Vision:

To be a vital resource for society and industry by producing highly skilled and knowledgeable graduates with excellence in education and research in the field of Chemical & allied industries

Mission:

1. Provide quality education to meet the needs of a rapidly changing technological environment in chemical engineering through continuous improvement
2. Create an interdisciplinary research culture through collaboration with industry and other organizations
3. Foster research and development based innovation to solve societal problems for sustainability

Program Educational Objectives(PEO's):

PEO1: Inculcate leadership qualities with strong communication, teamwork and technical skills in Chemical Engineering profession

PEO2:Develop research culture and entrepreneurship skills and capable for higher studies

PEO3:Evaluate and relate Chemical Engineering issues in context with industry and society

ProgramOutcomes:

PO1: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis: Identify, formulate, review research literature and analyze complex engineering problems researching substantiated conclusions using first principals of mathematics, natural science, and engineering sciences.

PO3: Design / development of solutions: Design solution for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Use research-based knowledge andresearch methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitation.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Understand the impact of professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

PO9: Individual and team work: Function effectively as an individual and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, as such, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principals and apply these to one's own work, as member and leader in team, to manage projects and in multidisciplinary environment.

PO12: Life-long learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes

PSO 1: Design and develop efficient chemical processes in view of safety, environmental and Techno-economical aspects

PSO 2: Implement innovative practices in industry as practising engineers to serve the society

PSO 3: Analyse and solve complex problems in process and allied industries by applying Chemical Engineering competencies

Course Outcomes:

S.E. Chemical Engineering (Pune Univeristy, 2019 Pattern) Sem-I

Subject 1 : Applied Mathematics –III (207004)

At the end of this course, students will be able to

COS207004.1 .Solve higher order linear differential equations and its applications to engineering problems in their disciplines.

COS207004.2 Apply Integral transform techniques such as Fourier transform & Laplace transform to solve differential equations involved in Vibration theory, Heat transfer, Liquid level systems and related engineering applications.

COS207004.3 Apply Statistical methods like correlation & regression and probability theory as applicable to analyzing and interpreting experimental data in testing and quality control.

COS207004.4 Perform vector differentiation & integration, analyze the vector fields and apply to fluid flow problems.

COS207004.5 Solve Partial differential equations such as wave equation, one and two dimensional heat flow equations.

Subject 2 : Industrial Chemistry I (209341)

At the end of this course, students will be able to

CO 209341.1 Analyze the type of forces and synthesize the materials based on their properties.....

CO 209341.2 Estimate the kinetics of reaction and analyze the factors controlling the rate of reactions.

CO 209341.3 Analyze the given chemical substance by different Instrumentation techniques.

CO 209341.4 Estimate the quantity of solute and synthesize the solution based on the properties

CO 209341.5 Evaluate the mechanism of reactions and apply proper factors for increasing the yield of the desired product.

Subject 2 :Fluid Mechanics (209342)

At the end of this course, students will be able to

CO 209342.1 Understand the basic concepts of fluid mechanics and their applications in Chemical Engineering.

CO 209342.2 Understand fluid statics and its applications related to pressure measuring devices in the chemical industry.

CO 209342.3 Analyze basic equations of fluid flow and their applications to determine fluid flow rate by different devices.

CO 209342.4 Formulate mathematical equations for flow of fluid through different systems and determine different losses occurring in pipelines.

CO 209342.5 Develop relationships among process or system variables using dimensional analysis.

CO 209342.6 Understand applications of different valves and pumps for transportation of fluid through pipelines.

Subject 3 : Engineering Materials (209343)

At the end of this course, students will be able to

CO 209343 .1 Apply basic concepts of material science.

CO 209343 .2 Select materials based on their properties for various applications

CO 209343 .3 Describe metals and their alloys and selection process and analyze them according to their properties.

CO 209343 .4 Describe and analyze nano materials and their properties.

CO 209343 4.5 Identify electron microscopes and their types.

Subject 4 : Process Calculations (209344)

At the end of this course, students will be able to

CO 209344 .1 On completion of the course, students will be able to Determine the composition of the materials.

