (pbk): 978-1-4842-3206-4, Apress. 		
Course Outcome:		
After completion of this course students shall be able to-		
<ol style="list-style-type: none"> 1. Understand the implementation procedures for the machine learning algorithms. 2. Design Java/Python programs for various Learning algorithms. 		

3. Apply appropriate data sets to the Machine Learning algorithms.
4. Identify and apply Machine Learning algorithms to solve real world problems.

Course Code: CA LAB-VII(B)	LAB On Digital Image Processing and Computer Vision	Total Marks: 50
Course Objectives:		
<ol style="list-style-type: none"> 1) The fundamental knowledge and basic technical competence in the field of Computer Graphics and Digital Image Processing. 2) Give an in-depth knowledge about 2D and 3D transformation algorithms. 3) Provide awareness about the current technologies and issues specific to Digital Image Enhancement, Restoration, Segmentation, Color Image Processing, and Morphological Image Processing. 		
<ol style="list-style-type: none"> 1. Read an 8 bit image and then apply different image enhancement techniques: <ol style="list-style-type: none"> (a) Brightness improvement (b) Brightness reduction (c) Thresholding (d) Negative of an image (e) Log transformation (f) Power Law transformation. 2. Read an image, plot its histogram then do histogram equalization. Comment about the result. 3. (a) Implement Gray level slicing (intensity level slicing) in to read cameraman image. (b) Read an 8 bit image and to see the effect of each bit on the image. (c) Read an image and to extract 8 different planes i.e. ‘bit plane slicing.’ 4. Implement various Smoothing spatial filter. 5. Read an image and apply <ol style="list-style-type: none"> (1) Gaussian 3x3 mask for blurring (2) High pass filter mask with different masks (3) Laplacian operator with centre value positive and negative (4) High boost filtering. 6. Write a program to implement various low pass filters and high pass filter in frequency domain. 7. Implement and study the effect of Different Mask (Sobel, Prewitt and Roberts) 8. Write a program to implement Object localization and processing: Contours, edges, lines, skeletons. 9. Write a program to implement feature extraction, Feature Selection, Scene and Object Discrimination. 10. Write a program to human face tracking from given image. 		
Course Outcome:		
After completion of this course students shall be able to-		
<ol style="list-style-type: none"> 1) Develop scientific and strategic approach to solve complex problems in the domain of Computer Graphics and Digital Image Processing; 2) Implement various algorithms for scan conversion, filling objects, 2-D and 3-D geometric transformations, viewing and clipping on graphical objects; 3) Make use of Open Source Image Processing software (Like OpenCV or Scilab) to implement image transformation, image enhancement in spatial and frequency domain. 		

Course Code: CA LAB-VIII(A)	LAB on Advanced Java (Technologies)	Total Marks: 50
Course Objectives:		
<ol style="list-style-type: none"> 1) Study Step-by-Step procedure for building the project in java from ground up by using IDE. 2) Develop application using collection framework, RMI technology, JavaBeans and EJB 3) Develop Web Applications using advanced Java technology Servlets , JSP, Strut and Hibernate 		
<ol style="list-style-type: none"> 1] Write java program(s) that demonstrates generic programming. 2] Write a Java program(s) that demonstrates the use of Collection Classes (Collection framework). 3] Write a Java program(s) that demonstrates the use of RMI technology. 4] Write a Java program(s) that demonstrates Java Bean. 5] Write a Java program(s) that demonstrates EJB. 6] Write a Java program(s) that demonstrates use of Servlets. 7] Write a Java program(s) that demonstrates use of JSP technology. 8] Implement the dynamic web application(s) to demonstrate use of struts. 9] Implement the dynamic web application(s) to demonstrate use of Hibernate. 		
Course Outcome:		
After completion of this course students shall be able to-		
<ol style="list-style-type: none"> 1) Step-by-Step procedure for building the project from ground up by using IDE. 2) Create dynamic web application to utilize the JavaBeans and EJBs reusable components 3) Create web application using servlets, JSP, Strut and Hibernate technologies. 		

Course Code: CA Lab-VIII(B)	LAB on Python programming	Total Marks: 50
Course Objectives:		
<ol style="list-style-type: none"> 1) To acquire programming skills in core Python. 2) To develop the skill of designing Graphical user Interfaces in Python 3) To develop the ability to write file handling, exception handling and modular programming applications in Python. 		
<ol style="list-style-type: none"> 1. Develop programs to understand the control structures of python 2. Develop programs to learn different types of structures (list, dictionary, tuples) in python 3. Develop programs to learn concept of functions scoping, recursion and list mutability. 4. Develop programs to understand object oriented programming using python. 5. Develop programs for data structure algorithms using python – searching, sorting and hash tables. 6. Develop programs to learn regular expressions using python. 7. Demonstrate the concept of exception handling using try/except/else Statement, Unified try/except/finally, try/finally Statement, raise Statement, assert Statement, catch multiple specific exceptions 8. Demonstrate the concept of String-Based Exceptions, Class-Based Exceptions and Nesting Exception handlers. 9. Demonstrate implementation of the Anonymous Function Lambda. 10. Demonstrate implementation functional programming tools such as filter and reduce 11. Demonstrate the Module Creation, Module usage. 12. Demonstrate image insertion in python. 13. Demonstrate use of DataFrame method and use of .csv files. 14. Develop programs to learn GUI programming using Tkinter. 		

15. Create a simple web application using Flask.
16. Create Simple Django Framework.
17. Demonstrate Database connectivity using MySql.

Course Outcome:

After completion of this course students shall be able to-

- 1) Demonstrate use and working of various data types, control structures, files, exceptional handling etc.
- 2) Create, configure and make use of modules.
- 3) Develop console based and GUI applications (both procedural/object oriented) to solve different problems using python programming.

Semester-III

<i>Course Code: CA-301</i>	Compiler Construction	<i>Clock Hours: 60 Total Marks: 100</i>
Course Objectives: 1) To cover the major topics in compiler design with emphasis on solving the problems encountered in designing a compiler regardless of the source language or the target machine.		
Unit-I	[05]	Max Marks:10
Introduction to Compilation Compiler Basics, Issues in Compilation, Phases of Compilation: the Analysis – Synthesis Model, Compiler Construction Tools.		
Unit-II	[06]	Max Marks:15
Designing a Lexical Analyzer Role of Lexical Analysis, Input Buffering, Specification of Tokens, Recognition of Tokens, Finite automata, Conversion from regular expression to NFA, Deterministic finite automata, Conversion from NFA to DFA, Minimization of DFA, Creating Lexical Analyzer with LEX.		
Unit-III	[15]	Max Marks:30
Designing Syntax Analyzer Role of Syntax Analyzer, Classification of parsers, Top-Down Parsing: Introduction, Problems in top-down parsing, Recursive Parsing, Problems in Recursive Procedures, Predictive Parsing, Error Handling in Predictive Parsers, Bottom Up Parsing: Shift Reduce Parser, Actions of shift reduce parser, Construction of parse tree, Operator Precedence Parsing, Components of operator precedence parsers, Parsing action, Construction of operator precedence parsers, Error reporting and recovery in operator precedence Parsers, Advantages and disadvantages of operator precedence Parsing. LR Parsing: Simple LR parser, LR (1) parser, LALR parser.		
Unit-IV	[10]	Max Marks:15
Intermediate Code Generation Need For Intermediate Code Generation, Intermediate Forms: Polish Notation, Quadruples, Triples, Indirect Triples & Blocks.		
Unit-V	[10]	Max Marks:15
Code Optimization Introduction, need for code optimization, Classification of code optimization techniques: Optimization techniques that work on machine code, Optimization techniques that work on intermediate forms of source code i.e. Optimization with in Basic Blocks: Folding, Redundant operation elimination, Optimization with in Loop: Strength Reduction, Dead code elimination, Moving operation within block out of block.		
Unit-VI	[10]	Max Marks:15
Symbol Table Organization Introduction, Methods of organizing a symbol table: Unsorted, sorted symbol tables, binary search, hashing, its advantages, disadvantages, Collision, Collision resolution techniques: Rehashing, Chaining.		

References:

1. Aho A.V., R. Sethi and J.D. Ullman. Compiler Principle, Techniques and Tools: Addison Wesley, ISBN 0-321-48681-1.
2. Barret, Couch. Compiler Construction Theory and Practice: Computer Science series, Asian Student Ed, ISBN 978-0574213358
3. Dhamdhare D.M. Compiler Construction Principle and Practice: McMillan India, ISBN 9780333904060
4. Gres D. Compiler Construction for Digital Computer: Wiley, ISBN 047132776X.
5. David Galles (2009). Modern Compiler Design: Pearson Education, ISBN 9788131709412

Course Outcome:

After completion of this course students shall be able to-

- 1) Understand the basic structure of compiler, concepts and terminology in programming languages.
- 2) Explain lexical analysis, finite state techniques, scanner generator, parsing, kinds of parsers, designing lexical analyzer, scanner and parsers, principal ideas with intermediate code generation, optimizations.
- 3) Understanding of all concepts is essential to design compiler in general for programming languages.

<i>Course Code: CA-302</i>	Design and Analysis of Algorithms	<i>Clock Hours: 60</i> <i>Total Marks: 100</i>
Course Objectives:		
<ol style="list-style-type: none"> 1) To understand Basics of algorithms, design techniques and analyze the performance. 2) To learn Searching and traversal algorithms for graphs. 3) To understand Nondeterministic algorithms and NP class of problem. 		
Unit-I	[06]	Max Marks:08
What Is An Algorithm?, Algorithm Specification, reasons to study algorithms, Pseudocode Conventions, Recursive Algorithms with iterations and recursion, types of analysis, Asymptotic Notation, best, average and worst case analysis,		
Unit-II	[06]	Max Marks:12
Tree and Graph Representations, Binary Trees Basics, Heaps And Heap Sort, Sets And Disjoint Set Union And Find.		
Unit-III	[12]	Max Marks:16
Divide And Conquer: General Method, Binary Search, Finding Maximum and Minimum, Merge Sort, Quick Sort, Strassen's Matrix Multiplication.		
Unit-IV	[08]	Max Marks:16
Greedy Method: General Method, Optimal Storage on Tapes, Knapsack Problem, Huffman Code, Minimum-Cost Spanning Trees, Single-Source Shortest Paths.		
Unit-V	[08]	Max Marks:14
Dynamic Programming: General Method, All-Pair Shortest Path, Matrix Chain Multiplication, Longest Common Sub Sequence, 0/1knapsack, Flow Shop Scheduling		
Unit-VI	[08]	Max Marks:10
Basic Search and Traversal Techniques: Breadth First Search and Traversal, Depth First Search And Traversal, Spanning Trees.		
Unit-VII	[06]	Max Marks:12
Backtracking: General Method, Constrains, 8-Queens Problem Graph Coloring		
Unit-VIII	[06]	Max Marks:12

NP-Hard and NP-Complete Problems: Basic Concepts, Nondeterministic Algorithms, Polynomial Time, Polynomial-Time Verification, The Classes NP-Hard and NP-Complete, NP-Completeness and Reducibility, NP-Completeness Proofs, NP-Complete Problems

References:

5. Horowitz E. and Sahni S. "Fundamentals of computer Algorithms" Galgotia publications.
6. Horowitz E., Sahni S. and Rajshekar S, Computer Algorithms, Computer Science Press.
7. S. Dasgupta, C. H. Papadimitriou, and U. V. Vazirani(2006), Algorithms. McGraw-Hill publications. ISBN 9780073523408
8. Cormen, Leiserson and Rivest, Introduction to Algorithms, Prentice Hall of India ISBN: 978-81-203-4007-7

Course Outcome:

After completion of this course students shall be able to-

- 1) Analyze the asymptotic performance of algorithms and write rigorous correctness proofs for algorithms.
- 2) Design and analyze divide-and-conquer, greedy and dynamic-programming based algorithms.
- 3) Model problems using backtracking, classify nondeterministic polynomial time algorithms.

Course Code: CA-303	High Performance Computing Paradigms and Applications	Clock Hours: 60 Total Marks: 100
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Course Objectives:

- 1) Comprehensive and in-depth knowledge of Cloud Computing concepts, technologies, architecture and applications
- 2) To expose the students to frontier areas of Cloud Computing and information systems, while providing sufficient foundations to enable further study and research.
- 4) To provide knowledge of cloud concepts capabilities across the various cloud service models which includes IaaS, PaaS and SaaS; and learn how to use Cloud Services, implementation of Virtualization, Task Scheduling algorithms.

Unit-I	[06]	Max Marks:20
Basics of Cloud Computing: Introduction to Distributed Systems, Single System Image, Naming and Synchronization Communication in DS, Load Balancing, Process Migration, Fault Tolerant Systems. Introduction to Grid and Cluster Computing.		
Unit-II	[06]	Max Marks:15
Introduction to Cloud Computing: Roots of Cloud Computing, Layers and Types of Clouds, Features of a Cloud, Cloud Infrastructure Management, Infrastructure as a Service Providers, Platform as a Service Providers, and Challenges and Opportunities		
Unit-III	[06]	Max Marks:10
Virtualization and Resource Provisioning in Clouds: Introduction and Inspiration, Virtual Machines (VM), VM Provisioning and Manageability, VM Migration Services, VM Provisioning in the Cloud Context, and Future Research Directions.		
Unit-IV	[10]	Max Marks:10
Cloud Computing Architecture: Cloud Benefits and Challenges, Market-Oriented Cloud Architecture, SLA-oriented Resource Allocation, Global Cloud Exchange; Emerging Cloud Platforms, Federation of Clouds		
Unit-V	[12]	Max Marks:15
Programming Enterprise Clouds using Aneka: Introduction, Aneka Architecture, Aneka Deployment, Parallel Programming Models, Thread Programming using Aneka, Task Programming		

using Aneka, and MapReduce Programming using Aneka, Parallel Algorithms, Parallel Data mining, Parallel Mandelbrot.		
Unit-VI	[12]	Max Marks:15
Advanced Topics and Cloud Applications: Integration of Private and Public Clouds, Cloud Best Practices, GrepTheWeb on Amazon Cloud, ECG Data Analysis on Cloud using Aneka, Hosting Massively Multiplayer Games on Cloud.		
Unit-VII	[08]	Max Marks:15
Practical Related Topics: Topics related to Practical hands on will be added later on.		
Unit-I	[06]	Max Marks:20
Basics of Cloud Computing: Introduction to Distributed Systems, Single System Image, Naming and Synchronization Communication in DS, Load Balancing, Process Migration, Fault Tolerant Systems. Introduction to Grid and Cluster Computing.		
References		
1. A. S Tanenbaum and M.V. Steen(2007), Distributed Systems: Principles and Paradigms, Second Edition, Pearson Prentice Hall Publication, 2007, ISBN:0-13-239227-5		
2. Rajkumar Buyya, Christian Vecchiola, and Thamarai Selvi(2013), Mastering Cloud Computing, Tata McGraw Hill, New Delhi, India, 2013 ISBN-13: 978-1-25-902995-0		
3. Rajkumar Buyya, James Broberg , Andrzej M. Goscinski(2011), Cloud Computing: Principles and Paradigms, Wiley India Publication, 2011, ISBN: 978-0-470-88799-8		
4. Toby Velte, Anthony Velte, Robert Elsenpeter (2009), Cloud Computing: A Practical Approach, Tata McGraw Hill Publication,2009, ISBN 0071626948 / 9780071626941		
5. Barrie Sosinsky (2011), Cloud Computing Bible, Wiley Publishing India Pvt Ltd.,2011, ISBN: 978-0-470-90356-8		
Course Outcome:		
After completion of this course students shall be able to-		
1) Analyze the Cloud computing setup with its vulnerabilities and applications using different architectures.		
2) Design suitable Virtualization concept, Cloud Resource Management.		
3) Assess cloud Storage systems and Cloud security, the risks involved, its impact and develop cloud application.		

Course Code: CA-304(A)	Natural Language Processing	Clock Hours: 60 Total Marks: 100
Course Objectives:		
1) The prime objective of this course is to introduce the students to the field of Language Computing and its applications ranging from classical era to modern context.		
2) Course also aims to provide understanding of various NLP tasks and NLP abstractions such as Morphological analysis, POS tagging, concept of syntactic parsing, semantic analysis etc.		
3) Course provide knowledge of different approaches/algorithms for carrying out NLP tasks; it also discusses concepts of Language grammar and grammar representation in Computational Linguistics.		
Unit-I	[08]	Max Marks:12
Introduction to NLP, brief history, NLP applications: Speech to Text(STT), Text to Speech(TTS), Story Understanding, NL Generation, QA system, Machine Translation, Text Summarization, Text		

classification, Sentiment Analysis, Grammar/Spell Checkers etc., challenges/Open Problems, NLP abstraction levels, Natural Language (NL) Characteristics and NL computing approaches/techniques and steps, NL tasks: Segmentation, Chunking, tagging, NER, Parsing, Word Sense Disambiguation, NL Generation, Web 2.0 Applications : Sentiment Analysis; Text Entailment; Cross Lingual Information Retrieval (CLIR).

Unit-II [12] Max Marks:16

Text Processing Challenges, Overview of Language Scripts and their representation on Machines using Character Sets, Language, Corpus and Application Dependence issues, Segmentation: word level(Tokenization), Sentence level. Regular Expression and Automata Morphology, Types, Survey of English and Indian Languages Morphology, Morphological parsing FSA and FST, Porter stemmer, Rule based and Paradigm based Morphology, Human Morphological Processing, Machine Learning approaches.

Unit-III [12] Max Marks:18

Word Classes ad Part-of-Speech tagging(POS), survey of POS tagsets, Rule based approaches (ENGTOWL), Stochastic approaches(Probabilistic, N-gram and HMM), TBL morphology, unknown word handling, evaluation metrics: Precision/Recall/F-measure, error analysis.

Unit-IV [15] Max Marks:22

NL parsing basics, approaches: TopDown, BottomUp, Overview of Grammar Formalisms: constituency and dependency school, Grammar notations CFG, LFG, PCFG, LTAG, Feature-Unification, overview of English CFG, Indian Language Parsing in Paninian Karaka Theory, CFG parsing using Earley's and CYK algorithms, Probabilistic parsing, Dependency Parsing: Covington algorithm, MALT parser, MST parser.

Unit-V [15] Max Marks:22

Concepts and issues in NL, Theories and approaches for Semantic Analysis, Meaning Representation, word similarity, Lexical Semantics, word senses and relationships, WordNet (English and IndoWordnet), Word Sense Disambiguation: Lesk Algorithm Walker's algorithm, Coreferences Resolution:Anaphora, Cataphora.

References:

1. Indurkha, N., & Damerau, F. J. (2010), *Handbook of Natural Language Processing, 2nd Edition*. New York: CRC Press Taylor and Francis Group, Boca Raton London, New York. ISBN-10: 1420085921, ISBN-13: 978-1420085921
2. Martin, J. H., & Jurafsky, D.(2013), *Speech and Language Processing*, Pearson Education India; 2 edition, ISBN-10: 9332518416, ISBN-13: 978-9332518414
3. Manning, Christopher and Heinrich, Schutze(1999), *Foundations of Statistical Natural Language Processing*, MIT Press, ISBN-10: 0262133601, ISBN-13: 978-0262133609.
4. Akshar Bharati, Chaitanya, V., Kulkarni, A., & Sangal, R. (July 1997). *Machine translation in Stages* (Vol. 10 no. 3). Mumbai: NCST, Mumbai.
5. Bharati, A., Chaitanya, V., & Sangal, R. (1995). *Natural Language Processing: A Paninian Perspective*, New Delhi: Prentice Hall of India, ISBN 10: 8120309219, ISBN 13: 9788120309210.
6. Steven Bird, Edward Loper (2016), *Natural Language Processing With Python, Ed. 2*, O'Reilly Media, ISBN 1491913428, 9781491913420

Auxiliary Resources:

Web Links

1. <https://see.stanford.edu/Course/CS224N>
2. <https://web.stanford.edu/~jurafsky/NLPCourseraSlides.html>
3. <https://stp.lingfil.uu.se/~nivre/docs/ACLslides.pdf>

Video Links
<ol style="list-style-type: none"> 1. http://www.nptelvideos.in/2012/11/natural-language-processing.html 2. https://www.youtube.com/playlist?list=PL6397E4B26D00A269
<p>Course Outcome:</p> <p>After completion of this course students shall be able to-</p> <ol style="list-style-type: none"> 1) Understand issues and challenges in Natural Language Processing and NLP applications and their relevance in the classical and modern context. 2) Understand Computational techniques and approaches for solving NLP problems and develop modules for NLP tasks and tools. 3) Understand various grammar formalisms, which they can apply in different fields of study.

Course Code: CA-304 (B)	Artificial Intelligence in Practice with Python	Clock Hours: 60 Total Marks: 100
<p>Course Objectives:</p> <p>The objectives of the course are:</p> <ol style="list-style-type: none"> 1) How to make informed decisions about the type of algorithms you need to use and implementation of these algorithms for solving AI problems. 2) Use of artificial intelligence techniques for solving practical real-life problems. 3) To build real-world artificial intelligence applications. 		
Unit-I	[03]	Max Marks:06
<p>Fundamental Use Cases for AI</p> <p>What is AI?, Why AI?, Branches of AI, Building Intelligent Agents, Representative AI Use Cases, Digital Personal Assistant and Chatbots, Shipping and Warehouse Management, Human Health, Knowledge Search, Recommender Systems, The Smart Home, Gaming, Movie Making, Data Cleansing and Transformation.</p>		
Unit-II	[04]	Max Marks:10
<p>Machine Learning Pipelines</p> <p>What is a Machine Learning Pipeline? Problem Definition, Data Ingestion, Data Preparation, Data Segregation, Model Training.</p>		
Unit-III	[05]	Max Marks:08
<p>Feature Selection and Feature Engineering</p> <p>Feature Selection, Feature Engineering, Outlier Management, One-hot Encoding, Log Transform, Scaling, Date Manipulation.</p>		
Unit-IV	[06]	Max Marks:10
<p>Classification and Regression Using Supervised Learning</p> <p>Supervised versus Unsupervised Learning, What is Classification? Preprocessing Data, Label Encoding, Logistic Regression Classifiers, The Naive Bayes Classifier, Confusion Matrices, Support Vector Machines, What is Regression?, Building Single-Variable Regressor, Building Multivariable Regressor.</p>		
Unit-V	[05]	Max Marks:08
<p>Predictive Analytics</p> <p>Decision Trees, Ensemble Learning, Random Forests, Dealing with Class Imbalance, Finding Optimal Training Parameters with Grid Search, Computing Relative Feature Importance, Case Study: Use Extremely Random Forest Regressor for Application like Predicting Traffic.</p>		
Unit-VI	[06]	Max Marks:08
<p>Detecting Patterns with Unsupervised Learning</p>		

Unsupervised Learning, Clustering Data with K-Means Algorithm, Estimating Number of Clusters with the Mean Shift Algorithm, Estimating Quality of Clustering with Silhouette Scores, Gaussian Matrix Models, Finding Subgroups in Stock Market Using the Affinity, Propagation Model, Segmenting the Market based on Shopping Patterns.		
Unit-VII	[05]	Max Marks:08
Building Recommender Systems Extracting the nearest Neighbors, Building K-Nearest Neighbors Classifier, Computing Similarity Scores, Finding Similar Users Using Collaborative Filtering, Case Study: Building Movie Recommender System.		
Unit-VIII	[07]	Max Marks:10
AI on Cloud Why are Companies migrating to Cloud?, Top Cloud Providers, Amazon Web Services (AWS), Microsoft Azure, Google Cloud Platform (GCP).		
Unit-IX	[05]	Max Marks:08
Building Speech Recognizer Working with speech signals, Visualizing audio signals, Transforming audio signals into frequency domain, Generating audio signals, Synthesizing tones to generate music, Extracting speech features, Recognizing spoken words.		
Unit-X	[06]	Max Marks:08
Building NLP Tools Installations of NLP packages, Tokenizing text data, Stemming, Lemmatization, Dividing text into chunks, Bag of words model, Building category predictor, Constructing gender Identifier, Building sentiment Analyzer.		
Unit-XI	[04]	Max Marks:08
Chatbots Chatbots today, Concepts, A well-architected chatbot, Platforms, Creating a chatbot,		
Unit-XII	[04]	Max Marks:08
AI and Big Data Crawling, Indexing, Ranking, Worldwide datacenters, Distributed lookups, Custom softwares, The three V's of Big data, Big data and machine Learning - Apache Hadoop, Apache Spark, Apache Impala, NoSQL databases - Apache Cassandra, MangoDB, Redis, Neo4j.		
References: 1] Python Machine Learning, Sebastian Raschka, Vahid Mirjalili, Packt Publishing, ISBN: 978-1-78995-575-0 2] AI Crash Course, Hadelin de Ponteves, Packt Publishing, ISBN: 978-1-83864-535-9 3] Artificial Intelligence with Python, Prateek Joshi, Packt Publishing, Packt Publishing, ISBN: 9781786464392		
Course Outcome: After completion of this course students shall be able to- 1) Develop practical AI applications with solid understanding of many new AI techniques. 2) Implement more complex AI algorithms using Python. 3) Use AI algorithms to create new real world AI applications.		

Course Code: CA-304(C)	Data Analytics	Clock Hours: 60 Total Marks: 100
Course Objectives:		

<ol style="list-style-type: none"> 1) This course will cover fundamental algorithms/techniques used in data analytics and will provide exposure to theory as well as practical systems and software used in data analytics. 2) The statistical foundations will be covered first, followed by various machine learning and data mining algorithms. 3) 3. Technological aspects like data management (Hadoop), scalable computation (MapReduce) and visualization will also be covered. In summary, this course 		
Unit-I	[10]	Max Marks:08
Data Definitions and Analysis Techniques <ul style="list-style-type: none"> • Elements, Variables, and Data categorization • Levels of Measurement • Data management and indexing • Introduction to statistical learning and R-Programming 		
Unit-II	[10]	Max Marks:10
Descriptive Statistics <ul style="list-style-type: none"> • Measures of central tendency • Measures of location of dispersions • Practice and analysis with R 		
Unit-III	[13]	Max Marks:15
Basic analysis techniques <ul style="list-style-type: none"> • Statistical hypothesis generation and testing • Chi-Square test • t-Test • Analysis of variance • Correlation analysis • Maximum likelihood test • Practice and analysis with R 		
Unit-IV	[15]	Max Marks:17
Data analysis techniques <ul style="list-style-type: none"> • Regression analysis • Classification techniques • Clustering • Association rules analysis • Practice and analysis with R 		
Unit-V	[12]	Max Marks:10
Case studies and projects <ul style="list-style-type: none"> • Understanding business scenarios • Feature engineering and visualization • Scalable and parallel computing with Hadoop and Map-Reduce • Sensitivity Analysis 		
References: <ol style="list-style-type: none"> 1) Probability & Statistics for Engineers & Scientists (9th Edn.), Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers and Keying Ye, Prentice Hall Inc. 2) The Elements of Statistical Learning, Data Mining, Inference, and Prediction (2nd Edn.), Trevor Hastie Robert Tibshirani Jerome Friedman, Springer, 2014 3) An Introduction to Statistical Learning: with Applications in R, G James, D. Witten, T Hastie, and R. Tibshirani, Springer, 2013 		

- 4) Software for Data Analysis: Programming with R (Statistics and Computing), John M. Chambers, Springer
- 5) Mining Massive Data Sets, A. Rajaraman and J. Ullman, Cambridge University Press, 2012
- 6) Advances in Complex Data Modeling and Computational Methods in Statistics, Anna Maria Paganoni and Piercesare Secchi, Springer, 2013
- 7) Data Mining and Analysis, Mohammed J. Zaki, Wagner Meira, Cambridge, 2012
- 8) Hadoop: The Definitive Guide (2nd Edn.) by Tom White, O'Reilly, 2014
- 9) MapReduce Design Patterns: Building Effective Algorithms and Analytics for Hadoop and Other Systems, Donald Miner, Adam Shook, O'Reilly, 2014
- 10) Beginning R: The Statistical Programming Language, Mark Gardener, Wiley, 2013

Course Outcome:

After completion of this course students shall be able to-

- 1) Find a meaningful pattern in data; graphically interpret data.
- 2) Implement the analytic algorithms.
- 3) Handle large scale analytics projects from various domains; Develop intelligent decision support systems.

Course Code: CA-305(A)	Mobile Application Development (Android Programming)	Clock Hours: 60 Total Marks: 100
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Course Objectives:

- 1) Understand basics of mobile application development and get introduced Android platform and its architecture.
- 2) To learn activity creation and Android UI designing.
- 3) To be familiarized with Intent, Broadcast receivers and Internet services, SQLite Database and content providers; to integrate multimedia, camera and Location based services in Android Application.

Unit- I	[05]	Max Marks:08
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Mobile Application Development: Introduction to handheld devices (Palm, Pocket Pc, Symbian OS smart phones, MS windows based smart phones, BlackBerry, iphone etc.), features of handheld devices, Device Applications Vs Desktop application, overview of application development platforms (OS-Palm OS, Symbian, BlackBerry, Windows CE, OS for iphone, Android), Programming Languages (C/C++, JAVA), IDE tools. Comparison of Android with other Mobile OS. Comparative study of all versions of Android.

[Note: The unit is to be thought with respect to current scenario of Mobile Development hence above contents may change]

Unit-II	[06]	Max Marks:16
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Hello, Android and Installations: Background, What is android and what isn't, Open Mobile Development Platform, Native Android Applications, Android SDK Features, Introducing the Open Handset Alliance, What Does Android Run On? Why Develop for Android?, Introducing the Development Framework. What Comes in the Box, Developing for Android, Developing for Mobile Devices, Android Development Tools as per current version, Installations, Emulator.

Unit-III	[16]	Max Marks:24
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Creating Applications, activities and User Interfaces: What Makes an Android Application?, Introducing the Application Manifest. Using the Manifest Editor, The Android Application Life Cycle. Application Priority and Process States. Externalizing Resources. A Closer Look at Android

Activities. Fundamental Android UI Design. Introducing Views. Introducing Layouts and fragments, Using Adapters, Creating New Views.		
Unit-IV	[16]	Max Marks:24
Intents, Broadcast Receivers, and the Internet: Using Intents to Launch Activities, Explicitly Starting New Activities, Implicit Intents and Late Runtime Binding, Returning Results from Activities, Native Android Actions, Linkify, Native Linkify Link Types, Creating Custom Link Strings, Match Filter, Transform Filter, Intents to Broadcast Events, Listening using Broadcast Receivers, Ordered Intents, Sticky Intents, Local Broadcast Manager, Pending Intents, Intent Filters and Broadcast Receivers, Intent Filters to Service Implicit Intents, Resolving Intent Filters, Intents Received Within an Activity, Intent Filters for Plug-Ins and Extensibility, New Actions from Third-Party Intent Receivers, Incorporating Anonymous Actions as Menu Items, Listening for Native Broadcast Intents, Device State Changes Using Broadcast Intents, Connecting to an Internet Resource, Parsing XML Using the XML Pull Parser, Download Manager, Internet Services, Connecting to Google App Engine, Introducing Dialogs and Action Bars, Creating and Using Menus.		
Unit-V	[06]	Max Marks:12
Working in the Background: Creating and Controlling Services, Binding Services to Activities, Creating Foreground Services, Using AsyncTask to Run Asynchronous Tasks, Intent Service, Loaders, Creating, Setting, and Canceling Alarms, Setting Repeating Alarms.		
Unit-VI	[06]	Max Marks:08
Files, Saving State, and Preferences: Application Data Saving, Shared Preferences: Creating, Saving, Retrieving, Preference Framework, Preference Activity, Application Instance State, Static Files as Resources, File System.		
Unit-VII	[05]	Max Marks:08
Databases and Content Providers: Android Databases, SQLite, Content Values and Cursors, data manipulation using SQLite, Content Providers, Create Content Providers use for data manipulation, adding searching in application.		
References:		
<ol style="list-style-type: none"> 1. Reto Meier. Professional Android Application Development, Wrox Publications ISBN: 978-0-470-34471-2. 2. Rick Rogers, John Lombardo, Zigurd Mednieks, G. Blake Meike. Android Application Development: Programming with the Google SDK. O'Reilly ISBN 10: 0596521472 / ISBN 13: 9780596521479. <p>Auxiliary Resources: https://developer.android.com/index.html</p>		
Course Outcome:		
After completion of this course students shall be able to-		
<ol style="list-style-type: none"> 1) Compare android with other smartphone OS and desktop OS; Able to understand software stack of android OS. 2) Understand Activity lifecycle, UI management, use Intent, Broadcast receivers and Internet services. 3) Effectively use SQLite Database and content providers, multimedia, camera and Location based services in Android Application. 		

Course Code: CA-305(B)	Microsoft .Net Technologies	Clock Hours: 60 Total Marks: 100
Course Objectives:		
<ol style="list-style-type: none"> 1) To learn .Net Framework and creating ASP.Net web applications using standard .net controls. 2) Develop database applications using ADO.Net and Connecting to data sources and managing them. 3) Develop a data driven web application. 4) Use Web Services and develop simple and complex applications using .Net framework 5) Maintain session and controls related information for user used in multi-user web applications 		
Unit-I	[05]	Max Marks:08
Desktop Computing vs. Internet Computing, Internet computing infrastructure, Client side scripting vs. Server Side Scripting technologies, Web Server basics and configuration: IIS, Apache etc., Web site hosting basics, Web Publishing, HTML, introduction to .NET framework, Features of .NET framework: CTS,CLS,CLR.		
Unit-II	[10]	Max Marks:10
.NET technologies, languages' C#.NET, VB.NET, basics of ASP.NET page framework, Visual studio .NET IDE, Page Life Cycle, PostBack, Viewstate, Page directives, ASP.Net page execution cycle, HTTP Pipeline, HTTP Application, HTTP Request, HTTP Response classes, HTTP Modules and HTTP Handlers, State Management, Role of Global.asax, Application configuration using web.config file		
Unit-III	[12]	Max Marks:20
ASP.NET Control hierarchy, HTML Server Controls, Web Server Controls, User and Server controls, Validation Controls, List bound controls: dropdown lists, list boxes, Repeater, DataList, Data Grid, DataGridView, FormsView controls, Data binding to List Bound Controls, Templating and Styling of ASP.NET server controls		
Unit-IV	[10]	Max Marks:22
Web Page Designing principles, CSS anatomy, Anatomy of Master Pages, nesting master pages, Site map file, Web site Navigation controls, properties:TreeView, Sitemap Path, Menu, Other Navigation methods: Response.Redirect(), Server.Transfer().		
Unit-V	[10]	Max Marks:15
Personalization through Profiles, Themes/Skins, Web Site security basics: authentication modes:Windows,Forms,passport, authorization, roles/Membership, access rules, login controls,Web services: working, anatomy, hosting		
Unit-VI	[13]	Max Marks:25
Database technology: ADO.NET, Anatomy/architecture of ADO.NET, working with Connection, Command, Data Adaptor, DataReader, DataSet, DataTable objects, Editing data in Data Tables, concurrency control. Introduction to MVC, Data Reports		
References:		
<ol style="list-style-type: none"> 1. Richard Anderson, Brian Francis, Alex Homer, Rob Howard, David Sussman, Karli Watson(2002), Professional ASP.NET 1.0, Special Edition, Wrox Press Ltd., 2002, ISBN 1-861007-0-3-5. 2. Chris Hart, John Kauffman, Dave Sussman, and Chris Ullman(2006), Beginning ASP.NET 2.0, Wiley Publishing, Inc., 2006, ISBN-13: 978-0-7645-8850-1, ISBN-10: 0-7645-8850-8. 3. Beginning ASP.NET 4: in C# and VB, Imar Spaanjaars, Wiley Publishing, Inc 2010., ISBN: 978-0-470-50221-1 4. Bill Evjen, Scott Hanselman, Devin Rader (2008), Professional ASP .NET 3.5 in C# and VB, Wiley Publishing Inc.,2008 ISBN:978-0-470-18757-9. 		

<p>5. Dino Esposito (2008), Programming Microsoft ASP.NET 3.5, Second Edition, Microsoft Press, 2008, ISBN-10: 0735625271, ISBN-13: 978-0735625273</p> <p>Auxiliary Resources:</p> <p>a. Website URLs_</p> <p>https://www.asp.net/ http://asp.net-tutorials.com/</p> <p>b. Video Links</p> <ol style="list-style-type: none"> https://www.asp.net/web-forms/videos https://www.youtube.com/playlist?list=PL6n9fhu94yhXOS_pli-HLIftB9Y7Vnxlo&feature=view_all
<p>Course Outcome:</p> <p>After completion of this course students shall be able to-</p> <ol style="list-style-type: none"> Design Web applications / Website using ASP.NET. Use ASP.NET controls in web applications Debug and deploy ASP.NET web applications. Create database driven ASP.NET web applications and web services.

<i>Course Code: CA-305(C)</i>	Ruby on Rails	<i>Clock Hours: 60</i> <i>Total Marks: 100</i>
Course Objectives:		
Unit-I	[08]	Max Marks:12
<p>Version control: Github, Branching Strategies</p> <p>Ruby Installation and Basics: Ruby/Rails Installation, Introduction to Ruby, Ruby naming convention, Interactive Ruby (IRB) & “ri” (Ruby Interactive) command-line tools, Ruby object, Ruby types: String, Hash, Symbol, Ruby class, Inheritance, Ways of creating Ruby object, Ruby methods, Methods Basics, Methods Advanced: Arguments, Visibility, Method with a! (bang), Modules, Control structures, Exception handling, Ruby operators, Regular expression</p>		
Unit-II	[10]	Max Marks:15
<p>Ruby core: Basics of block, How does a block look like? Block passing and execution, Proc, & (Ampersand), lambda, Closure, What is and Why Meta-programming?, Ruby language characteristics (that make it a great metaprogramming language), Object#respond_to?, Object#send, Dynamic typing (and Duck typing), missing_method, define_method</p>		
Unit-III	[04]	Max Marks:06
Ruby I/O: File I/O, File inquiries, Directories, Navigation through Directories		
Unit-IV	[10]	Max Marks:15
Ruby Advanced: Ruby OOPs concepts, Database Access, Web Application without framework, Sending email, Ruby - XML, XSLT and XPath		
Unit-V	[10]	Max Marks:15
Ruby Advanced: Ruby TK (GUI for Ruby), Ruby – Multithreading Built in Functions, Variables, Constants, Ruby associated tools, Ruby - XML, XSLT and XPath		
Unit-VI	[18]	Max Marks:27
<p>Rails Basics: What is and Why Ruby on Rails? Building HelloWorld Rails application step by step, App directory structure (MVC), Environment, Rake, Gems, Generators, Migration, Console, Bundle, scaffolding, ORM (ActiveRecord), Action controller basics, Action Views, Helpers, Authentication.</p> <p>Application: Rails Associations, JSON, APIs, and Oauth, Debugging Rails Application, Action Mailer, Rails Command lines/rails console, Securing Rails Application, Active Support, Rails</p>		

Internationalization

Unit Test: Rspec

Deployment: Heroku deployment

References:

1. Yukihiro Matsumoto (2008), The Ruby Programming Language, Shroff, First edition, 2008, ISBN-10: 8184044925, ISBN-13: 978-8184044928
2. Michael Fitzgerald, Learning Ruby, Published by O'Reilly Media, Inc., May 2007, ISBN-10: 8184043341, ISBN-13: 978-8184043341
3. Rails AntiPatterns, Wesley Professional Ruby Series, 1st edition, 2010, ISBN-10: 0321604814, ISBN-13: 978-0321604811
4. Adam Gamble, Cloves Carneiro, Jr. Rida Al Barazi (2007), Beginning Rails4, Apress, 3rd edition, 2013 ISBN-13 (pbk): 978-1-4302-6034-9| ISBN-13 (electronic): 978-1-4302-6035-6

Course Outcome:

After completion of this course students shall be able to-

- 1) Understand Ruby Programming language with lexical and syntactic structure of Ruby programs, Datatypes and Objects, Expressions and Operators, Statements and Control Structures, Methods, procs, lambdas, and closures, Classes and modules, Reflection and Metaprogramming.
- 2) Use the Ruby TK (GUI for Ruby).
- 3) Design web applications using Rails framework.

Course Code: CA Lab-IX

LAB on Design and Analysis of Algorithms

Total Marks: 50

Course Objectives:

- 1) To convert the algorithms to code, measure the complexities at run time and modify the algorithms for efficiency.
- 2) To debug and test the programs.
- 3) To conclude using profile of outcomes.

Laboratory Requirements:

OS: Windows/Linux,

Programming Language: C++/Java/C#

8. Write a program for creating max./min. heap using INSERT.
9. Write a program for creating max./min. heap using ADJUST/HEAPIFY.
10. Write a program to implement union and find operation.
11. Write a program to find minimum and maximum form a given array.
12. Write a program for searching element form given array using binary search for n=1000,2000,3000 find exact time of execution.
13. Write a program for sorting given array in ascending/descending order with n=1000,2000,3000 find exact time of execution using
 - Heap sort
 - Merge sort
 - Quick sort
14. Write a program for matrix multiplication using Strassen's matrix multiplication.
15. Write a program to find solution of Knapsack instant.
16. Write a program to find shortest path using single source shortest path.
17. Write a program to find Minimum-Cost Spanning Trees (Prim's & Kruskal's Algorithm).
18. Write a program to find shortest path using all pair path.
19. Write a program to find longest common subsequence.

20. Write a program to implement breadth first and depth first search.
21. Write a program to implement breadth first and depth first traversal.
22. Write a program to find all solutions for 8-queen problem using backtracking.

Course Outcome:

After completion of this course students shall be able to-

- 1) Construct logic for the algorithms designed using designing techniques.
- 2) Posterior analysis of the algorithms.
- 3) Debug, test and profile the algorithms, modify to improve performance of the algorithms.

Course Code: CA LAB-X	Lab on High Performance Computing Paradigms and Applications	Total Marks: 50
Course Objectives:		
<ol style="list-style-type: none"> 1) Study configurations of cloud infrastructure. 2) Analyze and monitor the cloud. 3) Handle and backup real time warehouse data. 		
<ol style="list-style-type: none"> 1. Study and do the Configuration of CCloudSim. Also execute & check the performance of existing algorithms. 2. Install a Cloud Analyst and Integrate with Eclipse/Netbeans. Monitor the performance of an Existing Algorithms. 3. Modify or propose a new load balancing algorithm compatible with Cloud Analyst. 4. Integrating GoogleApp Engine API's in Eclipse and develop an application in Java/Python on the top of Google Cloud. 5. Make the registration groupwise on Google and register your application by using google application-ID 6. Creating a Warehouse Application in Salesforce.com. 7. Creating an Application in Salesforce.com using Apex programming Language. 8. Implementation of SOAP Web services in C#/JAVA Applications. 9. Implementation of Para-Virtualization using VM Ware's Workstation/ Oracle's Virtual Box and Guest O.S. 10. Installation and Configuration of Hadoop. 11. Create an application (Ex: Word Count) using Hadoop Map/Reduce. 12. Case Study: PAAS(Facebook, Google App Engine) 13. Case Study: Amazon Web Services. 		
Course Outcome:		
After completion of this course students shall be able to-		
<ol style="list-style-type: none"> 1) Configure cloud infrastructure. 2) Monitor load on cloud, balance load by analyzing. 3) Work with real time cloud solutions. 		

