Courese Outcome for B.E. Chemical Engineering

Class	Semester	Name of the Subject	CO	Course Outcome
FE	I	Chemistry	819101.1	Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
			819101.2	Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques
			819101.3	Rationalise periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.
			819101.4	Rationalise bulk properties & processes using thermodynamic considerations
			819101.5	List major chemical reactions that are used in the synthesis of molecules.
FE	I	Engineering Graphics	819104.1	Introduction to engineering design and its place in society
			819104.2	Exposure to the visual aspects of engineering design
			819104.3	Exposure to engineering graphics standards
			819104.4	Exposure to solid modeling.
FE	I	English	819103.1	To acquire basic proficiency in English including reading and listening
			819103.2	To demonstrate proficiency in the use of written English, including proper spelling, Grammar and punctuation.
			819103.3	To enhance their ability to use spoken words in interpersonal communication, small group interactions and public speaking Comprehension, writing and speaking skills.
			819103.4	Become accomplished technical communicators.
FE	I	Mathematics - I	819102.1	Apply differential and integral calculus. Apart from some other applications they will have a basic understanding of Beta and Gamma functions.
			819102.2	The fallouts of Rolle’s Theorem that is fundamental to application of analysis to Engineering problems.
			819102.3	The tool of Fourier series for learning advanced Engineering Mathematics.
			819102.4	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.

Class	Semester	Name of the Subject	CO	Course Outcome
FE	I	Chemistry Lab	819106.1	Upon successful completion of lab Course, student will be able to: 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:
			819106.2	Estimate rate constants of reactions from concentration of reactants/products as a function of time
			819106.3	Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc
			819106.4	Synthesize a small drug molecule and analyse a salt sample .
FE	I	Engineering Graphics Lab	819108.1	Introduction to engineering design and its place in society
			819108.2	Exposure to the visual aspects of engineering design
			819108.3	Exposure to engineering graphics standards
			819108.4	Exposure to solid modeling.
FE	I	English Lab	819107.1	Students will be sensitized towards recognition of English sound pattern.
			819107.2	The fluency in speech will be enhanced.
FE	I	Workshop Practices	819105.1	Students will be able to fabricatecomponents with their own hands.
			819105.2	Get practical knowledge of the dimensional accuracies and dimensional tolerances possible
			819105.3	with different manufacturing processes.
			819105.4	Assemble different components, they will be able to produce small devices oftheir interest.
FE	II	Physics	819201.1	To study Bragg’s Law and introduced to the principles of lasers, types of lasers and applications
			819201.2	Various terms related to properties of materials such as, permeability, polarization, etc.
			819201.3	Some of the basic laws related to quantum mechanics as well as magnetic and dielectric
			819201.4	properties of materials
			819201.5	Simple quantum mechanics calculations
			819201.6	Nanotechnology and their industrial applications.

Class	Semester	Name of the Subject	CO	Course Outcome
FE	II	Mathematics-II	819202.1	Use mathematical tools needed in evaluating multiple integrals and their usage.
			819202.2	Apply effective mathematical tools for the solutions of differential equations that model physical processes.
			819202.3	Use tools of differentiation and integration of functions of a complex variable that are used in various techniques dealing engineering problems.
FE	II	Basic Electrical & Electronics Engineering	819203.1	Students will be able to demonstrate knowledge of circuit analysis using various basic laws and theorems of electrical circuits
			819203.2	Students will be able to demonstrate and understand definition and relationship of various AC circuits.
			819203.3	Understand working principle of PN junction diode, Zener diode and their applications.
			819203.4	Describe different configuration of Bipolar Junction Transistor.
			819203.5	Describe different configurations of FET
			819203.6	Understand operating principle Power Electronics Devices
			819203.7	Describe use of the Basic gate and Universal gate
FE	II	Programming for Problem Solving	819204.1	To formulate simple algorithms for arithmetic and logical problems
			819204.2	Understand the fundamentals of C programming.
			819204.3	To test and execute the programs and correct syntax and logical errors
			819204.4	Choose the loops and decision making statements to solve the problem.
			819204.5	To decompose a problem into functions and synthesize a complete program using divide and conquer approach
			819204.6	To use arrays, pointers and structures to formulate algorithms and programs
FE	II	Physics Lab	819205.1	To study Bragg's Law and introduced to the principles of lasers, types of lasers and applications
			819205.2	Various terms related to properties of materials such as, permeability, polarization, etc
			819205.3	Some of the basic laws related to quantum mechanics as well as magnetic and dielectric
			819205.4	properties of materials
			819205.5	Simple quantum mechanics calculations