CO 209344 .2 Apply the various laws governing solid, liquid and gas phases

CO 209344 .3 Perform material balance with and without chemical reaction.

CO 209344 .4 Perform material balance for various unit operations or processes in Chemical Engineering.

CO 209344 .5 Identify and solve stoichiometry aspects of unit operation and humidification

CO 209344 .6 Calculate the Calorific values of different fuels by understanding the knowledge of combustion processes of Chemical Engineering.

Subject 5 : Soft Skills (209345)

At the end of this course, students will be able to

CO 209345 .1 Write grammatically correct technical reports in MS Words or equivalent software.

CO 209345 .2 Prepare effective power point slides in MS PowerPoint or equivalent software.

CO 209345 .3 Perform the group/ team Work/ task.

CO 209345 .4 Apply MS Excel and it's features for solving problems.

CO 209345 .5 Present, convince and persuade to be an effective and successful professional.

Subject 6 : Audit Course 3

After successful completion of the course students should be able to

CO209353.1 Understand the basic of Scilab, its importance, relevance, and its application in chemical engineering

CO209353.2 Development of basic and advanced understanding of calculations performed in mathematics at Scilab platform

CO209353.3 Solve chemical engineering problems

S.E. Chemical Engineering (Pune Univeristy, 2019 Pattern) Sem-II

Subject 7 : Industrial Chemistry II (209347)

At the end of this course, students will be able to

CO 209347.1 Apply the concept of naturally occurring polymer and synthesize the new polymers.

CO 209347.2 Apply the theory of synthesis of complex and evaluate their properties

CO 209347.3 Analyze the given chemical substance by different Instrumentation techniques.

CO 209347.4 Understand catalyst and its mechanism and apply it in the synthesis of compounds.

CO 209347.5 Understand the concept of isomerism and analyze different isomers and their properties.

Subject 8 : Heat Transfer (209348)

At the end of this course, students will be able to

CO 209348.1 Get acquainted with three modes of heat transfer such as conduction, convection and radiation.

CO 209348.2 Distinguish the concept of natural and forced convection with and without phase change of the fluids and their application in the process industries.

CO 209348.3 Understand the concept of radiation and the industrial applications of it.

CO 209348.4 Understand the basics of the Heat Exchangers and type of Heat Exchangers.

CO 209348.5 Classify the types of evaporators with their principles and design the evaporators.

Subject 9 : Principles of Design (209349)

At the end of this course, students will be able to

CO 209349.1 Apply basic knowledge of strength of materials for designing machine components.

CO 209349.2 Analyze stresses and strains in machine elements and structures subjected to various loads.

CO 209349.3 To develop understanding about drawing of shafts, keys, couplings etc

CO 209349.4 To impart the basic concepts of chemical engineering drawing, mechanical design and process design for different process equipments

CO 209349.5 Define the approach and solve process design problems by employing knowledge of mathematics.

CO 209349.6 Critically review design alternatives and select and size appropriate process equipment.

Subject 10: Chemical Technology I (209350)

At the end of this course, students will be able to

CO 209350.1 State basic principles of chemical process industry.

CO 209350.2 Describe various manufacturing processes used in chemical process industries.

CO 209350.3 Understand major engineering problems encountered in chemical process industries.

CO 209350.4 Determine process aspects like yield, byproducts formed,generation of waste.

CO 209350.5 Draw and explain process flow diagrams for a given process.

CO 209350.6 Understand use of various equipment/instruments used in process industry

Subject 11 : Mechanical Operations (209351)

At the end of this course, students will be able to

CO 209351.1 To select suitable type of screening and size reduction equipment for different particle sizes.

CO 209351.2 To select suitable type of thickeners and clarifiers for separation of suspended solid particles from liquid for example applications in Wastewater treatment plants.

CO 209351.3 To apply fluidization and beneficiation techniques in Chemical Industries

CO 209351.4 To select a suitable type of agitator for mixing and agitation and to estimate power consumption in mixing and agitation.