Course Code: CA LAB XI(A)	Lab on Natural Language Processing	Total Marks: 50
Course Objectives:		
The objectives of the course are:		
<ol style="list-style-type: none"> 1) Course provides knowledge of installation and use of NLTK in python. 2) Course provides knowledge of implementation of text files processing operations and Regular Expressions in NLP 		

<p>3) Course provide knowledge of implementation of dependency parser, porter stemmer, Morphology, PoS Tagging</p> <ol style="list-style-type: none"> 1. Install NLTK and perform basic preprocessing steps of NLP like tokenization, stemming, lemmatization, chunking etc using NLTK in python. 2. Write a program to perform text files statistical operation like count number of lines in files, number of words in file. 3. Working with PDF files in Python like Extracting text from PDF, Rotating PDF pages, Merging PDFs, Splitting PDF, Adding watermark to PDF pages 4. Write program to count number of articles (a, an, the) in file. 5. Write a program to perform tokenization and filtering stopwords in file. 6. Write a program which makes use of basics in regular expressions like /a*/, /a+/, /a? /, /[^A-Z]/, /[^Ss]/, etc. 7. Write a program for minimum edit distance algorithm. 8. Write a program for Understanding the morphology of a Marathi word. Take one or two suffixes of Marathi language and show the inflection on Gender, Number, Person, and Case. 9. Write a program to demonstrate use of porter stemmer in python. 10. Write a program to demonstrate use of dependency parser. 11. Write a program to demonstrate use of NP and VP chunker. 12. Write a program for Tagging Sentences which takes input as sentence and performs PoS Tagging. 13. Write a program for bigram formation from given list.
<p>References:</p> <ol style="list-style-type: none"> 1] Indurkha, N., & Damerau, F. J. (2010), Handbook of Natural Language Processing, 2nd Edition. New York: CRC Press Taylor and Francis Group, Boca Raton London, New York. ISBN-10: 1420085921, ISBN-13: 978-1420085921 2] Martin, J. H., & Jurafsky, D. (2013), Speech and Language Processing, Pearson Education India; 2 edition, ISBN-10: 9332518416, ISBN-13: 978-9332518414 3] Steven Bird, Edward Loper (2016), Natural Language Processing With Python, Ed. 2, O'Reilly Media, ISBN 1491913428, 9781491913420
<p>Course Outcome:</p> <p>After completion of this course students shall be able to-</p> <ol style="list-style-type: none"> 1. idea about installation and use of NLTK in python. 2. understanding of implementation of text files procesing operation and Regular Expressions in NLP 3. Knowledge of implementation of dependency parser, porter stemmer, Morphology, PoS Tagging and other NLP applications

Course Code: CA LAB-XI (B)	LAB on AI Practice using Python	Total Marks: 50
<p>Course Objectives:</p> <ol style="list-style-type: none"> 1) To explore most common artificial intelligence (AI) use cases. 2) To implement various new artificial intelligence techniques. 3) To create real-world AI application/s using above AI technique/s. 		
<ol style="list-style-type: none"> 1. Installation of Python on Windows/Ubuntu, Installing Packages, Loading data. 2. Data Preparation using techniques like Data Cleansing, Filtration, Aggregation etc 3. Handling missing values, Feature Scaling, Inconsistent values in the given dataset. 4. Feature selection using techniques like univariate selection correlation heatmaps, Wrapper-based methods, Filter-based methods. 		

5. Feature engineering using techniques like Outlier management, One-hot encoding, Log transform.
6. Implement Logistic regression classifier.
7. Implement Naïve Bayes classifier.
8. Use confusion matrixes to describe performance of a classifier.
9. Implement classifier using Support Vector Machines.
10. Build a decision tree classifier and evaluate performance of a classifier by printing classification report.
11. Build random forest and extremely random forest classifiers and analyze the output.
12. Implement K-Means algorithm for clustering.
13. Build K-nearest classifier
14. Visualizing audio signals.
15. Transform audio signals to the frequency domain.
16. Generate audio signals.
17. Installation of NLTK and tokenizing text data.
18. Converting words to their base forms using stemming, lemmatization.
19. Extracting the frequency of terms using Bag of Words model.

Course Outcome:

After completion of this course students shall be able to-

- 1) Use most common artificial intelligence (AI) use cases in developing AI applications.
- 2) Apply various new artificial intelligence techniques in developing AI applications.
- 3) Create real-world AI application/s using above AI technique/s.

<i>Course Code: CA LAB-XI(C)</i>	Lab on Data Analytics	<i>Total Marks: 50</i>
<p>Course Objectives:</p> <ol style="list-style-type: none"> 1) Learn Data Science concepts of R and functioning of R 2) Understand Exploratory Data Analytics 3) Learn to program various analysis techniques 		
<ol style="list-style-type: none"> 1. Write program for Creating and Manipulating R Objects in R – Vectors, Matrices, Arrays, Data Frames and Lists. 2. Write program to demonstrate Loops & Vectorization Missing Values. 3. Demonstrate Importing and exporting data. 4. Write program for Validating & Exploring Data Manipulations (Summarizing, Sorting, Sub-setting, Merging, joining) 5. Write program to implement the following analysis techniques using R <ul style="list-style-type: none"> • Statistical hypothesis generation and testing • Chi-Square test • t-Test • Analysis of variance • Correlation analysis • Maximum likelihood test • Regression analysis • Classification techniques • Clustering • Association rules analysis 		
<p>Course Outcome:</p>		

After completion of this course students shall be able to-

- 1) Develop code using R programming constructs.
- 2) Manipulate data using R.
- 3) Write code for various data analysis techniques.

Course Code: CA LAB-XII(A)	LAB on Android Programming	Total Marks: 50
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Course Objectives:

- 1) To gain knowledge of installing Android Studio and Cross Platform Integrated Development Environment;
- 2) To learn designing of User Interface and Layouts for Android App, intents to broadcast data within and between Applications.
- 3) To use Content providers and Handle Databases using SQLite.

Assignments:

1. Demonstrate string manipulation by displaying at the middle of the screen in the red color with white background with change in fonts & styles of text.
 2. Write a program to populate resources (res>>value folder). Show resource on changing selection of the resources.
 3. Write a program to create UI with one screen having radio button of the types of cars. On selecting any car name, next screen should show car details.
 4. Write a program for android application to demonstrate android life cycle stages.
 5. Create the application that will change color of screen based on selected option from the menu.
 6. Write an android application that takes input from user and shows messages on screen.
 7. Create foreground application that will display toast (Message) on specific interval time.
 8. Demonstrate use of intents for any 3 native intents.
 9. Create the android application that will read phonebook contact using content providers and display in list on selecting specific contact makes a call to selected contact.
 10. Develop android application to take a picture using native application.
 11. Use fragments to develop UI. Demonstrate use of fragments.
 12. Create the android application that will send SMS using your android application.
 13. Write a android background service that will open activity on specific time.
 14. Demonstrate use of shared preferences.
 15. Write code that will call maps using android application.
 16. Develop application for database manipulation.
- Mini project:** Develop an app in android.

Course Outcome:

After completion of this course students shall be able to-

- 1) Design and Implement User Interfaces and Layouts of Android App; Use Intents for activity and broadcasting data in Android App.
- 2) Design and Implement Database Application and Content Providers.
- 3) Develop Android App with Security features.

Course Code: CA LAB-XII(B)	Lab on Microsoft .Net Technologies	Total Marks: 50
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Course Objectives:

- 1) Students will understand Web Sites / Web applications, basics of Web hosting and working of IIS web server.

<p>2) Set up a programming environment for ASP.Net programs, configure an ASP.Net application, creating standard .net controls based and data driven web application using ASP.Net; Maintain session and controls related information for user used in multi-user web applications.</p> <p>3) Understand the fundamentals of developing modular application by using object-oriented methodologies.</p>
<p>Assignments:</p> <p>Demonstrate followings in IIS:</p> <ol style="list-style-type: none"> 1) Creation of Virtual Directory, Home directory, Home page, hosting of website 2) Demonstrate Page Life Cycle of ASP.NET. Use important page events for your demonstration. 3) Write VB.Net/C# console applications to demonstrate: OO concepts: polymorphism, encapsulation, inheritance, interface inheritance, abstract classes/methods, overloading, overriding, collection classes, properties 4) Demonstrate concept of postback and viewstate using web form server controls of ASP.NET 5) Demonstrate various Web form server controls using sample data entry screen form for registering for a service on website. Also use validation controls to validate input data. 6) Demonstrate DropDown List box, CheckButtonList, RadioButtonList controls. 7) Demonstrate Databinding using Hashtable, ArrayList, DataTable data sources. 8) Demonstrate Repeater control with the help of various templates. 9) Demonstrate paging, sorting, filtering of data in asp.DataGrid/DataGridView. 10) Demonstrate editing process in DataGrid and DataList controls. Make use of necessary templates for proper visual appearance. 11) Demonstrate State Management features of ASP.NET using sample shopping cart application. 12) Create sample website for demonstrating use of Profiles/Themes using skin files. 13) Demonstrate Master Pages and website navigation controls(sitemap path, treeview, menu) using SiteMap file. 14) Demonstrate Properties of website navigation controls. 15) Demonstrate Authorization/Authentication using Login controls and Roles/Membership/AccessRules 16) Demonstrate creation of simple/complex DataReader/DataSet Objects. 17) Demonstrate editing in DataTable objects. 18) Demonstrate Web Service hosting, access in ASP.NET
<p>Course Outcome:</p> <p>After completion of this course students shall be able to-</p> <ol style="list-style-type: none"> 1) Design web site and web applications using ASP.NET 2) Debug and deploy ASP.NET web applications 3) Create database driven ASP.NET web applications and web services.

<i>Course Code: CA LAB-XII(C)</i>	LAB on Ruby on Rails	<i>Total Marks: 50</i>
<p>Course Objectives:</p> <ol style="list-style-type: none"> 1) Install Ruby on Rails 2) Write programs in ruby. 3) Develop applications using rails framework. 		
<p>Assignments:</p> <ol style="list-style-type: none"> 1. Demonstrate a Ruby Basic program which manipulate Hash, Array, Strings. Any five methods of each container. Also use !(bang) operator. 		

2. Write Ruby program which accepts user input and process it then print the result. Like radius.rb is a file which accept input as float and returns a calculated Area of circle.

```

cirletom@laptop:~/courses/ruby/asst$ ruby radius.rb
Enter the radius: 2
Area is: 12.5663708

```
3. Write a ruby program which prompts for and reads one line of input. It then echos the line, then prints it repeatedly, each time removing every second character. It continues until no more characters can be removed. Treat all characters alike; no special treatment for spaces or punctuation.
4. Demonstrate Inheritance in Ruby by building a superclass called Bird from which our Duck, Goose, and Owl classes will derive their functionality. (http://www.gotealeaf.com/books/oo_ruby/read/inheritance)
5. Demonstrate a Ruby programs which uses loops like, each, times, do loop, etc. With having use of operators & exceptions which cause to break loop like divide by zero, etc.
6. Write a Ruby script which demonstrate use of blocks, lambda & proc.
7. Write a Ruby program which show duck typing, uses respond_to? Method.
8. Write a Ruby program which access private methods/attributes outside of class.
9. Write a Ruby program which define dynamic methods and method will return something also use missing_method. It should return some result to console if some method is missing.
10. Create a Basic Ruby on Rails web application which print "Hello World on web browser"
11. Create a Ruby on Rails web application which shows having Post Section. In which user can Insert, Edit, Delete Post, using scaffolding.
12. Create a Ruby on Rails web application with Post Model uses various type of server validation.
13. Create a Ruby on Rails web application which shows having Post Section. In which user can Insert, Edit, Delete Post, using scaffolding, using mysql database.
14. Create a Ruby on Rails web application using mysql database without scaffold. which shows having Post Section. In which user can Insert, Edit, Delete Post. Post have multiple comments, comments can also Insert, Edit, Delete with nested routes like "/posts/2/comments"
15. Create a Ruby on Rails web application using mysql database. Post is always belongs to user and user has many posts. Without login user can't Insert, Delete or Edit Post, can only show post using devise gem.
16. Create a Ruby Application having 3 to 4 .rb files interconnected with each other. Which demonstrate all above concept with Human readable console output.
17. Design a Ruby On Rails Web Application which deals with User, Registration Form, Validations, CSS, JavaScripts, Ajax, Associations, etc

Course Outcomes:

After completion of this course students shall be able to-

- 1) Develop program using syntactic structure in ruby.
- 2) Build program using APIs of Ruby Programming Language.
- 3) Design web applications using Rails framework.

Semester-IV

Course Code: CA-401

Full Time Industrial Training

Total Marks: 300

Course Objectives:

- 1) To provide comprehensive learning platform to students where they can enhance their employ ability skills and become job ready along with real corporate exposure.
- 2) To enhance students' knowledge in a particular technology and to Increase self-confidence of students and helps in finding their own proficiency.
- 3) To cultivate student's leadership ability and responsibility to perform or execute the given task.

Twelve credits shall be awarded to the Industrial Training/Project course, which will commence in the IVth Semester and the final work and report will be completed at the end of IVth Semester of M. C.A. The student is expected to work on software development project. The project work should have coding part. Student will have to submit the bound project report in university prescribed format at the end of the semester. Student will have to appear for Project Viva-voce and the marks and the credits will be allotted at the end of IVth semester of M. C.A.

Course Outcomes:

After completion of this course students will:

- 1) Handle specialized technology and update themselves with latest changes in technological world with ability to communicate effectively.
- 2) Be multi-skilled IT professional with good technical knowledge, management, leadership and entrepreneurship skills.
- 3) Be able to identify, formulate and model problems and find engineering solution based on a systems approach.

Program Specific Outcomes for M.C.A. program

At the end of the program the graduate will be able to:

- Apply knowledge of computer science in practice to identify, critically analyze, formulate and develop computer applications using modern computing tools and techniques and will use these tools with dexterity.
- Design computing systems to meet desired needs within realistic constraints such as safety, security and applicability. These systems will function professionally with ethical responsibility as an individual as well as in multidisciplinary teams with positive attitude.
- Appreciate the importance of goal setting and recognize the need for life-long learning with good communication skills.

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.

<u>M.E. COMPUTER SCIENCE & ENGINEERING</u> 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 able to 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	
<ol style="list-style-type: none"> 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", 3 rd 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, Jacobson, "Unified Modeling Language User Guide", Addison Wesley.

<u>M.E. COMPUTER SCIENCE & ENGINEERING</u>	
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	
<ol style="list-style-type: none"> 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:	
<ol style="list-style-type: none"> 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",Prelice 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.

<u>M.E. COMPUTER SCIENCE & ENGINEERING</u>	
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	
<ol style="list-style-type: none"> 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- binomial 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 Comparison networks, the zero-one principle, a bitonic sorting networks, a merging network, a sorting network 	
BOOKS	
Text Books:	
<ol style="list-style-type: none"> 1. Cormen, Leiserson, Rivest, Stein, "Introduction To Algorithms", PHI, 2nd Edition. 2. Horowitz, Sahni, Rajasekaran, "Fundamentals of Computer Algorithms", Universities Press, 2nd Edition. 	
References:	
<ol style="list-style-type: none"> 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 	

<u>M.E. COMPUTER SCIENCE & ENGINEERING</u>	
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	
<ol style="list-style-type: none"> 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:
<ol style="list-style-type: none">1. Embedded Systems Design – Introduction to Processes, Tools, Techniques, Arnold S Burger, CMP books2. Embedded Systems Design by Steave Heath, Newnes.3. "ARM Systems Developers Guide Designing and Optimizing System Software" By Andrew N Sloss, Dominic Symes & Cheri 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 pages5. Building Embedded Linux Systems by Karim Yaghmour6. Inside Microsoft Windows CE By John Murray
References:
<ol style="list-style-type: none">1. ARM System on chip architecture by Steve Furbur2. μC/OS-II by Jean Labrosse www.uCOS-II.com3. 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:
<ol style="list-style-type: none">1. R.C.Gonsales R.E.Woods, "Digital Image Processing", Second Edition, Pearson Education2. Anil K.Jain, "Fundamentals of Image Processing", PHI3. K. R rao and J.J. Hawang, "Techniques and Standards for Video and Audio Coding", Prentice Hall PTR
References:
<ol style="list-style-type: none">1. William Pratt, "Digital Image Processing", John Wiley2. Milan Sonka,Vaclav Hlavac, Roger Boyle, "Image Processing, Analysis, and Machine Vision" Thomson Learning3. N Ahmed & K.R. Rao, "Orthogonal Transforms for Digital Signal Processing" Springer4. B. Chanda, D. Dutta Majumder, "Digital Image Processing and Analysis", PHI.

<u>M.E. COMPUTER SCIENCE & ENGINEERING</u>	
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	
<p>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.</p> <p>2. Computational Complexity. Introduction. Turing Machines. Deterministic Polynomial Time. Probabilistic Polynomial Time. Non-deterministic Polynomial Time. Non-Polynomial Bounds. Polynomial-time Indistinguishability.</p> <p>3. Algebraic Foundations. Introduction. Groups. Rings and Fields. The Structure of Finite Fields. Group Constructed Using Points on an Elliptic Curve.</p> <p>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.</p> <p>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</p>	
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, 4 th edition.	
3. Elements of Discrete Mathematics, C.L.Liu, TMH, 2 nd 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 Pröll, 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 Practitioner'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

<u>M.E. COMPUTER SCIENCE & ENGINEERING</u>	
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	
<p>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.</p> <p>2. Parallel processing: parallel computer structure, designing of parallel algorithms, analyzing algorithms, general principles of parallel computing.</p> <p>3. Parallel sorting algorithms Batcher's bitonic sort, Bitonic sort using the perfect Shuffle, parallel bubble sort, Odd- even transpose sort, Tree sort.</p> <p>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.</p> <p>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</p> <p>6. Computing Fourier Transforms: Computing the DFT in parallel, a parallel FFT algorithm.</p>	
BOOKS	
References:	
<p>1. Design & Analysis of Parallel Algorithm by Salim & Akil, PHI.</p> <p>2. Design Efficient Algorithm for Parallel Computers by Michel J. Quinn, TMH.</p>	

M.E. COMPUTER SCIENCE & ENGINEERING	
FIRST YEAR TERM II	
SUBJECT: SOFT COMPUTING	
Lectures: 3 Hrs per week	Theory: 100 Marks
<p>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.</p>	
<p>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.</p>	
DETAILED SYLLABUS	
<ol style="list-style-type: none"> 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:	
<ol style="list-style-type: none"> 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.

<u>M.E. COMPUTER SCIENCE & ENGINEERING</u>	
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 able to 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	
<ol style="list-style-type: none"> 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:
<ol style="list-style-type: none">1. William Stallings, "Cryptography and Network Security, Principles and Practice", Pearson/PHI Publication2. B A Forouzan, "Cryptography and Network Security", TMH
References:
<ol style="list-style-type: none">1. Bruce Schneier, "Applied Cryptography", John Wiley & Sons Inc2. Charles B. Pfleeger, Shari Lawrence Pfleeger, "Security in Computing", Pearson Education3. D Denning, "Cryptography and Data Security", Addison-Wesley

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	
<ol style="list-style-type: none"> 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 case and General theory, Problems of dimensionality, Hidden Markov Model 4. Nonparametric Techniques: Density estimation, Parzen windows, k_{nn}-Nearest-Neighbor estimation, Nearest-Neighbor rule, Matrices 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:	
<ol style="list-style-type: none"> 1. Duda, Hart, and Stock, "<i>Pattern Classification</i>", John Wiley and Sons. 2. Gose, Johnsonbaugh and Jost, "<i>Pattern Recognition and Image analysis</i>", PHI 	

<u>M.E. COMPUTER SCIENCE & ENGINEERING</u>	
FIRST YEAR TERM II	
SUBJECT: Mobile Computing (ELECTIVE-II)	
Lectures: Hrs per week	Theory: 100 Marks
<p>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.</p>	
<p>Pre-requisites: Knowledge of Computer Networks.</p>	
DETAILED SYLLABUS	
<ol style="list-style-type: none"> 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.

<u>M.E. COMPUTER SCIENCE & ENGINEERING</u>	
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.	

<u>M.E. COMPUTER SCIENCE & ENGINEERING</u>	
SECOND YEAR TERM I	
SUBJECT: SEMINAR-III	
Practical: 4 Hrs per week	Term Work: 50 Marks Oral: 50 Marks
DETAILED SYLLABUS	
<p>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.</p>	
TERM WORK	
<ol style="list-style-type: none"> 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. 	

<u>M.E. COMPUTER SCIENCE & ENGINEERING</u>	
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.

<u>M.E. COMPUTER SCIENCE & ENGINEERING</u>	
SECOND YEAR TERM II	
SUBJECT: PROJECT STAGE-II	
Practical: 18 Hrs per week	Term Work: 150 Marks Oral:100 Marks
DETAILED SYLLABUS	
<p>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.</p> <p>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.</p>	
TERM WORK	
<ol style="list-style-type: none"> 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. 	

North Maharashtra University, Jalgaon
M. E. (Electrical Power System)
Examination Scheme & Structure with Effect from Year 2012-13
FIRST YEAR TERM – I

Sr. No.	Subject	Teaching Scheme per week		Examination Scheme				
		L	P	Paper Hrs.	Paper	TW	PR	OR
1	Power System Optimization Techniques	3	--	3	100	--	--	--
2	Microprocessor and Microcontroller	3	--	3	100	--	--	--
3	Power System Planning & Reliability	3	--	3	100	--	--	--
4	Power System Dynamics	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. FACTS & Power Quality
2. Artificial Intelligence and its Applications in Power Systems
3. Renewable Energy Sources
4. Power Sector Economics, Management and Restructuring

FIRST YEAR TERM – II

Sr. No.	Subject	Teaching Scheme per week		Examination Scheme				
		L	P	Paper Hrs.	Paper	TW	PR	OR
1	Computer Methods Power System Analysis	3	--	3	100	--	--	--
2	Digital Signal Processing	3	--	3	100	--	--	--
3	Power System Modeling & Control	3	--	3	100	--	--	--
4	High Voltage Power Transmission	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. Advanced Power System Protection
2. Power Electronics Applications in Power Systems
3. EHV Transmission Systems
4. Power System Design

North Maharashtra University, Jalgaon
M. E. (Electrical Power System)
Examination Scheme & Structure with Effect from Year 2012-13
SECOND YEAR TERM – I

Sr. No.	Subject	Teaching Scheme per week		Examination Scheme				
		L	P	Paper Hrs.	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 Hrs.	Paper	TW	PR	OR
1	Progress Seminar	--	--	--	--	50	--	--
2	Project Stage – II	--	18	--	--	150	--	100
Total		--	18	--	--	200	--	100
Grand Total		18		300				

SEMESTER-I

1. Power System Optimization Techniques

Teaching Scheme:

Lectures: 3 Hrs. / Week

Examination Scheme:

Theory Paper: 100 Marks

Duration: 3 hours

- 1) Introduction to optimization and classical optimization techniques, Linear Programming: Standard form, geometry of LPP, Simplex Method P.F. solving LPP, revised simplex method, duality, decomposition principle, and transportation problem.
- 2) Non-Linear Programming (NLP): One dimensional methods, Elimination methods, Interpolation methods Unconstrained optimization techniques-Direct search and Descent methods, constrained optimization techniques, direct and indirect methods.
- 3) Dynamic Programming: Multistage decision processes, concept of sub-optimization and principle of optimality, conversion of final value problem into an initial value problem. CPM and PERT
- 4) Genetic Algorithm: Introduction to genetic Algorithm, working principle, coding of variables, fitness function. GA operators; Similarities and differences between GAs and traditional methods; Unconstrained and constrained optimization.
- 5) Applications to Power system: Economic Load Dispatch in thermal and Hydro-thermal system using GA and classical optimization techniques, Unit commitment problem, reactive power optimization. Optimal power flow, LPP and NLP techniques to optimal flow problems.

Reference books:

- a. "Optimization - Theory and Applications", By S.S.Rao, Wiley-Eastern Limited
- b. "Introduction of Linear and Non-Linear Programming", By David G. Luenberger, Wesley Publishing Company
- c. "Computational methods in Optimization", By Polak, Academic Press
- d. "Optimization Theory with Applications" By Pierre D.A., Wiley Publications
- e. "Operations Research" By D. S. Hira & P. K. Gupta , S Chand Publications

2. Microprocessor and Microcontroller

Teaching Scheme:

Lectures: 3 Hrs. /Week

Examination Scheme:

Theory Paper: 100 Marks

Duration: 3 hours

- 1) Overview of 8086 : Architecture, instruction including I/O instructions, Addressing modes, interrupt structure, ISR minimum and maximum mode, Assembly Language Programmes on 16-bit multiplication, 16-bit by 8-bit division, bubble sort, palindrome. **Hardware and Software debugging aids:** 1 Pass and 2 Pass assemblers, cross assemblers, circuit emulators, simulators, linkers, loaders, compiler, cross compiler, Types of interfacing devices-→Latches(74373), Buffers(74244/245).
- 2) **8051 Architecture:** 8051 Microcontroller Hardware, Input/output. Pins, ports, and circuits, External Memory, Counter and Timers, Serial Data input/ output, Interrupts **Assembly language programming concepts :** The mechanics of programming, The assembly language programming process, PAL instructions, Programming tools and techniques, Programming the 8051 **Moving Data :** Addressing modes, external data moves, code memory read only data moves, push and pop -op codes, data exchanges
- 3) **Logical Operations :** Byte level logical operations, bit level logical operations, rotate and swap operations **Arithmetic Operations :** Flags, incrementing and decrementing, addition, subtraction, multiplication and division, decimal arithmetic **Jumps and Call Instructions :** The jump and call program range, jumps, calls and subroutines, interrupts and returns
- 4) **8051 Microcontroller Design :** Microcontroller specification, microcontroller design, testing the design, timing subroutines, look up tables for the 8051, serial data transmission
- 5) **Applications:** Keyboard, displays→LED & LCD, pulse measurement, D/A and A/D conversion, multiple interrupts **Serial Data Communication:** Network Configuration, 8051 Data Communication.

Reference books:

- a. "The 8051 Micro Controller : Architecture, Programming," By Kenneth J.Ayala, Penram International, Mumbai.
- b. Intel Embeded Micro Controller Data Book, Intel Corporation.
- c. "Microprocessor and Digital Systems" By D.V.Hall, ELBS Publication, London.
- d. "Advance Microprocessors and Micro Controllers" By B.P.Singh,, New Age International, New Delhi.
- e. "Microprocessors and Interfacing" By D.V.Hall, Tata McGraw Hill Publication, New Delhi.
- f. "Microcomputer Systems: the 8086/8088 Family, Architecture, Programming and Design" By Y.C.Liu, Gibson, Prentice Hall of India Publications, New Delhi.
- g. "Introduction to Microprocessor, Software, Hardware and Programming" By Lance A. Leventhal,
- h. "Microprocessor Architecture, Programming and Applications with the 8085" By Ramesh S.Gaonkar, Penram International, Mumbai.
- i. "8051 microcontroller and embedded system" By Muhammad Ali Mazidi, Janice Mazidi, Rollin McKinlay, Pearson Second Edition

3. Power System Planning & Reliability

Teaching Scheme:

Lectures: 3 Hrs. / Week

Examination Scheme:

Theory Paper: 100 Marks

Duration: 3 hours

- 1) **Load Forecasting** : Introduction, Factors affecting Load Forecasting, Load Research, Load Growth Characteristics, Classification of Load and Its Characteristics, Load Forecasting Methods - (i) Extrapolation (ii) Co-Relation Techniques, Energy Forecasting, Peak Load Forecasting, Reactive Load Forecasting, Non-Weather sensitive load Forecasting, Weather sensitive load Forecasting, Annual Forecasting, Monthly Forecasting, Total Forecasting.
- 2) **System Planning** : Introduction, Objectives & Factors affecting to System Planning , Short Term Planning, Medium Term Planning, Long Term Planning, Reactive Power Planning.
Reliability : Reliability, Failure, Concepts of Probability, Evaluation Techniques (i) Markov Process (ii) Recursive Technique, Stochastic Prediction of Frequency and Duration of Long & Short Interruption, Adequacy of Reliability, Reliability Cost.
- 3) **Generation Planning and Reliability** : Objectives & Factors affecting Generation Planning, Generation Sources, Integrated Resource Planning, Generation System Model, Loss of Load (Calculation and Approaches), Outage Rate, Capacity Expansion, Scheduled Outage, Loss of Energy, Evaluation Methods. Interconnected System, Factors Affecting Interconnection under Emergency Assistance.
- 4) **Transmission Planning and Reliability**: Introduction, Objectives of Transmission Planning, Network Reconfiguration, System and Load Point Indices, Data required for Composite System Reliability.
- 5) **Distribution Planning and Reliability**: Radial Networks – Introduction, Network Reconfiguration, Evaluation Techniques, Interruption Indices, Effects of Lateral Distribution Protection, Effects of Disconnects, Effects of Protection Failure, Effects of Transferring Loads, Distribution Reliability Indices. Parallel & Meshed Networks - Introduction, Basic Evaluation Techniques, Bus Bar Failure, Scheduled Maintenance, Temporary and Transient Failure, Weather Effects, Breaker Failure

Reference Books :

- a. “Modern Power System Planning” By X. Wang & J.R. McDonald, McGraw Hill
- b. “Electrical Power Distribution Engineering” By T. Gönen, McGraw Hill Book Company
- c. “Generation of Electrical Energy” By B.R. Gupta, S. Chand Publications
- d. “Electrical Power Distribution” By A.S. Pabla, Tata McGraw Hill Publishing Company Ltd.
- e. “Electricity Economics & Planning” By T.W.Berrie, Peter Peregrinus Ltd., London.
- f. “Power System Planning” By R.N. Sullivan , McGraw Hill

4. Power System Dynamics

Teaching Scheme:

Lectures: 3 Hrs. / Week

Examination Scheme:

Theory Paper: 100 Marks

Duration: 3 hours

- 1) Requirement of reliable power system, Basic concepts of stability, Reliable electrical power service, Stability of Synchronous machines, Tie line oscillations, Method of simulation.
- 2) Synchronous Machines: Review of synchronous machine equations, parameters, Equations in a-b-c phase co-ordinates and Park's co-ordinates, Representation of external system, Low and High order state models, Choice of state variables. Initial state equivalent circuit, Phasor diagram p.u. reactance. 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, Pre calculated Swing curves and their use.
- 3) 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.
- 4) 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 with delay Distribution of power impacts.
- 5) Effect of Excitation on Stability: Effect of excitation on generator power limits, transients 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.

Reference Books :

- a. "Synchronous Machines" By C. Concordia, John Wiley & Sons.
- b. "Power System Stability" By E.W. Kimbark, Dover Publication, Vol.-3
- c. "Power System Control & Stability" By Anderson, Galgotia Publ.
- d. "Power System Stability" By S.B. Crary, John Wiley & Sons.
- e. "Modern Power System Analysis" By Nagrath I. J. & Kothari D. P., Tata McGraw Hill Publication New Delhi

ELECTIVE-I

i. FACTs & Power Quality

Teaching Scheme:

Lectures: 3 Hrs. Week

Examination Scheme:

Theory Paper: 100 Marks

Duration: 3 hours

- 1) Steady state and dynamic problems in AC systems, Flexible AC transmission systems (FACTS), principles of series shunt compensation.
- 2) Description of static var compensation (SVC), thyristor controlled series compensation (TCSC) static phase shifters (SPS), static condenser (STATCON), static synchronous series compensator (SSSC) and unified power flow controller (UPFC), modeling and analysis of FACTS controllers, control strategies to improve system stability.
- 3) Power quality problems in distribution systems, Harmonics, Harmonics creating loads, modeling.
- 4) Harmonic propagation, series and parallel resonance, harmonic power flow, mitigation of harmonics, filters, passive filters, active filters, shunt and series hybrid filters, voltage sag and swells.
- 5) Voltage flicker, mitigation of power quality problems using power electronics conditioners, IEEE standards.

Reference Books :

- a. "Understanding FACTS" By Hingorani & Gyugui, IEEE press.
- b. "FACTS Controllers in Transmission & Distribution" By K. R. Padiyar. New Age Publication.
- c. "Power Quality" By G.T.Heydt , Stars in a Circle Publication, Indiana, 1991.
- d. "Static Reactive Power Compensation" By E.J.E.Miller John Wiley & Sons, New York, 1982.
- e. Recent Publications on Power Systems and Power Delivery.

ii. **Artificial Intelligence and its Applications in Power Systems**

Teaching Scheme:

Lectures: 3 Hrs. Week

Examination Scheme:

Theory Paper: 100 Marks

Duration: 3 hours

- 1) **Introduction to Artificial Intelligence:** Introduction, Fuzzy systems, Artificial Neural Network (ANN), Expert Systems, Genetic Algorithm, Evolutionary Programming. Biological neurons: Function of single biological neuron, function of artificial neuron, Basic terminology related to artificial neuron. Characteristics of ANN, Typical applications of ANN such as classification, pattern recognition, forecasting Properties, strength of NN.
- 2) **Different Architectures of ANN and Learning Processes :** Different architectures of Neural Network, types of activation function, concept of Learning with a Teacher, Learning without a Teacher, Learning Tasks (Any two learning methods and applications)
- 3) **Single Layer Network and Multi-layer Network :** Single Layer Perception: architecture – training algorithm, Least – Mean square algorithm, learning curves, Learning Rate, Annealing techniques. Feed forward Neural Network(MLP) , Back propagation algorithm. Limitation of Back propagation algorithm. Concept of learning rate, momentum coefficient, Generalization capacity
- 4) **Fuzzy Mathematics :** Basic concept of Fuzzy Logic, Fuzzy set – Basic definition – Membership function, Operations of fuzzy sets.
- 5) **Fuzzy Theory :** Fuzzy relations - Fuzzy graphs - Fuzzy analysis – Propositional logic, predictive logic, Fuzzy set theory.
AI Applications in Power Systems : Application of ANN and Fuzzy logic in Power System Planning, Operation and control – load forecasting, Unit Commitment, Load Dispatch and Protection.

Reference Books:

- a. “Neural Networks, Fuzzy Logic & Genetic Algorithms Synthesis & Applications” By S. Rajsekaram, G. A. Vijayalaxmi Pai, Practice Hall India
- b. “Introduction to Neural Network Using MATLAB 6.0” By S. N. Sivanandam, S. Sumathi, S. N. Deepa, , Tata McGraw Hill
- c. “Fuzzy Sets, Uncertainty and Information” By George Klir & Tina. A. Folger, Prentice Hall of India Pvt. Ltd
- d. “Artificial Intelligence” By G. F. Luger and W. A. Stubblefield, Redwood City, CA: Benjamin Cummings, 1993.
- e. “Fundamentals of Artificial Neural Network” By Mohamed H. Hassoun, Practice Hall India.
- f. “Introduction to Artificial Intelligence” By Eugene Charniat, Drew McDermott, Pearson Education.
- g. “An Introduction to Neural Networks” By James A. Anderson, Practice Hall India Publication.

iii. Renewable Energy Sources

Teaching Scheme:

Lectures: 3 Hrs. Week

Examination Scheme:

Theory Paper: 100 Marks

Duration: 3 hours

- 1) **Energy Scenario:** Classification of Energy Sources, Energy resources (Conventional and nonconventional), Energy needs of India, and energy consumption patterns. Worldwide Potentials of these sources. Energy efficiency and energy security. Energy and its environmental impacts. Global environmental concern, Kyoto Protocol, Concept of Clean Development Mechanism (CDM) and Prototype Carbon Funds (PCF). Factors favoring and against renewable energy sources.
- 2) **Solar Energy:** Solar thermal Systems: Types of collectors, Collection systems, efficiency calculations, applications. Photo voltaic (PV) technology: Present status, - solar cells , cell technologies, characteristics of PV systems, equivalent circuit, array design , building integrated PV system, its components , sizing and economics. Peak power operation. Standalone and grid interactive systems.
- 3) **Wind Energy:** Wind Energy : wind speed and power relation, power extracted from wind, wind distribution and wind speed predictions. Wind power systems: system components, Types of Turbine, Turbine rating Choice of generators, turbine rating, electrical load matching, Variable speed operation, maximum power operation, control systems, system design features, stand alone and grid connected operation.
- 4) **Other energy sources:** Biomass – various resources, energy contents, technological advancements, conversion of biomass in other form of energy – solid, liquid and gases. Gasifires Biomass fired boilers, Co firing, Generation from municipal solid waste, Issues in harnessing these sources. Hydro energy – feasibility of small, mini and micro hydel plants scheme layout economics. Tidal and wave energy, Geothermal and Ocean-thermal energy conversion (OTEC) systems – schemes, feasibility and viability.
- 5) **Energy storage and hybrid system configurations:** Energy storage: Battery – types, equivalent circuit, performance characteristics, battery design, charging and charge regulators. Battery management. Fly wheel energy relations, components, benefits over battery. Fuel Cell energy storage systems. Ultra Capacitors.
Grid Integration : Stand alone systems, Hybrid systems – hybrid with diesel, with fuel cell, solar wind, wind –hydro systems, mode controller, load sharing, system sizing. Hybrid system economics. Grid integration with the system: Interface requirements, Stable operation, Transient-safety, Operating limits of voltage, frequency, stability margin, energy storage, and load scheduling. Effect on power quality - harmonic distortion, voltage transients and sags.

Reference Books :

- a. “Wind and solar systems” By Mukund Patel, CRC Press.
- b. “Solar Photovoltaics for terrestrials” By Tapan Bhattacharya.
- c. “Wind Energy Technology” By Njenkins, John Wiley & Sons,
- d. “Non Conventional Energy Resources” by D.S. Chauhan and S.K.Srivastava,.
- e. “Solar Energy” By S.P. Sukhatme, Tata McGraw Hill.
- f. “Solar Energy” By S. Bandopadhyay, Universal Publishing.

iv. Power Sector Economics, Management and Restructuring

Teaching Scheme:
Lectures: 3 Hrs. / Week

Examination Scheme:
Theory Paper: 100 Marks
Duration: 3 hours

1) Power Sector in India

Introduction to various institutions in Indian Power sector such as CEA, Planning Commissions, PFC, Ministry of Power, state and central governments, REC, utilities and their roles. Critical issues / challenges before the Indian power sector, Salient features of Electricity act 2003, Various national policies and guidelines under this act.

2) Power sector economics and regulation

Typical cost components and cost structure of the power sector, Different methods of comparing investment options, Concept of life cycle cost , annual rate of return , methods of calculations of Internal Rate of Return(IRR) and Net Present Value(NPV) of project, Short term and long term marginal costs, Different financing options for the power sector. Different stakeholders in the power sector, Role of regulation and evolution of regulatory commission in India, types and methods of economic regulation, regulatory process in India.

3) Power Tariff

Different tariff principles (marginal cost, cost to serve, average cost), Consumer tariff structures and considerations, different consumer categories, telescopic tariff, fixed and variable charges, time of day, interruptible tariff, different tariff based penalties and incentives etc., Subsidy and cross subsidy, life line tariff, Comparison of different tariff structures for different load patterns. Government policies in force from time to time. Effect of renewable energy and captive power generation on tariff. Determination of tariff for renewable energy.

4) Power sector restructuring and market reform

Different industry structures and ownership and management models for generation, transmission and distribution. Competition in the electricity sector- conditions, barriers, different types, benefits and challenges Latest reforms and amendments. Different market and trading models / arrangements, open access, key market entities- ISO, Genco, Transco, Disco, Retailco, Power market types, Energy market, Ancillary service market, transmission market, Forward and real time markets, market power.

5) Electricity Markets Pricing and Non-price issues

Electricity price basics, Market Clearing price (MCP), Zonal and locational MCPs. Dynamic, spot pricing and real time pricing, Dispatch based pricing, Power flows and prices. Optimal power flow Spot prices for real and reactive power. Unconstrained real spot prices, constrains and real spot prices. Non price issues in electricity restructuring (quality of supply and service, standards of performance by utility, environmental and social considerations) Global experience with electricity reforms in different countries.

Reference Books :

- a. "Know Your Power", A citizens Primer On the Electricity Sector, Prayas Energy Group, Pune
- b. Sally Hunt, "Making Competition Work in Electricity", 2002, John Wiley Inc
- c. Electric Utility Planning and Regulation, Edward Kahn, American Council for Energy Efficient Economy

LABORATORY PRACTICE-I

Teaching Scheme:

Practical: 6 Hrs. /Week

Examination Scheme:

Term Work: 100 Marks

Oral: 50 Marks

Term work shall consist of record of minimum eight experiments using Engineering Computation Software such as MATLAB, SCILAB, PSCAD, ETAP, with moderate to high complexity /assignments based on syllabus of subjects from Semester-I

SEMINAR-I

Teaching Scheme:
Practical: 4 Hrs. /Week

Examination Scheme:
Term Work: 100 Marks

Each student is required to deliver a seminar in first semester on the topic of his/her own choice. The topic of the seminar should be out of the syllabus and relevant to the latest trends in Electrical Power Systems.

The topic will be decided by the student, Guide and Head of department. Each student will make seminar presentation with audio/video aids, for the duration of 45 minutes and seminar work shall be in format of report to be submitted by the student at the end of semester.

The report copies must be duly signed by Guide and Head of department. (One copy for institute, one copy for guide and one copy for candidates for certification). The student is expected to submit the seminar report in standard format. Attendance of all students for all seminars is compulsory.

SEMESTER-II

1. COMPUTER METHODS IN POWER SYSTEM ANALYSIS

Teaching Scheme:

Lectures: 3 Hrs. Week

Examination Scheme:

Theory Paper: 100 Marks

Duration: 3 hours

- 1) Representation of power systems for computerized analysis: Mathematical models of synchronous generator for steady state and transient analysis, Transformer with tap changer, transmission line, phase shifter and loads.
- 2) Topology of Electric Power System-Network Graphs, Incidence matrices, fundamental loop and cutset matrices, primitive impedance and admittance matrices, equilibrium equations of networks. Singular and nonsingular transformation of network matrices.
- 3) 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. Three phase network elements-transformation matrix - incidence and network matrices for three phase network. Algorithm for formulation of three - phase bus impedance matrix.
- 4) Short Circuit Studies: Three phase network, Symmetrical components. Thevenin's theorem and short circuit analysis of multi node power systems using bus impedance matrix. Short circuit calculations for balanced and unbalanced short circuits bus impedance and loop impedance matrices, Stability studies- Solution of state equation by modified Euler method and solution of network equations by Gauss-Seidal interactive method
- 5) Load flow studies : Slack bus, load 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. Multi area power flow analysis with the line control.

Reference Books :

- a. "Computer Methods in Power System Analysis" By G.W. Stagg, A.H.Elabiad, McGraw Hill Book Co.
- b. "Computer Techniques in Power System Analysis" By M.A. Pai, Tata McGraw Hill Publication.
- c. "Electric Energy System Theory" By O.I.Elgard, Tata McGraw Hill Publication.
- d. "Computer Aided Power System Operation and Analysis" By R.N.Dhar, Tata McGraw Hill Publication.
- e. "Modern Power System Analysis" By I.J.Nagrath, D.E.Kothar, Tata McGraw Hill, New Delhi.

2. Digital Signal Processing

Teaching Scheme:

Lectures: 3 Hrs. / Week

Examination Scheme:

Theory Paper: 100 Marks

Duration: 3 hours

- 1) Characterization & Classification of Digital Signals. Digital Signal Processing of continuous signals. Discrete time signals - sequences, representation of signals on orthogonal basis, sampling, aliasing, quantization & reconstruction of signals.
- 2) Discrete systems-attributes, z-transform, analysis of LTI system. Frequency analysis, inverse systems, Discrete Fourier transforms, Fast Fourier implementation of discrete time system.
- 3) Digital filters - structures, sampling, recursive, non-recursive A to D & D to A conversion. FIR, IIR & lattice filter structures, Design of FIR digital filters. Window method, Park-McCellan's method. Design of IIR digital filters. Butterworth, Chebyshev.
- 4) Elliptic approximations, low-pass, band-pass, band-stop & high-pass filters. Effect of finite register length in FIR filter design. Multirate signal processing-motivation-application, decimation & interpolation, sample rate conversion, polyphase implementation of sampling rate conversion, Filter bank theory-DFT filter banks, Adaptive filtering theory.
- 5) DSP Processors and Applications - DSP Microprocessor architectures, fixed point, floating point precision, algorithm design, mathematical, structural and numerical constraints, DSP programming, filtering, data conversion, communication applications. Real time processing considerations including interrupts.