Class	Semester	Name of the Subject	CO	Course Outcome
			819205.6	Nanotechnology and their industrial applications.
FE	II	Basic Electrical and Electronics Engineering Lab.	819206.1	Identify electrical and electronics components/equipments.
			819206.2	Simplify D.C. network using Superposition Theorem.
			819206.3	Simplify D.C. network using Thevenin's Theorem.
			819206.4	Learn diode V-I Characteristic
			819206.5	Understand BJJ as a switch
			819206.6	Understand LED, JFET, SCR V-I characteristics
FE	II	Programming for Problem Solving Lab	819207.1	Understand the fundamentals of C programming.
			819207.2	Choose the loops and decision making statements to solve the problem.
			819207.3	Use functions to solve the given problem.
			819207.4	Implement different Operations on arrays.
			819207.5	Understand strings and structures.
			819207.6	Understand the usage of pointers.
SE		Industrial Chemistry	819301.1	Draw symbols and flow diagrams for the manufacturing of chemical products.
			819301.2	Understand the importance of unit operations and unit processes in chemical process Industries.
			819301.3	Understand the workingof processequipmentsin the manufactureofchemicals.
			819301.4	Analyze the processparameters in the manufacture of petrochemicals.
			819301.5	Demonstrate the basics ofconversion ofraw materials into finishedproducts.
SE	III	Thermodynamics-I	819302.1	Understand the aspects of chemical classical thermodynamics.
			819302.2	Apply mass and energy balances to different type of systems.
			819302.3	Solve problems involving liquefaction,refrigeration.

Class	Semester	Name of the Subject	CO	Course Outcome
			819302.4	Apply the knowledge of Le-Chatelier sprinciple in finding optimum parameters in the manufacture of important chemical products
			819302.5	Identify the critical constant parameters forliquefactionofgases.
SE	III	Engineering and Solid Mechanics	819303.1	Understand the useof basic concepts ofresolution and composition of forces
			819303.2	Analyse beams, truss or engineering component by applying conditions of equilibrium
			819303.3	Understand the different stresses and strains occurring in components of structure
			819303.4	Calculatethe deformations such asaxial, normal deflections under different loading conditions
			819303.5	Display knowledge of torsion and its application.
SE	III	Fluid Mechanics	819304.1	Understand the role of mechanical and hydrodynamical unit operations in the field of chemical engineering.
			819304.2	Analyze key concepts and fundamental principles, together with the assumptions made in their development, pertaining to fluid behavior, both in static and flowing conditions.
			819304.3	Demonstrate to deal effectively with practical engineering situations, including analysis and design of engineering systems and devices involving fluids and flow.
			819304.4	Understand the knowledge of pipe fittings and pumping system important in chemical industries
			819304.5	Identify,formulate,design and provide the solution to various chemical engineering problems.
SE	III	Industrial Organization and Management	819305.1	Understand and apply the principles of management with scientific view, and will contribute to the profitable growth of industry.
			819305.2	Study various managerial skills which will help them to share responsibilities and will make them able to work effectively in diverse, multicultural environments.
			819305.3	Demonstrate ability to work in multidisciplinary team and will display communication skills.