CO 209351.5 To select a suitable type of filter for filtration of a slurry or a suspension..

CO 209351.6 To select a suitable type of conveyor for transportation of different types of solids.

Subject 12 : Project Based Learning (209352)

At the end of this course, students will be able to

CO 209352.1 Student will be able to identify the problem and approach the solution comprehensively.

CO 209352.2Students will comprehend the impact of engineering in a universal, economic, environmental, and societal context.

CO 209352.3Students will be able to appreciate the need for, and develop a capability to employ lifelong learning.

Subject 13 : Audit Course 4 (209353)

At the end of this course, students will be able to

CO 209353.1 To impart basic understanding of Scilab, its importance, relevance, and applications in chemical engineering

CO 209353.2 To develop understanding of basic and advanced calculations performed in mathematics at Scilab platform

CO 209353.3 To solve various question based on chemical engineering subjects

T.E. Chemical Engineering (Pune Univeristy, 2019 Pattern) Sem-I

Subject 1 : Mass Transfer-I (309341)

At the end of this course, students will be able to

CO309341.1 To Identify the suitable technique for the Separation of specific component in various industrial applications.

CO309341.2 Understand mass transfer coefficient and theories of mass transfer

CO309341.3 Understand the Gas Absorption operation and various gas liquid contact equipments

CO309341.4 Apply the knowledge of Humidification and Dehumidification

CO309341.5 Apply the knowledge of various equipment used for gas liquid contact.

CO309341.6 Understand rate of drying and equipments used for drying

Subject 2 : Chemical Technology -II (309342)

At the end of this course, students will be able to

CO309342.1 Understand basic principles of chemical process industry

CO309342.2 Describe various manufacturing processes used in chemical process industries.

CO309342.3 Draw and explain process flow diagrams for a given process.

CO309342.4 Understand use of various equipment/instruments used in the process industry.

CO309342.5 Determine process aspects like yield, byproducts formed,generation of waste.

CO309342.6 Understand major engineering problems encountered in chemical process industries.

Subject 4 : Chemical Engineering Mathematics (309343)

At the end of this course, students will be able to

CO309343.1 Differentiate and evaluate different types of errors and to find roots of equations by using various methods.

CO309343.2 Analyze and apply the knowledge of Linear Algebraic Equation to solve problems of Process Calculation, Heat Transfer and Fluid flow operation in chemical engineering.

CO309343.3 Get acquainted to solve problems on regression analysis and interpolation.

CO309343.4 Application of the knowledge of Ordinary Differential Equation to solve problems of Process Calculation, Heat Transfer and Fluid flow operation in chemical engineering.

CO309343.5 Application of the knowledge of Finite Difference Method to solve problems of Process Calculation, Heat Transfer and Fluid flow operation in chemical engineering.

CO309343.6 Able to apply the basic concepts of optimization and its applications.

Subject 4 : Chemical Engineering Thermodynamics (309344)

At the end of this course, students will be able to

CO309344.1 Apply fundamental thermodynamic principles to analyze closed systems, evaluate chemical potential, and understand phase equilibrium in ideal solutions.

CO309344.2 Calculate excess properties, interpret VLE data, and describe property changes during mixing using Margules and van Laar equations.

CO309344.3 Explain equilibrium principles, identify azeotropes, and perform calculations for multi-component systems.

CO309344.4 Analyze various phase equilibria types and maintain thermodynamic consistency.

CO309344.5 Apply equilibrium criteria to chemical reactions, calculate constants, and assess their temperature dependence.

CO309344.6 Understand equilibrium constants, calculate conversions, and apply the phase rule and Duhem's theorem to reacting systems.

Subject 5 : Elective-I (309345 A) Chemical Industry Management

At the end of this course, students will be able to

CO309345.1 Apply theories to improve the practice of management and understand scope of industrial management, principles of management, production planning, specifications and requirements.

CO309345.2 Analyze the role of Motivation and Job satisfaction, stress management, Organizational culture, Leadership & group dynamics.