Reference Books :

- a. "Digital Signal Processing Principles, Algorithm and Applications" By J.G.Proakis and D.G.Manolakis ' ' Prentice Hall 1997
- b. "Discrete Time Signal Processing" By A.V.Oppenheim, R.W.Schafer, John Wiley.
- c. "Introduction to Digital Signal Processing" By J.R. Johnson,Prentice Hall 1992
- d. "Digital Signal Processing" By D.J.Defatta, J.G.Dulas. Hodgekiss, J. Wiley and Sons Singapore, 1988
- e. "Theory & Applications of Digital Signal Processing" By L.R.Rabiner & B. Gold , Prentice Hall, 1992
- f. "Digital Signal Processing:A Practical Approach" By Emmanuel Ifeachor, Prof. Barrie Jervis, Prentice Hall

3. Power System Modeling & Control

Teaching Scheme:

Lectures: 3 Hrs. Week

Examination Scheme:

Theory Paper: 100 Marks

Duration: 3 hours

- 1) Transient response and concept of stability in Electrical Power System. Modelling of Power System. Control of voltage, frequency and tie-line power flows, Q-V and P-f control loops, mechanism of real and reactive power control.
- 2) Mathematical model of speed governing system. Turbine governor as affecting the power system dynamics. Transient and steady state response in the interconnected power systems. Excitation systems. Transformation model of exciter system. Analysis using block diagrams.
- 3) Power systems stabilizers. Dynamic stability (small disturbances), effect of excitation control and turbine dynamics, characteristic equation, method of analysis of the stability of power system. Multi machine systems, Flux decay effects. Multi machine systems with constant impedance loads, matrix representation of a passive network in the transient state, converting to a common reference frame. Converting machine co-ordinates to system reference, relation between machine current and voltages, system order, machine represented by classical methods.
- 4) Net interchange tie-line bias control. Optimal, sub-optimal and decentralized controllers. Discrete mode AGC. Time - error and inadvertent interchange correction techniques. On-line computer control. Distributed digital control.
- 5) Data acquisition systems. Emergency control, preventive control, system, System wide optimization, SCADA. Self excited electro-mechanical oscillations in power system and the means for control.

Reference Books :

- a. "Transient Processes in Electrical Power System" By V.Venlkov ,Mir Publication, Moscow.
- b. "Electric Energy Systems Theory" By Olle I.Elgard , Tata McGraw Hill Pub. Co., New Delhi.
- c. "Power System Control and Stability" By Anderson P.M. & Foad A.A., Galgotia Pub.
- d. "Modern Power System Analysis" By Nagrath I.J., Kothari D.P. , Tata McGraw Hill Pub. Co., New Delhi.

4. High Voltage Power Transmission

Teaching Scheme:

Lectures: 3 Hrs. Week

Examination Scheme:

Theory Paper: 100 Marks

Duration: 3 hours

HIGH VOLTAGE AC TRANSMISSION

- 1) **Engineering Aspects of EHV AC Transmission System:** Principles, configuration, special features of high voltage AC lines, power transfer ability, reactive power compensation, audible noise, corona bundle conductors, electric field, right of way, clearances in a tower, phase to phase, phase to ground, phase to tower, factors to be considered, location of ground wire, angle of protection, tower configuration. Principles of radio interference, origin of radio interference, method of propagation, factors to be considered in line design.
- 2) **Power System Transients:** Introduction, circuit closing transients, sudden symmetrical short circuit of alternator, recovery transients due to removal of short circuit, traveling waves on transmission lines, wave equation, surge impedance and wave velocity, specifications of traveling waves, reflection and refraction of waves, typical cases of line terminations, equivalent circuit for traveling wave studies, forked lines, reactive termination, successive reflections, Bewley lattice diagram, attenuation and distortion, arcing grounds, capacitance switching, current chopping, lightning phenomenon, over voltages due to lightning, line design based on direct strokes, protection of systems against surges, statistical aspects of insulation co-ordination.

HIGH VOLTAGE DC TRANSMISSION

- 3) **General Background :** EHV AC versus HVDC Transmission, power flow through HVDC link, equation for HVDC power flow, effect of delay angle and angle of advance, bridge connections, waveform of six pulse and twelve pulse bridge converter, commutation, phase control, angle of extinction, control of DC voltage, connections of three phase six pulse and twelve pulse converter bridges, voltage and current waveforms.
- 4) Bipolar HVDC terminal, converter transformer connections, switching arrangements in DC yard for earth return to metallic return, HVDC switching system, switching arrangements in a bipolar HVDC terminal, sequence of switching operations, HVDC circuit breakers, DC current interruption, commutation principle, probable types and applications of HVDC circuit breakers, multi-terminal HVDC systems, parallel tapping, reversal of power, configurations and types of multi-terminal HVDC systems, commercial multi terminal systems.
- 5) Faults and abnormal condition in bipolar, two terminal HVDC system, pole-wise segregation, protective zones, clearing of DC line faults and reenergizing, protection of converters, transformer, converter valves, DC yards, integration of protection and controls, hierarchical levels of control, block diagram, schematic diagram, current control, power control, DC voltage control, commutation channel, master control, station control, lead station, trail station, pole control, equidistant firing control, synchronous HVDC link, asynchronous HVDC Link.

Reference Books:

- a. "An Introduction to High Voltage Engineering" By Subir Ray, Prentice Hall of India Private Limited, New Delhi – 110 001.
- b. "HVDC Transmission" By Adamson C., Hingorani N.G., IEEE Press
- c. "Power Transmission" By DC Uhimann E.
- d. "HVAC and HVDC Transmission, Engineering and practice" By S. Rao, Khanna Publisher, Delhi.
- e. "Electric Power Systems" By B.M. Weddy and B.J.Cory, John Wiely and Sons, Fourth edition (2002)
- f. "Power System Analysis and Design" By J.Duncan Glover, Mulukutla S.Sarma, Thomson Brooks/cole /Third Edition (2003)
- g. "Power System Analysis and Design" By B.R. Gupta, S.Chand and Company (2004)

ELECTIVE-II

i. Advanced Power System Protection

Teaching Scheme:

Lectures: 3 Hrs. Week

Examination Scheme:

Theory Paper: 100 Marks

Duration: 3 hours

- 1) Review of principles of power system equipments protection, configuration of various solid state protection scheme, evolution of digital relays from electromechanical relays,
- 2) performance & operational characteristics of digital protection, Basic elements of digital filtering, analog multiplexers, conversions of system: the sampling theorem, signal aliasing error, sample & hold circuit, multiplexers, analog to digital conversion, digital filtering concepts, A digital relay. Hardware & Software.
- 3) Mathematical background to protectional algorithm, first derivative (Mann & Morrison) algorithm, Fourier algorithm- full cycle window algorithm, fractional cycle window algorithm,
- 4) Walsh function based algorithm, least square based algorithm, differential equation based algorithm, travelling wave based technique.
- 5) Digital differential protection of transformer, digital line differential protection, recent advances in digital protection of power system.

Reference Books:

- a. "Digital Protection for Power System" By A.T.Johns and S.K.Salman, Peter, Published by Peter Peregrinus Ltd. on behalf of the IEE, London, U.K.
- b. "Power System Protection and Switchgear" By Badri Ram and D.N.Vishvakarma, Tata McGraw Hill, New Delhi.
- c. "Transmission Network Protection" By Theory and Practice, Y.G.Paithankar, Marcel Dekker, New York, U.S.A.
- d. "Fundamentals of Power System Protection" By Y.G.Paithankar and S.R. Bhide, Prentice Hall of India, New Delhi.

ii. Power Electronics Applications in Power Systems

Teaching Scheme:

Lectures: 3 Hrs. Week

Examination Scheme:

Theory Paper: 100 Marks

Duration: 3 hours

- 1) **Power Electronic Controllers:** Basics, challenges and needs, static power converter structures, AC controller based structures, D.C. link converter topologies, converter output and harmonic control, power converter control issues.
- 2) **Shunt Compensation:** SVC and STATCOM: Operation and control of SVC, STATCOM configuration, control & applications.
Series Compensation: Principle of operation, application of TCSC for damping of electromechanical oscillations, application of TCSC for mitigation of sub-synchronous resonance, TCSC layout and protection, static synchronous series compensator (SSSC).
- 3) **Unified Power Flow Controller:** Steady state operation, control and characteristics, introduction to transient performance, power flow studies in UPFC embedded systems, Operational constraints on UPFC.
- 4) **Other FACTS Controllers:** Circuit, model and operating features of Dynamic Voltage Regulator(DVR), Thyristor Controlled Braking Resistors (TCBR), Thyristor Controlled Phase Angle Regulator(TCPAR), comparison of all FACTS controllers.
- 5) **Control Strategies and co-ordination :** Conventional control, Hysterisis control, Artificial Neural Network, fuzzy logic controls, comparison between different control schemes, co-ordination between different FACTS controllers.

Reference Books:

- a. "Flexible A.C. Transmission Systems (FACTS)" By Yong Hua Song and Johns (IEE Power and Energy Series 30)
- b. "Thyristor based FACTS controllers" By Mathur & Verma (IEEE Press, New York)
- c. "Sub-synchronous Resonance" By K.R. Padiyar, B.S. Publications, Hyderabad.
- d. "FACT's Controllers in Transmission & Distribution" by K.R. Padiyar New Age Publishers ,Delhi, May 2007

iii. EHV Transmission Systems

Teaching Scheme:

Lectures: 3 Hrs. / Week

Examination Scheme:

Theory Paper: 100 Marks

Duration: 3 hours

- 1) Basic Aspects of A.C. Power Transmission, Power-Handling Capacity and Line Loss, Surface Voltage Gradient on 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 of Traveling Waves. Transient Response of Systems with Series and Shunt Lumped Parameters. Principles of Traveling-Wave Protection
- 2) Lightning & Lightning Protection, Insulation Coordination Based on Lightning
- 3) Over Voltages in EHV Systems Caused by Switching Operations, Origin of Over Voltages and their Types, Over Voltages Caused by Interruption of Inductive and Capacitive Currents, Ferro-Resonance Over Voltages, Calculation of Switching Surges, Power Frequency Voltage Control and Over Voltages, Power Circle Diagram.
- 4) Reactive Power Flow and Voltage Stability in Power Systems. Steady - State Static Real Power and Reactive Power Stability, Transient Stability, Dynamic Stability. Basic Principles of System Voltage Control. Effect of Transformer Tap Changing in the Post- Disturbance Period, Effect of Generator Excitation Adjustment, Voltage Collapse in EHV Lines, Reactive Power Requirement for Control of Voltage in Long Lines. Voltage Stability.
- 5) Power Transfer at Voltage Stability Limit of EHV Lines, Magnitude of Receiving End Voltage at Voltage Stability Limit. Magnitude of Receiving End Voltage During Maximum Power Transfer. Magnitude of Maximum Power Angle at Voltage Stability Limit. Optimal Reactive Power at Voltage Stability Limit.

Reference Books:

- a. "Performance, operation & control of EHV power transmission system"
A. Chakrabarti, D.P. Kothari, A.K. Mukhopadhyay, wheeler publications
- b. "Extra high-voltage A.C. transmission Engineering" By Rakash Das Begamudre, New Age International Pvt. Ltd.
- c. "EHVAC & HVDC Transmission Engineering & Practice" By S. Rao, Khanna Publications

iv. Power System Design

Teaching Scheme:

Lectures: 3 Hrs. Week

Examination Scheme:

Theory Paper: 100 Marks

Duration: 3 hours

- 1) Power System Components, Location of Main Generating Stations and Substations, Interconnections, Load Dispatch Centers
- 2) Design of Transmission Lines, Selection of Voltage, Conductor Size, Span, Number of Circuits, Conductor Configurations, Insulation Design, Mechanical Design of Transmission Line, Towers, Sag- Tension Calculations
- 3) Design of EHV Transmission Line Based Upon Steady State Limits and Transient Over Voltage, Design Factors Under Steady States, Design of 400kV, 1000MW Medium and Long Transmission Line Without and with Series Capacitance Compensation and Shunt Reactors at Both Ends, 750KV Long Transmission Line with Only Shunt Reactors. Extra High Voltage Cable Transmission, Design Basis of Cable Insulation, Search Performance of Cable Systems, Laying of Power Cables
- 4) Vigorous Solution of Long Transmission Line, Interpretation of Long Line Equations, Ferranti Effect, Tuned Power Lines, Equivalent Circuit of Long Line, Power Flow Thorough Transmission Line and Methods of Voltage Control
- 5) Power System Earthing, Earth Resistance, Tolerable and Actual Step and Touch Voltages, Design of Earthing Grid, Concrete Encased Electrodes, Tower Footing Resistance, Impulse Behavior of Earthing System

Reference Books:

- a. "Electrical Power System Design" By M.V. Deshpande, Tata McGraw Hill
- b. "Power System Analysis and Design" By B.R.Gupta, Wheeler Publishing co.
- c. "Power System Engineering" By I.J.Nagrath & D. P. Kothari, Tata Mc Graw Hill
- d. "Extra high-voltage A.C. transmission Engineering" By Rakosh Das Begamudre, New Age International Pvt. Ltd.
- e. "EHV AC & HVDC Transmission Engineering & Protection" By S.S.Rao, Khanna Publishers

LABORATORY PRACTICE-II

Teaching Scheme:

Practical: 6 Hrs. /Week

Examination Scheme:

Term Work: 100 Marks

Oral: 50 Marks

Term work shall consist of record of minimum eight experiments using Engineering Computation Software such as MATLAB, SCILAB, PSCAD, ETAP, with moderate to high complexity /assignments based on syllabus of subjects from Semester-II

SEMINAR-II

Teaching Scheme:

Practical: 4 Hrs. /Week

Examination Scheme:

Term Work: 100 Marks

Each student is required to deliver a seminar in second semester on the topic of his/her own choice. The topic of the seminar should be out of the syllabus and relevant to the latest trends in Electrical Power Systems.

The topic will be decided by the student, Guide and Head of department. Each student will make seminar presentation with audio/video aids, for the duration of 45 minutes and seminar work shall be in format of report to be submitted by the student at the end of semester.

The report copies must be duly signed by Guide and Head of department. (One copy for institute, one copy for guide and one copy for candidates for certification). The student is expected to submit the seminar report in standard format. Attendance of all students for all seminars is compulsory.

SEMESTER-III

SEMINAR-III

Teaching Scheme:

Practical: 4 Hrs. /Week

Examination Scheme:

Term Work: 50 Marks

Oral: 50 Marks

Each student will select a topic in the area of electrical engineering, related to M. E. Project Stage-I.

The topic will be decided by the student, guide and Head of department. Each student will make seminar presentation with audio/video aids, for the duration of 45 minutes and seminar work shall be in format of report to be submitted by the students at the end of semester.

The report copies must be duly signed by guide and Head of department. (One copy for institute, one copy for guide and one copy for candidates for certification). The student is expected to submit the seminar report in standard format. Attendance of all students for all seminars is compulsory.

PROJECT STAGE-I

Teaching Scheme:

Practical: 18 Hrs. /Week

Examination Scheme:

Term Work: 100 Marks

Project Stage – I is the integral part of the dissertation project. The project should be based on the knowledge acquired by the student during the coursework and should contribute to the needs of the society.

The project aims to provide an opportunity of designing and preparing complete system or subsystems in an area where the student like to acquire specialized skills. The student should present the progress of the project. It will consist of problem statement, literature survey, project overview and scheme of implementation (block diagram, algorithm, program, PERT chart, etc.)

The term work should be continuously evaluated as per the norms/guidelines.

SEMESTER-IV

PROGRESS SEMINAR

Examination Scheme:

Term Work: 50 Marks

Each student will select a topic in the area of electrical engineering, related to M. E. Project Stage-II.

The topic will be decided by the student, guide and Head of department. Each student will make seminar presentation with audio/video aids, for the duration of 45 minutes and seminar work shall be in format of report to be submitted by the students at the end of semester.

The report copies must be duly signed by guide and Head of department. (One copy for institute, one copy for guide and one copy for candidates for certification). The student is expected to submit the seminar report in standard format. Attendance of all students for all seminars is compulsory.

PROJECT STAGE-II

Teaching Scheme:

Practical: 18 Hrs./Week

Examination Scheme:

Term Work: 150 Marks

Oral: 100 Marks

The project work will start in second year (Continue to project stage-I).

The term work should be continuously evaluated as per the norms/guidelines.

The project work (dissertation) should be presented in a standard format.

The oral examination shall be conducted with the help of approved external examiner, appointed by university.



**North Maharashtra University,
Jalgaon**

FACULTY OF COMMERCE & MANAGEMENT

**Syllabus of Master in Business
Administration (MBA-II)**

W.E.From 2015-16





North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

PROPOSED STRUCTURE OF MASTER IN BUSINESS ADMINISTRATION (M.B.A.)

Semester-I and II w.e.f. July 2014

Paper	Semester-I	Paper	Semester-II
101	Management Science	201	Business Research Methods
102	Corporate Communication Skills	202	Information Technology For Managers
103	Managerial Economics	203	Global Economics Scenario
104	Human Resource Management	204	Marketing Management
105	Business Accounting	205	Management Accounting
106	Organizational Behavior -I	206	Organizational Behavior- II
107	Corporate Social Responsibility	207	Financial Management
108	Quantitative Techniques	208	Operations Management

Semester-III and IV w.e.f. July 2015

Paper	Semester-III	Paper	Semester-IV
301	Strategic Management	401	Current Business Scenario
302	Management Information System & ERP	402	e-Commerce & Excellence Management
303	Legal Aspects Of Business	403	Indian Commercial Laws
304	Specialization-I	404	Entrepreneurship & Project Management
305	Specialization-II	405	Specialization-V
306	Specialization-III	406	Specialization-VI
307	Specialization-IV	407	Specialization-VII
308	Field Work/ Survey Report	408	Project Report & Viva-Voce

Specialization (Any One)

A	Financial Management
B	Marketing Management
C	Human Resource Management
D	Operations & Materials Management
E	International Business Management
F	Agro Business Management
G	Information Technology & Systems Management
H	Retail Management
I	Hospitality Management



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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	Business Research Methods	40	60	100
102	Corporate Communication Skills	40	60	100	202	Information Technology For Managers	40	60	100
103	Managerial Economics	40	60	100	203	Global Economics Scenario	40	60	100
104	Human Resource Management	40	60	100	204	Marketing Management	40	60	100
105	Business Accounting	40	60	100	205	Management Accounting	40	60	100
106	Organizational Behavior -I	40	60	100	206	Organizational Behavior – II	40	60	100
107	Corporate Social Responsibility	40	60	100	207	Financial Management	40	60	100
108	Quantitative Techniques	40	60	100	208	Operations Management	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	Current Business Scenario	40	60	100
302	Management Information System & ERP	40	60	100	402	e-Commerce & Excellence Management	40	60	100
303	Legal Aspects Of Business	40	60	100	403	Indian Commercial Laws	40	60	100
304	Specialization-I	40	60	100	404	Entrepreneurship & Project Management	40	60	100
305	Specialization-II	40	60	100	405	Specialization-V	40	60	100
306	Specialization-III	40	60	100	406	Specialization-VI	40	60	100
307	Specialization-IV	40	60	100	407	Specialization-VII	40	60	100
308	Field Work/ Survey Report	40	60	100	408	Project Report & Viva-Voce	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.)

W.E.FROM JULY 2014

1. TITLE OF THE DEGREE

This degree shall be titled as Master in Business Administration (MBA) with the mention of Specialization in the bracket as "MBA (Specialization)". This new curricula shall be effective from July 2014.

2. DURATION

The regular Full Time Course shall be of 2 Years duration; comprising of 4 Semesters through Theory papers, Practical, Project report, Field work, 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, the student has to opt for one specialization as specialization comprising 8 papers, of which for 1 paper the student has to undergo Summer Internship Project for minimum period of 7 weeks and 1 paper on field work/Survey Report.

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 Department/Institution certifies completion of internal work, regularity, practical etc. The institution / 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. 20 Marks for Classroom Paper Presentation, Research Paper Presentations at State Seminars, Research Paper Presentations at National Seminars, Publications in Journals, Practical (Computer related courses), Presentations of Case Study, Group Discussions, Book Review, Survey, Working Assignment, Active participation in Event Management, Industrial Visit, Placement Activities, Institutional Branding Activities, Visit to National/International Business Exhibitionist in related

subjects (at Least Two activity have to be completed by the student per semester per paper to be supervised and guided by the concerned subject teacher).

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 at least 48 lecture hours per semester per course. The duration of the lectures shall be 60 minutes each. There shall be at least 14-16 weeks of teaching before commencement of examination of respective semester.
- 6.2. There shall be 4 lectures of 60 min duration / week / paper.
- 6.3. The semester workload is balanced with 8 full papers of 100 marks each / semester. Thus 384 lectures hours are considered for teaching sessions out of which and 48 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, working assignment, 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. GUIDELINES FOR FIELD WORK/ SURVEY REPORT

- 7.1. Each student shall have to undergo a field work/ Survey Assignment while 3rd Semester.
- 7.2. In the Third semester examination student were to do "field work/ Survey Assignment"; compulsorily based on social problems as mentioned in clause 7.4 below. Group of 2 students is allowed in this. The topic should be decided with consultation and guidance of internal teacher of the Institute having enough knowledge of survey. The field work should be necessarily Research oriented, Innovative and Problem solving.
- 7.3. The departments / institute shall submit the detailed list of candidate with field work/ Survey Assignment Title, name of the internal guide on or before 31st October of the second year.
- 7.4. The themes for field work should be related (Not Restricted) to Social issues such as -Education, Sanitation, Health, Village/Cottage Industry, Watershed Management, Problems Of Slum Area, Tribal Upliftment,

Rehabilitation, Superstitious (Andhashraddha), NGO, Study of Government Welfare Schemes, and as per necessity of the yearly social situation in that area, etc.

- 7.5. The student has to write a report based on the actual Field work, get it certified by the concerned Guide/teacher (With Minimum 2 years of teaching Experience) that the field work/ Survey Assignment has been satisfactorily completed and submit one typed copy of the same to the Head / Director of the institute.
- 7.6. Field work/ Survey Assignment shall be strictly based on primary data. The Sample Size shall be minimum 100.
- 7.7. Student is expected to formulate at least one hypothesis and use SPSS/PASW or similar software for data analysis and Hypothesis Testing.
- 7.8. field work/ Survey Assignment details should be displayed on institutes websites
- 7.9. field work/ Survey Assignment external viva shall be conducted at the end of Semester III
- 7.10. Viva Voce for one student shall be of minimum 12-15 minutes. The Student has to prepare PowerPoint presentation based on field work/ Survey Assignment to be presented at the time of Viva voce.
- 7.11. The field work/ Survey Assignment will carry maximum 100 marks, of which internal teacher shall award marks out of maximum 40 marks on the basis of work done by the student. Remaining marks shall be awarded out of maximum 60 marks by examining the student through compulsory PowerPoint presentations followed by Viva-voce, by the panel of the examiners comprises one internal & one External examiner to be appointed by the University. Maximum 30 projects per day will be evaluated by per panel.
- 7.12. No students will be permitted to appear for Viva-voce and Semester III examinations, unless and until (s) he submits the field work/ Survey Assignment before the stipulated time.

8. GUIDELINES FOR PRACTICAL TRAINING AND SUMMER INTERNSHIP PROJECT

- 8.1. 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 either IInd Semester.
- 8.2. In the Fourth semester viva-voce examination student were to study "Project Work" individually on the basis of 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.
- 8.3. 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 January of the second year.
- 8.4. No teacher shall be entrusted with more than 15 students for guidance and supervision, in case if more students opt for specific specialization then, Director/Principal of the Institute/College shall certify such project work.
- 8.5. 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 and head of the department that the

Project report has been satisfactorily completed and submit Two typed copies of the same to the Head / Director of the institute.

- 8.6. It is responsibility of Director/Principal of concerned Institute to check the authenticity of Project.
- 8.7. Student may use SPSS software if required.
- 8.8. One of the reports submitted by the student shall be forwarded to the University by the Institute before 1st March.
- 8.9. 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, if possible.
- 8.10. Project details should be displayed on institutes websites
- 8.11. Project viva shall be conducted at the end of Semester IV
- 8.12. Viva Voce for one student shall be of minimum 10-15 minutes. The Student has to prepare PowerPoint presentation based on Project work to be presented at the time of Viva voce.
- 8.13. 10 % of the projects May be given by institute to the students for summer training as basic research projects to be supervised under faculty having enough exposure & knowledge of research.
- 8.14. 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.
- 8.15. 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.

9. ADDITIONAL MAJOR SPECIALIZATION

- 8.1. The student who has passed MBA of this University with a specific specialization may be allowed to appear for MBA examination again, with other specialization by keeping term for the IIIrd and IVth semester for the so opted 8 papers of additional specialization. He has to appear for 8 papers including Project report of the additional specialization so opted.
- 8.2. He shall be given exemption for all other papers.
- 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 specialization.

10. 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(101, 106, 206, 301, 303 & 403)** 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 Paper - 406)** out of 5 cases 3 cases should be attempted by the student. Each case shall carry 20 marks.

11. ELIGIBILITY OF THE FACULTY

Strictly As per norms fixed by AICTE / UGC and North Maharashtra University (www.nmu.ac.in)

12. JOB OPPORTUNITIES

In India, a Masters in Business Administration is considered as an attractive career option as after pursuing this degree, the demand of a student in the industry goes up. It is such a degree which makes students ready for a Managerial level role in the chosen field.

- Finance forms a major part of the operations of any company and there are great opportunities lying ahead for students of MBA finance, The prime areas where opportunities occur are **Commercial Banking, Corporate Finance**, Apart from these there are openings as financial planner, credit manager, investor relations officer, insurance advisor, risk management, money management, real estate planner and investment banking.
- Marketing is another common career path for MBA grads. Most large businesses, and many small businesses, utilize marketing professionals. Career options exist in areas of branding, advertising, promotions, and public relations. Some of the job titles include marketing manager, branding specialist, advertising executive, public relations specialist, and marketing analyst.
- HR is another field which is in demand in both public and private sector organizations. One can seek employment in public and private sector industries, banking and financial institutions, corporate houses, and multinational companies.
- Operations and Materials management specialization offers a very good scope to graduate engineers and can seek jobs in areas such as Material controls specialist, Inventory control specialists, Material planner, Loss control specialist, Production departments and quality assessment department.
- The Information Technology field also needs MBA grads to oversee projects, supervise people, and manage information systems. Career options are bright for IT and Systems mgt specialization. Many MBA grads are chosen to work as project managers, information technology managers, and information systems managers.
- Agriculture is the backbone to the Indian economy. This sector occupies 17.5% rate in the national GDP. Every company that is doing business transactions with farmers come under the agribusiness sector. Therefore opportunities for Agro business management students are tremendous; students can join in the warehousing,

retail, seeds companies, fertilizers and pesticides companies, banks and insurance sectors. They can join management experts in the agriculture related industries, policy makers in financial industries. A career in agriculture consultancy, journalism, agri banking, hi-tech farming and agriculture engineering sectors also is a possibility.

- Apart from all these fields, there exists an opportunities in the export field with specialization as International Business Management. This field has got vast scope in the wake of globalization. The world became small as far as business and technology is concerned, this poses lot of challenges for international business opportunities.
- Retail Industry is one of the fastest changing and vibrant industries in the world, and has contributed to the economic growth of many countries. Indian retail sector has been rated as the fifth most attractive, emerging retail market in the world. Retail industry is expected to grow at a compound rate of 30 per cent over the next five years. Some of the opportunities available for students after specializing in retail are Customer Sales Associate, Department Manager, Floor Manager, Category Manager, Store Manager, Retail Operation Manager, Visual Merchandisers Manager, Back-end Operations Logistics, Warehouse Managers, Retail Communication Manager and Retail Marketing Executives.
- Hospitality management specialization students can find work in catering, conference and events management, the entertainment and leisure sector, facilities management, food service management as well as Hospital Management and Tourism industry. Self-employment is an option with experience, business sense and a sound plan.

Finally merely a buzz word, MBA, produces lot of opportunities; it is the responsibility of the student to capture the hand on knowledge to understand the changing needs of the corporate world. One has to make sure that this conceptual knowledge opens up the doors to enter into the "Corporate world" which is normally our aim. This means one can become a successful entrepreneur or a manager depends upon how he/she shapes up with the knowledge...MBA degree is a GATEWAY.



North Maharashtra University, Jalgaon

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FACULTY OF COMMERCE & MANAGEMENT

EQUIVALENCE OF OLD AND NEW COURSES FOR MASTER IN BUSINESS ADMINISTRATION (M.B.A.)

Old Paper	Old courses (w.e.f.- July 2011)	New Paper	New courses (w.e.f.- July 2014)
Semester-I			
101	Management Science	101	Management Science
102	Accounting for Managers	105	Business Accounting
103	Managerial Economics	103	Managerial Economics
104	Information Technology for Managers	202	Information Technology For Managers
105	Introduction To Operations Mgmt.	208	Operations Management
106	Organizational Behavior	106	Organizational Behavior - I
107	Corporate Social Responsibility	107	Corporate Social Responsibility
108	Corporate Communication Skills	102	Corporate Communication Skills
Semester - II			
201	Management Practices	206	Organizational Behavior – II
202	Business Research Methods	201	Business Research Methods
203	Global Economic Scenario	203	Global Economics Scenario
204	Management Information System & ERP	302	Management Information System & ERP
205	Financial Management	207	Financial Management
206	Human Resource Management	104	Human Resource Management
207	Marketing Management	204	Marketing Management
208	Quantitative Techniques	108	Quantitative Techniques
Semester - III			
301	Strategic Management	301	Strategic Management
302	Entrepreneurship & Project Management	404	Entrepreneurship & Project Management
303	Legal Aspects of Business	303	Legal Aspects Of Business
304	Specialization-I (Major)*	304	Specialization-I
305	Specialization-II (Major)*	305	Specialization-II
306	Specialization-III (Major)*	306	Specialization-III
307	Specialization-IV (Major)*	307	Specialization-IV
308	Specialization (Minor-I)**		Three chances to be given of the same paper (308 minor-I)
Semester - IV			
401	e-Commerce & Excellence Management	402	e-Commerce & Excellence Management
402	Family Business Management	401	Current Business Scenario
403	Indian Commercial Laws	403	Indian Commercial Laws
404	Specialization-V (Major)*	405	Specialization-V
405	Specialization-VI (Major)*	406	Specialization-VI
406	Specialization-VII (Major)*	407	Specialization-VII
407	Project Report & Viva-Voce*	408	Project Report & Viva-Voce
408	Specialization (Minor-II)**		Three chances to be given of the same paper (408 minor-II)



North Maharashtra University, Jalgaon

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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: 48 hours

Objectives:

- To equip students with the core concepts, frameworks, and techniques of Strategic management and its applications

1. Strategic Management and Establishment of Strategic Intent (6)

- 1.1 Introduction to Strategic Management- Evolution, Concept, Decision Making Process, Schools of thoughts, Definition, Process, Model to Strategic Management
- 1.2 Levels of Strategic Management,
- 1.3 Strategic Intent-Concept of stretch, Leverage and Fit, Strategies Vs Tactics
- 1.4 Nature, Characteristics, Formulations of -Vision, Mission, and Goals & Objectives, Balance Score Card

2. Strategy Formulation

2.1 Environmental Appraisal (4)

- 2.1.1 Concept
- 2.1.2 SWOT and PESTLE Analysis
- 2.1.3 Scenario Building
- 2.1.4 Environmental Scanning
- 2.1.5 Appraising Environment
- 2.1.6 Industry Analysis- Porter five forces analysis

2.2 Organizational Appraisal (3)

- 2.2.1 Capability factors, Methods and Techniques
- 2.2.2 Structuring Organisational Appraisal

2.3 Corporate Level Strategies (4)

- 2.3.1 Types-Introduction to Expansion, Stability, Retrenchment and combination of Strategies
- 2.3.2 Integration of Strategies
- 2.3.3 Diversification Strategies- Related and Unrelated

2.4 Business Level Strategies (4)

- 2.4.1 Introduction
- 2.4.2 Porter's Generic Business Strategies
- 2.4.3 Tactics for Business Strategies
- 2.4.4 Strategies for Different Industry conditions (Industry Life Cycle Analysis)

3. Strategic Analysis and Choice (5)

- 3.1 Process of Strategic Choice
- 3.2 Strategic Analysis- Corporate Portfolio Analysis- BCG Product Portfolio and
- 3.3 GE Nine Matrix Cell, Competitor Analysis
- 3.4 Strategic Plan

4. Strategy Implementation (8)

- 4.1 Project Implementation
- 4.2 Procedural Implementation
- 4.3 Resource Allocation
- 4.4 Structural Implementation - Interrelationship of Structure and Strategy, Structures for Business and Corporate Strategies
- 4.5 Behavioural Implementation-Strategic Leadership, Composition Corporate
- 4.6 Culture, Corporate Politics and use of power
- 4.7 Functional Implementation- Vertical and Horizontal Fit
- 4.8 Internal and External Innovation, Implementing internal innovation

5. Strategy Evaluation and Control

(4)

- 5.1 Strategic Evaluation- Nature, Importance and Barriers
- 5.2 Strategic Control and Operational Controls.
- 5.3 Techniques of Strategic Evaluation and Control

1.2. Comprehensive Cases on various strategic situations and at least 10 cases based on application of strategic management must be discussed & solved.
(10)

REFERENCE BOOKS

1. Strategic Management and Business Policy-Azar Kazmi, The McGraw Hill
2. Business Policy and Strategic Management : Concepts and Applications- Vipin Gupta, Kamala Gollakota, R. Srinivasan -Prentice Hall India
3. Concepts in Strategic Management and Business Policy- Thomas L. Wheelen, J. David Hunger, Wheelen Thomas L.- Pearson
4. Strategic Management- P.Subba Rao – Himalaya Publishing House.
5. Strategic Management: Concepts and Cases – Upendra Kachru- Excel Books
6. Business Policy and Strategic Management: Text and Cases- Francis Cherunilam- Himalaya Publishing House.
7. Strategic Management- Garth Saloner, Andrea Shepard, Joel Podolny– Willey India
8. Strategic Management – B Hiriyappa – New Age International
9. Strategic Management – V.S.P. Rao , Harikrishna – Excel Books
10. Strategic Management: Concepts: Competitiveness and Globalization- Michael Hitt, R. Duane Ireland, Robert Hoskisson- Cengage Learning



North Maharashtra University, Jalgaon

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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

302-Management Information System and ERP

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objectives:

- To explain students why information systems are so important today for business and management
- To evaluate the role of the major types of information systems in a business environment and their relationship to each other
- To assess the impact of the internet and internet technology on business electronic commerce and electronic business
- To identify the major management challenges to building and using information systems and learn how to find appropriate solutions to those challenges

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

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 (05)

- 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 (07)

- 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)
- 6.4 Assignment on ERP implementation in Manufacturing & Service sector.

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, Venkitkrishnan– PHI
11. Enterprise Resource Planning by Jyotindra Zaveri - Himalaya Publishing House
12. Textbook of Enterprise Resource Planning Jaiswal Macmillan



North Maharashtra University, Jalgaon

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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

303 Legal Aspect of Business

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objectives: -

- To provide the Basic knowledge about the different types of Contract.
- To increase the Understanding level of Individual about Sales of Goods act.
- To aware about the basic terms in the field of LLP Act 2008.
- To provide the practical aspects in the light of case study.

- 1. Law of Contract – “Indian Contract Act, 1872** **(6)**
 - 1.1. Introduction, Meaning, Definitions & Essentials of Contract
 - 1.2. Classification of Contract: - (i) Void, Voidable & Valid Contract (ii) Wagering Agreement, Contingent Contracts & Quasi-contracts
 - 1.3. Discharge of Contract
 - 1.4. Breach of Contract & Remedies
 - 1.5. Specific Contracts: - i) Indemnity & Guarantee ii) Agency iii) Bailment & Pledge
- 2. Law of Sale of Goods – “Sale of Goods Act, 1930”** **(9)**
 - 2.1. Contract of Sale of Goods: - i) Its essentials & types of Goods ii) Distinction between ‘Sale & Agreement to Sale’ Condition & Warranties: - i) Difference between Condition & Warranty ii) Express & Implied conditions & warranties iii) Doctrine of Caveat Emptor
 - 2.2. Transfer of Property: - i) Rules regarding Transfer of Property ii) Transfer of Title & Transfer of Title by Non-owners Performance of Contract of Sale: - Delivery, modes, rules etc.
 - 2.3. Unpaid seller & his rights
 - 2.4. Buyer’s right against Seller
 - 2.5. Concept of Auction Sale
- 3. Limited Liability Partnership Act 2008** **(7)**
 - 3.1. Meaning & Silent Features of LLP
 - 3.2. Incorporation of LLP
 - 3.3. Extent & Limitations of Liability
 - 3.4. Benefit or Advantages of LLP
 - 3.5. Difference between LLP & Partnership Firm
 - 3.6. Prima facie steps of conversion to LLP
 - 3.6.1. Partnership firm to LLP
 - 3.6.2. Private Limited Company to LLP
 - 3.7. Winding up & Dissolution
 - 3.7.1. Ways of winding up
 - 3.7.2. Circumstances in which LLP may be wound up by Tribunal
- 4. Law of Negotiable Instruments – “Negotiable Instrument Act, 1881”** **(4)**
 - 4.1. Introduction, Definition & Characteristics
 - 4.2. Parties to Negotiable Instruments
 - 4.3. Specimen & its Essentials - Promissory Note & Bill of Exchange

- 4.4. Cheque - Bearer & Crossed, Types of Crossing
- 4.5. Holder & Holder in due course
- 4.6. Rights/Privileges of Holder in Due course

5. Intellectual Property Law – Patent, Copyright & Trade mark (12)

- 5.1. **“The Patents Act, 2002”** - i) Application for Patent ii) Grant of Patent iii) Rights of Patentee iv) What inventions are not patentable? v) Revocation of Patents
- 5.2. **“Copyright Act, 1957** - i) Introduction ii) Duration of Copyright protection iii) Registration of Copyright iv) Infringement of Copyright – Exceptions
- 5.3. **“The Trade Marks Act, 1999”** - i) Introduction ii) Classification of Goods & Services iii) Procedure for registration of Trade Marks iv) Grounds for refusal of registration

6. 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

Specialization – A – Financial Management

North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

304 A -Banking & Investment Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40= Maximum Total Marks: 100

Required Lectures: 48 hours

Objectives:

- To study various operational areas of the bank management.
- To enable students to understand and analyze various investment alternatives

1. Bank Management

(08)

- 1.1 Objectives, Evolution, Scope & functional areas of bank management
- 1.2 Functional areas: Deposit Mobilization, Credit planning & Management, Asset Management, Liability Management, Liquidity Management, Investment Management, Management of legal department, Office Management
- 1.3 Terms in banking- RTGS, NEFT, Franking Services

2. Credit planning & Management

(10)

- 2.1 Objective & Scope
- 2.2 CRR, SLR, Bank Rate, Repo Rate, Reverse Repo Rate
- 2.3 Credit Culture
 - 2.3.1 Financial Analysis, Credit rating, Project Appraisal
 - 2.3.2 Consortium lending, loan Syndication
- 2.4 Priority Sector lending as per the RBI directives
- 2.5 NPA management-
 - 2.5.1 Meaning, Impact, Process
 - 2.5.2 Recovery mechanism and management
 - 2.5.3 Provisioning required as per RBI directives

3. Co-operative Banking

(04)

- 3.1 Meaning, Nature and Types
- 3.2 Governance & reforms in co-operative banking
- 3.3 State Co-op agriculture & Rural Development banks

4. Investment Avenues

(08)

- 4.1 Concept, Objectives, Characteristics, Attributes, Factors favorable for Investment
- 4.2 Investment Avenues
 - 4.2.1 Non Marketable fixed Income avenues- Bank Deposit, Corporate Fixed Deposit, Provident Fund including PPF, National Saving Certificate
 - 4.2.2 Marketable Avenues- Shares, Debentures, Bonds, Private Equity & Venture Capital
 - 4.2.3 Other Avenues: Units of Mutual fund, Life Insurance, Real Estate, Money Market Instruments.

5. Security Analysis

(09)

- 5.1 Concept of Security & Security analysis
- 5.2 Fundamental Analysis : Economic Analysis, Industry Analysis, Company Analysis
- 5.3 Technical Analysis: Technical Assumptions
- 5.4 Technical Vs Fundamental analysis
- 5.5 Efficient Market Theory

6 Portfolio Analysis & Management

(09)

- 6.1 Meaning, Elements & Measurement of Risk, Systematic Risk & Unsystematic risk

- 6.2 Optimal Portfolio, Selecting the Best portfolio, Markowitz Model of Portfolio Selection
- 6.3 Portfolio revision: Meaning, Need, Strategies & Constraints
- 6.4 Performance Evaluation of Portfolios – (Theory only)
- 6.5 Portfolio Management: Meaning, Phases, Strategies, Asset Allocation, Building Investment Portfolio

REFERENCE BOOKS

1. Introduction to Banking: Vijayaragavan Iyengar – Excel Books
2. Merchant Banking & Financial Services – Dr. K Ravichandran - Himalaya
3. Investment Management by V. A. Avdhani , Himalaya Publishing House
4. Fundamentals of Investment Management - Geoffrey Hirt, Stanley Block –Tata Mcgrew Hill
5. Investment Analysis & Portfolio Management by Ranganathan - Pearson
6. Investment Management: Security analysis and portfolio Management by V. K. Bhalla - S. Chand
7. Investments – Bodie, Kane, Marcus, Mohanty – Tata McGraw Hill
8. Security analysis and portfolio Management by V.A.Avadhani - Himalaya
9. Security analysis and portfolio Management by Rohini Sing – Excel Books



North Maharashtra University, Jalgaon

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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: 48 hours

Objectives:

- To understand various provisions of Direct and Indirect Tax Laws and the compliance Procedures.
- To study the compliance procedures under Direct and Indirect Tax Laws .

1. Income Tax : (34)

- 1.1. Basic concepts: agricultural Income, Assessee, Assessment Year, Income, Person , Gross Total Income, Previous year, Capital and Revenue Receipts, , Capital and Revenue Expenditure, Exempted Incomes, Residential Status.
- 1.2. Heads of Income:
 - 1.2.1. Salary: Allowances, Perquisites, Deductions, Practical Problems
 - 1.2.2. Income from House Property: let out property, self-occupied properties, deductions, Practical problems
 - 1.2.3. Income From Business or Profession: Depreciation and other permissible Deductions, Disallowable Expenses, Provisions regarding Tax Audit, Practical Problems
 - 1.2.4. Capital gains: Capital assets, transfer, cost of acquisition, cost of improvement, exemptions, Practical Problems
 - 1.2.5. Income from Other Sources: Incomes, Deductions, grossing up, Practical Problems
- 1.3. Deductions from Gross Total Income: u/s 80C, 80D, 80 E, 80 G, 80GG
- 1.4. Tax Deducted at source , Advance Tax, PAN , TAN , Submission of Returns , e-filing of ITR

2. Central Excise : (6)

- 2.1. 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, valuation of Excisable Goods, Specific Duty Vs. Ad valorem Duty, Maximum Retail sale Price, CENVAT Credit, Registration Procedure

3. Service Tax: (4)

- 3.1. Features, Exemptions and threshold limits, Gross Value of Services, Registration, Payment, Furnishing of Returns, An Overview of Taxable Services

4. VAT: (4)

- 4.1. Definitions: Agriculture, Business, Capital Asset, Dealer, Goods, Place of business, Purchase Price, Sale price, Resale, Turnover of Purchase and Turnover of Sale. Incidence of Tax, Registration, Returns, Audit.