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			819305.4	Design sound purchasing skill ability and Inventory Control strategies, and simplistic materials management system.
			819305.5	Develop,implement,and improve integrated systems that include people, materials, information,equipment,and energy and will provide engineering solutions in a global,economic,environmental, and societal context.
SE		Thermodynamics-I Lab	819306.1	Accustom concepts of heat, work, and energy and their interrelations.
			819306.2	Under stand basic thermodynamic properties and units.
			819306.3	Demonstrate the ability for calculating heat of solution, heat of neutralization,heat of hydration of a chemical reaction.
			819306.4	Execute the knowledge for determining enthalpy change, entropy change and free energy change of a particular reaction.
			819306.5	Apply the knowledge of fundamental thermodynamic properties and thermochemistry principles in chemical industries**.**
SE	III	Fluid Mechanics Lab	819307.1	Analyze potential head, kinetic head and pressure head using Bernouillis theorem.
			819307.2	Demonstrate how to measure flow rates of fluids.
			819307.3	Analyze laminar or turbulent or transient nature of flow.
			819307.4	Apply the knowledge of characterization of pumps.
			819307.5	Apply the knowledge fluid mechanics.
SE	III	Chemical Engineering Lab-I	819308.1	Gain knowledge of experimental techniques for verifying theoretical concepts.
			819308.2	Apply experimental skills for purification of impure substances.
			819308.3	Display the ability to carry qualitative & quantitative chemical analysis.
			819308.4	Apply the basics of experimentation in analysis of oil and petroleum samples.
			819308.5	Demonstrate the analytical skills for solving problems arising during chemical analysis.
SE	IV	Biology	819401.1	Explain the structure and importance of different biomolecules for different cellular functions and metabolic activities in the living organisms
			819401.2	Explain the conditionsrequired for growth,characteristics of growth and development.

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			819401.3	Explain major components of celland tissue culture media, e.g. minerals, growthfactors, hormones, and what governs the choice of components.
			819401.4	Explain various techniques for isolation and identification of microorganisms with their role in various fields.
			819401.5	Explain the significanceofmodel organisms in recombinant DNA technology
SE	IV	Material Science	819402.1	To know the essential parameters for the formation of covalent, ionic and metallic bond.
			819402.2	To understand the structure-properties relationship for engineering materials.
			819402.3	To learn basics for creating desired structure.
			819402.4	To study the inorganic engineering materials & composites.
			819402.5	To learn the fundamental principles underlying and connecting the structure, processing, properties, and performance of materials systems.
SE	IV	Thermodynamics -II	819403.1	Execute knowledge of basic scienceandengineeringafter studyofthe laws of thermodynamics and state functions.
			819403.2	Capable of identifying,formulating, designing and providing the solution to chemical engineering problems by study of calculations of entropy changes,Vant‟Hoff equation.
			819403.3	Capable ofevaluating chemical reaction equilibrium
			819403.4	Display the research ability by designing, conducting, interpreting and analyzing to experimental data for preparing reports by study of the thermodynamic consistency test of VLE data.
			819403.5	Exhibit the skill of construction of pressure-composition and boiling point diagrams.
SE	IV	Material and Energy Balance Computations	819404.1	Analyze a particular process in whole or part.
			819404.2	Evaluate the economics of the various processes, design the various equipments and help in identifying the losses in processes.
			819404.3	Exhibit theskill of material balances and steady state energy balance for various systems.
			819404.4	Apply the techniques for increasing the efficiency of the chemical processes.

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			819404.5	Capable of use of humidity charts for engineering calculations.
SE	IV	Project Management and Entrepreneurship	819405 .1	Understand theimportanceofprojectplanningandmanagementofthe project to become successful entrepreneur.
			819405 .2	Display ability to design and develop newer products.
			819405 .3	Demonstrate abilityto work in multidisciplinary teams and understand the impact of engineering solutions in a global,economic,environmental, and societal context.
			819405 .4	Demonstrate capability about customer relationship management
			819405 .5	Exhibit skill about industrial policies for development of enterprise
SE	IV	Material Science Lab	819406.1	Underst and the importance of testing of materials from engineering point of view.
			819406.2	Apply the knowledge for providing structural engineering solutions.
			819406.3	Accustom the testing machines for testing of engineering materials.
			819406.4	Analyze experimental data for providing technical solutions.
			819406.5	Display the ability in proper selection of materials for specific applications.
SE	IV	Thermodynamics–II Lab	819407 .1	Understand the fundamental laws of thermodynamics.
			819407 .2	Understand Vapour-Liquid Equilibrium
			819407 .3	Display knowledge about partial molar properties, activity coefficient and the equilibrium constant in calculations.
			819407 .4	Use Van‟tHoff Equation
			819407.5	Demonstrate for construction of pressure-composition & boiling point diagrams.
SE	IV	Material and Energy Balance Computations Lab	819408.1	Analyze a particular process in whole or part.
			819408.2	Evaluate the economics of the various processes, design the various equipments and help in identifying the losses in processes.
			819408.3	Apply the techniques for increasing the efficiency of the chemical processes.
			819408.4	Capable of use of humidity charts for engineering calculations