CO309345.3 Apply the concepts of Quotation, Tenders and Comparative statement.

CO309345.4 Apply the concepts of marketing management to increase the demand of a particular product.

CO309345.5 Apply theories to improve the quality of product and understand the scope of TQM.

CO309345.6 Justify the need of management laws and suggest the appropriate law.

Subject 6 : Computer Aided Chemical Engineering- I (309346)

At the end of this course, students will be able to

CO309346.1 Apply the concepts of mathematics to find different types of errors and roots of equations by using computer programming methods.

CO309346.2 Create and program to solve Linear Algebraic Equation to solve problems in Process Calculation, Heat Transfer and Fluid flow operation in chemical engineering.

CO309346.3 Get acquainted to analyze and evaluate the different ways to solve problems on regression analysis on computer.

CO309346.4 Application of the knowledge of Ordinary Differential Equation to solve problems of Process Calculation, Heat Transfer and Fluid flow operation in chemical engineering

CO309346.5 Application of the knowledge of Interpolation method to solve problems of Process Calculation, Heat Transfer and Fluid flow operation in chemical engineering in programming.

Subject 7 : Seminar (309347)

At the end of this course, students will be able to

CO309347.1 Acquire Knowledge and skill for proper Literature revivew and it's analysis of specific process

CO309347.2 Able to perform small experimentation to investigate chemical engineering data on working models.

CO309347.3 Acquire innovative problem solving skills and conceptualization of creative ideas.

CO309347.4 Understand report writing skills with the help of research papers, Journals and Reference Book.

CO309347.5 Acquire presentation and communication skills

Subject 8: Industrial Waste Management (311087BS)

At the end of this course, students will be able to

CO311087BS.1 Classify types of pollutions and illustrate pollution laws and standards

CO311087BS.2 Methods of Industrial waste management and types of industrial waste treatment

(Chemical, Physical and Biological)

CO311087BS.3 Determine the types, sources, and effects of water pollutants in industrial wastewater and the characteristics of the wastewater

CO311087BS.4 Identify the types, sources, and effects of industrial solid waste and its characteristics.

CO311087BS.5 Analytical equipment used for solid, liquid, and gas components

Subject 9: Polymer Engineering

After successful completion of course students will be able to

CO209344 .1 Understand Polymer Classification and Properties

CO209344 .2 Understanding of various polymerization techniques

CO209344 .3 Analyze various properties of polymers.

CO209344 .4 Explore the Kinetics of Polymerization

CO209344 .5 Identification of methodology for synthesis of various polymers.

CO209344.6 Manufacturing and Application of Polymers.

T.E. Chemical Engineering (Pune Univeristy, 2019 Pattern) Sem-II

Subject 9 : Chemical Reaction Engineering I (309348)

At the end of this course, students will be able to

CO309348.1 Determine rate determining steps in rate equation and propose mechanism for given reaction.

CO309348.2 Analyse kinetic data and determine rate equation based on different methods of analysis

CO309348.3 Design reactors using performance equations for different reactors

CO309348.4 Understand different types of multiple reactions and determine yield of product

CO309348.5 Relate temperature and pressure dependency on rate of reaction.

CO309348.6 Analyze deviations from ideal reactors and determine residence time distributions.

Subject 9 : Mass Transfer II (309349)

At the end of this course, students will be able to

CO309349.1 Apply theories of distillation to improve the separation and purity.

CO309349.2 Evaluate the number of theoretical stages required for all the separation techniques.

CO309349.3 Implement the basic principles of Extraction Operation.

CO309349.4 Relate the single stage and multistage operations for separation of various components in leaching.

CO309349.5 Justify the need of Adsorption and ion-exchange.

CO309349.6 Apply the concepts of crystallization to form crystals from its solution and relate various methods of supersaturation.

Subject 10 : Transport Phenomena (309350)

At the end of this course, students will be able to

CO309350.1 Apply momentum balance equation to determine velocity distribution for different types of fluids flowing through various systems and solve momentum transfer problems by applying equations of change.