REFERENCE BOOKS

1. Students guide to Income Tax , Vinod Singhaniya & Kapil Singhaniya, Taxmann Publications
2. Income Tax law, Mehrotra, Sahitya Bhawan, Agra
3. Direct Taxes, Girish Ahuja and Ravi Gupta, Bharat Publications
4. Direct Taxes, T N Manoharan, Snowwhite Publications.
5. Direct Taxation, Dr Meena Goyal, Biztantra Publications
6. Indirect Taxes, V S Datey, Taxmann Publications
7. Indirect Taxes : V. K. SAREEN and MAYA SHARMA, Kalyani Publishers.
8. Students' Guide to Indirect Taxes : Yogendra Bangar, Vandana Bangar, and Vineet Sodhani – Aadhya Prakashan Pvt Ltd., Jaipur
9. Systematic Approach to Indirect Taxes – Dr Sanjiv Kumar – Bharat Law House Pvt. Ltd., New Delhi.
10. Service Tax : Law, Practice & Procedure – C. Parthasarathy, Sanjiv Agrawal – Snow White Publications Pvt. Ltd., Mumbai
11. Government of India- Income Tax Manual
12. Income Tax Act and Latest Finance Act.



North Maharashtra University, Jalgaon

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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: 48 hours

Objectives:

- To study the financial resources which can maximize the value of the business.
- To enable students to understand importance of strategies such as Merger, takeover, Joint Venture etc. that enhance the firms competitive strengths.
- To enhance the ability of students as regards the financial decision making in rapidly changing global economic environment.

1. Capital Structure & Leverages (15)

1.1 Capital Structure

1.1.1 Meaning & Features & Determinants

1.1.2 Approaches to Capital Structure

1.2 Indifference Point

1.2.1 Meaning

1.2.2 Problems on Computation of Indifference Point

1.3 Computation of Cost of Capital

1.3.1 Meaning & Significance

1.3.2 Problems on Weighted Average Cost of Capital

1.3.3 Under & Over Capitalization

1.4 Leverages

1.4.1 Meaning & Types

1.4.2 Problems on Computation of Operating, Financial & Combine Leverages

2. Capital Budgeting Techniques: (12)

2.1 Payback period Method

2.2 Rate of return Method

2.3 Net Present Value Method

2.4 Internal rate of Return Method

2.5 Profitability Index

2.6 Replacement Decision

2.7 Lease or Hire- Purchase or Buy Decision

3. Dividend Policy (5)

3.1 Determinants of Dividend

3.2 Problems on Dividend Theories: Walter approach, Gordon Growth Model

4. Strategic Financial Management (4)

4.1 Strategic Planning: - Meaning

4.2 Strategic Management: - Meaning & Importance

4.3 Strategic Decision Making Framework

4.4 Interface of Financial Policy & Strategic Management

5. Turnaround Management (8)

5.1 Corporate Sickness

5.1.1 Definition, Causes & Symptoms of sickness

5.1.2 Prediction of Sickness, Revival of Sick Units.

5.2 Types of Turnaround

5.2.1 Basic Approaches

5.2.2 Phases in Turnaround Management.

5.3 Mergers and Takeover :

5.3.1 Mergers & Acquisitions: Kinds, Motives, Reasons

5.3.2 Major Causes of Mergers & Acquisitions failures

5.3.3 Post-Merger Integration Issue

5.4 Takeovers

5.4.1 Meaning

5.4.2 Kinds of Takeovers

5.4.3 Stages of Hostile Takeover

5.4.4 Defensive Measures

6. Corporate Restructuring

(6)

6.1 Meaning, Need, Areas, Implication

6.2 Steps in Financial Restructuring

6.3 Joint Ventures & Strategic Alliance

6.4 Leveraged Buyout

REFERENCE BOOKS

1. Strategic financial Management , Ravi M. Kishore, Taxman Publication
2. Strategic Financial Management By Saravanan – Oxford Uni. Press
3. Strategic financial Management, A. N. Sridhar , Shroff Publishers & Distributors Pvt. Ltd
4. Strategic Management' Sharplin McGraw Hill
5. Strategic financial Management , J B Gupta, Taxman Publication
6. Financial Management- I. M. Pandey – Vikas Publication
7. Financial Management by Berk – Pearson Publication
8. Financial Management – Prasanna Chandra



North Maharashtra University, Jalgaon
(NACC Accredited 'B' Grade University)
FACULTY OF COMMERCE & MANAGEMENT
New Syllabus: M.B.A.
SEMESTER: III

307A Practical Aspects of Business

60 + 40 Pattern: External Marks 60 (Theory) + Internal Marks 40 (Practical) = Maximum Total Marks: 100
Required Lectures: 48 hours (Theory 28 hours, Practical: 20 hours)

Objectives of the course:-

- To enable students to learn how to record accounting operations in Tally Software.
- To establish a connection between theories, concepts & principles of Accounts & Finance with practical business operations.
- To understand the importance of Advanced Excel in business operations in order to perform complex business calculations and preparation of Financial Reports

TALLY

1. Basics of Tally (6)

- 1.1 Distinction between Computerized Accounting & Manual Accounting
- 1.2 Introduction to Tally
- 1.3 Versions & Features of Tally
- 1.4 Creation of Company Process - (by taking hypothetical information for the Co. to be created)
- 1.5 Alteration of Company Process - (by taking hypothetical information which is to be altered)
- 1.6 Deletion of Company - Create a company Temporary Friends Pvt. Ltd. By using hypothetical information and then write process to delete

2. Groups & Vouchers, Stock item in Tally (14)

- 2.1 Introduction to Gate way of Tally
- 2.2 Process of Creation of Groups in Tally
- 2.3 Process of Creation of Ledgers in Tally
- 2.4 Process of Creation of Vouchers in Tally
Purchase, Sales, Contra Voucher, Receipt, Payment vouchers.
- 2.5 Process of showing Financial Statements in Tally- Trial Balance, P & L A/c, Balance Sheet
- 2.6 Procedure to create of Stock items & stock groups in Tally
- 2.7 VAT Features, Computation of VAT in Tally

Advanced Excel

3. Introduction to Excel & Financial Functions (6)

- 3.1 Introduction to Excel
- 3.2 Data Entry- Text, Number, Formulae, Functions (AVERAGE, SUM, PRODUCT, COUNT, MIN, MAX)

3.3 Importance of Financial Functions

3.4 Syntax & benefits of following Financial Functions in Excel -

FV, PV, PMT, PPMT, DB, SLN, IRR, NPV

4. Pivot Table, Charts & Bars, V look up & H Lookups Functions (4)

4.1 Importance of Pivot Table

4.2 Importance of Bars /Pie- Charts

4.3 Importance of V lookup & H Lookup Functions in Excel

Audit

5. Basics of Audit (12)

5.1 Meaning & Significance of Audit

5.2 Difference between Accounting and Auditing, Difference between Auditing and Investigation

5.3 Internal Control, Audit Evidence, Audit Report

5.4 AAS-1 Basic Principles Governing an Audit

5.5 Types of Audit- Statutory Audit, Internal Audit, Balance Sheet Audit, Tax Audit, VAT Audit

5.6 Limitations of auditing

6. Auditing in Computerized Information System (CIS) Environment: (8)

6.1 Meaning of CIS

6.2 Approaches to Computer Auditing- Black Box & White Box

6.3 Characteristics of CIS Environment

6.4 Computer Frauds

Practicals

TALLY

Assignment : 1

Creation, Deletion and alteration of company

A. Create a Company **MBA Friends Pvt. Ltd.** With following details

Enter the hypothetical details e.g. Address, State, PAN No. etc.

Select Accounts with Inventory option, Use 1-4-20XX(Current Financial Year) as the date of commencement of business.

B. Alteration of Company details :-

Alter the Following Details MBA Friends Pvt. Ltd.

Address & contact no. and save the alterations. .(Show Pop-up Menu before Saving changes).

C. Deletion of the Company:-

Create a Company **MBA Temporary Friends Pvt. Ltd.** With following details

Enter the hypothetical details e.g. Address, State, PAN No. etc.

Now, delete the company. (Show Pop-up Menu before deletion)

Select Accounts with Inventory **OR** only Accounts option, Use current financial year as the year of commencement and then **delete the Company**

{**Note :-** In this practical students are required to take print out before saving the information of Creation , Alteration and Deletion of companies }

Assignment: 2.

Creation of Ledger Accounts, assigning the proper groups and opening Balances of those accounts as on 31 March,2015 in the books MBA Friends Pvt. Ltd. as per the following the information

Sr. No.	Date	Ledger Names (To Be Created)	Groups (To Be Assigned)	Opening Balances (Rs.)
1	1-Apr-201X	Cash A/c	(Already Existing Group.)	5,00,000
2	1-Apr-201X	Mr. X A/c	Sundry Debtors	50,000
3	1-Apr-201X	Mr. Y A/c	Sundry Creditors	20,000
4	1-Apr-201X	Mr. Y A/c	Sundry Creditors	30,000
5	1-Apr-201X	Share Capital Account	Capital A/c	10,00,000
6	1-Apr-201X	SBI Bank A/c	Bank Account	5,20,000
7	1-Apr-201X	Plant & Machinery A/c	Fixed Assets	20,00,000
8	1-Apr-201X	Land & Building A/c	Fixed Assets	30,00,000
9	1-Apr-201X	Furniture & Fixture A/c	Fixed Assets	5,00,000
10	1-Apr-201X	Bank of Maharashtra Loan A/c	Loans & Advances	1,00,000

(**Note :** Students are required to take the current financial year for accounting entries)

Assignment: 3 –

Journalize the following (by Using Proper Vouchers in Tally) in the books of **MBA Friends Pvt. Ltd.** along with their appropriate narrations:-

- Paid Rs.30,000 as Salary for the month of April on 1st May,20XX
- Paid Telephone bill Rs.2,000 through SBI Bank Cheque No. 543210 on 5th May,20XX
- Received a cheque Rs. 20,000 from Mr. X (Cheque No.700001) which is deposited in SBI Bank A/c (No.SBIIND123456789) on 8th May,20XX
- Purchased Machinery of Rs.50,000 through SBI BANK Cheque No 123456 on 1st June, 20XX
- Purchased goods of Rs.1,70,000 from Mr. Y for Cash on 1st Aug,20XX
Create 3 hypothetical stock items; specify rates per unit and total amount.
- Sold Goods of Rs.2,00,000 for cash to Mr. X on 10th June,20XX
Take any one stock item from entry (e) above for sale, Specify hypothetical prices.

Note:- In above transactions students need to create Purchase & Sales A/c i.e. Ledgers , other Ledgers are already created in Assignment No. 2.

Assignment: 4

Considering the transactions in Assignment no.1,2,3 above, Show Trial Balance , Trading Accounts & Profit & Loss Accounts and Balance sheet as on 31st March,20XX for MBA Friends Pvt. Ltd.

Split Company Data

Split company data in Tally up to 31st Jan, 20XX and now Make Zip File of the Data up to 30th Jan, 2015 and email it to your tax consultant Mr. Ganesh Maurya on his email Id : ganesh@maurya.com

And

Export of Data in Excel

Export data from Tally containing the Trial Balance, Trading Accounts And Profit & Loss Accounts and Balance sheet as on 31st March, 20XX in Excel Format.

ADVANCED EXCEL

Assignment No: 5

Loan Amortization Schedule

Use PMT function & calculate the monthly payment on a loan with an annual interest rate of 5%, 2-year duration and a present value (amount borrowed) of 20,000.

Name the input cells as:-

Payment Number	Payment	Principal	Interest	Balance
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2. Use the PPMT function to calculate the principal part of the payment.
3. Use the IPMT function to calculate the interest part of the payment.
4. Update the balance.
5. It takes 24 months to pay off this loan.

Show how the principal part increases and the interest part decreases with each payment.

Assignment No: 6

Calculation of Depreciation as per accounting principles & as per Income Tax Act,1961

A) As per Accounting Principles

Consider an asset with an initial cost of Rs. 10,000, a salvage value (residual value) of Rs.1000 and a useful life of 10 periods (years).

You are required to calculate -

- i) Depreciation using Straight Line Method using above information
- ii) Depreciation using Written Down Value Method rate @ 10 % p.a.
- iii) Also write interpretation.

B) As per Income Tax Act,1961

The following table shows the opening WDV, Addition and sale of Fixed Assets during a particular Financial Year along with rate of Depreciation .You are required to calculate the Total amount of Depreciation as per the Income Tax Act, 1961 ?

Sr.No.	PARTICULARS	W.D.V. AS ON 01.04.20XX	ADDITION DURING THE YEAR BEFORE 30.09.XX	AFTER 30.09.XX	SALE DURING THE YEAR	RATE OF DEPR %
1	Furniture & Fitting	3,00,000	1,00,000	-	50,000	10
2	Buliding	10,00,000	3,00,000		-	10
3	Motor Car	4,00,000	-	-	1,00,000	15
4	Plant & Machinery	20,00,000	-	4,00,000	-	15
	Total Rs.	37,00,000	4,00,000	4,00,000	-	-

Note : -Rate of Depreciation as per Income Tax Rules Depreciation is Charged on block of Assets .

The asset purchased during the year before 30 Sept (put to use for more than 180 days is charged with full rate of depreciation whereas for the asset purchased during the year after 30 Sept (put to use for less than 180 days) is charged with half rate of depreciation.]

Refer Income Tax Act,1961 for more details.

Assignment No: 7 Compound Interest Calculation

- 1) Assume you put Rs.100 into a bank. How much will your investment be worth after one year at an annual interest rate of 8%?
- 2) Now this interest will also earn interest (compound interest) next year. How much will your investment be worth after two years at an annual interest rate of 8%?
- 3) How much will your investment be worth after 5 years?
- 4) Assume you put Rs. 10,000 into a bank. How much will your investment be worth after 10 years at an annual interest rate of 5% compounded monthly?
- 5) Assume you put Rs. 10,000 into a bank. How much will your investment be worth after 15 years at an annual interest rate of 4% compounded quarterly?

Assignment: 8 Creation of Income Tax Calculator

Prepare a Income Tax Calculator in Excel to calculate Income Tax on the Net Taxable Income of Following 6 Assesseees .

Sr.No.	Name of Assessee	Net Taxable Income (Rs.)
1	Mr. Ganesh	4,25,000
2	Mr. Jayesh	3,10,000
3	Mr.Suresh	7,25,000
4	Mr.Nilesh	6,80,000
5	Mr.Shailesh	11,00,000
6	Mr.Ramesh	15,10,000

Students are required to show in their Print outs.

- i) The Applicable Slab and Tax Rates and coding required to calculate the Income Tax (Exclude Education Cess in Calculation)
- ii) Final Table Showing Income Tax Calculated for above 6 Assesseees.

(Note : Student should take Income Tax Slab Rates as per the applicable Assessment Year for the particular Financial year in which they are pursuing this practical)

Assignment: 9 Creation of Pie Chart & Bar Chart (2 Dimension or 3 Dimensional) & Interpretation.

Create Pie Chart & Bar Graphs from the following Particulars for -

i) Sales & Net Profit

Sr.No.	Particulars	2011-12	2012-13	2013-14
1	Sales	40,00,000	45,00,000	50,00,000
2	Net Profit	8,00,000	11,25,000	5,00,000

ii) Sales & Sundry Debtors

Sr.No.	Particulars	2011-12	2012-13	2013-14
1	Sales	40,00,000	45,00,000	50,00,000
2	Sundry Debtors	2,00,000	5,00,000	6,00,000

Write Interpretation for above Table (i) & (ii)

Assignment: 10 Ratio Analysis

From the following particulars Calculate following Ratios for Given 3 Years Financial Year -

Particulars	2011-12 Rs.	2012-13 Rs.	2013-14 Rs.	Particulars	2011-12 Rs.	2012-13 Rs.	2013-14 Rs.
Sales	10,00,000	12,00,000	15,00,000	Bills Receivable	50,000	60,000	80,000
Net Profit	1,50,000	2,40,000	3,15,000	Cash in Hand	40,000	60,000	70,000
Capital	5,00,000	10,00,000	11,00,000	Cash at Bank	1,10,000	1,50,000	1,80,000
Land & Building	2,00,000	7,00,000	8,00,000	Prepaid Expenses	30,000	40,000	50,000
Plant & Machinery	3,00,000	4,00,000	5,00,000	Sundry Creditors	40,000	60,000	70,000
Sundry Debtors	40,000	50,000	70,000	Bills Payable	20,000	15,000	25,000
Stock	60,000	70,000	80,000	Provision for Taxation	10,000	20,000	40,000

Calculate:

1. Net Profit Ratio
2. Current Ratio
3. Liquid Ratio
4. Debtor Turnover Ratio
5. Fixed Assets Turnover Ratio

Also write interpretation for above Ratios by comparing 3 years Ratios.

References :-

Websites :

1. <http://www.tallysolutions.com/>
2. <http://tallyerp9book.com/>

Books :-

1. Tally.ERP 9: Basic Accounts, Invoice, Inventory by Asok K. Nadhani (Author)
2. Tally ERP 9 (English) Paperback – 2014 by Mr. Tarang (Author)
3. Excel With Excel (English) Author: **Rajesh Seshadri**
4. Excel 2010 in Simple Steps Paperback –by **Kogent Learning Solutions Inc.**
5. Auditing – **N. D. Kapoor**
6. Auditing- **G. Shekhar**

Specialization –B – Marketing Management



North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

304 B: Product and Brand Management

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objectives

1. To equip the students with the various dimensions of Product and Brand management
2. To develop familiarity and competence with the strategies and tactics involved in building, leveraging and defending strong Products and Brands

1. Introduction (6)

- 1.1. Need for Product Management, Product Line Decision, Product Mix Decision
- 1.2. Product Manager- Functions and Skills Required
- 1.3. Marketing Strategies in different Phases of PLC, PLC Extension, Diffusion Model
- 1.4. Issues of Product Management in India
- 1.5. Marketing Planning- Concept, The Planning Process, Components of Marketing Plan, Two case Studies based on Marketing Plan

2. Competitive Strategy for Products (12)

- 2.1. Nature, Stages of competition, Forces Driving / Shaping competition, Forms of Competition
- 2.2. Category Attractive Analysis- Concept, Aggregate Market Factors, Category Factors and Environmental Analysis
- 2.3. Competitors Analysis- Nature, Sources of Information, Assessing competitor's- Objectives & Marketing Strategies, Differential advantage Analysis
- 2.4. Customer Analysis
- 2.5. Market Potential and Sales Forecasting- Methods

3. Developing Product Strategy (6)

- 3.1. Elements of Product Strategies
- 3.2. Positioning and Differentiation Strategies
- 3.3. Product Strategy over PLC
- 3.4. New Product Development- Factors contributing to New Product Development, Factors responsible for failing New Product, Managing New Product Development and Product Innovation- Setting Innovation Objectives, Methods and Steps

4. Concept of Brand (6)

- 4.1. Definition, Nature, Brand and Product, Brand challenges and Opportunities
- 4.2. Types of Brands, Brand Perspectives
- 4.3. Brand Evolution-Consumerism Continuum, Brand Levels, Value Hierarchy
- 4.4. Brand and Product Position, 3 Cs of Positioning and Competitive Positioning-POPs and PODs
- 4.5. Identifying and Establishing Brand Positioning
- 4.6. Strategic Brand Management Process

5. Brand Equity (12)

- 5.1. Concept, Customer Based Brand Equity
- 5.2. Criteria for choosing Brand Element, Options and Tactics for Brand Elements
- 5.3. Marketing Communication to Build Brand (Criteria for Integrating Marketing communication-IMC)
- 5.4. Leveraging Secondary Brand Associations to Build Brand Equity
 - 5.4.1. Conceptualising the leveraging Process

- 5.4.2.Co-Branding, Licensing, Celebrity Endorsement,
- 5.5. Measuring Brand Performance
 - 5.5.1.Qualitative Techniques- Free Association, Projective Technique, Brand personality
 - 5.5.2.Quantitative Techniques-Brand Awareness, Brand identity, Brand Image, Brand Responses, Brand Relationships, Brand Attitude , Brand Loyalty , Brand Switching
- 5.6. Measuring outcomes of Equity: Models of Brand Equity Aaker Model, Brandz Model, Brand Equity Measurement System, Brand Valuation
- 6. Brand Extensions and Managing Brand (6)**
 - 6.1. Types, Advantage and Disadvantage, New Product and Brand Extensions
 - 6.2. Managing Brand Over a Time-Reinforcing Brand, Revitalising Brand and adjustment to Brand Portfolio
 - 6.3. Global Branding-Advantages and Disadvantages

REFERENCE BOOKS

1. Product Management- Lehmann Donald R ; Winer Russell S, Tata McGraw Hill
2. Brand Management: Text and Cases- Harsh V. Verma- Excel Books
3. Strategic Brand Management: Building, Measuring, and Managing Brand Equity-Kevin Lane Keller, M. G. Parameswaran, Isaac Jacob-Pearson
4. Product Policy and Brand Management-A.K. Chitale and Ravi Gupta, PHI Learning
5. Product Management Text and Cases- Kaushik, Mukerjee-PHI Learning
6. Product and Brand Management-U.C. Mathur, Excel Books
7. Marketing Management- Rajan Saxena (4th Edition), McGraw Hill
8. Marketing Concept and Cases- Michael J. Etzel, Bruce J. Walker, William J. Stanton and Ajay Pandit, Tata McGraw Hill
9. Principles of Marketing- Philip Kotler- PHI Learning
10. Brand Positioning Strategies for Competitive Advantage-Sengupta- Tata McGraw Hill



North Maharashtra University, Jalgaon

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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

Paper: 305 B – Consumer Behavior and Service Marketing

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objective:

- To highlight the importance of learning about consumer behavior
- To develop understanding of the need to market services differently from general marketing
- To help students in learning different approaches required for effective marketing of services.

- 1. KNOWLEDGE OF BUYERS (6)**
 - 1.1. Buyer behavior & Consumer decision making process
 - 1.2. Factors influencing buying behavior & Post purchase behavior
 - 1.3. Consumer Reference Groups
 - 1.4. The family Life Cycle
 - 1.5. Social Class and Consumer Behaviour
 - 1.6. Organizational Buying Vs Consumer Buying
- 2. INTRODUCTION TO SERVICES (8)**
 - 2.1. Understanding services phenomena
 - 2.2. Characteristics of services
 - 2.3. Differentiating services from goods
 - 2.4. Role of services in economy
 - 2.5. The service triangle management model
 - 2.6. SERVQUAL
 - 2.7. GAP model of customer satisfaction
- 3. SERVICES MARKETING MIX (7PS) (10)**
 - 3.1. Marketing mix in services and traditional 4PS
 - 3.2. Product
 - 3.3. Price
 - 3.4. Promotion
 - 3.5. Place or distribution
 - 3.6. People
 - 3.7. Physical evidence
 - 3.8. Process management
- 4. CROSS CULTURAL CONSUMER BEHAVIOR: AN INTERNATIONAL PERSPECTIVE (8)**
 - 4.1. Diffusion and adoption of innovations
 - 4.2. Cross-cultural consumer analysis
 - 4.3. Cross cultural psychographic segmentation
 - 4.4. Developing multinational marketing strategies
 - 4.5. Cultural aspects of emerging international market
- 5. INTEGRATED SERVICE STRATEGY (8)**
 - 5.1. Growth strategies for service businesses
 - 5.2. Customer satisfaction measures
 - 5.3. Service profit chain
 - 5.4. Strategy for market leader, challengers, niche market and followers
 - 5.5. Service performance metrics
- 6. CUSTOMER RELATIONSHIP MANAGEMENT (CRM) (8)**

- 6.1. Concept of CRM and CRM issues
- 6.2. Customer value
- 6.3. Standardization verses customization
- 6.4. CRM Objectives
- 6.5. CRM: Global Perspective
- 6.6. The scenario of CRM in Indian companies

REFERENCE BOOKS

1. Consumer Behavior, Schiffman G.L and Kanuk L.L, Prentice- Hall
2. Services marketing : ravi Shankar, Excel Book
3. Services marketing C Bhattacharjee, Excel Book
4. Services marketing Govind Apte, Oxford
5. Services marketing: Rajendra Nargundkar, Tata Mc Graw Hill
6. Marketing Management: A south Asian perspective; Philip Kotler, Kevin Lane Keller, Abraham Koshy Mithileshwar Jha, 14 ed, Pearson
7. Marketing Management, Rajan Saxena, Tata McGraw Hill
8. Marketing; Grewal, levy, Tata McGraw Hill
9. Services Marketing, Lovelock, Wirtz, Chatterjee; Pearson



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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

Paper: 306 B– Sales & Distribution

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objective:

- To impart knowledge about the selling function and highlight the managerial issues involved in sales management.
- To bring out the changes in distribution function and understand current practices

1. Introduction to sales management (10)

- 1.1. Nature and Scope of Sales Management
- 1.2. Objectives of Sales management
- 1.3. Functions of Sales management
- 1.4. Prospecting for customers
- 1.5. Modes of sales presentation
- 1.6. Designing and delivering of sales presentation
- 1.7. Recruiting and selecting Sales Personnel
- 1.8. Methods and administering selection procedures

2. Sales force involvement, evaluation and training (10)

- 2.1. Developing Sales Training Programs,
- 2.2. Executing and Evaluating sales training programs
- 2.3. Motivating Sales Personnel
- 2.4. Compensating sales personnel
- 2.5. Designing and Administering various Compensation Plans
- 2.6. Controlling Sales personnel
- 2.7. Managing sales evaluation programs
- 2.8. Comparing standards with actual performances of sales personnel;

3. Sales force management (8)

- 3.1. Objective and Types of Quotas
- 3.2. Quota setting procedure
- 3.3. Administering the quota system
- 3.4. Designing Sales Territories
- 3.5. Allocating Sales efforts to sales territories

4. Marketing channels, structure and distribution (6)

- 4.1. Functions and Relationships of channels of Distribution
- 4.2. Channel Dynamics
- 4.3. Channel Planning and organizational Patterns in Marketing Channels
- 4.4. Channel Design Process
- 4.5. Channel Management Decisions

5. Channel intermediaries (8)

- 5.1. Channel Intermediaries- Role and Types
- 5.2. Wholesaling- Types of Wholesalers
- 5.3. Wholesaler marketing decisions
- 5.4. Retailing- Types of retailers
- 5.5. retailer marketing decisions

6. Market logistics

(6)

- 6.1. Logistics Objectives,
- 6.2. Market logistics decisions for Distribution Channels
- 6.3. Role of Information System in Distribution Channel Management
- 6.4. Assessing Performance of Marketing Channels.

REFERENCE BOOKS

1. Tanner, J; HoneycuttED; Erffmeyer Robert C.; Sales management: Pearson Education, 2009
2. R.S.N. Pillai :Marketing management, S. Chand
3. Still, R R. & Cundiff; Sales Management, Englewood Cliff, New Jersey, Printice Hall Inc.,
4. Anderson, R. Professional Sales Management. Englewood Cliff, New Jersey, Prentice Hall Inc., 1992.
5. Buskirk, R H and Stanton, W J. Management of Sales Force. Homewood Illonois, Richard D Irwin, 1983.
6. Dalrymple, D J. Sales Management: Concepts and cases. New York, John Wiley, 1989.
7. Johnson, E M etc. Sales Management: Concepts Practices and cases. New York, McGraw Hill, 1986.
8. Stanton, William J etc. Management of Sales Force. Chicago, Irwin,1988.



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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

Paper: 307 B: Global Marketing Management

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objectives

- to apply Global marketing theories, frameworks and concepts to managerial decision contexts

1. Introduction to International Marketing (8)

- 1.1. International Market: Meaning, Expansion, Growing Attractiveness
- 1.2. International Marketing: Meaning, Need, Significance, Participants, Motives, Problems, Complexities
- 1.3. International Orientation & Stages
- 1.4. Scope of Marketing Indian Products Abroad
- 1.5. International market orientation- EPRG frame work;
- 1.6. International Marketing Environment:
 - 1.6.1. Internal, External, Domestic, Economic, Social, Cultural, Demographic, Technological, Political and Legal
 - 1.6.2. International Trading Environment
 - 1.6.3. Trading Blocs
- 1.7. International Market Entry Strategies & Modes

2. International Product Strategy: (8)

- 2.1. Levels & Hierarchy of product, Product-line analysis, Product design Strategy
- 2.2. Product Life Cycle Management,
- 2.3. New Product Development, Product Positioning & Product Adoption , Repositioning Strategies
- 2.4. Product planning Matrix, Dimensions of Product Strategies
- 2.5. Product planning for global markets;
- 2.6. Standardization v/s Product adaptation;
- 2.7. Management of international brands: Brand Drivers
- 2.8. Packaging and labelling

3. International Pricing (8)

- 3.1. Role of Pricing, Objectives, Factors affecting Pricing, Pricing decisions
- 3.2. Pricing Methods, Pricing Strategies, Cost based pricing, Transfer pricing, Dumping , Export price structure, Skimming Pricing, Penetration Pricing, Price discounts, Discriminating Pricing
- 3.3. Price-Market relationship, Price Escalation: cost of exporting, Taxes, tariffs & Administrative costs, Exchange rate
- 3.4. Price control: Approaches to lessening price escalation, Leasing in international markets
- 3.5. Currencies and foreign Exchange- Money, Foreign Exchange Market, Foreign exchange rate and its system, Evaluation of floating rates

4. International Promotions (8)

- 4.1. Promotion Decisions: Complexities and issues; International advertising
- 4.2. Marketing Environment & Promotional Strategies
- 4.3. Role of Export Promotion Organizations, Trade fairs and Exhibitions
- 4.4. International Marketing Communication: Major Decisions, Communication Mix, Problems in International Marketing Communication
- 4.5. International Personal selling, Sales promotion and public relations.

5. International Distribution

(8)

- 5.1. Distribution Channels: Policy, issues, Functions & types of channels;
- 5.2. International Channel conflict & Channel Decision
- 5.3. Functional Excellence in Distribution Planning
- 5.4. International logistics decisions & Management, Developing logistic Strategy

6. Export Management

(8)

- 6.1. Managing Export Decisions
- 6.2. Export Contract: INCOTERMS
- 6.3. Export procedure & Documentation, Certificate of Origin, Modes of payments- LOC, Forfeiting agents, Cross Border Factoring, Bankers Acceptance (BA), Counter Trade
- 6.4. EXIM policy of India

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2. International Marketing: Text & Cases – Francis Cherunilam – Himalaya
3. International Marketing – Cateora, Graham, Salwan – Tata McGraw Hill
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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. International Financial Management- V.K. Bhalla, Anmol Publications
12. International Financial Management- P.G. Apte, Tata McGrawhill

Specialization - C - Human Resource Management



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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

304 C - Industrial Relations & Labour Welfare

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objectives:

- To Study various Industrial Relations practices in the organisation
- To understand Grievance handling & collective bargaining.
- To study various aspects of labour welfare.

1. Introduction to Industrial Relations (10)

1.1. Industrial Relations –

- 1.1.1. Concept, Scope & Objectives of IR, Approaches to IR
- 1.1.2. Conditions for Congenial IR & Functional Requirement for Sound IR Policy

1.2. Employee Discipline –

- 1.2.1. Concept, Objectives, Need,
- 1.2.2. Red Hot Stove Rule,
- 1.2.3. Principles & Approaches to Discipline

1.3. Trade Unionism-

- 1.3.1. Types, role & importance
- 1.3.2. Growth & Need of & Managerial Trade Unions

2. Industrial Disputes- (12)

2.1. Industrial Disputes

- 2.1.1. Concept, Definition,
- 2.1.2. Causes & Consequences of Industrial Disputes,
- 2.1.3. Types of Industrial Disputes - Strikes & Lockouts,
- 2.1.4. Prevention of Industrial Disputes-

2.2. Industrial Dispute Settlement Machinery-

2.2.1. Mediation –

- 2.2.1.1. Meaning, Importance,
- 2.2.1.2. Types and Essentials of Mediation

2.2.2. Conciliation-

- 2.2.2.1. Meaning, Steps for Conciliation Procedure,
- 2.2.2.2. Role and Qualities of Conciliator,
- 2.2.2.3. Essentials for Effective Conciliation

2.2.3. Arbitration –

- 2.2.3.1. Concept, Advantages, Disadvantages,
- 2.2.3.2. Essentials of arbitration

2.2.4. Adjudication –

- 2.2.4.1. Concept, Meaning,
- 2.2.4.2. Three Tier System of Adjudication – Labor Courts, Industrial Tribunal & National Tribunal

3. Grievance Procedure & Collective Bargaining (08)

3.1. Grievance Procedure-

- 3.1.1. Meaning, Nature & Causes,

- 3.1.2. Steps in Grievance Procedure
- 3.2. **Collective Bargaining –**
 - 3.2.1. Concept, Objectives, Importance & Need,
 - 3.2.2. Process of Collective Bargaining,
 - 3.2.3. Bargaining Strategies
 - 3.2.4. Collective Bargaining in India & Qualities of Good Negotiator,
- 4. **Introduction to labour welfare** (06)
 - 4.1. Meaning, Importance & Objectives of Labour Welfare.
 - 4.2. Types of Labour Welfare Services,
 - 4.3. Need and Scope of Labour Welfare in India,
 - 4.4. Labour Welfare Officer- Concept, Qualities and Role
- 5. **Workers' Participation in Management (WPM) & Employee Empowerment-** (08)
 - 5.1. **Workers' Participation in Management (WPM) –**
 - 5.1.1. Definition, Meaning and Objectives,
 - 5.1.2. Causes of Failure and Forms of WPM,
 - 5.1.3. Essentials for Effective WPM
 - 5.2. **Employee Empowerment—**
 - 5.2.1. Concept, Importance and Need of Employee Empowerment,
 - 5.2.2. Characteristics of Empowered Organization,
 - 5.2.3. Empowerment Process
 - 5.3. **Quality Circles-**
 - 5.3.1. Concept, Objectives and Benefits of Quality Circles,
 - 5.3.2. Organization Structure of Quality Circles
- 6. **India & International Labour Organization** (04)
 - 6.1. Objectives, Structure of ILO
 - 6.2. Impact of ILO on India Labour
 - 6.3. Recommendations of ILO

REFERENCE BOOKS:

1. Industrial Relations Trade Union & Labour Legislations by PRN Sinha & Shekher – Pearson
2. Dynamics of Industrial Relations by C. B. Mamoria; Himalaya Publishing House
3. Essentials of HRM & IR by P Subba Rao – Himalaya
4. Industrial Relations by Arun Monappa – Tata McGraw Hill
5. Labour Welfare Trade Union & Industrial Relations by Punekar, Deodhar & Sankaran - Himalaya Publications
6. Human Resource Management by K. Ashwathappa – Tata McGraw Hill
7. Industrial Relations in India 2/e – Sen - Macmillan
8. Human Resource Management by S. S. Khanka; S. Chand & Co. Ltd. New Delhi.
9. Industrial Relations of Developing Economy by Bishwanath Ghosh- Himalaya



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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

305-C: HUMAN CAPITAL MANAGEMENT AND DEVELOPMENT

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objectives:

- To understand the concept of Human Capital Management
- To study various testing concepts in selection process

- 1. Human Capital Management (HCM)- (08)**
 - 1.1. Concept of Human Capital & Its Origin
 - 1.2. Definition, Aims, Rationale of HCM
 - 1.3. HCM Vs HRM
 - 1.4. Role of HR in HCM
 - 1.5. Human Capital Advantage & Resource based Strategy
 - 1.6. Applications of HCM- HCM & Talent Management, HCM & Strategic HRM, HCM & Knowledge Management
- 2. Human Resource Development (HRD)- (05)**
 - 2.1. Concept, Objectives & Scope of HRD
 - 2.2. Need, Importance of HRD
 - 2.3. HRD Framework
- 3. Basics of Job Analysis- (05)**
 - 3.1. Concept, Importance and Steps
 - 3.2. Collecting Job Analysis Information
 - 3.3. How to write Job Description- Job Identification, Job summary & Relation
 - 3.4. How to write Job Specification for Trained & Untrained Persons, Its Methods
- 4. Employee Testing & Selection- (12)**
 - 4.1. Importance of Careful Selection of Employees
 - 4.2. Testing Concepts-
 - 4.2.1. Reliability and Validity-Way to Validate Test
 - 4.2.2. Types of Tests- Tests of Cognitive Abilities, Tests of Physical Abilities, Personality and Interest Tests, Some other Tests-Honesty (Polygraph) Test, Graphology, Substance Abuse Screening, Test of Intelligence-IQ, Spiritual & Emotional Quotient, , Multiple Intelligences Test
 - 4.3. Interviews-
 - 4.3.1. Concept & Importance of Interviews
 - 4.3.2. Types of Interviews- Structured Vs Unstructured, Exploratory, Directive, Telephonic, Video Conferencing, Stress Interview, Panel Interview, Peer Interview, Group Interview, Behavioral Event Interview (BEI), Situational Interviews
 - 4.3.3. Designing of Effective Process
 - 4.3.4. Best Practices for Effective Interview
 - 4.3.5. Pitfalls of Interview Process
 - 4.3.6. How to measure effectiveness of Selection
- 5. Developing Effectiveness of HR- (12)**
 - 5.1. Potential Appraisal- Concept, objectives and Importance
 - 5.2. Training- Investments in Training, Aspects of Training
 - 5.3. Training Process-
 - 5.3.1. Need Assessment- Organizational Analysis, Task Analysis, Personal Analysis

5.3.2.Designing Training Program- Instructional Objectives, Trainee Readiness & Motivation, Principles of Learning & Teaching, Areas & Principles of Training, Characteristics of Good Instructor

5.3.3.Implementing Training Program- Methods

5.3.4.Evaluating Training Program- Essential Ingredients for Successful Evaluation, Evaluation Techniques- General Observations, HR Factors, Controlled Experimentation, Performance Tests, Cost Value Relationship, Training Metrics, Kirkpatrick Model

5.3.5.Benchmarking of HR Training

6. High potential Employees & Competency Management-

(06)

6.1. High Potential Employees-

6.1.1.-Definition, Concept, Categories & Characteristics

6.1.2.-Identification of High Potential Employees

6.1.3.-Retention of High Potential Employees-Motivators, Retention Measures

6.2. Competency Management-

6.2.1. Concept & Types

6.2.2. Competency Framework- Competency Dictionary, Competency Band Matrix, Job/Role Competency Profile, Competency Assessment Tool

* **Note** - 1. The Practical Aspects of concepts in syllabus should also be discussed with students.

