

**Department of Chemical Engineering**  
**Final Year Engineering**

**SEM-VII**

Subject Code	Subject	Course Outcomes	
409341	Process Dynamics and Control	CO1	Able to develop transfer function for first order systems
		CO2	Able to develop transfer function and system behavior for second order systems
		CO3	Able to develop and analyze the feedback control loops
		CO4	Able to develop frequency analysis for linearized systems and effect of different controllers
		CO5	Able to design a complex control system
		CO6	Able to understand the computer based control systems
409342	Chemical Reaction Engineering- II	CO1	Able to design heterogeneous catalytic reactors like fluidized bed reactor and packed bed reactor.
		CO2	Able to write rate equations fluid – fluid reactions design fluid- fluid reactors.
		CO3	Able to apply concept of adsorption in catalytic reactions and predict mechanism of catalytic reactions.
		CO4	Able to explain reaction and mechanism in porous catalyst.
		CO5	Able to write rate equations for solid catalysed reactions and determine controlling resistance.
		CO6	Able to design heterogeneous catalytic reactors like fluidized bed reactor, isothermal and adiabatic fixed bed reactor and slurry reactor. Able to explain mechanism of enzyme catalysed reactions.
409343	Chemical Engineering Design	CO1	Able to design Agitating Vessel and Reacting Vessel
		CO2	Able to design storage tank.
		CO3	Able to design Heat Transfer equipment like Shell and Tube Heat Exchanger, double pipe Heat Exchanger and Evaporators
		CO4	Able to design Distillation column for binary system.
		CO5	Able to design Packed and plate column for Absorption and Distillation.
		CO6	Able to design Pipeline system

409344 A	<b>Elective-III Environmental Engineering</b>	CO1	Able to understand causes and effects of environmental pollution and overall current environmental scenario
		CO2	Able to describe causes, effects and control techniques for abatement of air, water and solid wastes
		CO3	Able to estimate the various design parameters of pollution control equipment
		CO4	Able to decide the air and water quality of industrial effluents
		CO5	Able to apply various waste water treatment process
		CO6	Able to interpret the various tertiary waste water treatment processes for domestic and industrial waste water
409345 A	<b>Elective-IV Chemical Process Synthesis</b>	CO1	Able to apply concept of development of a new chemical process and effective industrial utilization of reactors and separators.
		CO2	Able to apply different criteria for choosing appropriate reactor for a given process.
		CO3	Able to apply different criteria for choosing appropriate separator for a given process.
		CO4	Able to apply different distillation sequencing in the chemical process plants.
		CO5	Able to apply different heat exchange networking and utilities in the chemical process plants.
		CO6	Able to demonstrate insight about different considerations of health and safety parameters and able to do hazard analysis.
409345 D	<b>Elective-IV Advance Separation Processes</b>	CO1	Able to apply the concept of multicomponent distillation, were able to find the design parameter required for same
		CO2	Able to understand and analyse the concept of Azeotropic & extractive distillation, and could evaluate the residue curve maps required.
		CO3	Able to understand the concept of advanced separation and their working principle.
		CO4	Able to analyze the different membrane separation techniques like MF, UF, RO, and could differentiate their usage required in different separation areas
		CO5	Able to understand the concept of adsorption like PSA & TSA, and Chromatography as a separation processes
		CO6	Able to understand the how Non-Conventional Separation Techniques are used in Industries, and their benefits and future scope

## SEM-VIII

Subject Code	Subject	Course Outcomes	
409349	<b>Process Modeling and Simulation</b>	CO1	To Apply various fundamental law to Develop the state of process
		CO2	To Formulate Steady State Model for Fluid flow Operation
		CO3	To Formulate Steady State Model for Heat transfer Operation
		CO4	To Formulate Steady State Model for Mass Transfer Operation
		CO5	To Formulate Steady State Model for Reacting Equipments
		CO6	To Analyze Unsteady state bheaviour of Unit Operation
409350	<b>Process Engineering Costing &amp; Plant Design</b>	CO1	To analyze process selection parameters for Chemical Processes.
		CO2	To Evaluate various costing parameters -Deprecation, taxes, discount and annuities.
		CO3	To Evaluate estimation of plant costs, profitability and Rate of return on investment.
		CO4	To estimate economic optimization and optimum design parameters.
		CO5	To Evaluate various chemical processes for techno economic feasibility report.
		CO6	To Evaluate chemical industries for scheduling and networking activates using PERT & CPM.
409349 B	<b>Elective-V Chemical Process Safety</b>	CO1	Able to understand the various concepts and regulations of industrial safety
		CO2	Able to evaluate exposure of harmful chemicals
		CO3	Able to explain the conditions of fire and explosions in chemical industries
		CO4	Able to choose safety codes related to toxic and explosive materials
		CO5	Able to illustrate Industrial Hazards and Risk Assessment for chemical process industries
		CO6	Able to understand and apply the hazard models and risk management systems
419352 B	<b>Elective-VI Nanotechnology</b>	CO1	To understand the fundamentals of nanotechnology and apply various methods for synthesis of carbon nanostructure for specific application.
		CO2	To illustrate various techniques available for production of nanomaterials and differentiate based on specific engineering application
		CO3	To analyze various properties of nanomaterial's using characteristics techniques
		CO4	To apply law of mass action, de Broglie's hypothesis and Schrödinger's equation to determine change in particle characteristics.
		CO5	To evaluate nanomaterials for contact angle, colloidal stability and electrical phenomenon.
		CO6	To demonstrate unit applications of nanomaterials in various chemical processes.

409349 D	<b>Elective-VI Petrochemical Engineering</b>	CO1	Analyze status of petrochemical industries and its necessity in India
		CO2	Get acquainted and interpret the first generation petrochemicals and its basic raw materials
		CO3	Evaluate and recognize process and methodology for separation and purification techniques in petrochemical complexes
		CO4	Analyze and Differentiate between First generation and second generation petrochemicals
		CO5	feedstock and different types of polymers and its preparation methodologies along with its use in industries
		CO6	Evaluate the different safety norms and aspects in petrochemical industry and pollution control norms and methods of elimination.
409351: (A)	<b>Elective-V Energy Audit and Conservation</b>	CO1	Able to understand and analyze various energy sources and their uses
		CO2	Able to understand the concept of energy audit its need, and types with various approach
		CO3	Understood the steps for writing guidelines for writing energy audit report
		CO4	Able to evaluate energy available for Industrial Use.
		CO5	Able to understand about different Management and Organizations involved in Energy Conservation Programs. Their vision and goals, and methods involved
		CO6	Able to analyze the various Guidelines for Improving Process Operations for Energy Conservation.