Class	Semester	Name of the Subject	CO	Course Outcome
			819408.5	Demonstrate the ability of calculating heat and material balances of combustion processes
SE	IV	Chemical Engineering Lab-II	819409 .1	Verify various theoretical principles through experimentation.
			819409 .2	Accustom the experimental skills in product preparations.
			819409 .3	Visualize practical implementation ofpropertechniques for the conversion of raw materials into finished products.
			819409 .4	Apply knowledge in investigating reaction rates of elementary reaction.
			819409 .5	Demonstrate the ability for providing technical solutions in the manufacture of products.
TE	V	Mass Transfer-I	819501.1	Learn about the basics of the mass transfer process.
			819501.2	Understand diffusion phenomenon in solids and fluids.
			819501.3	Demonstrate knowledge of mathematics, science and engineering principles.
			819501.4	Providing a sound process design of various equipments used in humidification, gas absorption/stripping, crystallization and drying operation.
			819501.5	Identify, formulate, design and provide the solution to various chemical engineering problems.
TE	V	Chemical Reaction Engineering-I	819502.1	Understand the basic concepts of chemical reaction engineering.
			819502.2	Compare various reactors.
			819502.3	Understand the Optimum temperature progression for single reaction, Isothermal, adiabatic, non adiabatic operation.
			819502.4	Know the residence time distribution of fluid in vessel & concept of micro and macro mixing.
			819502.5	Identify related calculation and solutions to chemical reaction engineering problems for designing chemical reactors.
TE	V	Particle and Fluid-Particle Processing	819503.1	Analyze solid particle characterization.

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			819503.2	Know the types of fluidization and its applications.
			819503.3	Analyze filtration data and select filtration equipments.
			819503.4	Calculate drag force and terminal settling velocity for single particles.
			819503.5	Demonstrate size enlargement; nucleation and growth of particles.
TE	V	Process Equipment Design (PEC - I)	819541.1	Exhibit design skills in chemical process industry and in a competitive manner how to design Heads, storage vessel, support for vessels, cylindrical vessels under external pressure, shell and tube heat exchanger, calendria type evaporator, reaction vessel, crystallizers, rotary dryer, thick wall high pressure vessel and turbine agitator.
			819541.2	Demonstrate the ability to perform the task by identifying, formulating, designing and providing the solution to various chemical engineering problems.
			819541.3	Identify, formulate, design and provide the solution to various chemical engineering problems.
			819541.4	Understand professional and ethical responsibilities formally and informally show the capacity of designing the product to meet economical and societal requirements.
			819541.5	Understand about the environmental issues and will provide solutions for green and clean technologies.
TE	V	Energy Engineering (OEC - I)	819551.1	Apply knowledge of mathematics, science, and engineering to various energies.
			819551.2	Analyze and interpret the data i.e. the conventional and nonconventional source of energy, national energy strategy and energy plans, energy power management, energy audit, various energy conversion processes, devices and the power plants.
			819551.3	Understand conventional energy sources like Coal and types of coal and byproduct, Petroleum, Natural gas and Refinery Products.
			819551.4	Demonstrate Fuel cells and design and operation of a Fuel cell.
			819551.5	Analyze Nuclear Energy, Solar Energy and Wind Energy.
TE	V	Mass Transfer-I Lab	819506.1	Recognize types of diffusion and the mechanism of diffusion

Class	Semester	Name of the Subject	CO	Course Outcome
			819506.2	Demonstrate an ability to solve the mass transfer problems by calculating the Mass Transfer Coefficient.
			819506.3	Use practical considerations for designing and operation of mass transfer operations /
			819506.4	Identify, formulate, design and provide the solution to various chemical engineering problems.
			819506.5	Understand the environmental issues and to provide solutions for green and clean technologies.
TE	V	Chemical Reaction Engineering-I Lab	819507.1	Demonstrate the concepts of chemical reaction engineering using knowledge of basic Sciences and Mathematics.
			819507.2	Accustom of reactors, residence time distribution and concept of micro and macro mixing.
			819507.3	Identify, formulate, design and provide the solution to various reactors such as Continuous Stirred Tank Reactor, Plug Flow Reactor, and Packed Bed Reactor by obtaining
			819507.4	Demonstrate the understanding of professional and ethical responsibilities.
			819507.5	Understand the environmental issues and to provide solutions for green and clean technologies.
TE	V	Chemical Engineering Lab-III	819508.1	Understand the size of the product according to utilization into proper size reduction equipment.
			819508.2	Visualize, formulates, analyze and solve basic engineering problem of equipments.
			819508.3	Accustom with scientific principles and apply them to the practice of engineering
			819508.4	Understand and predict the applications of filtration processes and its working and carrying out the design of engineering layout.
			819508.5	Design and fabricate screw conveyor, chain and flight.
TE	V	Minor Project (Stage–I)	819509.1	Demonstrate a sound technical knowledge of their selected project topic.
			819509.2	Undertake problem identification, formulation and solution.
			819509.3	Design engineering solutions to complex problems utilizing a systems approach.
			819509.4	Conduct an engineering project