2. The formation of HR Policies for any small organization can be carried out from the students as an assignment work

Reference Books:

1. Human Capital Management-Angela Baron & Michael Armstrong, Kogan Page Publishers, 2007
2. Strategic Human capital Management-John Ingham, Butterworth- Heinemann, 2007
3. Human Resource Management, 2/E Gilmore & Williams- Oxford University Press
4. Human Resource Management-Sharon Pande & Swapnalekha Basak, Pearson
5. Essentials of Human Resource Management & Industrial Relations- P Subbaro, Himalya Publications, 2012
6. Managing Human Resource-Bohlander, Snell, Thomson-South Western, 2004
7. Human Resource Management- Gary Dessler & Biju Varkkey, Pearson Prentice Hall, 2009
8. Human Resource Management by Gary Dessler – Pearson
9. Human Resource Management by Snell Bohlander - Cengage
10. Cross Cultural Management by Madhavan Oxford University Press
11. Human Resource Management by Mondy - Pearson



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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

306-C: Strategic Human Resource Management

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objectives:

- To study the integration of Strategy alongwith Human Resource Management
- To understand Employee engagement.
- To study HR as Strategic Value addition Function
- To study role of IT in Strategic HRM

- 1. Strategic Human Resource Management (10)**
 - 1.1. Meaning, Definition of SHRM
 - 1.2. Strategic HR Vs Traditional HR
 - 1.3. Need & Importance of SHRM
 - 1.4. Steps in SHRM
 - 1.5. HR Strategies
 - 1.5.1. Overall HR Strategy
 - 1.5.2. Specific HR Strategy
 - 1.6. Barriers to Strategic HR
 - 1.7. Outsourcing & Revamping HR
 - 1.8. Role of HR during
 - 1.8.1. Organizational growth
 - 1.8.2. Retrenchment
 - 1.8.3. Organizational Turnaround
- 2. Strategic Job Analysis, Job design & Redesigning of Work System (12)**
 - 2.1. Concept, Process & Method & uses of Job Analysis
 - 2.2. Concept of - Job Description, Job Specification & Job Design
 - 2.3. Modern Management Techniques
 - 2.4. Designing work systems
 - 2.5. Redesigning of work Systems
 - 2.6. Organizational Design Process & Emerging issues in Organizational Design
 - 2.7. Factors affecting Design Process
- 3. Employee Engagement & Goal Setting (08)**
 - 3.1. Employee Engagement**
 - 3.1.1. Meaning & Importance
 - 3.1.2. Factors influencing engagement
 - 3.1.3. Strategies for enhancing engagement
 - 3.2. Goal Setting**
 - 3.2.1. Introduction ,
 - 3.2.2. Requirements of Goal setting procedure
 - 3.2.3. Relationship between Vision, Mission and Goal setting
 - 3.2.4. Approaches to Goal setting
 - 3.2.5. Process of Goal setting
 - 3.2.6. Characteristics of Goal setting (SMART)
- 4. Global Competitiveness & Strategic HR (08)**
 - 4.1. Strategic Procurement: Strategic Recruitment, Strategic Selection

- 4.2. Strategic Challenges
 - 4.2.1. Managing Talent Surplus
 - 4.2.2. Managing Talent Shortage
- 4.3. Technology Challenges
- 4.4. Strategic Dimensions of Performance Appraisal
- 4.5. A Shift from Appraisal to Performance Management
- 4.6. Economic Value added
- 4.7. Organisational Appraisal- Balanced Scorecard (BSC)
- 5. Strategic HR & Information Technology (06)**
 - 5.1. Technologies Affecting HRM
 - 5.2. Human Resource Innovations
 - 5.3. Conventional HRM to Web Based HRM
 - 5.4. Application Software for HR Practices
- 6. Developing HR as Strategic Value addition Function (06)**
 - 6.1. Gaining competitive Advantage through HR
 - 6.2. HR as a Strategic Partner
 - 6.3. The VRIO Framework
 - 6.4. The changing role of HR
 - 6.5. Future Challenges of HR
 - 6.6. Economic Value Added

REFERENCE BOOKS:

1. Strategic Human Resource Management by Jeffrey Mello.- Pearson
2. Strategic Human Resource Management by Truss Et Al Oxford University Press
3. Strategic Human Resource Management by Rajeesh Viswanathan – Himalaya
4. Strategic Human Resource Management by Armstrong – Kogan Page
5. Strategic Human Resource Management by Rajib Dhar – Excel Books
6. Strategic Human Resource Management by Greer - Pearson
7. Human Resource Strategy by Dreher & Dougherty – Tata Mcgraw Hill
8. Human Resource Management: A South Asian Perspective – Mathis, Jackson & Tripathy - Cengage
9. Managing Human Resources By Fisher- Cengage Learning



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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

307C – Labour Laws

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objectives:

- To study various labour laws applicable to Indian industries
- To understand various benefits available under labour laws

- 1. Factories Act, 1948** (06)
 - 1.1. Object & Definitions
 - 1.2. Health Provisions
 - 1.3. Safety Provisions
 - 1.4. Welfare Provisions
 - 1.5. Obligations of Worker & Occupier
 - 1.6. Offences & Penalties
- 2. Minimum wages Act, 1948** (04)
 - 2.1. Object, Applicability & definitions
 - 2.2. fixation of minimum rate of wages
 - 2.3. Procedure for fixing and revising minimum wage,
 - 2.4. Offences & Penalties
- 3. Payment of wages Act, 1936** (04)
 - 3.1. Object, Applicability & definitions
 - 3.2. Time of payment of Wages.
 - 3.3. Deductions from wages.
 - 3.4. Obligations of Employers & Employees.
- 4. Payment of Bonus Act 1965** (06)
 - 4.1. Object, Applicability & definitions
 - 4.2. Calculation of Bonus,
 - 4.3. Time limit for payment
 - 4.4. Employees entitled to Bonus
 - 4.5. Payment of min/max Bonus
 - 4.6. Calculation of allocable surplus,
 - 4.7. Set-on and set-off of allocable surplus
- 5. Workmen's Compensation Act, 1923.** (04)
 - 5.1. Object, Scope & definitions
 - 5.2. Amount of Compensation
 - 5.3. Obligations of Workmen & Employer
 - 5.4. Distribution of Compensation
 - 5.5. Occupational diseases
 - 5.6. Penalties
- 6. Equal Remuneration act, 1976** (06)
 - 6.1. Object & definitions
 - 6.2. Duty of employer to pay equal remuneration to men and women workers for same work of a similar nature
 - 6.3. No discrimination to be made while recruiting man & women workers
 - 6.4. Advisory committee
 - 6.5. Authorities for hearing and deciding claims & Complaints
 - 6.6. Duty of employers to maintain registers
 - 6.7. Power of inspectors

- 7. Employees state insurance Act, 1948** (03)
- 7.1. Object, definitions
 - 7.2. Obligations of Employers & Employees.
 - 7.3. Contribution
 - 7.4. Benefits to employees
- 8. The employee Provident fund & Miscellaneous provisions Act, 1952** (05)
- 8.1. Object, Applicability & definitions
 - 8.2. Employees' Provident Funds Scheme
 - 8.3. Employees' Family Pension Scheme,
 - 8.4. Employees' Deposit-linked Insurance Scheme,
 - 8.5. Determination of moneys due from employers,
 - 8.6. Special provisions relating to existing provident funds
 - 8.7. Transfer of accounts
 - 8.8. Obligations & Rights of employer & employees.
- 9. Payment of Gratuity act, 1972** (05)
- 9.1. Object & Definitions
 - 9.2. Payment of gratuity: Amount of Gratuity
 - 9.3. Nominations
 - 9.4. Compulsory Insurance
 - 9.5. Forfeiture, exemption
 - 9.6. Inspectors, Power of inspectors
 - 9.7. Obligations & Rights of employer & employees.
- 10. Maternity Benefit Act, 1961** (05)
- 10.1. Object, Applicability & definitions
 - 10.2. Right to payment of maternity benefit
 - 10.3. Forfeiture of maternity benefit
 - 10.4. Payment of maternity benefit in case of death of a woman
 - 10.5. Payment of medical bonus
 - 10.6. Leave for miscarriage
 - 10.7. Leave for illness arising out of pregnancy, delivery, premature birth of child, or miscarriage
 - 10.8. Nursing breaks

REFERENCE BOOKS:

1. Taxmann's Labour Laws – Taxmann publications
2. Industrial and Labour Laws – Saravanavel – Galgotia Publications
3. Elements of Merchantile Law by N.D.Kapoor – Sultan Chand & Sons
4. Industrial Relations, Trade Unions & Labour Legislation by PRN Sinha, InduSinha, SeemaShekhar – Pearson
5. Industrial Jurisprudence and Labour Legislation by A.M.Sharma – Himalaya Publications
6. Labour Laws for managers by B.D.Singh – Excel Books
7. Labour Laws – Bare Acts

Specialization – D – Operations & Materials Management

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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



Objective:

- 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 (06)**
 - 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. Operations Management by B Mahadevan – Pearson
2. Production and Operations Management by N.G. Nair – Tata McGraw Hill
3. Production & Operations Management by Upendra Kacharu – Excel Books
4. Global Management Solutions-Demystified – Seth, Rastogi – Thomson Press
5. Total Quality Management: Text & Cases – K Shridhara Bhat - Himalaya
6. Production and Materials Management by K. Shridhar Bhat –Himalaya
7. Management of Technology by Tarek Khalil - TMH
8. Production and Operation Management by Kanishka Bedi – Oxford
9. Operation management by Ray wild – Thomson
10. Production and Operation Management by Chunnawala Patel - Himalaya
11. Materials and Purchasing Management by S.A. Chunawala – Himalaya



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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: (06)**
 - 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: (06)**
 - 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: (04)**
 - a) Exploratory: Intuitive, Extrapolation, Growth Curves,
 - b) Technology Monitoring, Normative: Relevance Tree, Morphological Analysis, Mission Flow Diagram

- 3) Technology Assessment: (06)**
 - a) Technology Choice, Technological Leadership and Follower ship,
 - b) Technology Acquisition. Meaning of Innovation and creativity,
 - c) innovation management

- 4) Technology strategy: (04)**
 - 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, Speed of Diffusion.
 - b) 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



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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 (15)**
- 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 (15)**
- 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



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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 | (06) |
| 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 | (06) |
| 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 | (06) |
| 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 | |

REFERENCE BOOKS:

1. Operations Research by V.K.Kapoor - Sultan Chand & Sons
2. Operations Research by D.S Heera & P.K.Gupta - S.Chand & Sons
3. Quantitative Techniques in Management by Vohra – Tata McGraw Hill Company
4. Operations Research by Natarajan - Pearson
5. Quantitative Techniques in Management by Jaishankar – Excel Books

Specialization – E – International Business Management

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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

Paper: 304 e – International Business

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours



Objective:

- To develop a sound conceptual framework for understanding International business management
- To get in-depth knowledge on Theories of International Trade
- To be able to understand international trade strategies.

- 1. Introduction to International Business (IB) (06)**
 - 1.1. Concept of International Business
 - 1.2. International Vs Domestic Business
 - 1.3. Evolution, Development & Factors leading to Growth of IB
 - 1.4. International Orientation
 - 1.5. Globalization of Business Structure
- 2. Modes of International Business (06)**
 - 2.1. Determinants of Entry Mode
 - 2.2. country-specific,
 - 2.3. Industry-specific,
 - 2.4. Firm-specific,
 - 2.5. Project-specific
 - 2.6. Entry Mode Selection & Choices
 - 2.7. Trade Related
 - 2.8. Contractual
 - 2.9. Investment Based
- 3. Theories of International Trade (06)**
 - 3.1. Mercantilism
 - 3.2. Theory of Absolute cost Advantage
 - 3.3. Comparative cost Advantage Theory
 - 3.4. Comparative cost Advantage Theory with Money
 - 3.5. Country Similarity Theory
 - 3.6. Global Strategic Rivalry Theory
 - 3.7. Factor Proportions Theory
 - 3.8. Product life Cycle Theory
 - 3.9. Porter's National Competitive advantage Theory
- 4. International Business Environment (08)**
 - 4.1. Meaning of IB Environment, IB Environmental Factors
 - 4.2. Socio-cultural & Ethical Environment
 - 4.3. Economic Environment
 - 4.4. Political Environment
 - 4.5. Technological Environment
- 5. International Business Strategies (12)**
 - 5.1. Strategy: Role & Choices
 - 5.2. Strategy formulation: Approaches, Spectrum, Levels
 - 5.3. Planning, Organization & Control
 - 5.4. International Marketing Strategy
 - 5.5. International Investment & Financing Strategy
 - 5.6. International HRM Strategies

6. Global Trade & Investment

(10)

- 6.1. World Trade Organization
 - 6.1.1. Establishment of WTO
- 6.2. Organization Structure of WTO
- 6.3. Anti Dumping Measures
- 6.4. Dispute settlement Mechanism
- 6.5. TRIMS & TRIPS
- 6.6. WTO & India
- 6.7. Conflict & Negotiations in IB
- 6.8. Factors causing Conflict
- 6.9. Host Country Vs Transnational Corporations
- 6.10. International Negotiations
- 6.11. Role of International agencies in Conflict resolution
- 6.12. Foreign Direct Investment (FDI)

7. Concept, Reasons & Trends in FDI

8. Costs, Benefits & Determinants in FDI

9. Theories of FDI

- 9.1. Industrial Organisation Theory
- 9.2. Product Cycle Theory
- 9.3. MacDougall-Kemp Hypothesis
- 9.4. Location-specific Theory

10. Foreign Direct Investment In India

REFERENCE BOOKS:

- 1) International Business: K. Ashwathappa -Tata McGraw Hill
- 2) International Business–Hill & Jain –Tata McGraw Hill
- 3) International Business: concept Env. & Strategies– Vyuptakesh Sharan –Pearson
- 4) International Business: concept Env. & Strategies –Sumati Varma –Ane Books
- 5) International Business: Text & Cases –P. Subba Rao –Himalaya
- 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

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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

Paper: 305 E-International Logistics and Supply Chain Management

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objective of the Course:

- To develop a sound conceptual framework for understanding International Logistics Management
- To get in-depth knowledge on Supply Chain Management
- To be able to plan global supply chain.

1. INTRODUCTION:

[8]

- 1.1. International Logistics and Supply chain management: meaning and objectives,
- 1.2. importance in global economy ,
- 1.3. Characteristics of global supply chains,:
- 1.4. Supply chain relationship to business performance, -Key tasks of logistics and supply chain managers,
- 1.5. Role of Government in controlling international trade and its impact on Logistics and supply chain.

2. SUPPLY CHAIN STRATEGY:

[8]

- 2.1. Supply chain as a competitive advantage,
- 2.2. Global Supply chain strategy,
- 2.3. Structuring supply chain capabilities,
- 2.4. Business matching supply chain design with business strategy.

3. TRANSPORTATION:

[8]

- 3.1. Strategic importance of transport in global logistics,
- 3.2. logistical objectives of transport,
- 3.3. International Ocean Transportation,
- 3.4. International Air Transportation, and International Land Transportation:
 - 3.4.1.types, characteristics and salient features,
 - 3.4.2.intermodal transportation in international operations,
 - 3.4.3.factors influencing mode and carrier selection decision,

4. OUTSOURCING AND LOGISTICS SERVICE PROVIDERS

[8]

- 4.1. Intermediaries and Alliances in Global Logistics,
- 4.2. Meaning of 3 PL and 4 PL service providers,
- 4.3. role in Global logistics,
- 4.4. Types of services, considerations for hiring 3PL and 4 PL service providers.
- 4.5. Concept and need of outsourcing,
- 4.6. determinants for outsourcing decisions,
- 4.7. role of outsourcing in global supply chain management

5. NETWORK DESIGN & INFORMATION TECHNOLOGY IN SUPPLY CHAIN

[8]

- 5.1. Decisions in Network design-strategic importance, location of plant, warehouse, Facilities; capacity and number of warehouses:
- 5.2. Factors influencing network design Decisions,
- 5.3. Role and Importance of IT in Supply Chain Management,
- 5.4. IT solutions for Supply Chain Management,
- 5.5. Supply Chain Information Technology in Practice.

6. PLANNING GLOBAL SUPPLY CHAIN

[8]

- 6.1. Planning the global supply chain,
- 6.2. Network design for global supply chain management,

- 6.3. Risk management in the global context,
- 6.4. Measuring logistics cost and performance.
- 6.5. Benchmarking the supply chain,
- 6.6. Performance measurement and evaluation in global supply chains

REFERENCE BOOKS:

1. Douglas Long International Logistics: Global Supply Chain Management Springer- Verlag New York, LLC;2004
2. Logistics Management Ganpathi & Nandi Oxford University Press
3. Philippe-Pierre Dornier, Panos Kouvelis, Michel Fender Global Operations and Logistics: Text and Cases Wiley, John & Sons, Incorporated 1998
4. Alan Branch Global Supply Chain Management in International Logistics Routledge 2007
5. Kent N. Gourdin Global Logistics Management: A Competitive Advantage for the New Millennium Blackwell Publishing 2006
6. Sridhar R. Tayur (Editor), Michael J. Magazine (Editor), RAM Ganeshan (Editor)
7. Quantitative Models for Supply Chain Management Kluwer Academic Publishers 1998)



North Maharashtra University, Jalgaon

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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

Paper: 306 E- Export Import Management

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objective of the Course:

- To develop a sound conceptual framework for understanding Export and Import management.
- To get in-depth knowledge in various aspects of Exports and Imports
- To be able to understand procedures of Exports and Imports

1. PRELIMINARIES FOR EXPORTS AND IMPORTS

(8)

- 1.1. Meaning of exports and imports
- 1.2. Effects of Exporting and Importing on Economy
- 1.3. Classifications of goods for exports
- 1.4. Strategy and preparations for exports
- 1.5. Methods of exporting
- 1.6. Export marketing organizations in India
- 1.7. Liberalizations of imports
- 1.8. Negative list for imports
- 1.9. Special schemes for imports

2. EXPORT PROCEDURE

(8)

- 2.1. Registration stage
- 2.2. Pre-shipment stage, shipment stage and post shipment stage
- 2.3. Quality control and pre-shipment inspection
- 2.4. Sales tax exemption
- 2.5. Procedure for excise clearance
- 2.6. Shipping and customs formalities
- 2.7. Realization of export incentives
- 2.8. Procedure for realization of export proceeds

3. EXPORT DOCUMENTATIONS

(10)

- 3.1. Aligned documentation systems (ADS)
- 3.2. Proforma Invoice, Commercial Invoice
- 3.3. Packaging list
- 3.4. Mate's receipt
- 3.5. Bill of lading
- 3.6. Certificate of origin
- 3.7. Shipping bill
- 3.8. Consular invoice
- 3.9. Bill of entry
- 3.10. Airway bill
- 3.11. GR Form

4. IMPORT PLANNING

(6)

- 4.1. Methods of Import Procurement – Global Tendering , Limited Tendering
- 4.2. Negotiated Procurement
- 4.3. Long-term Contracting
- 4.4. Foreign Exchange Regulations Relating to Import
- 4.5. Import finance – Instruments of financing, Related Procedures, Customs Clearance

5. **EXIM POLICY** (8)
- 5.1. Objectives
 - 5.2. Facilities & Restrictions
 - 5.3. Significance of Exports & Imports to Nations Progress
 - 5.4. Export Potential of Services
 - 5.5. Export Potential of Select Commodities: Textiles, Agricultural Products, Marine Products, Floriculture, Readymade Garments, Engineering Goods, Leather Products, Gems & Jewelry Export Prospects in Various Countries.
6. **INSTITUTIONAL FRAMEWORK FOR FOREIGN TRADE** (8)
- 6.1. Special Economic Zone(SEZ)
 - 6.2. Indian institute of packaging (IIP)
 - 6.3. Export promotion council(EPC)
 - 6.4. Export Oriented Units (EOU)
 - 6.5. Commodity Boards(CBs)
 - 6.6. Export Credit and Guarantee Corporation (ECGC)
 - 6.7. Federation of Indian Export Organizations(FIEO)
 - 6.8. Indian Trade Promotion Organization (ITPO)
 - 6.9. Indian Institute of Foreign Trade(IIFT)

REFERENCE BOOKS:

- Export Import Procedures and Documentation, Khuspat S Jain, Himalaya Publishing House
- Export Management, S.H. Nagalkar & M.A. Barhate, Sai Jyoti Publication
- Asin Kumar: Export – Import Management, Excel Publications. New Delhi
- Cherian and Parab : Export Marketing, Himalaya Publishing Houses, Delhi.
- Government of India, Handbook of Procedures, Import and Export Promotion, New Delhi
- Rathod, Rathore and Jani : International Marketing, Himalaya Publishing House, Delhi



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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

Paper: 307 E – International Finance and Forex Management

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objective:

- To develop a sound conceptual framework for understanding International Financial management
- To get in-depth knowledge on Forex Management
- To be able to understand international Tax and Monetary system

- 1. Financial Management in a Global Context** (8)
 - 1.1. Nature, Scope, Dimension & Importance of International Finance
 - 1.2. Why Study International Finance
 - 1.3. Domestic Vs International Finance
 - 1.4. Recent changes in Global Financial markets
 - 1.5. Globalization & international Financial Management
 - 1.6. Emerging challenges & Responsibilities of finance Manager
- 2. Exchange Rate determination & Forecasting** (8)
 - 2.1. Introduction
 - 2.2. Exchange Rate and interest rate volatility- A recent Experience
 - 2.3. Nominal, Real and Effective Exchange Rates
 - 2.4. Some Fundamental Equivalence relationship
 - 2.5. Structural models of Exchange Rate Determination
 - 2.6. Exchange Rate Forecasting and Need for it.
 - 2.7. Exchange Rate of Rupee
- 3. International Monetary system** (8)
 - 3.1. Introduction
 - 3.2. Exchange rate regimes since 1973
 - 3.3. Bretton woods system of Exchange Rate
 - 3.4. International Monetary Fund (IMF)- Solution for financial crisis
 - 3.5. Economic and Monetary Union (EMU)
 - 3.6. Asian Development Bank
- 4. Balance of Payments** (8)
 - 4.1. What is Balance of Payments
 - 4.2. Function Principles and Accounting of Balance of Payments
 - 4.3. Components of Balance of Payments
 - 4.4. Meaning of "Deficit" and "Surplus" in Balance of Payments
 - 4.5. Adjustments and Approaches to Adjustments
 - 4.6. Why Balance of Payments Statistics are important
 - 4.7. India's Balance of Payments
- 5. Foreign Exchange Market** (8)
 - 5.1. Introduction
 - 5.2. Distinctive features
 - 5.3. Major Participants
 - 5.4. Spot Market
 - 5.5. Forward Markets
 - 5.6. Currency Futures

5.7. Currency Options

6. **International Taxation**

(8)

6.1. Bases of International tax System

6.2. Types of Taxes

6.3. Tax havens

6.4. Modes of Doble Taxation Relief

6.5. International Tax Management Strategy

6.6. Indian Tax Scenario

7. **Field Work Suggested:-** Visit industries in your area which are involved in export business and Study the impact of the above factors on their business.

REFERENCE BOOKS:

- 1) International Finance Management by Thummuluri Siddaiah (IFM) - Pearson
- 2) International Finance Management by P. G. Apte - Tata McGraw Hill
- 3) International Finance Management by Vyuptakesh 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 and B K chaudhari- 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

SPECIALISATION - F -AGRI- BUSINESS MANAGEMENT

MBA Job opportunities:

- Agricultural Manger
- Marketing Analyst
- Accounting manger
- Bioterrorism energy
- Alternative energy consultant
- Sales Manager
- Operation officer
- Credit Analyst
- Business Manger
- Manger-rural
- Manger-Business planning
- Commercial Executive –Crop care
- Investment Analyst –Food and Agriculture
- Sales Representatives
- Relationship Manager-Corporate and Retail Agriculture



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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

304 F – Agro Business Management

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objectives:

- The course aims at providing students an exposure to the management practices in Agro Business Management.
- To train students in handling different issues related to Agro Business management.

1. Introduction to ABM

(06)

- 1.1 Meaning, definition, history, Importance and scope of agri-business
- 1.2 Changing dimension of agricultural business
- 1.3 Agri-business Management-distinctive features, nature and components
- 1.4 Five Years Plans and agri-business, characteristics of plan

2. Advanced Food Processing

(14)

- 2.1. Present scenario, scope and opportunities
- 2.2. Infrastructural Development
- 2.3. Constraints and policy initiatives
- 2.4. Value addition and waste utilization
- 2.5. Food plant hygiene
- 2.6. industry wise segmentation
 - 2.6.1. Processed fruits & vegetables
 - 2.6.2. Milk and milk products
 - 2.6.3. Grain processing
 - 2.6.4. Meat & Poultry processing
 - 2.6.5. Fisheries, Marine Products
 - 2.6.6. Packed/Convenience foods
 - 2.6.7. Beverages
 - 2.6.8. Regulatory measures

3. Agro-Processing Management

(16)

- 3.1. Role of agro-processing industries in the Indian economy
- 3.2. Status and potential of Indian agro-processing industries. Food grains, commercial Crops.
- 3.3. Policy environment of agro-processing industries-Development, management
- 3.4. structure and communication.
- 3.5. Work performance efficiency, public contact and public participation in agro-
- 3.6. Processing industries
 - 3.6.1. Decision making process and entrepreneurial efficiency
 - 3.6.2. Government policies relating to agro processing unit
 - 3.6.3. Interdependence of agro-processing industries, Problem of agro-processing units,
 - 3.6.4. Guideline for financing of agro-processing industries in India

4. HRM in Agri Business Management

(06)

- 4.1. Development of Human Resource in Agricultural Training
- 4.2. Importance of Human Resource in Agricultural
- 4.3. H. R. M. development program for Agribusiness

5. Emerging Trends in ABM

(06)

- 5.1. Agro Tourism
- 5.2. Organic Farming
- 5.3. Contract Farming
- 5.4. 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. Discovery 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)



North Maharashtra University, Jalgaon

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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

305 F –Management of Agro Industries

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objectives:

- The present course aims at familiarizing the participants with the concepts, tools and techniques of Management of Agro based industries so as to enable them to develop analytical and conceptual skills and the ability to handle the various situations.

1. Animal Production Management

(10)

- 1.1. Scope of livestock in Indian economy
- 1.2. Livestock census and trend of livestock production
- 1.3. 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.
- 1.4. Stress management. Housing of different livestock and poultry.
- 1.5. Routine farm management. Preparation of animal for different purposes
- 1.6. Various breeds of cattle, sheep, goat, buffalo and poultry
- 1.7. Nutrient requirement of livestock and poultry
- 1.8. Maintenance of records on livestock dairy and poultry farms
- 1.9. Animal health cover, structure of udder and letting down of milk, clean and hygienic milk production.
- 1.10. Reproductive systems of male and female, estrus cycle, pregnancy and parturition. Systems of breeding, artificial insemination

2. Value Addition in Animal Products

(10)

- 2.1. Present status of dairy, poultry, meat, wool and hide industries in WTO regime. Milk composition of different species
- 2.2. Production, packing, marketing of milk, meat and their products
- 2.3. Import, export of animal and poultry products
- 2.4. Price regulation in animal products. Factors influencing price
- 2.5. Trends in marketing and utilization of animal products
- 2.6. Importance of hides and bones, quality standards and storage Market standards and regulation of animal products

3. Post – Harvest Technology of Horticultural Crops

(12)

- 3.1. Importance and present status of post-harvest technology in horticultural crops in
- 3.2. India and Maharashtra. Maturity, harvesting and handling in relation to extended
- 3.3. shelf-life and storage quality of fruits, vegetables and flowers.
- 3.4. Methods of pre-cooling, grading, packaging, storage and transport of fruits, vegetables and flowers.
- 3.5. Importance and scope of fruits and vegetable preservation.
- 3.6. Selection of site for fruit and vegetable preservation unit. Principles and methods of preservation.
- 3.7. Preparation of jams, jellies, marmalades, squashes, juices, syrups, preserves, crystallized fruits, chutney, pickle and ketchups
- 3.8. Spoilage of processed products, Post-harvest management of cut flowers. Control of
- 3.9. Post-harvest diseases of important fruits and vegetables.

4. Bio-fertilizers and Mushroom Production

(08)

- 4.1. Bio-fertilizers: Introduction, importance and definition
- 4.2. Type of bio-fertilizers, Economics of bio-fertilizer production
- 4.3. Mushroom: Introduction, importance and types of mushrooms. Requirements for mushrooms cultivation: different tools, equipment's, substrates and chemicals required for
- 4.4. commercial cultivation of mushroom.

5. Technology in Agri-Business

(08)

- 5.1. Information Technology: meaning, role and importance in Agri business and Agriculture marketing.
- 5.2. Importance of Common Service Centers (CSC), Common issues of CSCs, Expert decision support system in Agriculture.
- 5.3. Information Technology for Agriculture Marketing.
- 5.4. Online market information, online market status in India.
- 5.5. Website on Agriculture marketing and export.
- 5.6. Role of private companies in online marketing – eChaupal, HLL Shakti, Quality control system.
- 5.7. Packaging, preservation and storage systems.

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. Singh, R.A. Poultry Production. Publishers, New Delhi.
5. Maske, O Norton. Commercial Chicken Production. Manuel AVI Publishers, INC West Port.
6. Ling. E.R. Text Book and Dairy Chemistry. Chapman Hall Ltd., London
7. 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.
8. Salunke, D.K. and Desai, B.B. Past Harvest Biotechnology of Vegetables. II CRC Press, Boca Raton, Florida.
9. Varma, L.R. and V.K.Joshi. Post Harvest Technology of Fruits and Vegetables, Vol. II. Indus Publishing Company, New Delhi-110027
10. Motsara I.M.R., P. Bhattacharyya and Beena Srivastava, Biofertilizer Technology, Marketing and Usage- A source Book – cum glossary, FDCO, New Delhi.
11. Bahl, N. Handbook on Mushrooms. Oxford and IBH Pub. Co.Pvt, Ltd, New Delhi.
12. Kapoor, J.N. Mushroom Cultivation. Sterling Pub. Co., New Delhi-16.
13. Recciuti, M. Database vendors hawk wares on Internet. Info World, 17-2, Jan 9,10.
14. Shah Jignesh. Commodity Future- Benefits start flowing in The Hindu Survey of Indian Industry.



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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

306 F- Agri-Business Financial Management

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objectives:

To understand the perspective of financing agricultural operations and rural development in India and the current developments in this field.

1. Introduction to Agriculture Economics

(08)

- 1.1. Meaning,-Need, importance, scope, importance of Agricultural in National Economy, Special characteristics of agriculture in Indian economy
- 1.2. Principles of agriculture finance, financial management for agribusiness.
- 1.3. Introduction-Accounting concepts,-Farm accounting,-Ratio analysis- Cash budget,Difference between Micro and Macro Economics, Basic terms and concepts used in economics.
- 1.4. Consumer behaviour and demand, law of diminishing marginal utility, consumer's surplus and application, Production and supply: Nature and factors of production, Short-run and long –run production function.

2. Structure & Dynamics of Indian Agricultural

(10)

- 2.1. Place of Agricultural in National and International economy.
- 2.2. Pattern of agricultural holdings.
- 2.3. Agricultural productivity: Trends, causes and consequences of low productivity in India. Measuring efficiency in agricultural production, Economic efficiencies.
- 2.4. Theory of product choice; selection of optimal product combination.
- 2.5. Green revolution: Strategy in development of Indian agriculture.

3. Indian Agricultural Policies

(16)

- 3.1. Meaning, types and importance of agricultural policies.
- 3.2. Evolution of agricultural policy.
- 3.3. Famine Commission Report.
- 3.4. Drought Prone area Programme (DPAP)
- 3.5. Nature and objectives of land reforms, Land Reform Policy.
- 3.6. National Insurance Policy.
- 3.7. Tenancy reforms, Crash Scheme for Rural Development.
- 3.8. National Rural Employment Assurance Programme & other recent Agricultural Development Programs.

4. Financial Management in Agri-Business

(14)

- 4.1. Definition, Importance, Need of Agricultural Finance, Problems of agricultural credit in India, Requisites of good credit system.
- 4.2. Classification of credit and loan, Institutional agencies in agricultural credit, test of farm Credit proposal, tools of farm financial analysis, agricultural projects.
- 4.3. Traditional sources of finance for agriculture – issues, Significance of Co-op. Credit, Estimation of Agricultural Finance, Issues Theories of Agricultural Finance - Productive Vs. Consumption Credit Analysis, Kind Loans Vs. Cash Loans, Supervised Credit – Crop Loan – Cooperative credit, agricultural Finance in India.
- 4.4. Financial Institutions, Central banks - role of NABARD, RBI and developmental banks. Budgetary provision to agri-business, Agricultural subsidies Agricultural taxation, Agricultural finance-Problems and remedies.

Reference Books:

1. Indian Economy- S.K. Misra, V.K. Puri, Himalaya Publishing House.
2. Student Guide to Income Tax- Singhanian, Taxman Publication
3. Indian Economy since Independence- Uma Kapila, Academic Foundation.
4. Banking Theory & Practice- Dr. P.K. Shrivastava, Himalaya Publishing House.
5. Direct Taxes- Singhanian, Taxman Publication.
6. Beattie BR & Taylor CR. 1985. The Economics of Production. John Wiley & Sons.
7. Doll JP & Frank O. 1978. Production Economics - Theory and Applications. John Wiley & Sons.
8. Gardner BL & Rausser GC. 2001. Handbook of Agricultural Economics. Vol. I Agricultural Production. Elsevier. Heady EO. Economics of Agricultural Production and Resource Use. Prentice-Hall.
9. Sankayan PL. 1983. Introduction to Farm Management. Tata Mc Graw Hill.
10. Agricultural Finance In India – Theories and Practices, VB Jugale, Atlantic Publishers
11. Financing Agricultural industries – Long term loans – Need and estimation – Working Capital loans – Issues in managing Finance For Micro Finance – SHGs Bank linkages ,Insurance – Crop Insurance, Financing Agro exports.
12. Agricultural finance in India – the role of NABARD - Rajkumar K. – New Century Publications(208)



North Maharashtra University, Jalgaon

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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: 48 hours

Objectives:

- To understand and appreciate the concept of marketing strategy formulation and implementation in agricultural marketing.

1. Introduction to Agricultural Marketing

(06)

- 1.1. Scope, concepts & objectives, Role of agricultural marketing
- 1.2. Differences in Agricultural & consumer marketing
- 1.3. Problems of Agri. Marketing: Traditional agri. Marketing and present status, suggestion for improvements.
- 1.4. Present status & problem in various marketing function, role of government in agricultural marketing, Standardization and Grading.

2. Retail Marketing

(14)

- 2.1. Concept, types of retailers, supermarkets, factory outlets, hypermarkets
- 2.2. Non store retailing. Retailer- marketing decisions. Direct selling, one to one selling, multiple selling, direct marketing and multiple marketing.
- 2.3. Major types of retail organization, co-operative chain stores, voluntary chain, retailers and consumer cooperatives.
- 2.4. Packaging and Market Segmentation in Retail Marketing.
- 2.5. Store Management: Retail location, merchandising, using price to stimulate market sale.
- 2.6. Branding Strategy: Manufacturer's brand, private label, brand for a sale.
- 2.7. Trends in retailing, retailing strategies.
- 2.8. Impact of retailing on economy and society.
- 2.9. Understanding Supply Chain, Decision phases in Supply Chain, Drivers of Supply Chain Performance.
- 2.10. The Role of Transportation in a Supply Chain, Factors affecting transportation Decisions, tailored Transportation, Managing Demand in Supply Chain.

3. Promotion of Agri Products

(10)

- 3.1. Basic Concept of Promotion, Fundamental of Advertising.
- 3.2. Market Analysis for Agri Products segmentation & Targeting
- 3.3. Concept of Direct marketing, Sales Management, Personal Selling & Salesmanship, Sales Related Marketing Policies.
- 3.4. Developing and implementing customer Relationships Management: Key concepts in Customer relationships, Customer loyalty, key principles of relationship management, framework for building CRM strategy in agriculture marketing, CRM Implementation.

4. Problems of Agricultural Marketing

(10)

- 4.1. Standardization: Basis of standards, aims of standardization, significance of standardization, demerits of standardization.
- 4.2. Grading: A marketing function, Importance of grading in agriculture grading in India.
- 4.3. 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, 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 police.
- 4.4. Warehousing: State and Central Warehousing Corporations, objectives, functions, advantages, speculation, future trading and hedging. Hedging: Meaning, chief features of hedging, kinds, purpose, benefits and limitations of Hedging.

5. Trading of Agricultural Marketing

(08)

- 5.1. Importance of agricultural commodities in agricultural marketing.
- 5.2. Marketing of cereals rice, wheat and jawar etc.
- 5.3. Marketing of pulses-mango, tur, gram, urid etc.
- 5.4. Average cost of processing wheat into wheat flour, paddy to rice, whole pulses into split pulses, comparison of different rice milling methods
- 5.5. Marketing of mango, citrus and grapes etc.
- 5.6. Improving efficiency in commodity marketing, Role of co-operative and regulated market in commodity marketing.
- 5.7. Marketing of commercial crops with special reference to all functions and price analysis
- 5.8. Commercial commodity Trading- cotton, sugarcane, grapes, banana, mango, cut flowers – roses, gerbera, gladiolus, etc. vegetables – cauliflower, tomato, potato, onion, ladies finger.

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
13. Customer relationship Management –A strategy approach to marketing by Kaushik Mukerjee , Prentice Hall India.

Specialization – G - Information Technology & Systems Management

Employability Opportunities for MBA in Information Technology & Systems Management Specialization Students

Students who have a desire to take control of technology transformations and gain a thorough understanding of business factors, IT networking, and specialized databases should consider pursuing this Specialization. This specialization can teach students the necessary skills to lead organizations in strategic decision-making regarding systems, database administration, telecommunications, and internet technologies.

MBA in Information Technology & Systems Management offers students the opportunity to study critical business and management skills, database management, and business application of these principles. Courses centre on IS principles, analysis, and design while also focusing on project and change management and networking communications. Most programs are tailored toward developing graduates that are leaders in the IS industry.

MBA students specializing in Information Technology & Systems Management can perform the following broad roles within an organization:

1. Software Developers:

This job name broadly describes those information technology professionals who design computer programs, applications and operating systems.

2. Information security analyst:

These analysts monitor and protect an organization's computer network and systems. According to the BLS, prior experience in a related field is usually a prerequisite, and companies prefer to hire those with an MBA.

3. Management analyst:

In this field, you'll provide feedback on improving an organization's efficiency and profitability.

4. Systems Analyst:

Systems analysts are responsible for the complete life-cycle of a new/modified IT system, from analysing existing arrangements to implementing systems and providing training, Addressing Information systems issues & developing Systems.

5. IT Entrepreneur:

Students are able to start their own Software Project Development firm.

6. Information Technology Consultant :

Information technology consultants provide analysis, advice and solutions for organizations that need to develop or improve their communication, data or software systems. They can also provide training for current employees. Job duties of IT business consultants vary by industry and specialty, but generally include performance assessments of a business' existing systems, strategic planning and implementation of the new system or process.

7. IT Administrative Officer:

This job includes investigating and diagnosing network problems, collecting IT usage stats, making recommendations for improving the company's IT systems and carrying out routine configuration and installation of IT solutions.

8. Network Administrator

To monitor computer networks for security threats or unauthorized users. To identify compromised machines and report on security measures taken to address threats. He also needs to analyze security risks and develop response procedures. Additional duties may include developing and testing software deployment tools, firewalls and intrusion detection systems.

9. E-commerce Development :

Expand their business over internet & become a part of E-Commerce, E-business & E-World.

10. Database Manager:

Database Manager works closely with the teams who need to use the data and manage a database administrator or a team of database administrators to help you with the work.

The Job involves modeling and designing databases. This means database Manager spend a lot of time working with users to find out what information they need to use, how frequently, what categories they need to split it by and what would make it easy to use. Once database is built, it needs to test thoroughly by database manager.

11. Cyber Security Analyst

Cyber Security analysts assess and mitigate risk while enhancing system security. They are typically responsible for identifying and patching any security weaknesses they may find and making recommendations for security hardware and software. The Analyst is often tasked with establishing information security policies and procedures, as well as reviewing violations to help prevent future occurrences. Cyber Security analysts have to regulate access to computer files, develop firewalls, perform risk assessments and test data processing systems to verify security measures.

the firm's policies and practices. Lead digital forensic and cybercrime response efforts. Liaise with client representatives.

12. MIS Manager:

An MIS manager who is employed by an organization plans computer-related work for organizations and develops and implements new technologies for more efficient business processes. ; directs the work of technology professionals; analyzes business technology needs; works with top management to discuss and determine technology projects needed for the business; hires, manages and developed technology staff; develops technology policies and procedures within the organization; oversees purchases and maintenance of office computer equipment and peripherals; acts as a technology consultant to business managers; performs gap analysis to determine required changes to core systems of the organization; creates test scenarios; conducts testing efforts; designs and documents combined solutions; and supervises and delegates work to other IT staff members.



North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

Paper: 304G: EMERGING TRENDS IN INFORMATION TECHNOLOGY

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objective:

- To gain the basic knowledge of emerging trends in Information technology.
- To understand the changing scenario of business
- To understand the diversifying need of customer & make utilization of same for expanding the scope of business.

- 1. Overview of an E – Commerce** (8)
 - 1.1. Definition of ecommerce, Essential of E-commerce, Goals of E- Commerce
 - 1.2. Difference between E-Commerce and Traditional Commerce,
 - 1.3. Limitations and Advantages of E-Commerce, Scope of E-commerce
- 2. E-Business** (8)
 - 2.1. Definition-E-business,
 - 2.2. Characteristics of E-business,
 - 2.3. E-business Roles & their Challenges,
 - 2.4. E-business Requirements, Impact of E-business,
 - 2.5. Inhibitors of E-Business,
 - 2.6. Case study of Amazon.com & Flip cart
- 3. E-Banking** (8)
 - 3.1. Transactions: Inter Banking, Intra Banking, Electronic Payments, Payment Gateway, Securities in E-banking -SSL, Digital Signatures
 - 3.2. Services Provided: ATM, Smart Card, Micro payment, E-cash, Electronic Fund Transfer,
 - 3.3. ECS (Electronic Clearing System) e.g. Telephone, Electricity Bills
 - 3.4. Case study based on E-banking services provided by National & International Banks
- 4. E- Security** (8)
 - 4.1. Type of cyber-attacks, Intruders-hacking, cracking, freaking,
 - 4.2. Types of Securities, Security Tools,
 - 4.3. Network Security,
 - 4.4. Security Protection & Recovery,
 - 4.5. Cryptography and Digital Certificates.
- 5. E – Governance:** (8)
 - 5.1. Concept of E-Governance,
 - 5.2. E –Governance Models: (G2B, G2C, C2G, G2G),
 - 5.3. Challenges to E – Governance,
 - 5.4. Strategies and tactics for implementation of E – Governance,
 - 5.5. Case Study of E-Governance services like UAN etc.
- 6. E-CRM** (8)
 - 6.1. Definition e-CRM, Need of e-CRM,
 - 6.2. Framework of e-CRM, Features of e-CRM,
 - 6.3. Various stages in evolution of e-CRM,
 - 6.4. Six e's of e-CRM, CRM Vs E-CRM,
 - 6.5. Architecture of e-CRM,
 - 6.6. mobile applications
 - 6.7. Case study of Dell & HP for E-CRM

REFERENCE BOOKS:

1. Management Information System: Jawadekar- TMH
2. Management Information System: Laudon & Laudon
3. E – Commerce: Bhaskar - TMH

4. The Essential Guide to Knowledge management: Amrit Tiwana
5. Electronic Commerce: Elias M. Awad, Pearson Education
6. E – Commerce: Milind Oka
7. Fire Wall and Internet Security: William Cheswick, Stevens, Aviel Rubin
8. E-Governance Case Studies – Ashok Agarwal
9. E-commerce – C. S. V. Murthy
10. E-Business: Michael P. Papazoglou, Wiley-India Education
11. E-Commerce: David Whiteley



North Maharashtra University, Jalgaon

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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

Paper: 305G: RDBMS USING ORACLE 8i

60 + 40 Pattern: External Marks 60 + Internal Marks (20 Marks Theory+ 20 Marks Practical=40 Marks) = Maximum Total Marks: 100

Required Lectures: 48 hours (30 Hours Theory + 18 Hours Practical)

Objectives:

- To understand the flow of data & how data is organized & manipulated.
- To provide basic understanding for retrieving data according to required format.
- To learn the accessibility of data for different users.

- 1. Introduction (3)**
 - 1.1. Limitation of File Processing System
 - 1.2. Advantages and limitations of RDBMS
 - 1.3. Applications of RDBMS
 - 1.4. Modelling Techniques
 - 1.4.1. Different Types of Database Models,
 - 1.4.2. Relational Model,
 - 1.4.3. Hierarchical Model,
 - 1.4.4. Network Model,
 - 1.4.5. E-R Model
- 2. Normalization (3)**
 - 2.1. Normalization Introduction,
 - 2.2. Advantages and disadvantages of Normalization;
 - 2.3. 1NF-2NF-3NF rules with examples;
 - 2.4. Anomalies,
 - 2.5. Denormalization
- 3. Data Types & SQL Functions- (4)**
 - 3.1. Numeric - abs(),ceil(),MOD, floor(), Round(), Trunc() etc
 - 3.2. Aggregate -avg(), count(), min(), Max(), Sum() etc.
 - 3.3. Character-char(),ltrim(), rtrim(), Upper(), LCase(), Concat() etc
 - 3.4. Date - sysdate(), Curdate(), Hour(), LastDay(), Month() etc
- 4. SQL Statements (12)**
 - 4.1. Type of SQL Statements, Structure of SQL statement(create, alter, delete, update, modify, Insert, select)
 - 4.2. Constraints- Primary key, Unique key, Foreign Key, Alternate Key, NULL, NOT NULL, Check Constraint
 - 4.3. Operator Used-IN, Between, AND, OR, IS NULL, NOT NULL, Join- Natural Join/Equal, Self Join, Left/Right/Both Join, Cross Join
 - 4.4. Queries: Simple queries, Sub queries, Nested Queries,
- 5. Views & Sequence (4)**
 - 5.1. Create View, Types of View(Simple, Complex, Updatable, Predicate View),
 - 5.2. Queries based on View & Join
 - 5.3. Sequence- Create, alter, Drop Sequence, Use of Sequence
- 6. Database Trigger & Stored Procedures (4)**
 - 6.1. Trigger-Types, Enabling, Disabling, Create, Drop, Predicates- Inserting, Updating, Deleting
 - 6.2. Stored Procedure- Definition, Implementation & Execution

REFERENCE BOOKS:

1. Mastering Database Technologies- Ivan Bayross
2. SQL by Scott Urman
3. Oracle 8- William G. Page Jr. and Nathan Hughes
4. Database System Concepts- Silberschatz, Korth, Sudarshan

Practical List

- 1) Create Database, table using data types(Create, Modify, Delete, Drop)
- 2) Write SQL queries to implement Insert, Delete, Update, Alter statement
- 3) Write SQL queries to apply table level & Column Level Constraints like Primary key, Foreign Key, Unique Key, Check, NULL, NOT NULL, Default
- 4) Write a SQL queries to use select statement with the use of different Clauses like Where, Group By, Order by, Having, Distinct
- 5) Write a SQL queries to implement different Functions Numeric, Aggregate, Character & Date
- 6) Write a SQL to demonstrate different Sub queries & Nested Queries.
- 7) Write a SQL queries to demonstrate different types of Joins.
- 8) Write SQL queries to perform different operation on View.



North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

Paper: 306G: OBJECT ORIENTED PROGRAMMING USING C++

60 + 40 Pattern: External Marks 60 +Internal Marks (20 Marks Theory+20 Marks Practical= 40 Marks) =Maximum Total Marks: 100

Required Lectures: 48 hours (30 Hours Theory + 18 Hours Practical)

Objectives:

- To gain the basic knowledge of programming language & build logical thinking.
- To understand the behavior of real life entities through practicality.
- To gain the knowledge or different structure.

1. Introduction & moving from C to C++

(6)

Difference between Structures oriented & Object oriented programming language, Advantages of C++, Structure of C++ Program, Single & Multi line Comment, Literals- Constant Qualifier, Variables, Data types in C++, Type Conversion, Array, Strings.