CO309350.2 Apply energy balance equation to determine temperature distribution for different systems and use basic equations to solve heat transfer problems.

CO309350.3 Apply mass balance equation to determine concentration distribution for different systems and use basic equations to solve mass transfer problems.

CO309350.4 Apply equation of change for isothermal systems.

CO309350.5 Evaluate energy losses for macroscopic systems and understand interphase transport and different analogies.

Subject 10 : Elective-II (309351) Process Instrumentation & Control & AIDS

At the end of this course, students will be able to

CO309351.1 Demonstrate Importance of Instrumentation, type of instruments, working elements, classification, characteristics of Instruments.

CO309351.2 Differentiate principal, working and construction of Temperature Measuring Instruments.

CO309351.3 Differentiate principal, working and construction of Pressure and Strain Measuring Instruments.

CO309351.4 Distinguish Principal, working and construction of Level and Flow Measuring Instruments.

CO309351.5 Analyze instrumental methods for chemical analysis like GC, AAS, UV, IR, HPLC etc.

CO309351.6 Apply knowledge of process control and it's tools such as P, PD, PI, PID, On-OFF control systems.

Subject 10 : Internship (309352)

At the end of this course, students will be able to

CO309352.1 Get practical exposure of actual processes/operations in the chemical industry.

CO309352.2 Apply theoretical knowledge gained from Chemical Engineering courses to actual problems in the Chemical industry.

CO309352.3 Acquire innovative problem solving skills and conceptualization of creative ideas.

CO309352.4 Acquire presentation, communication and report writing skills.

CO309352.5 Get acquainted with management skill, organizational structure and improve teamwork qualities.

B.E. Chemical Engineering (Pune Univeristy, 2019 Pattern) Sem-I

Subject 1 : Process Dynamics and Control (409341)

At the end of this course, students will be able to

CO409341.1 Analyze dynamic behavior of different first order systems for given input.

CO409341.2 Analyze dynamic behavior of different second order systems and select different types of controllers to analyze feedback control systems.

CO409341.3 Determine stability of a feedback control system by root locus method and set controller parameters by different controller tuning techniques.

CO409341.4 Analyze frequency response of a process by Bode method and predict stability of a feedback control system.

CO409341.5 Design control systems with multiple loops and application of computer in process control.

Subject 2 : Chemical Reaction Engineering- II (409342)

At the end of this course, students will be able to

CO409342.1 Understand basic concepts of heterogeneous reactions.

CO409342.2 Implement the knowledge of fluid – fluid heterogeneous reactions for design of suitable reactors.

CO409342.3 Understand the phenomenon of adsorption and diffusion in application of solid catalyzed reactions.

CO409342.4 Understand the process of design of heterogeneous- catalyzed reactors.

CO409342.5 Understand basic concepts of heterogeneous reactors & enzymatic reactions.

Subject 3 : Chemical Engineering Design (409343)

At the end of this course, students will be able to

Course Outcome	After successful completion of course students will be able to
CO409343.1	Develop the mechanical and process design of the plate distillation column.
CO409343.2	Design the process and mechanical aspects of the packed bed distillation column.
CO409343.3	Apply basic concepts, design calculations and materials of construction of the piping system
CO409343.4	Differentiate the types and applications of the plant utilities required in the process industries
CO409343.5	Identify the types of the maintenance and the process safety measures to be taken in the design and operation of the project

Subject 4 : Elective-III (409344- I) Environmental Engineering

At the end of this course, students will be able to

CO409344.1 Classify types of pollution and illustrate pollution laws and standards.

CO409344.2 Identify air Pollution-Sources, Effects and Measurement and apply Controlling Methods.

CO409344.3 Differentiate types, sources and effects of water pollutants in wastewater and determine Wastewater characteristics.

CO409344.4 Select and design the wastewater treatments to minimize water pollution.