Class	Semester	Name of the Subject	CO	Course Outcome
			819509.5	Demonstrate the knowledge, skills and attitudes of a professional engineer.
TE	VI	Mass Transfer-II	819601.1	Apply mass transfer principles to various phase equilibrium based separation processes viz. perform graphical calculations for binary distillation.
			819601.2	Understand and apply process design principles for large scale industrial separators – process design of liquid-liquid; solid liquid extraction.
			819601.3	Capable of identifying, formulating, designing and providing the solution to chemical engineering problems.
			819601.4	Develop the design of various equipments as per the standard specifications.
			819601.5	Demonstrate the caliber of mass transfer aspects in product design.
TE	VI	Chemical Reaction Engineering-II	819602.1	Apply basic kinetics and mass transfer principles for development of heterogeneous system rate expressions for fluid particle and fluid -fluid non catalytic reaction.
			819602.2	Demonstrate their ability how to prepare and use the catalyst for enhancements of reaction rate and understand its deactivation and generation.
			819602.3	Become competitive to undertake the designing of solid catalyzed reaction, Fluidized bed Reactors, Slurry bed reactors, Trickle bed reactors, Moving Bed Reactor, Isothermal and Adiabatic fixed bed reactor.
			819602.4	Display the research by designing, conducting, interpreting and analyzing experimental data for preparing reports.
			819602.5	Understand the environmental issues and to provide solutions for green and clean technologies.
TE	VI	Heat Transfer	819603.1	Understand conduction, convection and radiation modes applicable to design heat exchanging equipments widely used in chemical process and allied industry.
			819603.2	Apply the knowledge of individual and overall heat transfer coefficient for designing steady state and unsteady state heat transfer processes.
			819603.3	Provide suitable designing of heat exchanger and evaporator.
			819603.4	Demonstrate the understanding of professional and ethical responsibilities.

Class	Semester	Name of the Subject	CO	Course Outcome
			819603.5	Understand the environmental issues and to provide solutions for green and clean technologies.
TE	VI	Instrumentation & Instrumental Analysis (PEC - II)	819641 .1	Learn basics of instrumentation, dynamic and static characteristics of an instrument.
			819641 .2	Demonstrate the ability of measuring the quantities which are frequently involved in chemical process industries.
			819641 .3	Identify the instrument needed for measuring the quantity in different working atmospheres.
			819641 .4	Apply the knowledge for using modern tools and equipments in analytical research.
			819641 .5	Apply the instrumentation principles for solving real world problems.
TE	VI	Alternative Fuels (OEC - II)	819651.1	Display the skill of know of hydrogen, its production, on board storage, stationary storage, piping, dispensers, transportation, advantages and disadvantages, hazard, safety, standards and uses in IC and SI engine, CI engine.
			819651.2	Analyze the CNG production and its, storage, advantage and disadvantages, dispensing system, transportation, fuel kits, engine modification for CNG operation, CNG combustion.
			819651.3	Exhibit skills eco friendly use of biodiesel and its production, storage, dispensing, biodiesel standards, biodiesel transportation, advantages and disadvantages.
			819651.4	Apply means of maintaining productivity by identify composition and properties of producer gas.
			819651.5	Demonstrate the ability for providing solutions for use of ammonia and liquid nitrogen as a
TE	VI	Mass Transfer-II Lab	819606.1	Display skill of the theoretical principles and practical considerations for design and operation of mass transfer operations, processes.
			819606.2	Understand the engineering approaches to deriving the design equations for complex mass transfer operations.
			819606.3	Identify design requirement and predict the major process parameters in separation processes.