2. Operators & Expression

(6)

Character Set, Operators, Types of Operators (Arithmetic operators, Relational Operator, Logical Operator, Bitwise Operator, and Increment & Decrement Operators), and Operator Precedence & Associativity.

3. C++ At a Glance

(4)

Introduction, Data Encapsulation & Abstraction-Classes, Inheritance- Base & Derived Class, Polymorphism- Operator & Function Overloading, Friend Function. Control flow statement-If-else, nested if- else, for loop, while loop, do...while loop, Switch statement, goto statement, and break Statement.

4. C++ Structure & Inheritance

(6)

Difference between Structure & C++ Program, C++ Program Structure, Visibility Mode, Access Specifier scope, Concept-Inheritance, Types- Simple, Multiple, Multilevel, Hybrid Inheritance

5. Constructor & Destructor

(4)

Introduction, Types of Constructor (Default, Parameterized & Copy Constructor), Constructor Overloading, Destructor

6. Exception Handling

(4)

Introduction, Basics of Exception Handling, Types of Exception Handling, Exception Handling Mechanism (Try, Throw & Catch).

REFERENCE BOOKS:

1. Object oriented programming with C++ : E. Balagurusamy, 3rd Edition
2. Mastering C++: K. R. Venugopal, Rajkumar, T. Ravishankar.
3. The Complete Reference C++: Herbert Schildt, 4th Edition
4. C++ By Example under C Learning: Steve Donovan
5. Let us C++: S. Jaiswal, Galgotia Publication
6. Let us C++: Yashwant Kanetkar

PRACTICAL LIST

1. Write a C++ program to demonstrate use of operators(Arithmetic, Logical, Relational, Bitwise, Increment & decrement)
2. Write a C++ program to demonstrate use of if...else, nested if else
3. Write a C++ Program to demonstrate use of FOR, While & Do....While Loop.
4. Write a C++ program to demonstrate use of array.
5. Write a C++ Program to demonstrate use of encapsulation.
6. Write a C++ program to demonstrate use of different types of Inheritance.
7. Write a C++ program to demonstrate Function & Operator Overloading.
8. Write a C++ program to demonstrate use of Friend Function.
9. Write a C++ program to demonstrate different types of Constructor & destructor.
10. Write a C++ Program to demonstrate use of exception handling.



North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

Paper: 307G: SYSTEM ANALYSIS & DESIGN

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours (50 Hours Theory)

Objective of Course:

- Plan and organize an information systems development project.
- Apply system analysis and design techniques to define and document information system requirements
- Apply systems analysis and design techniques to develop object-oriented models (UML diagrams) of information systems
- Evaluate models of an information system

- 1. System Concept:** (6)
 - 1.1. Definitions, Types of Systems, Characteristics and elements of System
 - 1.2. Role of Software Engineer/Analysts/Users in the various phases of Systems
 - 1.3. Development Life Cycle
- 2. General phases of Systems Development Life Cycle:** (12)
 - 2.1. Feasibility Study, Requirements Capture, Detailed Systems Analysis, Systems Design,
 - 2.2. Testing, On-site Implementation and Maintenance, Fact Finding Methods
- 3. Different Approaches to Software Development** (10)
 - 3.1. Waterfall Model, Spiral Model, Prototyping, RAD, Object Oriented
- 4. Process & Data Modeling –** (6)
 - 4.1. Data Flow Diagrams; Concept of Object Oriented Modeling
 - 4.2. Data Modeling - Entity Relationship Diagrams
- 5. Database Design:** (8)
 - 5.1. Normalization Technique for Database Design; De-normalization
- 6. System Documentation Techniques:** (2)
 - 6.1. System Flow Charts; Functional Decomposition
 - 6.2. Diagrams; Structured Flow Charts (N-S Diagrams)
- 7. Logic Representation Techniques:** (2)
 - 7.1. Decision Trees;
 - 7.2. Decision Tables;
 - 7.3. Pseudo code and Structured English
- 8. Users Interface Design:** (2)
 - 8.1. Menu, Screen and Report Layout Designing
 - 8.2. Introduction to Computer Aided Software Engineering (CASE)

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
8. Software Engineering – K.K.Agrawal

Specialization –H– Retail Management



North Maharashtra University, Jalgaon

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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

Paper: 304 H :Introduction to Retail Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objectives:

- To understand the scenario of Retailing.
- To get in depth knowledge of Retail and functions of Retailing.
- To be able to understand the recent trends in Retailing.

1. Fundamentals of Retailing

(12)

1.1. Retailing:

- 1.1.1. Concepts of Retail, Retailing & Retail Management
- 1.1.2. Types and functions of Retailers
- 1.1.3. Characteristics, Role, Importance, functions and Principles of Retailing
- 1.1.4. Evolution of retailing in India- Growth, Reasons for growth,
- 1.1.5. Emerging trends in retailing - New approaches in Retailing
- 1.1.6. Indian Vs Global Scenario and careers in retailing
- 1.1.7. Concept of value chain in retail, Services retailing, ethical issues in retailing.

1.2. Retailing Formats

- 1.2.1. Store-based (1) By Ownership, (2) On the basis of Merchandise: Food-based & General Merchandise-based
- 1.2.2. Non Store-based : Traditional & Non-Traditional
- 1.2.3. Organized vs Un-organized Retailing

2. Retail Location, Design and Layout

(08)

- 2.1. Factors affecting retail location decision-Site selection-Location based retail strategies, Store design-Interiors & exteriors.
- 2.2. Store layout – Types of layouts – Factors affecting store layout – Retailing image mix:(employees, merchandise, fixtures, sound, odor, visual, etc.) Effective Retail Space Management
- 2.3. Live Exercise –To visit and observe any retail Supermarket from view point of location, store layout, merchandise arrangement and space utilization followed by group discussion in class room.

3. Managing a Retail Business-

(06)

- 3.1. Human Resource Management in Retailing:
- 3.2. Significance of Human resources in retail, Gaining competitive advantage through HRM, Designing retail organization structure, Motivating retail employees.
- 3.3. Retail store operations-Functional areas of retail operations, store operating parameters, strategic resource model in retailing
- 3.4. Theories of Retail Development: Environmental Theory, Cyclical Theory and Conflict Theory.

4. Merchandise Management

(12)

- 4.1. Basics of Retail Merchandising: Meaning, Evolution
- 4.2. Factors affecting buying functions
- 4.3. Roles & Responsibilities of Merchandiser & Buyer
- 4.4. Buying for a single store, chain store & Non store retailers
- 4.5. Lifestyle merchandising
- 4.6. Merchandising Planning: Concept and Process of Merchandising Planning
- 4.7. Developing Sales forecast
- 4.8. Determining Merchandising requirements
- 4.9. Merchandising Control & Assortment planning

- 4.10. Evaluation of Merchandise performance
- 4.11. Retail pricing: concepts & elements
- 4.12. Determining price, ii) Retail Pricing policies/ Strategies

5. Private Labels in Retailing (05)

- 5.1. Concept, Importance, evolution of private labeling in retail.
- 5.2. Role of private labels, current scenario in India
- 5.3. Factors influencing private labels development, promotion of private labels
- 5.4. Transition of private labels to store brands
- 5.5. Theory of retail incubation and propagation

6. Rural retailing & Legislation for Retailing (05)

- 6.1. Concept, opportunities and challenges in rural retailing.
- 6.2. Regulations and Policies for the rural retailing
- 6.3. Regulations to promote healthy retail competition, product related regulations.
- 6.4. Legal compliances in store operations
- 6.5. Taxation and its impact on retailing
- 6.6. Live Exercise- Students shall study various rural retail projects like Hariyaali Kisaan Bazaar, Project Shakti, e-choupal, Kisanseva kendra etc. followed by class room presentations.

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. Retail Management by Areef Sheikh & Kaneez Fatima
- 6. Retail Management by Bajaj, Tuli & Srivastava
- 7. Retail Management - Functional Principles & Practices by Gibson G. Vedamani, Jaico publishing house
- 8. Fundamentals of retailing by K.V.S. Madan, Tata Mcgraw Hill Publications



North Maharashtra University, Jalgaon

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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

Paper: 305 H – Retail Promotion & Consumer Behavior

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objective:

- To know the Retail promotion and advertising strategy.
- To provide essential knowledge of core concepts like market segmentation, customer loyalty, Consumer behavior.
- To prepare students to undertake practical assignments and live projects in various retail stores.

1. Retail Promotion Strategy –

(8)

- 1.1. Advertising sales promotion and publicity
- 1.2. Communication and stages of Models of Communication: what is communication, types of communication, important issues for consideration
- 1.3. Deciding objective of sales promotion
- 1.4. determining budget and allocation of budget
- 1.5. Implement promotional plans and evaluate implementation programs
- 1.6. Live assignment: visiting D-mart and Big bazaar in the festive season to understand the different retail promotional strategies

2. Advertising, Sales Promotion and Publicity

(12)

- 2.1. Developing plans for advertising
- 2.2. When to advertise, what to advertise, where to advertise and how to advertise
- 2.3. Sales promotion by vendor originated and retailer originated
- 2.4. Planning of promotional events & Limitations and benefits of promotional events
- 2.5. Ways to effective publicity and Dos and don'ts of effective publicity
- 2.6. Live assignment: analyzing list of advertising as per the products and brands available in the Retail store

3. Retail Promotional Strategy—

(8)

- 3.1. Store atmosphere and personal selling
- 3.2. Display as promotional tool: window display, interior display
- 3.3. How display affects the sales
- 3.4. Types of retail selling :Personal selling
- 3.5. Competencies, common errors of personal selling cause poor performance
- 3.6. Ideal selling: evaluate sales performance
- 3.7. Importance of CRM and personal selling

4. Retailing Strategy

(4)

- 4.1. Store image and target customer
- 4.2. Sustainable competitive advantage
- 4.3. Customer loyalty, vendor relation, location and low cost operations

5. Market segmentation and growth strategy

(6)

- 5.1. Establishing retail mix: components of retail mix

- 5.2. Market penetration, market expansion and diversification
- 5.3. Retail mix scales: innovative strategies, coordinate efforts, avoid diffusion

6. **Retail Consumer Behavior**

(10)

- 6.1. Major factors influencing buying behavior : cultural, social, personal, psychological
- 6.2. Purchase decision: basis of purchasing parameters and inducing factors
- 6.3. Customers buying behavior: complex, dissonance reducing, variety seeking, habitual
- 6.4. The buying decision process- a model: problem recognition, information search, Post purchase behavior
- 6.5. Live assignments: collecting data from the students actually filled at retail store for buying behavior and understanding the different factors influencing buying behavior

REFERENCE BOOKS:

- 1. Retail Management: Arif Shaikh and Kaneez Fatima, Himalaya Publishing
- 2. Retail Management: Swapna Pradhan – Tata McGraw Hill
- 3. Consumer Behavior and Text and Cases, Satish K.Batra, Excel Book
- 4. Consumer Behavior Building Marketing Strategy, Hawkins, Mc.Graw Hill
- 5. Consumer Behavior, Solomon, Pearson Publication
- 6. Marketing Management, (Kotler, Koshy, Keller, Jha), Pearson Publication



North Maharashtra University, Jalgaon

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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

Paper: 306 H –Retail Supply Chain Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objective:

- To understand the fundamental of supply chain.
- To get acquainted about Retail logistics.
- To provide knowledge of Retail distribution channels.

1. Fundamentals of Supply Chain

(06)

- 1.1. Meaning and importance of Supply Chain
- 1.2. How Retail Supply Chain is Different from Manufacturing Supply Chain
- 1.3. Aligning the Supply Chain with Business Strategy.
- 1.4. Supply Chain Linkages
- 1.5. Decision phases in supply chain
- 1.6. Supply chain flows
- 1.7. Cycle view of supply chain
- 1.8. Drivers of retail supply chain

2. Retail Distribution Channels-

(08)

- 2.1. Participants in the Distribution Channel, Need for distribution Channel and Types of Channels
- 2.2. Channel relationships-
 - 2.2.1. Retail supplier relationship management- retail sourcing, merchandise procurement, global Sourcing, and sourcing measures.
- 2.3. Retail customer relationship management- Introduction, customer service, order management,
- 2.4. Retail loyalty programmes, retail kiosks and Green retailing – what it means to CRM, measures of Retail CRM.
- 2.5. Direct Store Delivery (DSD), Managing Retail Home Delivery.
- 2.6. Live Exercise-Students shall visit the office of a manufacturer/marketer of any consumer/industrial
- 2.7. goods and discuss the distribution channels used by them in order to make their product available to the buyers/ customers.

3. Managing Retail Logistics-

(12)

- 3.1. Introduction to retail logistics management – Elements of retail logistics, Retail logistics structure, Importance and Retail logistics trends.
- 3.2. Retail Transport-Transportation Infrastructure, Freight Management, Freight Costs, Transportation Networks, Route Planning, Containerization.
- 3.3. Retail Warehousing-Warehousing Functions, Consolidation, Warehouse Site Selection, Size, Layout, Warehouse Costing, Warehousing Strategies, Virtual Warehouses, Cold Chain Infrastructure.
- 3.4. Retail returns and reverse logistics-challenge of product returns, scope of reverse logistics, system design for reverse logistics, reverse logistics – a competitive tool
- 3.5. Logistics Outsourcing-
- 3.6. Drivers of Outsourcing Trend, Benefits of Outsourcing, Third Party & Fourth Logistics, Selection of Service Provider, Value Added Services, Service Contracts.

4. Category and Format Specific Supply Chain Issues-

(08)

- 4.1. Food and Grocery Retailing Supply Chain- Food and Grocery Retailing, Food and Grocery Supply Chain Characteristics, Fresh Fruit and Vegetable Supply Chain, Managing the Cold Chain, Dairy Retailing, Technology Requirements for Food and Grocery Retailing

4.2. Apparel and Footwear Retailing Supply Chain-Understanding the Segment, Apparel Retailing Supply Chain, Supply Chain Characteristics, Apparel Retailing in India, Apparel Retail Supply Chain Innovations, Footwear Retailing.

5. Other Category Retailing Supply Chains- (08)

5.1. Consumer Electronics Retailing - Understanding the Segment, Consumer Electronics Retailing Supply Chain Characteristics, Jewelry Retailing, Home Furnishing Retailing,

5.2. Health and Beauty Retailing, Pharma Retailing, retailing of Books and Music, Retailing of Financial Products and Retail Banking, Courier Service Retailing, Service Retailing.

5.3. Live exercise- Students shall visit any retail mall/ outlet from above category products to study its retail supply chain followed by presentation in class room.

6. Information Technology for retail supply chain & logistics- (06)

6.1. Information Needs, Desired Characteristics of Information Systems, Retail Technology Maturity Model

6.2. Bar Coding & RFID- product tracking in transit

6.3. Retail ERP

6.4. Mobile Applications

6.5. Retail Analytics, Point of Sales Solutions

6.6. Green Information technology and other Emerging Retail Technologies

REFERENCE BOOKS:

1. Retail Supply chain Management: Rajesh Ray –Mcgraw Hill education
2. Supply Chain Management in the Retail Industry-Michael H. Hugos, Chris Thomas, Wiley Publications
3. Channel Management and retail marketing by Meenal Dhotre.
4. Supply chain Management by V.V. Sople
5. Supply Chain Management by Rahul V. Altekar



North Maharashtra University, Jalgaon

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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

307 H: Mall Management

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objectives:

- To understand the current scenario of Shopping Malls with challenges.
- To get in depth knowledge of Mall development.
- To provide knowledge of Mall maintenance, tenant mix etc.

1. Introduction to Shopping Malls

(08)

- 1.1. Introduction, Emergence of Organized retail in India,
- 1.2. Evolution of Shopping Malls
- 1.3. Malls move out of Indian Metros
- 1.4. Types of shopping malls
- 1.5. Factors stimulating growth of shopping malls in India
- 1.6. Challenges of Mall development in India.

2. Mall Development

(08)

- 2.1. Introduction, Planning & design Decisions.
- 2.2. Site for shopping malls, Mall Design process, Capital sources of malls, Sources of revenues, Strategic decisions in mall financing.

3. Tenant Mix

(10)

- 3.1. Introduction, Zoning, Concept of Tenant mix, important terms related to Tenant mix, Five attributes of Tenant mix, Tenant mix modification to flow with times.
- 3.2. Models of Tenant mix improvement. Future direction of Tenant mix management. Concept of anchor store.

4. Maintenance Management

(06)

- 4.1. Areas of maintenance, Housekeeping services, security services, Fire management, parking management, Finance, HR policies, some common Engineering system.

5. Marketing Planning

(08)

- 5.1. Marketing planning, Facilitating marketing planning process, Graphical summary of marketing plans. Customer segmentation methodology, 4P's, Marketing communication, Branding methodology. Brand valuation, Market research.

6. Attributes of Mall

(08)

- 6.1. Entertainment, Relationship between key constructs and overall satisfaction, important factors related to consumer choice of choosing shopping centers, Dimensions of retailer attributes, shopping centers and food court, Common area kiosks.

REFERENCE BOOKS:

1. Mall Management with case studies (2nd Edition)- Abhijit Das, Taxmann's, New Delhi.
2. Retail Management: Arif Shaikh and Kaneez Fatima, Himalaya Publishing
3. Mall Management- operating in Indian Retail space, Harvinder Sing, Srin R Srinivasan
4. Retail Management: Swapna Pradhan – Tata Mcgraw Hill

Specialization –I– Hospitality Management

Objective of the course:

The syllabus is aimed to organize, integrate, and present information about managing hospitality organizations, which comes from academic studies and by experience. It is designed to meet the needs of hospitality management students in exploration of this exciting, undeveloped area. It should also guide students to implement a guest-focused service strategy in any hospitality or service organization that wants to compete successfully in today's customer-driven market.



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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

304 I: Hospitality Management

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objective:

- To study the fundamental aspects of hospitality management
- To study Hospitality business models, Practices, Strategies
- To study Front Office Division, services & communication.

1. Nature and Scope of Hospitality Business

06

- 1.1. A generic view of Hospitality and Tourism business, Various characteristic of Hospitality industry
- 1.2. Corporate culture, Philosophy and Mission statement of the business.
- 1.3. Service – a focal point, Various ways to improve service, TQM approach in service

2. Hospitality business models, Practices, Strategies

08

- 2.1. Careers in hospitality – Career goals, Professionalism, Etiquettes, Self-assessment and Personal philosophy
- 2.2. Hospitality industry in India
 - 2.2.1. Emerging trends in hospitality industry
 - 2.2.2. Career options in hospitality industry
 - 2.2.3. Eco friendly practices in hospitality industry
- 2.3. Customer care in hospitality industry
- 2.4. Social Responsibility – Ethical dilemmas
- 2.5. Careers in allied industry

3. Hotel industry –

08

- 3.1. Classification of hotels, Hotel integration, Hotel chain
- 3.2. Organizational Structure of Hotel
 - 3.2.1. Departments in hotel and their functions
 - 3.2.2. Organizational charts in hotels
 - 3.2.3. Facilities provided in hotels
- 3.3. Classification of hotels
 - 3.3.1. Types of rooms
 - 3.3.2. Room Rates
 - 3.3.3. Classification of hotels
- 3.4. Registration & Gradation of Hotels

4. Recreation management

06

- 4.1. Recreation – Leisure and for Wellness
- 4.2. Types of Recreation – Sponsored, Non-sponsored, Commercial and Non-commercial recreation
- 4.3. Gaming, Entertainment – Size and Scope, Trends in Gaming industry
- 4.4. Meeting, Incentive Travel, Conventions and Exhibitions (MICE) – Overall perspective of MICE w.r.t trends

5.1. Front Office Division

- 5.1.1. Front Office department and its functions
- 5.1.2. Sections and layout of Front Office
- 5.1.3. The organization structure of rooms division
- 5.1.4. Organizational chart of front office department (small, medium and large hotels)
- 5.1.5. Duties and responsibilities of various staff
- 5.1.6. Attributes of front office personnel
- 5.1.7. Co-ordination of front office with other departments of the hotel
- 5.1.8. The Guest Cycle
- 5.1.9. Property Management Systems

5.2. Front Office Services

- 5.2.1. Equipments used (Manual and Automated)
- 5.2.2. Role of Front Office in
- 5.2.3. key control and key handling procedures
- 5.2.4. mail and message handling
- 5.2.5. paging and luggage handling
- 5.2.6. bell desk and concierge
- 5.2.7. Rules of the house
- 5.2.8. Black list

5.3. Front Office Communications & Other Attributes

- 5.3.1. Communication Fundamentals
- 5.3.2. Telephone etiquettes – restaurant and hotel English
- 5.3.3. Professional Attributes - Attitude towards your job,
- 5.3.4. Personal Hygiene
- 5.3.5. Uniforms
- 5.3.6. Care for your own health & safety
- 5.3.7. Important terminology used in hotels

6. Global Perspective of Hospitality Economy and a futuristic view

- 6.1. Tourism – International Organization, Domestic organizations, Long term prospect of tourism industry: Vision 2020
- 6.2. The economic impact of tourism and its multiplier effect
- 6.3. Social and cultural impact of tourism, Sustainable Tourism, Ecotourism etc.

References

1. Introduction to Hospitality Management by John R. Walker – Pearson
2. Hotel front office management by James A. Bardi.—3rd ed. - John Wiley & Sons
3. Hospitality Management By Prof. Jagmohan Negi, Gaurav Manohe – University science Press New Delhi
4. Hotel Front Office: Operations and Management by Jatashankar R. Tewari, Oxford
5. Hospitality Marketing Management by Robert D. Reid (Author), David C. Bojanic (Author) John Wiley & Sons



North Maharashtra University, Jalgaon

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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

305 I: Hospitality Marketing Management

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objective:

- To study Marketing Mix and Marketing Strategies for Hospitality sector.
- To study Marketing and positioning of hospitality services.
- To understand License & Permits required for Hotels

- | | |
|---|-----------|
| 1. Marketing for Hospitality and Tourism: | 06 |
| 1.1. Service Characteristics, | |
| 1.2. Segmentation, | |
| 1.3. Targeting and Positioning of Hospitality Industry, | |
| 1.4. Environmental influence on Hospitality | |
| 1.5. Marketing Mix and Marketing Strategies for Hospitality and Tourism. | |
| 2. Marketing of Hospitality Services | 10 |
| 2.1. Concepts & Issues : Marketing of Hospitality and Tourism | |
| 2.2. Services – Management and Marketing of Tourism in India- | |
| 2.3. Hospitality Marketing : A Special Case in Services Marketing. | |
| 2.4. Future trends in Hospitality Industry – | |
| 2.5. Usage of CRS in Hotel Industry, | |
| 2.6. operational usage through chain of hotels. | |
| 2.7. Role of Associations in hospitality management- Functions and operations. | |
| 3. Positioning of services – | 08 |
| 3.1. Designing service delivery System, | |
| 3.2. Service Channel – | |
| 3.3. Pricing of services, methods – | |
| 3.4. Service marketing triangle – | |
| 3.5. Integrated Service marketing communication. | |
| 3.6. Service Marketing Strategies for health – | |
| 3.7. Hospitality – Tourism – Financial – Logistics - Educational – Entertainment & public utility
Information technique Services | |
| 4. Distribution Channel | 10 |
| 4.1. Introduction | |
| 4.2. Functions of distribution channel | |
| 4.3. Number of channel levels | |
| 4.4. Distribution Channel in Hospitality | |

- 4.4.1. Travel Agents
- 4.4.2. Tour Operators
- 4.4.3. Specialists
- 4.4.4. Hotel Representatives
- 4.4.5. National, State and Local Tourist Agencies
- 4.4.6. Global Distribution System
- 4.4.7. Consortia and Reservation Systems
- 4.4.8. Concierge
- 4.4.9. Internet-Online travel companies,
- 4.4.10. Individual hotel website, mobile phones

5. Laws & Guidelines:

06

- 5.1. Recognition of Travel Agency,
- 5.2. Tour Operator and Travel Guide
- 5.3. License & Permits required for Hotels: National & International Organization: IATA, PATA, ICAO, WTO, UFTAA, FHRAI, TAAI.

6. Brand Building & Promotional activity for development of Hospitality Sector

08

- 6.1. Branding of location (Adventure, heritage, cultural etc)
- 6.2. Branding of service operators
- 6.3. Branding at state & National Level
- 6.4. Promotional tools and techniques used for brand building
- 6.5. Digital marketing avenues for hospitality sector

References

1. Hospitality Marketing Management, Fifth Edition by Robert D. Reid and David C. Bojanic - Willey
2. Hospitality Marketing By David Bowie, Francis Buttle - Elsevier
3. Stephen Ball, Jones Peter, Kirk David and Lockwood Andrew - Hospitality Operations: A System Approach (Cengage Learning, 1st Ed.)
4. Marketing for Hospitality and Tourism - Kotler Philip, Bowen John and Makens James - (Pearson Education, 3rd Ed.)
5. Services Marketing, Chiristopher H.Lovelock and Jochen Wirtz, Pearson Education, New Delhi, 7th edition, 2011.



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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

306 I: Travel and Tourism Management:

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objective:

- To study travel & tourism management w.r.to India
- To study different types of tourism & its future prospects vis a vis India
- To evaluate the components of demand and supply of tourism services.

1. Introduction	08
1.1. Introduction to travel and tourism	
1.2. Development of tourism through ages (History)	
1.3. Future prospects	
1.4. Impact of tourism	
1.5. Indian and Global perspective of tourism	
2. Types	10
2.1. Types of tourism	
2.2. Ecotourism	
2.3. Heritage Tourism	
2.4. Religious tourism	
2.5. Agrotourism	
2.6. Adventure tourism	
2.7. Wildlife tourism	
2.8. Sports tourism	
2.9. Medical tourism	
2.10. Cultural tourism	
2.11. Emerging new areas	
3. Organisational Support	10
3.1. Tourism Organisations	
3.2. Promoters of tourism	
4. Tourist Transport	08
4.1. Transportation: Different Modes	
4.2. Domestic travelling	
4.3. International Travelling	
5. Sustainability and Monitoring	06
5.1. Sustainability: Importance and problems	
5.2. Monitoring : Need and Techniques	
6. Demand and Supply	06
6.1. Basic Tourism Supply Components	
6.2. Measurement of Tourism Demand	

Reference Books

1. Tourism: Operations and Management, 1/e, by Sunetra Roday, Archana Biwal, & Vandana Joshi - Oxford
2. Tourism: Principals and Practices, Oxford,1/e, Sampad Kumar Swain & Jitendra Mohan Mishra
3. Tourism in Global Perspective, Global Vision Publishing House, Dr Sukanta Sarkar
4. Sustainable Tourism, Global Vision Publishing House, S. R. Chauhan
5. Monitoring Tourism, Sonali Publications, Romila Chawla
6. Tourism Marketing by Manjula Chaudhary - Oxford



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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

307 I: Human Resource Management in Hospitality Industry

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objective:

- To study Human resource activities in Hospitality sector
- To study the different HR function required in hospitality industry
- To study retention policies in hospitality industry.

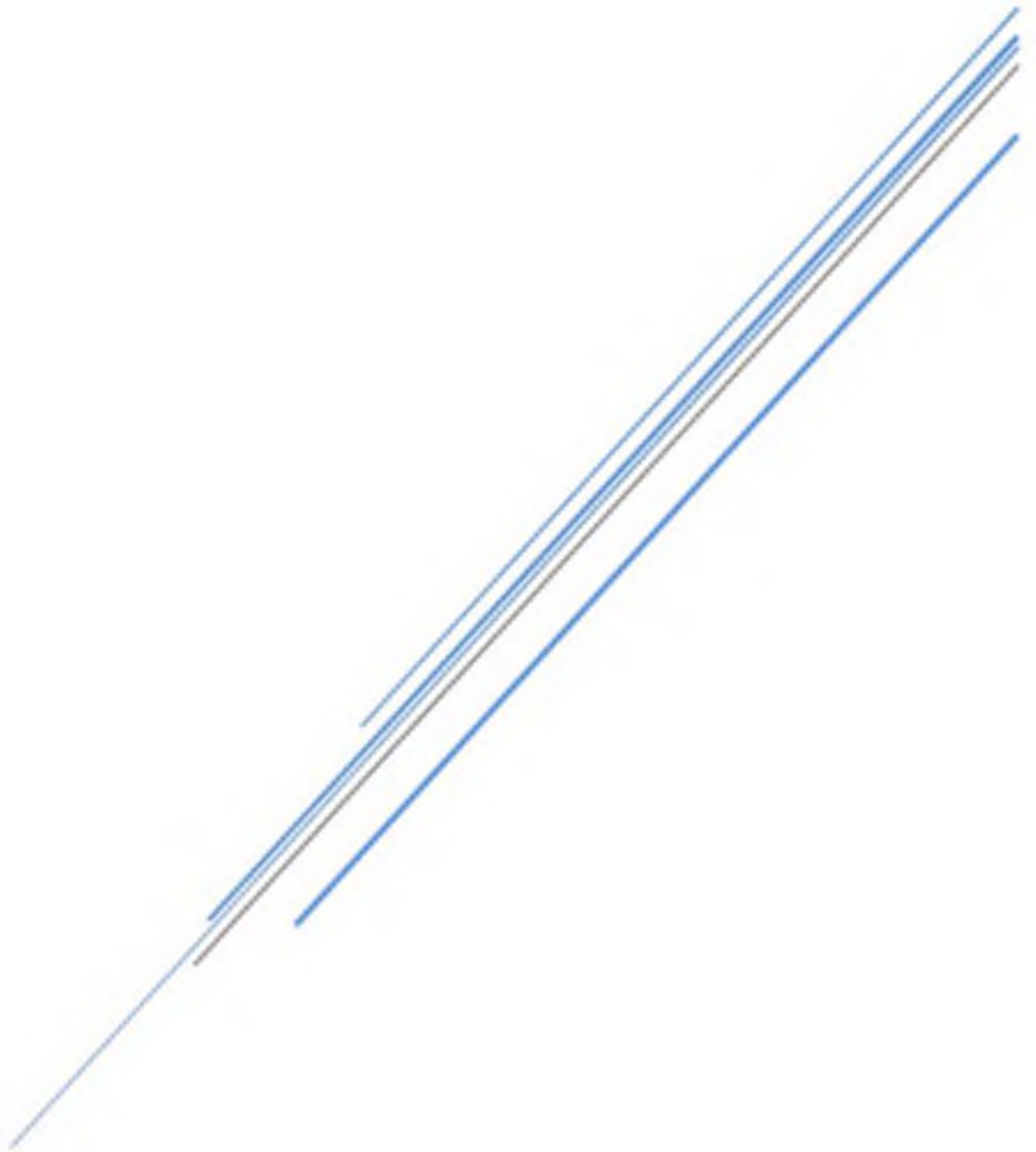
- | | |
|---|-----------|
| 1. HR & Hospitality Industry (An Overview)- | 06 |
| 1.1. Concept of Hospitality | |
| 1.2. HR Activities/Functions in Organizations | |
| 1.3. Diversity in Hospitality Workers | |
| 1.4. Views of HRM in Hospitality | |
| 2. Employee Recruitment & Selection- | 08 |
| 2.1. Recruitment- | |
| 2.1.1. Labor Market-Primary & secondary | |
| 2.1.2. Sources of Recruitment-Internal & External | |
| 2.1.3. Recruitment Process | |
| 2.1.4. Future of Recruiting in Hospitality Industry | |
| 2.2. Selection- | |
| 2.2.1. Concept of Selection | |
| 2.2.2. Process & Factors affecting Selection Efforts | |
| 3. Delivering & Evaluating Training- | 06 |
| 3.1. Concept of Training | |
| 3.2. Methods-Individual-On job and Off Job | |
| 3.3. Group Training-Concept, Preparing Group for Training and Methods | |
| 3.4. Evaluation of Training Programs | |
| 4. Performance Management & Appraisal- | 08 |
| 4.1. Performance Appraisal-Concept and Overview | |
| 4.2. Performance Management- Concept | |
| 4.3. Common Methods of Appraisal | |
| 4.4. Other Methods of Appraisal | |
| 4.5. Behavior Improvement Tactics | |

5. Reward & Compensation Strategies in Hospitality Industry-	08
5.1. Employee's & Employer's View of Pay	
5.2. Remuneration in Hospitality Industries	
5.3. Practice of Tipping	
5.4. Financial(Direct & Indirect) Compensation	
5.5. Non-Financial Compensation	
5.6. Retaining manpower in hospitality	
6. Employee Relation, Welfare, Health & Safety-	12
6.1. Employee Relation-	
6.1.1. Employee or Industrial Relations	
6.1.2. Trade Unions	
6.2. Welfare, Health & Safety Issues-	
6.2.1. Absence Management	
6.2.2. AIDS/HIV	
6.2.3. Drug Misuse-Alcohol & Smoking	
6.2.4. Sexual Harassment	
6.2.5. Stress	
6.2.6. Work time	
6.2.7. Workplace Violence	

Reference Books

1. HRM in Hospitality Industry-David Hayes, Jack D. Ninemeier-John Wiley & Sons
2. HRM for the Hospitality & Tourism Industries-Denis Nickson- Butterworth's
3. HRM in Hospitality Industry-M J Boella, Nelson Thornes Ltd.
4. Human Resource Management in Hospitality by Malay Biswas - Oxford
5. Human Resource Management, P S Rao, Himalaya

SEMESTER IV





North Maharashtra University, Jalgaon

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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

Paper: 401: Current Business Scenario

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objective :

To equip the students with the Current Indian Business Scenario and decision making.

1. Business Environment

(6)

- 1.1. Meaning and Definition, Scope of Environment
- 1.2. Environmental Factors, Characteristic of Business environment, Indian Perspective
- 1.3. Environmental Risk Overview, Methods of Assessing Environmental Risk, Managing Environmental Risk
- 1.4. Market Opportunities
- 1.5. Distribution of Indian Household by Income

2. Economic Overview

(12)

- 2.1. Emergence of Planning, five year plan challenges
- 2.2. The Planning Commission of India, The National Development Council and Niti Aayog
- 2.3. Highlights of Five Year Plan -2012-2017, infrastructure and Indian planning
- 2.4. Policies of Indian Government
 - New Industrial Policy-Historical Background, Meaning and Objectives, Recent Industrial Policy- MSME Sector
 - Indian Industrial Licensing- Objectives, Policy
- 2.5. The Indian Financial System- Structure and Functions, Markets-Money, Capital and Bill
- 2.6. Industrial Structure: Classification of Industry, Industrial Structure of India, Ownership sectors, Major Industries
- 2.7. Privatisation and Disinvestment of PSUs - Concept, Meaning, Objectives and government performance in last decade

3. Problems of Growth in India

(10)

- 3.1. Poverty- Concept, Factors Responsible, People Living Under Poverty Line, Measure to reduce Poverty Line
- 3.2. Unemployment- Concept, Factors Responsible, Types, Government Policy Measures to Reduce Unemployment
- 3.3. Inflation-Meaning, Overview, Measures, Effects of Inflation, Global Inflation and India
- 3.4. Human Development-Concept, Importance, Gender Situation
- 3.5. Rural Development- Concept, Importance, Important features of Rural Economy and Society, Challenges
- 3.6. Other- Parallel Economy, Regional Imbalance, Social Injustice

4. Management Systems (MS)- Certification Schemes

(6)

- 4.1. Overview of Bureau of Indian Standards
- 4.2. Quality Management System (IS/ISO 9001)
- 4.3. Environmental Management System (IS/ISO 14001)
- 4.4. Hazards Analysis and Critical Control Point (IS 15000)
- 4.5. Occupational Health and Safety Management System (IS 18001)
- 4.6. Food Safety Management System (IS/ISO 22000)

- 4.7. Quality Management Systems - Requirements for service quality by public service organizations (IS 15700)
- 4.8. Energy Management System (IS/ISO 50001)
- 4.9. Six Sigma Certification

5. Global Competitiveness (6)

- 5.1. Global Entry Strategies
- 5.2. Technology and Global Competition, Globalization and Human Resource Development, Globalization with Social Responsibility; Negotiating an International Business, Issues in Asset Protection; Multilateral Settlements

6. Indian Rural Market (8)

- 6.1. Understanding Indian Rural Economy- Introduction, Rural Urban Disparities, Diagnosis of Failure, Rural Face of reforms, Towards Cyber India.
- 6.2. Rural Banking System- Rural Indebtedness and Rural Credit, The co-operative Banks, Commercial Banks-Functions, Problems
- 6.3. Agriculture and Indian Economy
- 6.4. Various Employment Generation Schemes.

- **Comprehensive Cases on various business environments can be discussed and solved. (No Case Study in University Examinations)**

REFERENCE BOOKS

1. Business Environment, 2/E- Saleem Shaikh-Pearson
2. Business Environment – Paleri – Cengage Learning
3. Fundamentals of Business Environment by Shukla – Taxmann
4. Economic Environment of Business - By Pailwar-PHI
5. Economic Environment of Business-V. K. Puri , S. K. Misra-Himalayan Books
6. Business Environment- A.C. Fernando-Pearson
7. The International Business Environment – Janet Morrison- ANE Books Chennai
8. International Business Text and cases by Francis Cherunilam- PHI
9. International Business – By Rakesh Mohan Joshi-Oxford University Press
10. <http://www.bis.org.in/index.asp>
11. Cases in the Environment of Business international Perspective, David W Conklin, A South Asian Reprint, Sage India
12. Rural Development-Dr. I. Satya Sundaram, Himalaya Publishing House
13. Rural Marketing Indian Perspective- Awadesh Kumar Singh, Satya Prakash Pandey, New Age International Publication
14. Rural Marketing: Text and Cases- By C. S. G. Krishnamacharyulu- Pearson Education India



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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

402 – E-commerce and Excellence Management

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objective:

- To get in-depth knowledge about various e-commerce terminology
- To understand business excellence

1. Introduction to E-Commerce

- 1.1. History, E-Commerce Concepts, Definitions, Features of Electronic Commerce, Traditional vs. e-commerce transactions.
- 1.2. Electronic Commerce Framework, Benefits & Impact, Factors affecting Electronic Commerce, Challenges of e-commerce.
- 1.3. Classification of e-commerce: B2B, B2C, C2C, B2G, B2E.
- 1.4. The E-Commerce Domain and Applications
 - 1.4.1. e-Customer Relationship Management
 - 1.4.2. Enterprise Resource Planning
 - 1.4.3. e-Supply Chain Management
 - 1.4.4. E-Procurement
 - 1.4.5. E-Banking
 - 1.4.6. Knowledge Management.
 - 1.4.7. Call Center & BPO's etc.

2. E-commerce Models

- 2.1. Native Content Based Models
- 2.2. Native Transaction Models
- 2.3. Transplanted Content based Models
- 2.4. Transplanted Transaction based Models

3. E-Commerce Infrastructure

- 3.1. Meaning and concept of Cluster servers, Virtualization techniques.
- 3.2. Introduction to Cloud Computing, Hadoop and Google Apps Engine.
- 3.3. Network Infrastructure
 - 3.3.1. LAN, MAN, WAN, VPN
 - 3.3.2. TCP/IP Reference Model
 - 3.3.3. Domain Name Systems

4. Security, Encryption and Law

- 4.1. Concept of Firewalls, types, need and benefit.
- 4.2. Computer Crime, types of crime and Computer security classification, E-Commerce threats, Security of Clients and sever, Importance of Security.
- 4.3. Cryptography (Digital Signature): Public Key & Private Key.
- 4.4. Electronic Mail Security.
- 4.5. Cyber law
 - 4.5.1. Cyber laws aims and salient provisions.
 - 4.5.2. Copyright and intellectual Property concept relating to e-commerce.
 - 4.5.3. Cyber laws in India and their limitations.

5. EPS and EDI

- 5.1. **Electronic Payment Systems:**
 - 5.1.1. Online Electronic Payment Systems,
 - 5.1.2. Prepaid and Post Paid Electronic Payment Systems.

5.1.3.E-Cash, e-cheque, credit cards, debit cards, smart cards; E-Banking.

5.1.4.Inter-organizational commerce & intra—organizational commerce.

5.2. Electronic data interchange

5.2.1.Concept and Meaning of EDI and Paperless trading,

5.2.2.EDI architecture, EDI standards and components.

5.2.3.Internet based EDI, Web enabled EDI.

6. Business Excellence

6.1. Concept and Definition of business Excellence.

6.2. Business Excellence Models

6.2.1.EFQM

6.2.2.*Ericsson Business Excellence Model*

6.3. Excellence Maturity Model

6.4. Measuring Business Excellence.

6.5. Comparison of the Baldrige and EFQM

6.6. Quality awards & Excellence.

6.7. Overview & Development of Self-Assessment Process.

6.8. Achieving organizational Excellence.

REFERENCE BOOKS

1. Business on the Net : What's and How's of E-Commerce - Kamlesh N Agarwala - Macmillan Publishers India
2. E-commerce - C.S.V. Murthy – Himalaya Publications.
3. E-commerce: Framework, Technologies & Applications 3rd Edⁿ – Bharat Bhaskar – Tata McGraw Hill
4. Electronic Commerce–Awad - Pearson
5. Electronic Commerce: a Managers Guide – Ravi Kalakota - pearson
6. E-Commerce -Greenstein and Feinman – Tata McGraw Hill
7. Assessing Business Excellence – L.J.Porter& S.J Tanner – ElsevierButterworth Heinemann
8. E-Commerce: The Cutting Edge of Business -Bajaj & Nag – TMH
9. Measuring Business Excellence - by Gopal K. Kanji – Routledge
10. E-Commerce – Mishra - Macmillan



North Maharashtra University, Jalgaon

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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

403: Indian Commercial Law

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objectives:

- To provide the Basic knowledge about the Company.
- To increase the Understanding level of Individual about rights as a Consumer.
- To aware about the basic terms in the field of Information Technology.
- To provide the practical aspects in the light of case study.