CO409344.5 Apply tertiary wastewater Treatment and Solid Waste Management for its disposal

Subject 4 : Elective-III (409344- I) Petroleum Refining

At the end of this course, students will be able to

CO409344.1 Distinguish Petroleum composition, specifications of petroleum

CO409344.2 Describe various Pre- refining operations, and recent trends in petroleum industries.

CO409344.3 Demonstrate Refining methods of petroleum products.

CO409344.4 Operate conversion units such as, Reforming, Catalytic-Cracking, Hydro-cracking and coking.

CO409344.5 Manufacturing of Lube Oil and Bitumen with its applications.

CO409344.6 Petroleum Safety, transportation, storage, and marketing of petroleum products.

Subject 5 : Elective-IV (409345) Chemical Process Synthesis

CO40935 1.1 Apply basic concepts of approach to process development, development of new processes, ,overall process design, hierarchy of process design.

CO40935 1.2 Differentiate types of reactions, kinetics, reaction paths, reactors and Separation techniques.

CO40935 1.3 To design distillation sequencing, heat integration of sequences of simple distillation columns.

CO40935 1.4 To Evaluate efficient Heat Exchanger Networks: Pinch Technology, problem table algorithm, Threshold problems etc.

CO40935 1.5 Execute Safety And Health Considerations, Intensification and Attenuation of Hazardous Materials, Quantitative Measures of Inherent Safety.

Subject 5 : Elective-IV ASP (409344 (D))

At the end of this course, students will be able to

CO409344 (D).1 To built advanced concepts of separation techniques used in chemical industries.

CO409344 (D).2 To investigate the principles and functioning advanced separation techniques.

CO409344 (D).3 To utilize the advanced separation technique in problem solving where conventional techniques are not fruitful and require replacement.

CO409344 (D).4 To Identify the applications of advanced separation techniques as per industrial requirement.

CO409344 (D).5 To recognize the selection criteria between advanced separation techniques and conventional separation techniques
CO409344 (D).6 To Identify the suitable technique for the Separation of specific component in various industrial application.

Subject 6 : Computer Aided Chemical Engineering- II (409346)
At the end of this course, students will be able to
CO409346.1 Understand fundamentals of modeling and simulation
CO409346.2 Analyze theory and apply programming knowledge to solve chemical engineering problems
CO409346.3 Simulate chemical processes using chemical process simulation software.

Subject 7 : Project Stage I (409347)
At the end of this course, students will be able to
CO409347.1 Apply the knowledge gained from courses in Chemical Engineering curriculum to work on practical problems.
CO409347.2 Use practical experience gained through the in-depth study of a challenging problem in the Chemical Engineering field.
CO409347.3 Acquire innovative problem-solving skills and conceptualization of creative ideas.
CO409347.4 Acquire presentation skills, communication report writing skills.
CO409347.5 Improve the team working skills for a successful professional career.

Subject 8 : Audit Course 7 (409348)
At the end of this course, students will be able to
CO409348.1 Understand AI fundamentals and concepts related to that.
CO409348.2 Analyze and explore the performance of AI systems.
CO409348.3 Identify and analyse the various areas of AI related to process industries.
CO409348.4 To understand the applications of AI analysis in various regions
CO409348.5 Apply AI techniques for solving problems in chemical engineering.

T.E. Chemical Engineering (Pune Univeristy, 2019 Pattern) Sem-II

Subject 9 : Process Modeling and Simulation (409349)
At the end of this course, students will be able to
CO409349.1 Understand different types of models and fundamental laws governing models.
CO409349.2 Apply modeling laws to Fluid flow system
CO409349.3 Apply modeling laws to heat transfer systems
CO409349.4 Apply modeling laws to mass transfer systems
CO409349.5 Apply modeling laws to different types of chemical reactors
CO409349.6 Apply Numerical Techniques for solving chemical engineering problems.

Subject 10 : Process Engineering Costing & Plant Design (409350)

At the end of this course, students will be able to

CO409350.1 Apply the knowledge of overall aspects of the Chemical Engineering Plant Design.

CO409350.2 Implement basic concepts and various terms of cost Engineering and make cost estimation and cost-profit analysis of chemical manufacturing processes.