Class	Semester	Name of the Subject	CO	Course Outcome
			819606.4	Identify design requirement and predict the major process parameters in separation processes.
			819606.5	Understand the environmental issues and to provide solutions for green and clean technologies.
TE	VI	Chemical Reaction Engineering-II Lab	819607.1	Demonstrate about how enhance the rate of non catalytic heterogeneous chemical reactions.
			819607.2	Display skill of improvement in purity of ethanol using various reactive and extractive distillations.
			819607.3	Identify, formulate, design and provide the solution to absorption and adsorption processes for heterogeneous systems various.
			819607.4	Exhibit the understanding of professional and ethical responsibilities.
			819607.5	Understand the environmental issues and to provide solutions for green and clean technologies.
TE	VI	Heat Transfer Lab	819608.1	Determine thermal conductivity of metal rods and heat flux through composite wall.
			819608.2	Apply skill of calculation of heat transfer coefficient and fin efficiency in natural / forced convection.
			819608.3	Demonstrate determination of emissivity and Stefan Boltzmann Constant.
			819608.4	Display caliber of consideration about LMTD and overall heat transfer coefficient.
			819608.5	Demonstrate the understanding of professional and ethical responsibilities.
TE	VI	Minor Project	819609.1	Demonstrate a sound technical knowledge of their selected project topic.
			819609.2	Undertake problem identification, formulation and solution.
			819609.3	Identify, formulate, design and provide the solution to various chemical engineering problems.
			819609.4	Conduct an engineering project.
			819609.5	Demonstrate the knowledge, skills and attitudes of a professional engineer.

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BE	VII	Process Control	719701.1	Understand process dynamics and various forms of mathematical models required to express them, including differential equations, transfer functions, and frequency response plots.
			719701.2	Understand the main ideas behind advanced multivariable control
			719701.3	Capable to analyze, design and tune various control systems.
			719701.4	To function along with multidisciplinary teams
			719701.5	To be capable of setting and complete team projects.
BE	VII	Transport Phenomenon (PEC-III)	719721.1	Apply engineering principles and analyze problems dealing with transport phenomena.
			719721.2	Apply mathematics, science, and engineering principles to analyze transport phenomena
			719721.3	Implement and physically interpreting the transport mechanism.
			719721.4	Understanding various transport operations and collective effect of momentum, heat and mass transfer.
			719721.5	Display skill of various equation uses in momentum transfer.
BE	VII	Computer Aided Process Equipment Design (PEC-IV)	719731.1	Exhibit computer aided design skills in a competitive manner how to design of shell and tube heat exchanger and batch reactor -isothermal and non-isothermal heating and cooling medium.
			719731.2	Demonstrate the ability to perform the task by identifying, formulating, designing and providing the solution to various chemical engineering problems associated with single effect evaporator and distillation column.
			719731.3	Identify, formulate, design and provide the solution to various chemical engineering problems associate with the absorption column and rotary dryer.
			719731.4	Understand professional and ethical responsibilities formally and informally show the capacity of designing requires the module for vessel under internal pressure, heads and closures and vessel under external pressure and rectangular storage tank product to meet economical and societal requirements.

Class	Semester	Name of the Subject	CO	Course Outcome
			719731.5	Understand about computer aided design of tall vessels, thick-walled high pressure vessel, Skirt support, Lug support and Saddle supports along with the environmental issues and will provide solutions for green and clean technologies.
BE	VII	Plant Utility (OEC-III)	719741.1	Display the skill of steam generation and its application in chemical process plants.
			719741.2	Exhibit the knowhow about types of compressors and vacuum pumps & method of vacuum development.
			719741.3	Analyzed characteristics of refrigeration system& production of liquid N2 and O2.
			719741.4	Demonstrate use of insulation for meeting the process equipment requirement.
			719741.5	Identify formulating, designing and providing the various properties, use, sources and methods of generation of inert gases.
BE	VII	Process Control Lab	719705.1	Apply the knowledge of control theory for understanding the various processes, carried out in the Chemical Engineering Industry.
			719705.2	Demonstrate their ability of understanding the process control and its application by virtue of experimentation.
			719705.3	Apply the knowledge of first order control system.
			719705.4	Apply the knowledge of second order control system.
			719705.5	Apply the knowledge of Final Control Element system.
BE	VII	Instrumentation & Control Lab	719706.1	Develop expertise in handling laboratory instruments with due care & precautions.
			719706.2	Deliver the skill in calibration of instruments.
			719706.3	Demonstrate analytical skills in students through instrumental techniques.
			719706.4	Understand use chromatography.
			719706.5	Evaluate refractive index.
BE	VII	Project (Stage - I)	719707.1	Demonstrate a sound technical knowledge of their selected project topic.
			719707.2	Undertake problem identification, formulation and solution