1. The Consumer protection Act, 1986 (7)

- 1.1. Who is consumer
- 1.2. who can make a complaint
- 1.3. Unfair Trade practices
- 1.4. Restrictive Trade Practices
- 1.5. Medical services and the consumer protection Act,1986
- 1.6. Consumer Protection Councils
- 1.7. Consumer Dispute Redressal Agencies

2. The Company Law – Companies Act 2013

- 2.1. Definition, characteristics , & types of company
- 2.2. Setting up of a company
 - 2.2.1. Incorporation of company
 - 2.2.2. Prospectus & public offer
 - 2.2.3. share capital , debentures
- 2.3. Management & Administration
 - 2.3.1. Directors: - Types, Duties & Liability, Responsibilities
 - 2.3.2. Corporate Social Responsibility
- 2.4. MOA & AOA: - Meaning & Content
- 2.5. Winding up of the company & its types

3. Cyber laws – Information Technology Act 2000

- 3.1. Objectives & scheme of the IT Act 2000
- 3.2. Digital signature – i) meaning ii) Authentication of electronic records – Asymmetric Crypto system , Electronic records , Key pair , Private key , Public Key
- 3.3. Electronic Governance –
 - 3.3.1. Legal recognition of electronic records & digital signature
 - 3.3.2. Use of electronic records & digital signature in Government & its signature
 - 3.3.3. Retention of Electronic Records
 - 3.3.4. Powers to make rules by central government in respect of digital signature
 - 3.3.5. Definitions of – Information , electronic form , Computer , Computer network , Computer resources , Computer system , Data & functions.
 - 3.3.6. meaning of certifying authority under the act

4. Right to Information Act 2005

- 4.1. Important theme w.r.t. Citizen, information & public authority
- 4.2. Enforcement and Penalty under act
- 4.3. Right of Third Party

5. Arbitration

- 5.1. What is Arbitration

- 5.2. Arbitration Agreement
- 5.3. Appointment of Arbitrator
- 5.4. Arbitration Proceedings
- 5.5. Arbitral Tribunal
- 5.6. Arbitral Award
- 5.7. New York convention Awards
- 5.8. Geneva Convention Awards

6. Case studies in Indian commercial laws – Typical case based on above topics only

REFERENCE BOOKS

1. Mercantile & Commercial Laws by Rohini Aggrawal – Taxman Publication
2. Legal Aspects of Business by Akhileshwar Pathak – Tata McGraw Hill
3. Legal Aspects of Business by R.R. Ramtirthkar – Himalaya Publishing House
4. Mercantile Law by S.S. Gulshan – Excell Books
5. Elements of Merchantile Laws by N.D. Kapoor – Sultan Chand & Sons
6. Business law – Bulchandani - Himalaya



North Maharashtra University, Jalgaon

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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

404: Entrepreneurship & Project Management

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

-
- 1. Entrepreneur and Entrepreneurship (04)**
 - 1.1. Entrepreneur - Concept, Functions, Types, Characteristics, Qualities and Role – Ideal Entrepreneur
 - 1.2. Entrepreneur vis-à-vis Professional Manager, Intrapreneur, Copreneur
 - 1.3. Distinction between wage employment, self employment & Entrepreneurship
 - 1.4. Entrepreneurial Competencies
 - 1.5. Entrepreneur and Entrepreneurship – Factors, Barriers & Problems and Process of Entrepreneurship

 - 2. Entrepreneurship Development (10)**
 - 2.1. Entrepreneurship Development: Concepts, Factors affecting, Development Cycle and Strategy
 - 2.2. Entrepreneurship Development Program (EDP): Concepts, Objective, Contents, issues, Phases, Evaluation. Institutions conducting EDP's in India
 - 2.3. Entrepreneurship Development Training: Importance, Objective, Methods
 - 2.4. 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)
 - 2.5. Role of Central and State Government in Entrepreneurship Development

 - 3. Emerging areas in Entrepreneurship (08)**
 - 3.1. Women Entrepreneurship: Types, Challenges, Opportunities, Achievements, Problems, Remedial Measures & supporting Institutions and Role Models of Woman Entrepreneurs in India, Self Help Groups,
 - 3.2. Rural Entrepreneurship: meaning, need, Problems, Development, Role of NGO's, Entrepreneurship in agriculture, TRYSEM.
 - 3.3. Social Entrepreneurship: Genesis & Characteristic
 - 3.4. E- Entrepreneurship: Concept, Purpose and Essence.

 - 4. Family Business Management (08)**
 - 4.1. Importance of Family Business
 - 4.2. Types of Family business
 - 4.3. History of family businesses
 - 4.4. Responsibilities and Rights of Family Shareholders of a Family Business
 - 4.5. Succession in Family Business
 - 4.6. Pitfalls of the Family Business
 - 4.7. Improving Family Business Performance
 - 4.8. How to Overcome Nepotism in Family Businesses
 - 4.9. Management Development Plan in Family Business
 - 4.10. How to save the Family Business
 - 4.11. Seasonal Nature of the Family Business

 - 5. Project (08)**
 - 5.1. Project : Concept, Classification, Identification, Project Design, Project Appraisal, Project Planning,
 - 5.2. Formulation of Project Report - Cost Benefit Analysis, Technical Feasibility, Financial Feasibility, Managerial Feasibility, and Market Survey.
 - 5.3. Financing of the Project – Sources of Finance
 - 5.4. Role of Financial Institutions – Commercial Banks, IDBI, ICICI, SIDBI, SFC's, IFCI, NABARD, Venture Capital.

6. Project Management

(10)

- 6.1. Project Management Life Cycle: Project Initiation, Planning, Execution, Closure
- 6.2. Project Monitoring and Control – Parameters, Process
- 6.3. Monitoring and Control of group of Projects
- 6.4. Computer based Project Management
- 6.5. Integrated Project Management – Management of Project Finances, Materials – Production – Marketing – Personnel Management.
- 6.6. Project Audit

*** Out of 40 internal marks the student has to prepare & submit a business plan for 10 marks. The students may refer & take help from local DIC or Banks.**

REFERENCE BOOKS

References for 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 Ial 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. Project Management by Maylor - Pearson
4. Projects - [Prasanna Chandra](#) – CFM TMH Professional Series -Tata McGraw Hill
5. Project Management : Managerial Approach by Jack R. Mereditts and Samuel J. Mantel Jr., Willey Publications
6. Contemporary Project Management by Timothy J. Kloppenborg, Cenage Learning
7. Project Management and Control by Narendra Singh, Himalaya Publishing House
8. Project Management by Panneerselvam, Senthilkumar – PHI
9. Project Management by Nagarajan – New Age International

Specialization –A – Financial Management



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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

405 A –Financial Derivatives

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objectives:

- To understand the concept of derivatives, various derivative instruments and the techniques of hedging the risks.

1. Introduction to Financial Derivatives

(08)

- 1.1 Financial Derivatives: Meaning, need, Features, Types, Uses, Critiques
- 1.2 Derivative markets – participants & functions
- 1.3 Growth of Financial Derivatives in India
- 1.4 The regulatory framework of Derivatives trading in India

2 Futures & Forwards

(12)

- 2.1 Financial Futures: Contracts & Types
- 2.2 Future Market: Functions & Operators
- 2.3 Forward contracts: Concept, Features & Classifications
- 2.4 Future Vs Forwards
- 2.5 Pricing of Future and Forwards
- 2.6 Hedging strategies – hedging with Stock Index Futures, types of members & margining System in India
- 2.7 Futures trading on BSE & NSE

3 Options Market & Pricing

(12)

- 3.1 Options: Meaning, Need, Terminology, Valuation
- 3.2 Options v/s Futures
- 3.3 Types of Options contracts – Call & Put options, Covered & Uncovered options
- 3.4 Trading Strategies involving Options – basic Option Positions – margins – Options on stock indices
- 3.5 Option markets in India on BSE & NSE
- 3.6 Intrinsic value & Time value, Pricing at Expiration
- 3.7 Factors affecting Options pricing, Put-Call Parity Pricing Relationship
- 3.8 Pricing models – Introduction to Binomial Pricing model, Black Scholes Option Pricing model

4 Swaps

(06)

- 4.1 Swaps: Concepts, Nature, Evolution, Features & Structure of Swaps
- 4.2 Types – Interest-rate Swaps, Currency Swaps, Commodity Swaps, Equity Swaps
- 4.3 Swap variant, Swap Dealer Role
- 4.4 Economic Functions of Swap transactions.

5 Hedging & Credit Derivatives

(10)

- 5.1 Concept
- 5.2 Fixed Hedging with options - concepts
- 5.3 Naked & covered Positions
- 5.4 Strategies
- 5.5 Hedging option Portfolio
- 5.6 Credit Derivatives: Concept, feature, growth, Benefits & Credit derivatives in India

REFERENCE BOOKS:

1. Financial Derivatives: Theory concepts & problems – S.L.Gupta – Prantice Hall India
2. Derivatives And Risk Management, 2/E Srivastava Oxford University Press
3. Options, Futures & Other Derivatives - Hull C John – Pearson Educations Publishers
4. Derivatives And Risk Management - JayanthVerma- Tata Mcgraw Hill
5. Futures Markets: theory & practice” – Sunil K Parmeswaran – Tata McGraw Hill.
6. Financial Derivatives – Bishnupriya Mishra ,Swaroop – Excel Books
7. Risk Management: insurance & derivatives – Kotreshwar - Himalaya
8. Derivatives Valuation & Risk Management – David Thomas, Dubofsky Miller - Oxford Publication
9. Financial Derivatives – An introduction to Futures, Forwards, & Options – Read Head – Prentice Hall of India
10. Derivatives – T.V.Somnathan - Tata McGraw Hill.
11. Financial Derivative & Risk Management – O.P.Agrawal – Himalaya Publication
12. Risk Management & Insurance Arunajatesan Macmillan



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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

Paper: 406-A International Financial Management

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objectives of the course:

- To study the international environment in which the business operates
- To understand Exchange rate mechanism as well as international accounting practices

1. Fundamental of International Management	(06)
1.1 International finance: Importance, goals, features, & Scope	
1.2 Domestic Vs International finance	
1.3 Emerging challenges & Responsibilities of finance Manager	
2. Exchange Rate Mechanism	(26)
2.1 Structure/ Features of Foreign Exchange Market.	
2.2 Exchange Rate	(08)
2.2.1 Forex reserves	
2.2.2 Exchange rate theories	
2.2.3 Currency future quotes	
2.2.4 Speculations	
2.2.5 Hedging	
2.2.6 International Parity	
2.2.6.1 Exchange Rate Determination	
2.2.6.2 Factor Affecting Exchange Rate	
2.2.6.3 Balance of Payment & Purchasing Power Parity (PPP) theory of Exchange.	
2.2.6.4 Real Exchange Rate & Real Effective Exchange Rate	
2.2.6.5 Interest Rate & Exchange Rate	
2.2.6.6 Covered Interest Rate & Interest Rate Parity, Forward Rate Parity	
2.2.6.7 The Fischer Effect	
2.2.6.8 Exchange Rate Forecasting	
2.3 Foreign Exchange Markets	(05)
2.3.1 International Swap Market	
2.3.1.1 Currency Swap	
2.3.1.2 Fixed rate Currency Swap	
2.3.1.3 Swap Risk	
2.4 Global Financial Derivatives Market	(03)
2.4.1 Structure of Derivatives Market	
2.4.2 Credit Default Swap	
2.4.3 VaR methodology and Analysis	
2.5 Financial Integration	(02)
2.6 Foreign Exchange Market in India	(02)
2.7 Arbitrage- Two Point & Triangular Arbitrage	(01)
2.8 Forward & future spot rate	(02)
2.9 International Transaction Mechanism	(03)
2.9.1 Nostro, Vostro and Loro Account,	
2.9.2 SWIFT, CHIP, CHAP, Telegraphic Transaction (IT)	

3. International Accounting (06)

- 3.1 Consolidation of Financial Statements & its analysis
- 3.2 Accounting of Inflationary trends
- 3.3 IFRS
- 3.4 Transfer pricing
- 3.5 Financing of foreign trade
 - 3.5.1 Documentation
 - 3.5.2 Modes of Payment
 - 3.5.3 Methods of Financing
 - 3.5.4 EXIM Bank

4. International Monetary system (04)

- 4.1 International Monetary Fund (IMF)
 - 4.1.1 Constitution, Role & Responsibility of IMF
 - 4.1.2 Funding facilities, International liquidity
 - 4.1.3 Special Drawing Rights (SDR)
 - 4.1.4 Role in Post Bretton Woods world
- 4.2 Convertibility & Currency

5. Balance of Payment (06)

- 5.1 India's Balance of Payment
- 5.2 Importance, Functions, Principles & Components of Balance of Payment
- 5.3 Accounting of Balance of Payment: Deficit & Surplus
- 5.4 Elasticity approach Vs Absorption Approach
- 5.5 General Equilibrium approach
- 5.6 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



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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

Paper: 407 A – Case Studies in Financial Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objectives :

To depict thorough knowledge of the subject and develop decision making abilities

The student has to Select and discuss the case studies related to paper no. 105, 205, 207 and respective specialization papers no. 304, 305, 306, 307, 405, 406 those will have impact on business decision making in each paper.

Specialization -B - Marketing Management



North Maharashtra University, Jalgaon

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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

405 B – Marketing Research and Business Analytics

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objectives:

- The purpose of this course is to cultivate research skills in students and a beginning practitioner. The focus will be on qualitative (exploratory) and quantitative research execution and the application of research findings and analysis in decision making.
- The course is geared toward the practical application of research, though gaining a working knowledge of certain terminology will be important.

1. Introduction

(06)

- 1.1. Marketing research: Meaning, Scope, Purpose, Uses, Limitations and Threats to Marketing Research
- 1.2. Marketing Research and Marketing Management
- 1.3. Business research and its application vis-à-vis marketing
- 1.4. Marketing research process
- 1.5. Marketing Intelligence system:
- 1.6. Concept, Components, Scope, Significance
- 1.7. MIS and Marketing Decision Support System (MDSS)
- 1.8. Ethics in Marketing Research

2. Data Collection

(08)

- 2.1. Use of internet for primary data
- 2.2. Locating and Evaluating Secondary data
- 2.3. Measurement & Scaling
- 2.4. Concept of Measurement & Scaling
- 2.5. Types of measurement scales- Comparative, Non comparative
- 2.6. Attitude measurement scales, Attribute measurement scales
- 2.7. Questionnaire design & construction

3. Market Survey as a method of Data Collection

(12)

- 3.1. Market survey: Nature, Meaning and Objectives of Market survey
- 3.2. Types of Market survey
- 3.3. Field work: Conducting a Survey
- 3.4. Conducting Consumer Perception survey
- 3.5. Conducting Consumer Satisfaction survey
- 3.6. Conducting Concept Testing survey
- 3.7. Preparation of Report based on the conducted survey

4. Data Analysis Techniques and Interpretation

(12)

- 4.1. Regression Analysis,
- 4.2. Factor Analysis,
- 4.3. Cluster Analysis,
- 4.4. Discriminant Analysis,
- 4.5. Conjoint Analysis,
- 4.6. Multi-Dimensional Analysis
- 4.7. The Interrelationship between Analysis and Interpretation
- 4.8. Improper interpretation
- 4.9. Improper Analysis
- 4.10. The interpretative process

5. Specific Research Applications

(10)

- 5.1. Test Marketing
- 5.2. Advertisement Research: Promotion Research, Brand Equity Research, Brand Name testing
- 5.3. Industrial Marketing Research
- 5.4. Export Marketing Research
- 5.5. Sales Analysis forecasting
- 5.6. Pricing Research
- 5.7. Consumer Behavior Research
- 5.8. Rural Marketing

6. **Live Project 1:** *Students should visit any marketing organizations and conduct the any one of mentioned in 3rd unit & unit 5th surveys and prepare a survey report.*

7. **Live Project 2:** *As mentioned in live project 1, students should enter the data in SPSS or MS Excel to test the above mentioned multivariate data analysis techniques.*

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 Albaum - Prentice Hall Publications
10. Marketing Research by Ramanuj Majumdar –New age International
11. Marketing Research by D.M. Sarawte – Everest
12. Marketing Research by Shajahan –Macmillan



North Maharashtra University, Jalgaon

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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

Paper: 406 B - Retail Management And Digital Marketing

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objectives:

- To develop understanding about the retail sector and its current requirements
- To highlight the new trends of using technology and equip students to handle such developments in markets and marketing practices.

- 1. Retailing:** (6)
 - 1.1. Concept
 - 1.2. Importance
 - 1.3. Functions
 - 1.4. Indian Vs. Global Scenario
- 2. Retail format and retail locations** (6)
 - 2.1. Store and non-store retailing
 - 2.2. Franchising
 - 2.3. Unconventional channels
- 3. Merchandising:** (8)
 - 3.1. Concept, Importance, Functions
 - 3.2. Steps in **merchandising** planning .
 - 3.3. Category management: Definition and process
 - 3.4. Introduction to Private label brands
- 4. Principles and Drivers of New Marketing Environment - Digital Media:** (10)
 - 4.1. Industry - Reaching Audience Through Digital Channels
 - 4.2. Traditional and Digital Marketing
 - 4.3. Introduction to Online Marketing Environment
 - 4.4. Dotcom Evolution and Internet Relationships
 - 4.5. Integrating E-Business to an Existing Business Model
 - 4.6. Online Marketing Mix
 - 4.7. Digital Signage
- 5. Internet Enabled Retailing** (8)
 - 5.1. Turning Experience Goods into Search Goods
 - 5.2. Personalization through Mass Customization
 - 5.3. Choice Assistance
 - 5.4. Personalized Messaging
 - 5.5. Selling through Online Intermediaries
 - 5.6. Direct to Customer Interaction - Online Channel Design for B2C and B2B Marketing.

6. Integrating Online Communication into IMC Process - Online Advertising (10)

- 6.1. Email Marketing and Viral Marketing
- 6.2. Affiliate Marketing - Participatory
- 6.3. Communication Networks - Social Media Communities
- 6.4. Consumer Engagement
- 6.5. Networks - Customer – Led Marketing Campaigns
- 6.6. Legal and Ethical aspects related to Digital Marketing.

Reference Books

1. Retailing Management – Swapna Pradhan
2. Retail Management- Berman, Evans; Pearson
3. Retail Management Suja Nair- himalaya
4. Strauss Judy, E-Marketing, Prentice Hall, India



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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

Paper: 407 B: Case studies in Marketing

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objectives:

- To enhance analytical skills of students

The student has to select and discuss the case studies related to paper no 204 and respective specialization papers no 304, 305, 306, 307, 405, 406, those will have impact on business decision making in each paper

Specialization – C – Human Resource Management



North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

405 C – Performance & Compensation Management

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objectives:

- To study different performance parameters in organisation.
- To study Performance Management Process.
- To understand compensation structure in organisation.

Performance Management-

1. Introduction- (07)

- 1.1. Meaning, Definition and Purpose of Performance Management
- 1.2. Standards of Performance and Guidelines to set Performance Standards
- 1.3. Determinants of Performance
- 1.4. Approaches to Measure Performance
- 1.5. Characteristics of Ideal Performance System
- 1.6. Disadvantages of Poorly Implemented Performance System

2. Performance Management Process- (04)

- 2.1. Performance Planning
- 2.2. Performance Execution
- 2.3. Performance Assessment
- 2.4. Performance Review
- 2.5. Renewal & Re-contracting

3. Team Performance Management- (05)

- 3.1. Definition, Importance & Need of Teams
- 3.2. Types of Teams
- 3.3. Purposes and Challenges of Team Performance Management
- 3.4. Rewarding Team Performance
- 3.5. Techniques/Measures to enhance Team Performance

Compensation Management-

4. Introduction- (08)

- 4.1. Meaning, Concept, Objectives & Types of Compensation
- 4.2. Compensation Management Process
- 4.3. Determining Compensation: Wage Mix
- 4.4. Job Evaluation-Concept, Objectives, Principles and Methods/Techniques
- 4.5. Managerial/Executive Compensation

5. Wages & Salary Administration- (10)

- 5.1. Concept and Kinds of Wages
- 5.2. Objectives of Sound Wage Policy
- 5.3. Principles of Wages and Salary Administration
- 5.4. Wage Determinants
- 5.5. Wage Boards
- 5.6. Wage Differentials-

- 5.7. Concept, Rationale of Wage Differentials
- 5.8. Types of Wage Differential-Pay for Performance, Pay for Knowledge and Skills, Competency Based Pay
- 5.9. Methods of Wage Payments
- 5.10. Components of Wage Structure in India
- 6. **Incentives & Fringe Benefits** (08)
 - 6.1. **Incentives-**
 - 6.1.1. Meaning, Need and Types of Incentives
 - 6.1.2. Individual & Group Incentive Plans
 - 6.2. **Fringe Benefits-**
 - 6.2.1. Meaning, Need, Objectives & Types
 - 6.2.2. Advantages and Disadvantages of Fringe Benefits

- * Some Important Factors in Wage Administration MBA-HR Students must aware about-** (06)
- i. Income Tax Calculations on Salaries/TDS and e-Return Filing
 - ii. Preparation of Salary Sheet
 - iii. Provident Fund Calculations
 - iv. Bonus Calculations
 - v. Gratuity Calculations
 - vi. Retirement Calculations
 - vii. Calculations of all above things on MS-Excel

** Faculties are expected to take efforts on these points to improve Skills and Knowledge of students about subject. The above calculations are not expected in Exam Paper.*

Reference Books

1. Performance Management – Kohli - Oxford University Press
2. Performance Management by Herman Aguinis.- Pearson
3. Compensation Management An Indian Perspective 2e –Bhattacharyya -Oxford University Press
4. Performance Management-Chadha, Macmillan
5. Compensation by Milkovich, Newman, VenkataRatnam – Tata McGraw Hill (SiE)
6. Essentials of Human Resource Management By P. SubbaRao – Himalaya Publishing
7. Human Resource Management By Snell, Bohalender - Cengage Learning
8. Human Resource Management-Pande & Basak, Pearson
9. Human Resource Management- Gary Dessler & Biju Varkkey - Pearson Prentice Hall
10. Human Resource Management by S. S. Khanka – S. Chand & Sons



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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

406 C – International Human Resource Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objectives:

- To study HRM practices in International Environment
- To compare domestic HRM practices w.r.to International context
- To get indepth knowledge on Repatriation

- 1. Introduction To (IHRM) International Human Resource Management (10)**
 - 1.1. IHRM: Definition,
 - 1.2. Internationalization & HRM
 - 1.3. Domestic Vs International HRM
 - 1.4. Growing interest in IHRM
 - 1.5. Functional positioning of IHRM
 - 1.6. Organizational context of IHRM
 - 1.7. International Division of Labour
 - 1.8. Barriers to effective Global HRM
- 2. Social and Cultural Context of IHRM (08)**
 - 2.1. Culture & Cultural Sensitivity
 - 2.2. Social Environment
 - 2.3. Religions and Economic Implications
 - 2.4. Multiculturalism
 - 2.5. Cultural Predisposition
 - 2.6. Cultural Dimensions
 - 2.7. Managing across culture
- 3. International Joint Ventures (08)**
 - 3.1. Concept & Nature of International Joint Venture
 - 3.2. Motives & Extent of Merger & Acquisitions
 - 3.3. HRM factors in IJV
 - 3.4. Role & impact of Culture in International Joint Venture
 - 3.5. Methods of Overcoming Cultural & other Problems in IJV
- 4. Human Resource Practices in International environment (10)**
 - 4.1. Global HR Planning
 - 4.2. Recruitment and Selection in International Context
 - 4.2.1. Company Motive
 - 4.2.2. Individual Motive
 - 4.2.3. Recruitment Methods
 - 4.2.4. Selection Criterion & Techniques
 - 4.3. Emerging trends in training for competitive advantage
 - 4.4. Developing staff through International assignment
 - 4.5. Women Expatriates -The Glass Ceiling Phenomenon
- 5. International Industrial Relations (07)**
 - 5.1. Key Issues in International IR
 - 5.2. Trade Union & International IR
 - 5.3. IR policy of MNC's

5.4. MNC's Characteristic in Neutralizing the power of Labour Unions

5.5. MNC's Strategy towards International IR

6. Repatriation

(07)

6.1. Concept of Repatriation

6.2. Benefits from returnees

6.3. Challenges of Re-entry

6.3.1. Individual Perspective

6.3.2. Organisational Perspective

6.4. Repatriation Process

6.5. Managing repatriation

REFERENCE BOOKS:

1. International Human Resource Management by K. Ashwathappa – Tata McGraw Hill
2. Introduction to International Human Resource Management, 5/E by Crawley, Oxford University Press
3. International Human Resource Management by Tony Edwards & Chris Rees.- Pearson
4. International Human Resource Management by Peter Dowling &Denice Welch – Cengage Learning
5. International Human Resource Management by Sengupta, Bhattacharya – Excel Books
6. International Human Resource Management By P. SubbaRao – Himalaya Publication
7. International Human Resource Management by P L Rao – Excel Books
8. International Human Resource Management (2/e) by Gupta -Macmillan



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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

Paper: 407 C – Cases in Human Resource Management

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objective:

1. To Increase the understanding of what managers should and should not do in guiding a business to success.
2. To identify strategic issues that need to be addressed, evaluating strategic alternatives, and formulating workable plans of action.
3. To gain in-depth exposure to different industries and companies, thereby acquiring something close to actual business experience.

The student has to Select and discuss the case studies related to paper no. 104, 106, 206, and respective specialization papers no. 304, 305, 306, 307, 404, 405 those will have impact on business decision making in each paper.

To solve the case studies following steps may be considered –

Steps to solve case Study

1. Fact/ Summary
2. Problem Identification
3. Assumptions (if Any)
4. Analysis of problems
5. Alternate Solution
6. Feasibility of solution
7. Best (optimum) Solution
8. Action/Implementation Plan

Specialization –D – Operations Management



North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

405 D –Industrial & Productivity Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

Objectives :-

- 1) To study work study work management to improve productivity of organization.
- 2) To study measurement of work of labour & optimal utilization of plant & equipment to decrease waste, scrape.

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 (06)

- 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 (08)

- 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 (08)

- 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

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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

Paper: 406 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. 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 | (06) |
| 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) Total Quality Management- Poornima Charantimath, Pearson Education
- 2) Quality Management by Howard Gitlow, Alan J, Rosa O, David Levine, Mcgraw-Hill, 3rd Edition
- 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



North Maharashtra University, Jalgaon

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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

Paper: 407 D – Case study

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

Objective:

- To gain in-depth exposure to different industries and companies, thereby acquiring something close to actual business experience.

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.

Specialization –E – International Business Management



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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

405E-International Human Resource Management And Diversity Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objective of the Course:

- To develop a sound conceptual framework for understanding International HRM.
- To get in-depth knowledge in Diversity Management.
- To be able to understand management of global teams.

1. INTRODUCTION: OVERVIEW

(4)

- 1.1. Concepts of international management
- 1.2. What is IHRM
- 1.3. Issues in IHRM
- 1.4. Barriers to effective Global HRM
- 1.5. Expanding the role of HRM in international firms
- 1.6. Domestic Versus International HRM

2. INTERNATIONAL STRATEGIC HUMAN RESOURCE MANAGEMENT

(8)

- 2.1. Introduction
- 2.2. Peculiarities of Global Strategic Management
- 2.3. Value Creation
- 2.4. Global Strategic Management Process
- 2.5. MNC's Business Strategies and HRM Strategies
- 2.6. Formulation of Alternative Business Unit Level Strategies
- 2.7. Collaborative Strategies
- 2.8. Organizational and Human Resource Strategies

3. INTERNATIONAL INDUSTRIAL RELATIONS

(8)

- 3.1. Introduction
- 3.2. Three Actors of Industrial Relations
- 3.3. Trade Unions
- 3.4. Concerns of Trade Unions in Multinational Companies
- 3.5. Collective Negotiations
- 3.6. Disputes/ Conflicts
- 3.7. Quality Circles and Participative Management

4. MANAGING CULTURAL DIVERSITY

(10)

- 4.1. Introduction
- 4.2. Culture and its factors
- 4.3. Cross-cultural Differences in the Workplace
- 4.4. Workforce Diversity
- 4.5. Breaking the Glass-ceiling for Women and Minorities
- 4.6. Globalization and Mobility of Human Resources
- 4.7. Managing Diversity: Strengths and Weaknesses
- 4.8. Strategies for Managing Workforce Diversity

5. MANAGING PEOPLE IN INTERNATIONAL CONTEXT

(8)

- 5.1. Human Resource Management and Beyond
- 5.2. French Culture and people Management
- 5.3. The American Model of People Management
- 5.4. Japanese People Management
- 5.5. Chinese Model of People Management
- 5.6. Indian People Management

6. LEADING AND MANAGING GLOBAL TEAMS

(10)

- 6.1. Cross-Cultural misperceptions, misinterpretation and misevaluation
- 6.2. Managing expatriates effectively, equitably and ethically
- 6.3. Managing multicultural workforce
- 6.4. Domestic multiculturalism
- 6.5. Teams: the organization in microcosm
- 6.6. Types of diversity in teams
- 6.7. Cultural diversity's impact on teams
- 6.8. Conditions of high-performing multicultural teams
- 6.9. Managing culturally diverse teams

REFERENCE BOOKS:

1. International Human Resource Management by K. Ashwathappa – Tata McGraw Hill
2. Introduction to International Human Resource Management, 5/E by Crawley, Oxford University Press
3. International Human Resource Management by P L Rao – Excel Books
4. International Human Resource Management By P. SubbaRao – Himalaya Publication
5. International Human Resource Management by Tony Edwards & Chris Rees.- Pearson
6. International Human Resource Management by Peter Dowling &Denice Welch – Cengage Learning
7. International Human Resource Management by Sengupta, Bhattacharya – Excel Books
8. International Human Resource Management (2/e) by Gupta -Macmillan



North Maharashtra University, Jalgaon

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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

406E-International Marketing Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objective of the Course:

1. To develop a sound conceptual framework for understanding International Marketing management practices.
2. To get in-depth knowledge in International Marketing Mix Strategies.
3. To be able to understand Export Management.

1. Introduction to International marketing.

- 1.1. International Market.
- 1.2. International Marketing.
- 1.3. International orientation and stages.
- 1.4. International Market orientation.
- 1.5. International Marketing environment; External & Internal environment. International trading environment, trading blocs
- 1.6. International market entry strategies.

2. International Product strategy.

- 2.1. Hierarchy of product, Product design strategy.
- 2.2. Product life cycle management.
- 2.3. Product planning for global markets.
- 2.4. Standardization vs. Adaptation.
- 2.5. Packaging and labeling.

3. International Pricing strategy.

- 3.1. Role of Pricing, Factors affecting Pricing.
- 3.2. Pricing strategies – cost based, Transfer pricing, Dumping, Skimming price, penetration price, price discounts.
- 3.3. Price market relationship, Price escalation, cost of exporting, Taxes, tariffs, exchange rate.
- 3.4. Price control: Approaches to lessening price escalation, leasing in international markets.

4. International Promotion strategy.

- 4.1. Promotion decisions: complexities and issues, International advertising.
- 4.2. Marketing environment & Promotional strategies.
- 4.3. Role of export promotion organizations, Trade fairs and exhibitions.
- 4.4. International marketing communication mix.

5. International Distribution.

- 5.1. International distribution channels, types of channels.
- 5.2. International channel conflict and channel decisions.
- 5.3. Distribution planning and functional excellence.
- 5.4. International logistics management and strategy.

6. Export Management.

- 6.1. Export procedure and documentation.
- 6.2. Managing export decisions.
- 6.3. Export contracts; risk coverage.
- 6.4. Exit policy.
- 6.5. Limitations of International marketing.

REFERENCE BOOKS:

1. International Marketing, R.M.Joshi, OUP
2. Global Marketing Management, K. Lee, OUP
3. International Marketing-Cateora.
4. Managing International Marketing –Varkey.
5. Creating Market across the Globe: Strategies for business excellence – Korwar
6. Essence of International Marketing –Stan Paliwoda.
7. Global Marketing Management-Warren J. Keegan.
8. International Marketing Management-Subhash Jain.
9. International Marketing Micheal- R Czinkota, Ilkka A Ronkainen
10. International Marketing, R.M. Joshi



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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

Paper:407 E–Cases in International Business Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objective:

- To be able to understand & solve case studies in International Business Management.

The student has to Select and discuss the case studies related to respective specialization papers no. 304E, 305E, 306E, 307E, 404E, and 405E those will have impact on business decision making in each paper.

Specialization –F – Agro Business Management



North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

405 F- RURAL DEVELOPMENT

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objectives

- To understand the basic concept regarding rural development.
- To create awareness about various schemes and programs which are helpful for rural development.

- 1. Rural Development (7)**
 - 1.1. Concept and Basic Elements of Rural Development
 - 1.2. Nature & Scope of Rural Development
 - 1.3. Importance of Rural Development
 - 1.4. Objectives of Rural Development
- 2. Approaches and Determinants of Rural Development (8)**
 - 2.1. Community Development Programmes
 - 2.2. Intensive Agricultural District Programme
 - 2.3. Concept of Integration
 - 2.4. Changes in the utilization of natural resources
 - 2.5. Changes in employment, an increase in Capital.
- 3. Rural Development Special Schemes and policies (7)**
 - 3.1. Stress on special schemes
 - 3.2. Limitations of special schemes
 - 3.3. Strengthening special schemes
 - 3.4. Need and Goals of rural development policy
 - 3.5. Rural development policy in India
- 4. Employment Generation Programs (10)**
 - 4.1. Characteristics of Rural Employment
 - 4.2. Measures needed for employment generation
 - 4.3. Incidence of rural unemployment
 - 4.4. Crash scheme for Rural Development
 - 4.5. Pilot Intensive Rural Employment projects
 - 4.6. Antyodaya
 - 4.7. Employment Guarantee scheme
 - 4.8. Jawahar Rojgar Yojana
- 5. Role of Banking and Finance in Rural Development (8)**
 - 5.1. Role of Cooperative and Commercial Banking in Rural sector
 - 5.2. NABARD, its Schemes & Patterns
 - 5.3. Role of Self-Help Groups in rural development
 - 5.4. The role of foreign investment
- 6. Rural Development Administration and Panchayati Raj Institution (8)**
 - 6.1. Functions of Panchayati Raj System
 - 6.2. Merits & demerits of Panchayati Raj System
 - 6.3. Strengthening the Panchayati Raj System
 - 6.4. Rural Development Administration

Reference Books:

1. Rural Development by – Dr. I. Satya Sundaram, Himalaya Publishing House
2. Rural Development and Planning in India – Devendra Thakur, Deep & Deep Publications, New Delhi
3. Rural Industrialization in India – Shrinivas Thakur – Streling Publishess, New Delhi
4. Dynamics of Rural Development Power 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
7. Rural Development, Principles, policies and management- Katar Singh, Sage Publication



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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

406 F- Agro entrepreneurship and Project Management

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objectives

- 1) To understand the basic concepts of entrepreneurship and project management
- 2) To aware learners towards agro entrepreneurship.
- 3) To provide proper guidance to set a particular agro based project.

- 1. Rural Entrepreneurship (8)**
 - 1.1. Concept of rural entrepreneurship
 - 1.2. Aims of rural entrepreneurship
 - 1.3. Opportunities and barriers to entrepreneurship in rural India
 - 1.4. Policies Governing Entrepreneurship
- 2. Skill Development, ICT and rural entrepreneurship (10)**
 - 2.1. Skills required for entrepreneurship
 - 2.2. Rural applicability
 - 2.3. Government training programs for skill development
 - 2.4. Rural ICT initiatives
 - 2.5. Role of ICT in changing rural India
 - 2.6. Need to create rural ICT entrepreneurs
- 3. Introduction to Project Management (10)**
 - 3.1. Searching for a Business Idea
 - 3.2. Project Identification and Project formulation
 - 3.3. Project Analysis, Project Risk
 - 3.4. Project Planning, Project Design and Network Analysis
 - 3.5. Project Report, Project Appraisal
 - 3.6. Location of an Enterprise, Factory Design and Layout
- 4. Project Finance and Financial Analysis (10)**
 - 4.1. Source of Development of Finance, Project Financing
 - 4.2. Financial Analysis, Funds flow analysis
 - 4.3. Ratio Analysis, Investment process
 - 4.4. Break Even Analysis, Profitability analysis
 - 4.5. Social Cost- Benefit Analysis, Budget and planning Process, Benchmarking
 - 4.6. Role of various Government institutions for Promoting Agri. projects.
- 5. Project Reports (10)**
 - 5.1. Preparation of project reports for –
 - 5.2. Milk and Milk Products
 - 5.3. Live Stocks
 - 5.4. Medicinal plants
 - 5.5. Agro Tourism
 - 5.6. Irrigation
 - 5.7. Fertilizer /Pesticides
 - 5.8. Floriculture and Horticulture

Reference Books

1. Entrepreneurship Development- Theories and Practices- N.P.Singh
2. Project Management- Vasant Desai – Himalaya Publication
3. Management in Agricultural Finance.- Jain S.C.Vora and Company. Publishers Pvt. Ltd.
Entrepreneurship and Technology- Vasant Desai
4. Agri-Business Management- Iwase Smita-Everest Publishing House
5. Agricultural Policy in India – Karla O.P. - Bombay Popular Prakashan Mumbai
6. Text Book of Animal Husbandry – Banerjee G.C.-Oxford & IBH Publisher New Delhi.
7. Rural and Agricultural Marketing –Pandey, Mukesh and Deepak Tiwari-International Book Distribution Co. New Delhi.
8. Organizing Rural Business Policy Planning and Management- Rajagopal-Sage Publication, New Delhi.



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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

407 F- Case Studies in Agri Business management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objective:

- To get knowledge regarding agribusiness concepts and process.

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.

Specialization –G – Information Technology & Systems Management



North Maharashtra University, Jalgaon

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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

Paper: 405G: INTERNET TECHNOLOGY

60 + 40 Pattern: External Marks 60 + Internal Marks (20 Marks Theory + 20 Marks Practical= 40 Marks)= Maximum Total Marks: 100

Required Lectures: 48 hours (32 Hours Theory + 18 Hours Practical)

Objectives of the course:

- To understand Technical aspect of Internet Technology
- To learn Advanced web programming
- To gain the knowledge for building & customising your own web page

- 1. Introduction to Internet Technology** (5)
 - 1.1. Browser, Server, Client, ISP, Protocol, DNS, URL, WWW
 - 1.2. HTML Basics : HTML Page Block Diagram, Tags- Singular & Paired Tags, Attributes
 - 1.3. Simple & Dynamic Web pages.
- 2. Designing Web Page** (12)
 - 2.1. Block & Text Formatting Tags, Special Characters, Image tags
 - 2.2. Links – To a page, Within Page, To a Site.
 - 2.3. Links And Images – Image Mapping Layout
 - 2.4. List (OL, UL, DL)
 - 2.5. Tables- Frames (Nested, I Frame)
 - 2.6. Head Elements – Base Font, Meta Tags, Scripts, Styles
- 3. Cascading Style Sheet (CSS)** (5)
 - 3.1. Inline
 - 3.2. Embedded
 - 3.3. Sep. /External
 - 3.4. Transaction Effect (Marquee Tag)
- 4. VB Script** (15)
 - 4.1. Variables-Definition, Naming rules, Data types, Constant, Arrays, operator.
 - 4.2. VB Script Control Structure-Conditional, looping, branching
 - 4.3. VB Script built-in function, Typecasting variables, Math, date, String, Formatting -Function
- 5. ASP** (05)
 - 5.1. What are ASPs?
 - 5.2. Understanding Client – Server Model
 - 5.3. ASP versus Client side Scripting
 - 5.4. Setting PWs and/or IIS
 - 5.5. Dissecting your First ASP Script.
 - 5.6. Understanding ASP Script.
- 6. Database connectivity using ASP** (06)
 - 6.1. Using Database- Reading From a Database Using ASP
 - 6.2. 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. Mastering ASP- Ivan Bayross

Practical List

1. Create a web page to demonstrate text & block formatting tags.
2. Create a web page to demonstrate various list tags
3. Create a web page to demonstrate Image tags.
4. Create a web page to demonstrate different linking tags.
5. Demonstrate table tag with all attributes & values
6. Demonstrate frame and frameset tags
7. Demonstrate form tags & different element tags
8. Create a web page to demonstrate CSS(Internal & External).
9. Validate form controls using vb script function
10. Implement your own tags using XML



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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

Paper: 406G: SOFTWARE PROJECT MANAGEMENT

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objective:

- To provide basic project management skills with a strong emphasis on issues and problems associated with delivering successful IT projects.
- The module is designed to provide an understanding of the particular issues encountered in handling IT projects and to offer students methods, techniques and 'hands-on' experience in dealing with them. Upon completion of this module students will be able to undertake and be aware of aspects of project management.

1. Introduction to Software Project Management (8)

Definition-Project, Importance of Software Project Management, Software Projects Vs Other Projects, Ways to Categorize Software Projects, Problem with S/W Projects, Requirement Specification & Management Control

2. Project Planning (8)

Introduction, Select Project, Identify Project scope & objectives, Identify project infrastructure, Analyze Project Characteristics, Identify Project Products & Activities, Estimate effort for each activity, identify activity risk & Allocate Resources

3. Programme Management & Project Evaluation (8)

Introduction, Programme management, Managing the allocation of resources within programmes, Strategic Programme Management, Aids to Programme Management, Evaluation of Individual Projects, Technical Assessment, Cost- Benefit Evaluating Techniques & risk Evaluation

4. Selection of an appropriate project approach & Software Effort Estimation (8)

Project Selection Approach- Introduction, Choosing Technologies, Choice of Process Models, Structure Vs Speed Delivery, Waterfall Model, V-Model, Spiral Model, Software Prototyping, Managing iterative Processes

Software Effort Estimation- Introduction, Problems with over & under Estimates, the basis for Software estimating, Software Effort estimation Techniques, Expert Judgment, COCOMO- a parametric Model

5. Project organization & Implementation (8)

Project organization- Organization Structures, Comparison of organizational structures in projects, Level of project organizations, Functional & project Managers Comparison

Project Implementation- Information Systems Project Success, Information Systems Project Failure, Information Technology Failure, Critical Success Factors, Reasons for Information System Project Failure, Quality Control in project Implementation, User involvement in Project Implementation, Integrated Requisitioning System

6. Risk Management & Software Quality (8)

Risk Management- Introduction, Categories of Risk, Framework, risk identification, risk assessment, risk planning, risk management, evaluating risk to the schedule

Software Quality-Introduction, Software Quality in Project Planning, Importance of Software Quality, Practical Software Quality Measures, Product Vs Process Quality Management, External Standards, Techniques to help enhance software quality, Quality Plans

REFERENCE BOOKS:

1. Bob hughes & Mike Cotterell, "Software Project Management", Tata McGraw Hill, Fourth Edition
2. David L. Olson, "Introduction to Information Systems Project Management", McGRAW-HILL International Edition
3. Ramesh, Gopalswamy, "Managing Global Projects", Tata McGraw Hill, 2001.
4. Royce, "Software Project Management", Pearson Education, 1999.
5. Jalote, "Software Project Management in Practice", Pearson Education, 2000



North Maharashtra University, Jalgaon

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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

Paper: 407G : CYBER LAWS & CYBER SECURITY

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 50 hours

Objectives:

- To understand the fundamentals of cyber security and cyber offenses, be familiar with cybercrime techniques and prevention through cyber laws, gain knowledge of cyber forensics and the security mechanisms.

1. Introduction

(06)

- 1.1. Terminologies : cyberspace, cybercrime, cyber security, Cyber squatting, cyberpunk, cyber warfare, cyber terrorism
- 1.2. Cyber security needs
- 1.3. Cyber criminals : Introduction, Cybercriminals Groups
- 1.4. Classification of cyber crimes
- 1.5. Cybercrime categories
- 1.6. Cybercrime : The legal perspective

2. Cyber offenses

(08)

- 2.1. Hackers, crackers, Freakers : Introduction
- 2.2. Planning cybercrime
- 2.3. Social engineering
- 2.4. Cyber stalking
- 2.5. Cyber cafe and cybercrime
- 2.6. Attack vector
- 2.7. Bot nets

3. Cybercrime techniques

(10)

- 3.1 Proxy servers and Anonymizers, phishing
- 3.2 Password cracking
- 3.1. Key loggers and spywares
- 3.2. Virus and worms
- 3.3. Trojan horse and backdoors
- 3.4. Steganography
- 3.5. Dos and DDos attacks
- 3.6. SQL injection
- 3.7. Buffer overflow

4. Phishing and Identity theft

(08)

- 4.1. Phishing : Introduction
- 4.2. Phishing methods : Dragnet, Rod-and-reel , Lobsterpot, Gillnet
- 4.3. Techniques of phishing
- 4.4. Phishing Toolkits and Spy Phishing
- 4.5. Phishing countermeasures
- 4.6. Personally Identifiable Information (PII)
- 4.7. Types of Identity theft
- 4.8. Techniques of Identity theft
- 4.9. Identity Theft Countermeasures

5. Legal Perspective of Cyber security& Forensics fundamentals

(08)

- 5.1. Need for cyber laws: The Indian context
- 5.2. Indian IT Act 2000
- 5.3. Changes made in IT Act 2000
- 5.4. Digital signatures and the Indian IT Act
- 5.5. Cybercrime and punishment
- 5.6. Cyber forensics : introduction, types
- 5.7. Needs of cyber forensics
- 5.8. Cyber forensics and digital evidence

6. Cyber Security: Organization Implications

(08)

- 6.1. Search Breach: PI Collecting by Organization, Insiders threats in Organization
- 6.2. Privacy Dimension
- 6.3. Key-challenges in Organization
- 6.4. Cost of cyber crimes and IPR issues
- 6.5. Organizational guidelines for Internet usage, safe computing guidelines and computer usage policy
- 6.6. Forensics best practices for organization

REFERENCE BOOKS:

1. Nina Godhbole, SunitBelapure Cyber Security understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Wiley India
2. Marjie T. Britz Computer Forensics and Cyber Crime: An Introduction, Pearson
3. AlfaredBasta and Wolf Holten, Computer Security Concepts, Issues and Implementation, CENGAGE learning
4. Raghu Santanam, M. Sethumadhavan, MohitVirendraCyber Security, Cyber Crime and Cyber Forensics, IGI Global
5. George M. Mohay,Alison AndersonComputer and intrusion forensics, Artech House
6. G. Ram Kumar, Cyber Crimes-A primer on Internet Threats & Email Abuses,Viva Books

Specialization – H – Retail Management



North Maharashtra University, Jalgaon

(NACC Accredited 'B' Grade University)

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

Paper: 405 H: International Retailing

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objective:

- To get acquainted about emerging trends in global retailing in 21st century.
- To provide basic knowledge of International retailing, Global Markets along with problems.
- To study the role of financial management in International marketing.