CO409350.3 Apply Techniques for economic optimization and optimum design.

CO409350.4 Understand the optimization of different process equipment.

CO409350.5 Apply network Techniques such as CPM and PERT for the Chemical Engineering Project management.

Subject 11 : Elective-IV Petrochemical Engineering 409352(D)

At the end of this course, students will be able to

CO**409352(D)** .1 Analyze status of petrochemical industries and its necessity in India, Get acquainted and interpret the first generation petrochemicals and its basic raw materials

CO**409352(D)** .2 First generation raw material like olefins, aromatics, naphthenes. production of aromatics, naphthenes and other hydrocarbon feedstock, aromatic separation into B,T,X.

CO**409352(D)** .3 Production of low molecular weight olefins by hydrocarbon cracking, furnaces, separation techniques and purification

CO**409352(D)** .4 Combining olefins and aromatics to produce second generation intermediates such as glycols, amines, acids, ketones etc.

CO**409352(D)** .5 Polymers: bulk, engineering and specialty, types of polymerization such as bulk, emulsion and suspension etc.

CO**409352(D)** .6 Evaluate the different safety norms and aspects in petrochemical industry and pollution control norms and methods of elimination.

Subject 11 : Elective-VI Nanotechnology 409352(B)

At the end of this course, students will be able to

CO**409352(B)** .1 To understand the concept of Nano scale and Nanotechnology, and classify various types of Nano material.

CO**409352(B)** .2 Learn the synthesis procedure of Nano material and its method of synthesis according to application.

CO**409352(B)** .3 Identify the suitable type of Characterization technique for Nano material.

CO**409352(B)** .4 Distinguished the fundamental concept of Nano colloids and its chemistry and learn about aspects of quantum dots

CO**409352(B)** .5 Identify the concept of semiconductor and its types and differentiate between intrinsic and extrinsic semiconductors and P-n junction.

CO**409352(B)** .6 Identify the application of Nanotechnology in chemical Engineering and evaluate the impact of Nanotechnology on Environment and its safety aspects.

Subject 12 : Elective-V Chemical Process Safety (409351(B)

At the end of this course, students will be able to

CO409351.1 Recognize and analyze safety programs and Create safety culture.

CO409351.2 Interpret the exact causes behind different accidents in chemical history and apply the knowledge of Industrial hygiene for safety purposes.

CO409351.3 Evaluate cause of fire and explosion along its types and also create the prevention strategy

CO409351.4 Create different designs for preventing incidents and hazard management.

CO409351.5 Evaluate Hazop and risk assessment and plan for emergency.

Subject 12 : Elective-V Advanced Material 409351 (D)

At the end of this course, students will be able to

CO409351.1 Analyze advanced metallic systems, emphasizing microstructural design.

CO409351.2 Explore advanced polymeric materials like Kevlar, Nomex, and UHMWPE, focusing on properties and applications.

CO409351.3 Gain comprehensive knowledge of advanced ceramic materials, including synthesis and microstructure.

CO409351.4 Investigate composite materials, considering factors affecting properties and reinforcement mechanisms.

CO409351.5 Examine metal and ceramic composites, studying reinforcement types and mechanical behavior.

CO409351.6 Explore carbon composites, their characteristics, fabrication, and applications, including ablative polymers in aircraft materials.

Subject 13 : Project Phase- II (409353)

At the end of this course, students will be able to

CO409353.1 Apply the knowledge gained from courses in Chemical Engineering curriculum to work on practical problems.

CO409353.2 Use practical experience gained through the in-depth study of a challenging problem in the Chemical Engineering field.

CO409353.3 Acquire innovative problem-solving skills and conceptualization of creative ideas.

CO409353.4 Acquire presentation skills, communication report writing skills.

CO409353.5 Improve the team working skills for a successful professional career.

Subject 14 : Audit Course 8 (409354)

At the end of this course, students will be able to

CO409354.1 Setup a simulation for the process and run it.

CO409354.2 Compute design parameters, optimize and get results.