Class	Semester	Name of the Subject	CO	Course Outcome
			719707.3	Design engineering solutions to complex problems utilizing a systems approach
			719707.4	Conduct an engineering project
			719707.5	Demonstrate the knowledge, skills and attitudes of a professional engineer
BE	VIII	Process Technology and Economics	819801.1	Describe sources and processes of manufacture of various industrially important chemicals.
			819801.2	Draw block diagrams/ process flow diagrams of the processes used for manufacture of industrially important inorganic chemicals.
			819801.3	Identify the major engineering problems involved in manufacturing and provide best possible solutions for the same.
			819801.4	Explain and calculate economic aspects of Projects involved in manufacturing of Chemical
			819801.5	Analyze the projects through economical evaluation of manufacturing practices.
BE	VIII	Chemical Plant Design and Project Engineering (PEC-V)	819821.1	Exhibit the role of Chemical Engineer in Chemical Plant Design and Development of the project.
			819821.2	Apply requisite skill of the Process Design: Choice of process continuous Vs. Batch processing Process Equipments and Materials Selection Scale up method and development of process flow sheet.
			819821.3	Develop the Plant Layout and understand about Location of Chemical Plant.
			819821.4	Understand the Site Preparations and Structures requires in the chemical industry and adopting the tool of management for planning, scheduling and controlling like PERT and CPM network analysis
			819821.5	Demonstrate use of the Process Auxiliaries for reducing the cost of piping with overall safety for the sustainable plant design.
BE	VIII	Petrochemical Technology (PEC-VI)	819831.1	Understand the current status and challenges of petroleum refinery worldwide and in India.
			819831.2	Apply the knowledge for refining of crude oil through fractionation.
			819831.3	Display the knowledge for controlling pollution in the petrochemical refineries.

Class	Semester	Name of the Subject	CO	Course Outcome
			819831.4	Understand the significance of unit operations and unit processes in manufacturing of chemicals.
			819831.5	Demonstrate techniques for the economical manufacturing of commercially important petrochemicals.
BE	VIII	Energy Conservation and Management (OEC-IV)	819841.1	Learn energy conservation, management and audit.
			819841.2	Understand Indian energy conservation act.
			819841.3	Understand economics of efficient energy use and energy efficient technology.
			819841.4	Accustom waste heat recovery.
			819841.5	Demonstrate energy saving techniques
BE	VIII	Process Technology and Economics Lab	819805.1	State the basic concepts of process design development and general design considerations.
			819805.2	Understand importance of unit processes and symbols of unit operations.
			819805.3	Draw the process flow sheet for the manufacturing of specific chemical products
			819805.4	Identify and thereby solve major engineering problems encountered during manufacturing
			819805.5	Perform economic analysis for process to calculate equipment cost, and profitability for
BE	VIII	Design and Simulation Lab	819806.1	Demonstrate the ability of using Chemical Engineering concepts in designing and providing computer aided solutions to various unit operations and unit processes with the help of C/C++.
			819806.2	Display performing the task with multidisciplinary teams by identifying, formulating, designing.
			819806.3	Understand professional and ethical responsibilities formally and informally show the capacity of designing to meet economical and societal requirements.
			819806.4	Understand about computer aided design along with the environmental issues and will provide solutions for green and clean technologies.
			819806.5	Exhibit the computational skills using simulation.

Class	Semester	Name of the Subject	CO	Course Outcome
BE	VIII	Project - II	819807.1	Demonstrate a sound technical knowledge of their selected project topic.
			819807.2	Undertake problem identification, formulation and solution.
			819807.3	Design engineering solutions to complex problems utilizing a systems approach.
			819807.4	Conduct an engineering project
			819807.5	Demonstrate the knowledge, skills and attitudes of a professional engineer.