- 1. International Marketing (8)**
 - 1.1. Concept, Importance, Need of International Marketing
 - 1.2. International Marketing Research and Information system
 - 1.3. Problems in International Marketing
 - 1.4. EPRG Orientation
 - 1.5. International Retailing in 21st century
- 2. Internationalization of Retailing (8)**
 - 2.1. Internationalization of Retailing-Need, Scope
 - 2.2. Evolution of International Retailing
 - 2.3. FDI in retailing
 - 2.4. Drivers of International Retailing
 - 2.5. Live Exercise- Students should observe recent trends in Retailing along with FDI followed by group discussion in class room.
- 3. Global Retail Markets (8)**
 - 3.1. Strategic planning process for global retailing
 - 3.2. Challenges facing by global retailers,
 - 3.3. Challenges & Threats in global retailing,
 - 3.4. Factors affecting the success of a global retailing strategy
 - 3.5. Innovative emerging trends in global retailing
 - 3.6. A study of US and Asian Markets
- 4. Selection of International Retail Market (6)**
 - 4.1. Need to select International retail market
 - 4.2. Study and analysis of retailing in global arena/setting
 - 4.3. Different methods of international retailing
 - 4.4. Different modes of market entry for international retailers
- 5. Competing in Foreign Market (5)**
 - 5.1. Multi country competition and global competition
 - 5.2. Competitive advantages in foreign market
 - 5.3. Cross market subsidization
 - 5.4. Global Structure
 - 5.5. International retail marketing mix- concept & importance
 - 5.6. Managing brand at international level

- 6. Competing in Foreign Market II (5)**
- 6.1. Global issues in Supply chain Management: Forces behind globalization
 - 6.2. World class SCM
 - 6.3. World class demand management (WCDM)
 - 6.4. World class logistics management (WCLM)
- 7. Financial Management in International Retailing (8)**
- 7.1. Importance of financial management in international retailing
 - 7.2. Financial performances and Financial strategy
 - 7.3. Strategic Cost Management
 - 7.4. Accounting Methods
 - 7.5. Strategic Profit Model
 - 7.6. Financial ratios in Retailing

REFERENCE BOOKS:

1. Retail Management: Arif Shaikh and Kaneez Fatima, Himalaya Publishing
2. Retailing Management: Suja Nair, Himalaya Publishing
3. Retail Management: Swapna Pradhan, Tata Mc Graw Hill
4. The art of Retailing- A.J.Lamba, Tata McGraw Hill Education
5. Retail Management-A Strategic Approach: Berry Berman & J.R.Evans, Prentice Hall of India, New Delhi
6. Retail Management: S.L.Gupta, Wisdom Publications
7. Managing the Supply Chain-the definitive Guide-David Simchi Levi, Philip Kaminsky and Edith Simchi Levi, Tata Mc-Graw Hill, 2004
8. World Class Supply Management: The key to SCM- Burt, Dobler and Starling, Tata McGraw Hill, Seventh Edition, 2006.
9. High performance interactive marketing- Christopher Ryan, Viva Books Ltd, 2003.



North Maharashtra University, Jalgaon

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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

Paper: 406 H: Information Technology in Retail Management

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objective:

- To understand the role of Information technology in retail management.
- To get acquainted about Enterprise Resource Planning and E Commerce.
- To provide knowledge of E-retailing, Online Shopping, Mobile shopping etc.

1. Retail Management & Information System

(8)

- 1.1. Role of IT in business
- 1.2. Importance of IT in retail
- 1.3. The need for product identification
- 1.4. Factors affecting the use of IT in Retail
- 1.5. Radio frequency Identification (RFID) - Concept and applications in retailing.

2. Application of IT and its areas for impact

(8)

- 2.1. Adopting coding system
- 2.2. Inventory control
- 2.3. Sales analysis and point of sales,
- 2.4. Sales forecasting
- 2.5. Collaborative planning forecasting replenishment (CPFR)

3. Essential requirement of Information System

(6)

- 3.1. Ease of creation
- 3.2. Inventory level
- 3.3. EDI: Electronic data interchange
- 3.4. Database Management

4. Enterprise Resource Planning

(6)

- 4.1. Implementing ERP solutions
- 4.2. Need and Benefits of ERP
- 4.3. Use of ERP: Globalization and Retail Market

5. New trends in IT Application in Retailing

(8)

- 5.1. Web enable system and Data mining tools
- 5.2. LAN and WAN strategies
- 5.3. Interactive kiosks
- 5.4. Efficiency in operation and merchandise

6. E-retailing and Use of IT

(12)

- 6.1. How firms are using the Internet to expand their markets
- 6.2. E-retailing-concepts, growing importance in 21st century
- 6.3. Interactive home shopping
- 6.4. Mobile shopping: Apps, Smart cards, e-cash,
- 6.5. Retailing through television : Asian sky shop
- 6.6. Online shopping: Shopping carts e.g. e-bay, Amazon, Flip cart etc.
- 6.7. Strategies for E-commerce
- 6.8. Limitations to the web applications
- 6.9. Live Exercise –Students may visit personally or may observe any retail Supermarket on Internet which provides online services to customers followed by group discussion in classroom.

REFERENCE BOOKS:

1. Retail Management: Arif Shaikh and Kaneez Fatima, Himalaya Publishing
2. Retailing Management: Suja Nair, Himalaya Publishing
3. Retail Management: Swapna Pradhan, Tata Mc. Graw Hill
4. The art of Retailing- A.J.Lamba, Tata McGraw Hill Education
5. Retail Management-A Strategic Approach: Berry Berman & J.R.Evans, Prentice Hall of India, New Delhi
6. Retail Management: S.L.Gupta, Wisdom Publications
7. Enterprise Resource Planning-



North Maharashtra University, Jalgaon

[NACC Accredited 'B' Grade University]

FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

Paper: 407 H: Cases in Retail Management

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objectives:

- To provide a foundation for an understanding of the various dimensions of Retail Management along with problems through case studies.

The student has to Select and discuss the case studies related to respective specialization papers no. 304-H , 305 H, 306 H, 307 H, 405 H, 406 H, those will have impact on business decision making in each paper:

While solving case study students may use following steps-

- Summary of the case
- Problem Identification
- Analysis of Problem
- Alternative Solution
- Best Solution



North Maharashtra University, Jalgaon

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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

405 I: Food & Beverage Management

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objective:

- To study food & Beverage operations in hospitality industry
- To study how to develop Consumer product relationship
- To study production of food & beverages services.

- | | |
|---|-----------|
| 1. Food & Beverage Operations and Management: | 08 |
| 1.1. Food and Beverage operations. | |
| 1.2. The Hospitality industry and its Products. | |
| 1.3. The Business environment. | |
| 1.4. The Legal framework. | |
| 1.5. Setting organizational goals & objectives. | |
| 1.6. Quality in the management of Food & Beverage operations. | |
| 2. Developing the Consumer - Product Relationship. | 08 |
| 2.1. Framework for developing a consumer- Product relationship. | |
| 2.2. Market Research. | |
| 2.3. Market segmentation. | |
| 2.4. Idea evaluation. | |
| 2.5. Concept development. | |
| 2.6. Product development. | |
| 3. Food Production. | 08 |
| 3.1. Menu Planning. | |
| 3.2. Health & Safety. | |
| 3.3. Centralized food production systems. | |
| 3.4. Volume in food production. | |
| 3.5. Purchasing & Control. | |
| 3.6. Operations control. | |
| 4. Beverage Provisions. | 08 |
| 4.1. Compiling Wine and Drinks list | |
| 4.2. Pricing of Wines and Drinks | |
| 4.3. Purchasing | |
| 4.4. Storage and cellar management | |
| 4.5. Beverage control. | |

- 5. Operational Areas Equipment & Staffing: 08**
- 5.1. Food production areas
 - 5.2. Food production equipments
 - 5.3. Food and Beverage service areas
 - 5.4. Food and Beverage service equipment
 - 5.5. Automatic vending
 - 5.6. Staffing

- 6. Food and Beverage service: 08**
- 6.1. Food and Beverage service as two systems
 - 6.2. Customer relations
 - 6.3. Managing volume
 - 6.4. Sales promotion and merchandising
 - 6.5. Managing and service sequence
 - 6.6. Revenue control

Reference Books

1. Food and Beverage Management - By John Cousins, David Coskett. [Pearson Education India](#).
2. Food and Beverage Management By Anupam Mukherji by Gyan publishing house – New Delhi.
3. The SAGE Handbook of Hospitality Management edited by Roy C Wood, Bob Brotherto.
4. Food and Beverage Management By Bernard Davis, Andrew Lockwood, Ioannis Pantelidis, Peter Alcott published By Roulledge – UK
5. Food and Beverage Service by R. Singaravelavan- Oxford



North Maharashtra University, Jalgaon

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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: III

406 I: Event Management

60 + 40 Pattern: External Marks 60 + Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objectives

- To study different things needed to organize an event
- How to plan, organize, manage & Marketing an Event
- To study necessary steps to organize conference

1. Introduction to Event and Event Management (08)

- 1.1. Introduction & Definition of Event,
- 1.2. Need of Event Management,
- 1.3. Objectives of Event Management,
- 1.4. Events and Event Management,
- 1.5. Types of event & event management,
- 1.6. 5 C's of Event,
- 1.7. Growing importance of events in India.
- 1.8. Role of event management companies,
- 1.9. managing customer expectations,
- 1.10. Challenges in Event management

2. Event Planning & Team Management (08)

- 2.1. Introduction, Establish Objectives,
- 2.2. Preparing event proposal,
- 2.3. Use of planning tools.
- 2.4. Principles of event management planning,
- 2.5. important steps in planning & designing an Event,
- 2.6. importance of creativity in event planning, Event feasibility,
- 2.7. coordinating technical resources, Site inspection.
- 2.8. Protocols, Dress codes,
- 2.9. staging, importance of staffing,
- 2.10. managing human resources,
- 2.11. Leadership, Traits and characteristics

3. Event Marketing (10)

- 3.1. Introduction, Importance of event marketing,
- 3.2. five P's of Event marketing: Product, Price, Place, Promotion, Public relation.
- 3.3. Image, Branding,
- 3.4. Market Research,
- 3.5. Relationship Building,
- 3.6. Preparing press releases and press packs,
- 3.7. Internet event marketing,
- 3.8. Use of social media for event marketing.

- 4. Event Safety and Security** (06)
- 4.1. Introduction, Security,
 - 4.2. occupational safety,
 - 4.3. crowd management,
 - 4.4. major risks and emergency planning,
 - 4.5. reporting of incidences, measures for emergency
- 5. Organizing the Conference** (08)
- 5.1. Introduction, venue confirmation,
 - 5.2. Making the bookings, speaker selection,
 - 5.3. conference budgeting,
 - 5.4. conference marketing strategies,
 - 5.5. audio visual requirements, risk analysis,
 - 5.6. attendee evaluation.
- 6. Planning a Wedding Event** (08)
- 6.1. Introduction, wedding planning,
 - 6.2. venue selection and liaison,
 - 6.3. client briefings, budgeting,
 - 6.4. list of guests and invitations,
 - 6.5. list of gifts,
 - 6.6. Menus and catering services,
 - 6.7. flowers , table decorations, transportation etc.

References

1. Event Marketing and Management: Gaur, Sanjaya Singh, Vikas Publishing House Pvt Ltd, 2003
2. Marketing Management: Philip Kotler, Prentice Hall of India Pvt Ltd, 11 th edition,
3. Event Planning and Management: Sharma, Diwakar, Deep & Deep Publication Pvt Ltd, 2005.
4. Events Management: Raj, Razaq, SAGE Publication India Pvt Ltd, 2009
5. Event Marketing: Leonard H Hoyle, 2013 (ISBN 8126524679),
6. Event Management: Bhavana Chaudhari, Dr Hoshi Bhiwandiwalla, - Nirali Publications, Pune.

7.



North Maharashtra University, Jalgaon

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FACULTY OF COMMERCE & MANAGEMENT

New Syllabus: M.B.A.

SEMESTER: IV

407 I–Cases in Hospitality Management

60 + 40 Pattern: External Marks 60 +Internal Marks 40 = Maximum Total Marks: 100

Required Lectures: 48 hours

Objective:

- To be able to understand & solve case studies in the context of Hospitality Management.

The student has to Select and discuss the case studies related to respective specialization papers no. 304J, 305J, 306J, 307J, 405J, and 406J those will have impact on business decision making in each paper.



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 Grade A (3.14) NAAC Accredited (2nd Cycle)

DEPARTMENT OF APPLIED SCIENCE
TEACHING LOAD DISTRIBUTION
 Academic Year 2022-23 (Term – I)

Sr. No.	Name of the Faculty Member	Class	Name of the Course	TH in Hrs. + Tut	PR in Hrs.		Total in Hrs.	Total in Hrs.
					Hrs. per Batch	No. of Batches		
1.	Dr. K. S. Patil	FE	Physics(B,E)	06+02+02E	-	-	10	12
		B.Sc	Physics (PHY-101)	02	-	-	02	
2.	Dr. S. S. Patil	FE	M-I (C,D)	08+02+03E	-	-	12	17
		SE	M-III (Comp-A)	03+01			04	
3.	Ms. M. P. Kulkarni	FE	M-I (B,E)	08+02+01E	-	-	11	15
		SE	M-III (Comp-B)	03+01			04	
4.	Mr. C. U. Nikam	FE	Physics (F,C)	06+02+02E	02	06	22	24
		B.Sc	Physics (PHY-102)	02	-	-	02	
5.	Ms. D. I. Desai	FE	Chemistry (A1)	03+01		-	04	08
		B.Sc	Chemistry (CH-101)	02	02	01	04	
6.	Mr. M. B. Patil	FE	Physics (D)	04+01	02	09	23	27
		B.Sc	Physics (PHY-103)	--	02	02	04	
7.	Mr. U. T. Patil	FE	Chemistry (A2)	03+01	02	01	06	10
		B.Sc	Chemistry (CH-102)	02	02	01	04	
8.	Ms. Tanuja Chouhan	FE	English (A1)/ (A2)	06	02	03	09	16
		BBA	English	04	-	-	04	
9.	Mr. A. N. Shaikh	FE	M-I (F)	03+01+01E	-	-	05	19
		SE	M-III (Comp-C&ETc)	06+02			08	
		BSc	MTH(101/102/103)	06			06	
10.	Ms. Jayshree R. Tayade	FE	M-I (A1)/ (A2)	06+01+01E	-	-	08	16
		SE	M-III (ELE)/BBA/BCA	07+01			08	
11.	Ms. PoojaMalu	FE	A1/A3 batch	-	02	02	04	04
Total Load								168

Timetable In-charge

Head of the Department



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DEPARTMENT OF APPLIED SCIENCE
TEACHING LOAD DISTRIBUTION
 Academic Year 2022-23 (Term – II)

Sr. No.	Name of the Faculty Member	Class	Name of the Course	TH in Hrs. + Tut	PR in Hrs.		Total in Hrs.	Total in Hrs.
					Hrs. per Batch	No. of Batches		
1.	Dr. K. S. Patil	FE	Physics (A2)	03+02T	-	-	05	12
		B.Sc	Physics (PHY-201)	03	-	-	03	
		SE	EVS :Comp A&B	04			04	
2.	Dr. S. S. Patil	FE	M-II (C,D)	08+02+03E	-	-	13	13
		SE	-	-				
3.	Ms. M. P. Kulkarni	FE	M-II (B,E)	08+02+01	-	-	11	11
		SE						
4.	Mr. C. U. Nikam	FE	Physics A1	03+02T	02	01	07	16
		B.Sc	Physics (PHY-202)	03	-	-	03	
		SE	(EVS):Mechanical, Comp C,Civil,	06			06	
5.	Ms. D. I. Desai	FE	Chemistry (B,D,)	08+02T	02	03	16	21
		B.Sc	Chemistry (CH-201)	03	02	01	05	
6.	Mr. M. B. Patil	FE	Physics	-	02	02	04	16
		B.Sc	Physics (PHY-203)		02	02	04	
		SE	EVS:ELE, E TC, Chem	04			04	
		SE	EVS: BSC, BCA	04			04	
7.	Mr. U. T. Patil	FE	Chemistry (C,F)	08+02T	02	03	16	20
		B.Sc	Chemistry (CH-202)	02	02	01	04	
8.	Ms. Tanuja Chouhan	FE	English (B,D,)	08	02	05	10	18
9.	Ms. Vijaydeepa (English)	FE	English (C,E)	08	02	05	10	16
10.	X2 (English)	FE	F	04	02	05	14	17
		BCA	English	03			03	
11.	Mr. A. N. Shaikh	FE	M-II (F)	04+01+1T	-	-	05	15
		SE	M-III Mechanical	04+02			06	
		BSc	MTH(201)	03			03	
12.	Ms. Jayshree R. Tayade	FE	M-II (A1)/ (A2)	06+01+01E	-	-	08	18
			BSC 202/203	06			06	
		SE	M-III Civil	03+01	-	-	04	
13.	Ms. PoojaMalu	FE	Chemistry (E)	03+01	02	09	18	22
Total Load							215	

Timetable In-charge

Head of the Department



Shram Sadhana Bombay Trust's
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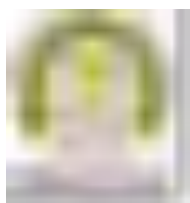
DEPARTMENT OF BIOTECHNOLOGY ENGINEERING
TEACHING LOAD DISTRIBUTION
Academic Year 2022 – 2023 (Term – I)

Sr. No.	Name of the Faculty Member	Class	Name of the Course	TH in Hrs.	PR in Hrs.			Total in Hrs.
					Hrs. per Batch	No. of Batches	Total in Hrs.	
1	Mrs. Sarika S. Pawar	B.E.	BOPD(OEC-III)	03	--	--	03	23
		T.E.	RE	03	02	01	05	
		T.E.	BAT(OEC-I)	03	--	--	03	
		B.E.	PROJECT (S-I)	--	12	--	12	
2	Ms. Ashwini Badgujar	B.E.	CI	03	--	--	03	20
		T.E.	Mol. Bio.	03	02	01	05	
		T.E.	ENZY	03	--	--	03	
		B.E.	Lab PTC	01(T)	02	01	03	
		T.E.	Minor Project Stage - I	--	06	--	06	
3	Mr. Ankur Khachane	B.E.	Bio info	03	02	01	05	13
		B.E.	CT&RA (PEC-IV)	03	--	--	03	
		T.E.	FB (PEC-I)	03	--	--	03	
		T.E.	Lab PBT	--	02	01	02	
Total							56	

***Biology load Civil +Mechanical = 04+04**

Total load including Biology =56 +08=64

Head of the Department



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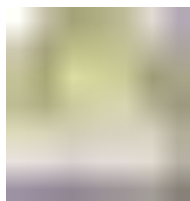
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Academic Year 2022 – 2023 (Term – II)

Sr. No.	Name of the Faculty Member	Class	Name of the Course	TH in Hrs.	PR in Hrs.			Total in Hrs.
					Hrs. per Batch	No. of Batches	Total in Hrs.	
1	Mrs. Sarika S. Pawar	TE	MT	03	02	01	05	19
		TE	OEC –II (BIA)	03	--	--	03	
		BE	PEC-V (BWT)	03	--	--	03	
		BE	Project-II	--	06		06	
2	Ashwini Badgujar	TE	GENE	03	02	01	05	19
		TE	PEC-II (PBT)	03	--	--	03	
		BE	PEC-VI (IB)	03	--	--	03	
		TE	Minor Project	--	06	01	06	
3	Ashutosh Shriramjwar	TE	BPE	03	02	01	05	17
		BE	BPI	03	02	01	05	
		BE	OEC-IV (ABT)	03	--	--	03	
		BE	Lab DSP	02	02	01	04	
4	Jaymala D.Chaudhari	SE	Biology (Computer + Electrical & Chemical)	16	--	--	--	16
Total								71

*Biology load [Computer (A+B+C=12) , E n TC (04) , Electrical + Chemical (04)] = 20

Total load including Biology Subject = 51+20=71

Head of the Department



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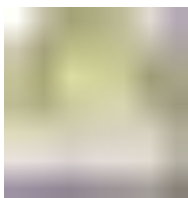
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DEPARTMENT OF CHEMICAL ENGINEERING
TEACHING LOAD DISTRIBUTION
Academic Year 2022 – 2023 (Term – I)

Sr. No.	Name of the Faculty Member	Class	Name of the Course	TH in Hrs.	PR in Hrs.			Total in Hrs.
					Hrs. per Batch	No. of Batches	Total in Hrs.	
1	Dr. V.R.DIWARE	B.E.	CAPED (PEC-III)	3	--	--	--	18
			PROJECT (S-I)	--	12	--	12	
		T.E.	PED (PCE - I)	3	--	--	--	
2	Dr. S.A.THAKUR	B.E.	PC	3	2	2	4	18
		T.E.	MT-I	3	2	1	2	
			Minor Project Stage - I	--	6	--	6	
3	V.P.SANGORE	B.E.	IC Lab	--	2	2	4	17
		T.E.	EE (OEC-I)	3	--	--	--	
		S.E.	IC	3	1(T)	1 (T)	1	
			THD-I	3	--	--	--	
			CEL-I	1	2	1	2	
4	Dr. N.Y.GHARE	B.E.	TP	3	--	--	--	21
			PROJECT (S-I)	--	12	--	12	
		T.E.	PFPP	3	--	--	--	
		S.E.	FM	3	--	--	--	
5	MS. SAKSHI S BANIYA	B.E.	PU (OEC-III)	3	--	--	--	17
		T.E.	CRE - I	3	2	1	2	
			CEL-III	--	2	1	2	
		S.E.	IOM	3	--	--	--	
			FM	--	2	1	2	
			THD-I	--	2	1	2	
Total Load								91

*Engineering & Solid Mechanics teaching load (3 Hours) at S.E. Chemical will be taken by Civil Engineering Department

Head of the Department



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ShramSadhana 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
Grade A (3.14) NAAC Accredited

DEPARTMENT OF CHEMICAL ENGINEERING
TEACHING LOAD DISTRIBUTION
Academic Year 2022 – 2023 (Term – II)

Sr. No.	Name of the Faculty Member	Class	Name of the Course	TH in Hrs.	PR in Hrs.			Total in Hrs.	
					Hrs. per Batch	No. of Batches	Total in Hrs.		
1	Dr. V.R.DIWARE	B.E.	CPDPE (PEC-V)	3	--	--	--	16	
			PROJECT	--	6	--	6		
			D & S Lab	2	--	--	--		
		T.E.	CRE-II	3	2	1	2		
2	Dr. S.A.THAKUR	B.E.	PTE	3	2	1	2	14	
			T.E.	Minor Project	--	6	--		6
			S.E.	PME	3	--	--		--
3	V.P.SANGORE	B.E.	ECM (OEC-IV)	3	--	--	--	16	
			PTE	-	2	1	2		
		T.E.	IIA (PEC-II)	3	--	--	--		
		S.E.	MS	3	2	1	2		
			CEL-II	1	2	1	2		
4	Dr. N.Y.GHARE	B.E.	PROJECT	--	6	--	6	17	
			PCT (PEC-VI)	3	--	--	--		
		T.E.	MT-II	3	--	--	--		
		S.E.	MEBC	3	2	1	2		
5	MS. SAKSHI S BANIYA	B.E.	D & S Lab	--	2	2	4	19	
			HT	3	2	1	2		
		T.E.	AFS (OEC-II)	3	--	--	--		
			MT- II	--	2	1	2		
		S.E.	THD-II	3	2	1	2		
Total Load								82	

* Biology teaching load (3 Hours Theory & 1 Hour Tutorial) at S.E. Chemical will be taken by Biotechnology Engineering Department

Head of the Department



ISO 9001:2015

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Grade B++ (2.91) NAAC Accredited

DEPARTMENT OF CIVIL ENGINEERING
TEACHING LOAD DISTRIBUTION
 Academic Year 2022 – 23 (Term – I)

Sr. No.	Name of the Faculty Member	Class	Name of the Course	TH in Hrs.	PR in Hrs.			Total in Hrs.
					Hrs. per Batch	No. of Batches	Total in Hrs.	
1.	Dr. M.Husain	BE	AWTT	6	-	-	-	18
		BE	MAJOR PROJECT				12	
2.	Dr.S.L.Patil	SE	SURG	3				3
3.	Dr.S.B.Pawar	SE	MTE-I	1	2	3	6	19
		BE	MAJOR PROJECT				12	
4.	Dr.P.A.Shirule	SE	MECHANICS	3				18
		SE	MECHANICS(Electrical)	3				
		BE	MAJOR PROJECT				12	
5.	F.I.Chavan	SE	ESM(CHEMICAL)	3				18
		BE	HWRE	3				
		BE	MAJOR PROJECT				12	
6.	Jayant Kale	TE	PMT	3				19
		BE	CEM LAB		2	2	4	
		BE	MAJOR PROJECT				12	
7.	Sonali B.Patil	TE	HDE	3				19
		BE	MAJOR PROJECT				12	
8.	Jyoti R.Mali							12
		BE	MAJOR PROJECT				12	
9.	Pankaj Punase	TE	MOM	3				18
		BE	ASSAD	3				
		BE	MAJOR PROJECT				12	
10	Ganesh Ahire	SE	ICE	3				18
		TE	GTE	1	2	1	2	
		SE	SURG		2	3	6	
		BE	CEM		2	2	4	
		BE	MINOR PROJECT				2	
11	Vrushali Mahadik	SE	ESE	3				15
		TE	HDE		2	4	8	
		BE	MINOR PROJECT				4	
12	Kavita Jadhav	BE	ASSAD	3				17
		BE	CEM LAB	2	2	4	8	
		BE	MINOR PROJECT				4	

13	Gauri Kale	TE	GTE	2	2	3	6	15
		TE	CM	3				
		TE	DPPM LAB		2	2	4	
14	Dipika Mali	BE	HWRE	3	2	4	8	15
		BE	MINOR PROJECT				4	
15	Ashwini More	BE	SHWM	3				15
		SE	MECH		2	3	6	
		BE	MINOR PROJECT				6	
16	Khatija Shaikh Rahim	BE	SHWM	3				15
		BE	HWRE		2	4	8	
		TE	DPPM LAB		2	2	4	

TOTAL = 254

Total Load= 31(SE)+6 (SE Electrical And Chemical)+63(TE)+154 (BE)=254

Timetable In-charge

Head of the Department

Timetable In-charge

Head of the Department



Shram Sadhana Bombay Trust's
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DEPARTMENT OF CIVIL ENGINEERING
TEACHING LOAD DISTRIBUTION
Academic Year 2022 – 23 (Term – II)

Sr. No.	Name of the Faculty Member	Class	Name of the Course	TH in Hrs.	PR in Hrs.			Total in Hrs.
					Hrs. per Batch	No. of Batches	Total in Hrs.	
1	DR. M. HUSAIN	TE	Environmental Engg.	3	2	3	6	18
		BE	Major Project Stage II		6	1	6	
		BE	Biotechnology of Waste Treatment	3				
2	DR.S.B.PAWAR	BE	Major Project Stage II				6	6
3	DR.P.A.SHIRULE	BE	Advanced Concrete Structural Analysis & Design	3				9
		BE	Major Project Stage II				6	
4	F.I.CHAVAN	SE	Introduction to Solid Mechanics	3				13
		SE	Introduction to Fluid Mechanics Lab		2	2	4	
		BE	Major Project Stage II		6	1	6	
5	J.N.KALE	TE	Building Construction Practices	3				22
		BE	Engineering Economics, Estimating & Costing	3	2	4	8	
		BE	Major Project Stage II		6	1	6	
		BE	Advanced Surveying		2	1	2	
6	SONALI PATIL	SE	Introduction to Fluid Mechanics	3	2	2	4	22
		BE	Industrial Wastewater Engineering	3				
		TE	Environmental Engg.		2	1	2	
		BE	Major Project Stage II		6	1	6	
		TE	Transportation Engg.		2	2	4	
7	JYOTI MALI	TE	Transportation Engg.	3	2	2	4	20
		SE	Computer Aided Civil Engineering Drawing	3				
		SE	Material Testing & Evaluation-II		2	2	4	
		BE	Major Project Stage II		6	1	6	

Sr. No.	Name of the Faculty Member	Class	Name of the Course	TH in Hrs.	PR in Hrs.			Total in Hrs.
					Hrs. per Batch	No. of Batches	Total in Hrs.	
8	PANKAJ PUNASE	TE	Structural Engg.	3	2	3	6	19
		SE	Material Testing & Evaluation-II Lab		2	2	4	
		BE	Major Project Stage II		6	1	6	
9	GANESH AHIRE	BE	Advanced Surveying Lab	4	2	1	2	14
		SE	Material Testing & Evaluation-II Lab		2	1	2	
		BE	EG lab		2	1	2	
		TE	Minor Project Stage II		4	1	4	
10	GAURI KALE	BE	Engineering Economics, Estimating & Costing	3	2	3	6	17
		TE	Minor Project Stage II		4	1	4	
		SE	Computer Aided Civil Engineering Drawing Lab		2	1	2	
		BE	Advanced Surveying Lab		2	1	2	
11	DIPIKA MALI	SE	Engineering Geology	1	2	2	4	18
		BE	Advanced Concrete Structural Analysis & Design	3				
		SE	Computer Aided Civil Engineering Drawing Lab		2	2	4	
		BE	Advanced Surveying Lab		2	1	2	
		TE	Minor Project Stage II		4	1	4	
12	VRUSHALI MAHADIK	BE	Industrial Wastewater Engineering	3				15
		TE	Environmental Engineering Lab		2	1	2	
		SE	Introduction to Fluid Mechanics		2	2	4	
		BE	Advanced Surveying Lab		2	1	2	
		TE	Minor Project Stage II		4	1	4	
13	KAVITA JADHAV	BE	Smart City Planning	3				15
		SE	Material Testing & Evaluation-II		2	3	6	
		BE	Advanced Surveying Lab		2	1	2	
		TE	Minor Project Stage II		4	1	4	
14	Ashwini More	BE	Biotechnology of Waste Treatment	3				17

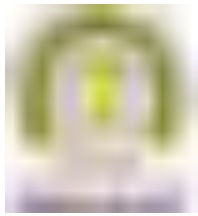
		BE	Advanced Surveying Lab		2	1	2	
		TE	Environmental Engg.Lab		2	3	6	
		TE	Structural Engg. Lab		2	1	2	
		TE	Minor Project Stage II		4	1	4	
15	Khatija Shaikh	SE	Civil Engineering Societal & Global Impact	3				17
		TE	Minor Project Stage II		4	1	4	
		SE	Computer Aided Civil Engineering Drawing		2	1	2	
		SE	Introduction to Fluid Mechanics		2	2	4	
		BE	Advanced Surveying Lab		2	1	2	
		BE	Engineering Economics, Estimating & Costing		2	1	2	

S.S.B.T.'s College of Engineering & Technology, Bambhori, Jalgaon
Electrical Engineering Department
Academic Year 2022-23
Term-I (UG)
Teaching Load Distribution

S. N.	Name of the Staff	Year	Subject	Th. (Hrs)	Pr. (Hrs)	Tu. (Hrs)	Project (Hrs.)	Total Load (Hrs)
1	Mr. V. S. Pawar	SE	IOM	03	-	-	-	19
		TE	S&S (PEC-I)	03	-	-	-	
		TE	Minor Project-I	-	-	-	3	
		BE	Project Stage-I	-	-	-	10	
2	Mr. M. M. Ansari	SE	EM/C-I	03	02	-	-	30
		BE	EECA (PEC-III)	03	-	-	-	
		BE	Electrical Drives	03	06	-	-	
		TE	Minor Project-I	-	-	-	3	
		BE	Project Stage-I	-	-	-	10	
3	Mr. S. M. Shembekar	TE	PS-I	03	04	-	-	26
		BE	PSDC (PEC-IV)	03	-	-	-	
		TE	EM (OEC-I)	03	-	-	-	
		TE	Minor Project-I	-	-	-	3	
		BE	Project Stage-I	-	-	-	10	
4	Ms. A.N. Salunkhe	TE	PE	03	04	-	-	22
		SE	EW	01	02	-	-	
		TE	EMF	03	-	-	-	
		TE	Minor Project-I	-	-	-	3	
		BE	Project Stage-I	-	-	-	6	
5	Ms. H.M. Rajane	BE	AI (OEC-III)	3	-	-	-	21
		TE	EDL	-	04	-	-	
		SE	ECA	-	02	-	-	
		BE	MATLAB	01	06	-	-	
		SE Mech.	EDC	03	02	-	-	
6	Mr. V.A. Shinde	SE	ECA	03	-	-	-	13
		FE (F)	BEEE	03	06	1	-	
Total load				44	38	1	48	131

S.S.B.T.'s College of Engineering & Technology, Bambhori, Jalgaon
Electrical Engineering Department
Academic Year 2022-23
Term-II (UG)
Teaching Load Distribution

S. N.	Name of the Staff	Year	Subject	Th.	Pr.	Tu.	Project	Total Load (Hrs)
1	Mr. V. S. Pawar	BE	Digital Signal Processing (OEC-IV)	03				11
		TE	Minor Project				03	
		BE	Project-II				05	
2	Mr. M. M. Ansari	SE	Electrical Machines-II	03	02			16
		BE	FACTS and Power Quality	03				
		TE	Minor Project				03	
		BE	Project-II				05	
3	Mr. S. M. Shembekar	TE	Power System-II	03				16
		BE	Power System Protection	03	02			
		TE	Minor Project				03	
		BE	Project-II				05	
4	Ms. A.N. Salunkhe	SE	Electrical Engineering Materials	03	02			18
		TE	Microprocessor & Microcontroller	03	04			
		TE	Minor Project				03	
		BE	Project-II				03	
5	Ms. H.M.Rajane	SE	Entrepreneurship Development	03				14
		BE	Electric and Hybrid Vehicles (PEC-VI)	03				
		BE	High Voltage Laboratory	02	06			
6	Mr. V.A. Shinde	SE	Analog and Digital Electronics	03	02			15
		TE	Power System-II		04			
		FE	BEEE	03	02	01		
7	Ms. M.A.Patil	TE	Control System	03	04			10
		SE	Measurement and Instrumentation Laboratory	01	02			
8	Mr. H.A.Patil	TE	Industrial Automation (PEC-II)	03				11
		BE	Power System Protection		04			
		FE	BEEE		04			
Load				42	38	01	30	111
Load taken by other Engg. Deptt.								
	Mr. D.B. Sadaphale (Mech. Engg. Deptt.)	TE	Power Plant Engineering	03				03
Total load				45	38	01	30	114



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DEPARTMENT OF BUSINESS ADMINISTRATION (M.B.A.)
TEACHING LOAD DISTRIBUTION

Academic Year : 2022-23

Term : I

Class : MBA-I & II

Semester : I & III

Sr. No.	Name of the Faculty Member	Class	Name of the Course	TH (Hrs)	Project (Hrs)	PR in Hrs.			Total (Hrs)
						Hrs. per Batch	No. of Batches	Total (Hrs)	
1	Dr.V.S.Rana.	MBA-I	102: Organizational Behavior	4					12
		MBA-II	305-B: Consumer Behavior & Service Marketing	4					
		MBA-II	307-B: International Marketing Management	4					
2	Dr. S. B. Patil	MBA-I	107: Communication Skill	4					16
		MBA-II	303: Legal Aspects Of Business	4					
		MBA-II	305-C: Organizational Leadership Change & Development	4					
		MBA-II	306-C: Strategic Human Resource Management	4					
3	Dr. R. A. Modiyani	MBA-I	105: Business Accounting & Costing	4					16
		MBA-II	301: Strategic Management	4					
		MBA-II	304-B: Product & Brand Management	4					
		MBA-II	306-A: Strategic Financial Management	4					
4	Dr. M. B. Ahirrao	MBA-I	103: Managerial Economics	4					16
		MBA-II	304-A: Banking & Investment Management	4					
		MBA-II	306-B: Sales & Distribution Management	4					
		MBA-II	307-A: International Financial Management	4					
5	Ms. F. A. Kazi	MBA-I	101: Management Science	4					16
		MBA-II	302: MIS & E-Commerce	4					
		MBA-II	304-C: Industrial Relations & Labour Welfare	4					
		MBA-II	307-C: Labour Laws	4					
6	Mrs. A. T. Devarale	MBA-I	104: Human Resource Management	4					12
		MBA-I	106: Operation Management	4					
		MBA-II	305-A: Income Tax	4					
Total				88					88

Note:

- All faculty members will share equal load of Audit Course: 301 Advanced Excel in addition to above.

Head of the Department

Name	Signature
Dr. V. S. Rana	:
Dr. R. A. Modiyani	:
Dr. S. B. Patil	:
Dr. M. B. Ahirrao	:
Ms. F. A. Kazi	:
Mrs. A. T. Devarale	:



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DEPARTMENT OF BUSINESS ADMINISTRATION (M.B.A.)
TEACHING LOAD DISTRIBUTION

Academic Year : 2021-22

Term : II

Class : MBA-I & II

Semester : II & IV

Sr. No.	Name of the Faculty Member	Class	Name of the Course	TH (Hrs)	Project (Hrs)	PR in Hrs.			Total (Hrs)
						Hrs. per Batch	No. of Batches	Total (Hrs)	
1	Dr. V.S .Rana.	MBA-I	204: Marketing Management	4					12
		MBA-II	406-B: Retail Management & Digital Marketing	4					
		MBA-II	407-B: Case Studies in Marketing	4					
		MBA-II	408: Project Report & Viva-Voce		4				
2	Dr. S. B. Patil	MBA-I	206: Computer Applications in Business	4					16
		MBA-II	402: Innovation Management	4					
		MBA-II	403: Indian Commercial Laws	4					
		MBA-II	405-C: Performance & Compensation Mgt	4					
		MBA-II	408: Project Report & Viva-Voce		4				
3	Dr. R. A. Modiyani	MBA-I	205: Financial Management	4					12
		MBA-I	105: Business Accounting & Costing	4					
		MBA-II	406-A: International Financial Management	4					
		MBA-II	408: Project Report & Viva-Voce		4				
4	Dr. M. B. Ahirrao	MBA-I	203: Indian Economy and Policy	4					12
		MBA-II	405-A: Financial Derivatives	4					
		MBA-II	407-A: Case Studies in Financial Management	4					
		MBA-II	408: Project Report & Viva-Voce		4				
5	Ms. F. A. Kazi	MBA-I	202: Business Research Methods	4					16
		MBA-II	401: Business & Government	4					
		MBA-II	406-C: International HRM	4					
		MBA-II	407-C: Case Studies in HRM	4					
		MBA-II	408: Project Report & Viva-Voce		4				
6	Mrs. A. T. Devarale	MBA-II	404: Entrepreneurship & Project Management	4					16
		MBA-II	405-B: Marketing Research & Bus. Analytics	4					
		MBA-I	201: Business Ethics & CSR	4					
		MBA-I	207: Business Analytics	4					
Total				84	20				84

Head of the Department

**DEPARTMENT OF MECHANICAL ENGINEERING
TEACHING LOAD DISTRIBUTION
Academic Year 2022 – 23 (Term – I)**

Sr. No.	Name of the Faculty Member	Class	Name of the Course	TH in Hrs.	PR in Hrs.			Total in Hrs.
					Hrs. per Batch	No. of Batches	Total in Hrs.	
1	Dr. S. P. Shekhawat	B.E. (A)	Research Methodology	03	----	----	----	15
		B.E.	Project-I	---	----	----	12	
2	Mr. N. K. Patil	B.E. (B)	Research Methodology	03	----	----	----	18
		B.E.	Project-I	---	----	----	12	
		S.E.	Thermodynamics	03				
3	Mr. K. Shrivastava	S.E.	Engg. Mechanics	03	----	----	----	22
		B.E.	Project-I	---	----	----	12	
		T.E.	Heat Transfer	03	02	02	04	
4	Mr. M.V.Rawlani	S.E.	IP	03	---	---	---	15
		B.E.	Project-I	----	----	----	12	
5	Dr. P. G. Damle	T.E.	Strength of Materials	03	----	----	----	15
		B.E.	Project-I	----	----	----	12	
6	Mr. D. B. Sadaphale	B.E. (A& B)	Power Plant Engg.	03	----	----	----	18
		B.E.	Project-I	----	----	----	12	
		T.E.	Industrial & Safety Engineering	03				
7	Mr. P. N. Ulhe	B.E. (B)	Design of Machine Elements	03	02	06	12	24
		B.E. (A & B)	Mechatronics System	03	----	----	----	
		T.E.	Minor Project-I	----	----	----	06	
8	Dr. P. M. Solanki	B.E. (A)	Design of Machine Elements	03	----	----	----	09
		T.E.	Minor Project-I	---	----	----	06	
9	Mr. P. D. Patil	T.E.	Process Planning Tool Design	03	----	----	----	20
		F.E. (A)	Engg. Graphics	03	02	03	06	

Vision: To nurture the students by providing high quality broad based technical education for global societal development and continuous improvement in value added knowledge.

Mission: To cultivate a conducive environment through teaching, application specific learning and services to foster the technical critical thinking ability of the students as well as the faculties to contribute for developing global mechanical engineering professionals and well-being of the society.

DEPARTMENT OF MECHANICAL ENGINEERING

		S.E.	CG lab		02	02	04	
		T.E.	M/c dwg Lab	---	02	02	04	
10	Mr. A. R. Bhardwaj	B.E.(A &B)	Automation in Manufacturing	03	-----	-----	-----	17
		T.E.	Manufacturing Processes	03	02	02	04	
		F.E. (A)	Workshop Practice	01	02	03	06	
11	Mr. D. C. Talele	B.E. (A& B)	Operation Research	03				22
		B.E. (A)	CAD Lab	01	02	03	06	
		B.E. (B)	CAD Lab	01	02	03	06	
		S.E.	CG lab	01				
		S.E.	Thermodynamics		02	02	04	

Mr. P. N. Ulhe
Time Table In-charge

Er. N. K. Patil
Head of the Department

CC to: 1. The Principal Office

Vision: To nurture the students by providing high quality broad based technical education for global societal development and continuous improvement in value added knowledge.

Mission: To cultivate a conducive environment through teaching, application specific learning and services to foster the technical critical thinking ability of the students as well as the faculties to contribute for developing global mechanical engineering professionals and well-being of the society.

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 whom term work marks are to be sent to the University.

The attendance record of the students is maintained in ERP software and 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 is given by Coordinator of Academics and Research and Development and the Principal.