

302-CHE-3- Principles of Chemical Engineering I

Pre-requisites: 102-CHM-4, 105-PHY-4

This course covers the fundamentals of chemical engineering that includes history and classification of chemical processes and units and dimensions analysis. The course also covers processes components, variables and data representation as well as material balance for simple and complex processes.

303-CHE-3- Principles of Chemical Engineering II

Pre-requisites: 302-CHE-3

This course covers energy balances for non-reactive, open and closed systems including mixing operations as well as reactive systems that comprises heat of formation, reaction and combustion. It also covers analysis of thermodynamic data for both non-reactive and reactive systems.

404-CHE-3 - Chemical Engineering Thermodynamics

Pre-requisites: 203-MATH-3, 232-CHM-3

This course covers principles and laws of thermodynamics, concepts of energy, enthalpy and heat effects. It also covers thermodynamic processes and mechanical work, chemical energy liberation, equations of state and behavior of gases and liquids as well as heat of reactions.

311-CHE-3- Fluid Mechanics

Pre-requisites: 203-MAT-3, 105-PHY-4

This course covers fluids properties and characteristics, fluid statics, fluid in motion that comprises mass, energy and momentum balance equations. It also covers the analysis of laminar and turbulent flow in pipes, flow in orifice, nozzle, Venturi systems and flow through beds, valves, pumps and compressors.

412-CHE-3- Mass Transfer

Pre-requisites: 303-CHE-3, 405-CHE-3

This course focuses on the fundamentals of mass transfer, steady-state and unsteady-state chemical processes including convective mass transfer and mass transfer equipment. It also covers interphase equilibrium and correlations for convective mass transfer coefficients as well as analysis of phase equilibrium.

413-CHE-3 - Heat Transfer

Pre-requisites: 203-MAT-3, 105-PHY-4

This course covers the mechanisms of heat transfer that includes conduction, convection and radiation. It contains steady state conduction analysis for heat transfer through fixed and variable area. It also covers heat transfer through multiple walls of different materials and heat transfer during phase change for boiling and condensation.

405-CHE-3 Phase and Chemical Equilibria

Pre-requisites: 303-CHE-3, 404-CHE-3

This course covers phase fluid properties, behavior of pure fluids, phase and chemical equilibria for systems of variable composition. It also covers the phase equilibria of homogeneous, heterogeneous reactive systems, and multi-reaction equilibria.

406-CHE-2 Chemical Engineering Lab 1

Pre-requisites: 311-CHE-3, 412-CHE-3, 413-CHE-3

The laboratory course introduces students to practical chemical engineering concepts. It covers fluid mechanics, mass transfer, and heat transfer. Students will conduct experiments and analyze data to learn about topics like flow in piping systems, filtration, diffusion, and heat transfer. They will present their findings in reports.

421-CHE-3 Separation Processes

Pre-requisites: 405-CHE-3, 412-CHE-3

This course covers the main separation processes including basic separation concepts and single equilibrium stages of binary, multicomponent and multiphase systems. It also covers separation by phase addition, distillation, liquid-liquid extraction and leaching.

407-CHE-3 - Kinetics and Reactors Design

Pre-requisites: 102-CHEM-4, 303-CHE-3

This course covers the theory of chemical kinetic mechanisms and the derivation of overall reaction rate expressions. It contains the analysis, sizing and design of ideal, isothermal and non-isothermal reactors. It also covers catalysis, homogenous and heterogeneous reactions and reactor design.

201-CHE-3 - Industrial Safety

Pre-requisites:

This course covers the safety practices related to personnel and environment in chemical industries that contains hazards identification, assessment and prevention. It also covers measures of fire prevention and fighting, emergency incident preparedness and waste characterization and management.

508-CHE-2 Chemical Engineering Lab 2

Pre-requisites :407-CHE-3, 421-CHE-3

The laboratory course focuses on practical aspects of separation processes and reactor design. It covers various separation techniques like distillation, extraction, and absorption. Students will conduct experiments on different reactor types, collect data, and analyze results. They will also present their findings in individual and team reports.

523-CHE-3 - Chemical Process Dynamics and Control

Pre-requisites: 254-MATH-3, 407-CHE-3

This course covers measurements of process variables and dynamics and modelling of linear and non-linear systems. It comprises analysis and design of transfer functions, linearization of non-linear systems, design of different types of controller, stability and tuning analysis methods for closed loop systems.

522-CHE-3- Chemical Engineering Design

Pre-requisites: 408-CHE-3, 421-CHE-3

This course covers technical and economic aspects of chemical engineering design that includes feasibility studies, process flow diagrams, process design, equipment sizing, materials selection and cost estimation using CAD software. It also covers applications in petroleum, petrochemicals, emerging chemical industries and water treatment.

541-CHE-2 Graduation Project 1

Pre-requisites: Level 8

This course aims to apply knowledge gained from previous courses to a project where students choose a specific industry or a chemical process to investigate different aspects of the process, and study the technical and economics of the project in a presented formal report.

542-CHE-3 Graduation Project 2

Pre-requisites: 541-CHE-2

This course aims to apply knowledge gained from previous courses to a project where students choose a specific industry or a chemical process to investigate different aspects of the process, and study the technical and economics of the project in a presented formal report.

526-CHE-3- Industrial Process Technology

Pre-requisites: NA

This course offers an overview of major chemical industries. It covers the basics of chemical processing, including cement, pharmaceuticals, food, and others. Students learn about different chemical processes, their design, operation, and safety.

527-CHE-3- Chemical Process Optimization

Pre-requisites: 523-CHE-3

This course teaches students how to optimize chemical processes by understanding and applying principles like modeling, experiments, statistics, and control. It covers topics like process variables, quality, yield, and cost, and teaches students how to improve process performance.

528-CHE-3- Chemical Process Automation

Pre-requisites: 523-CHE-3

This course introduces chemical process automation. Students learn about automation systems, their use in the chemical industry, and topics like process control, instrumentation, and control loops. They also explore different automation systems like PLCs, DCSs, and SCADA systems.

431-CHE-3- Oil Refining Processing

Pre-requisites: 241-CHM-3

The course provides an overview of modern petroleum refineries, including their processes, feedstocks, products, and chemistry. It covers distillation, cracking, reforming, and other refining processes, and discusses factors affecting unit performance and product quality.

432-CHE-3- Polymers Technology

Pre-requisites: 241-CHM-3

The course focuses on advanced polymer concepts, including processing, design, technology, and mechanical properties. It covers a wide range of polymer applications, from plastics and elastomers to fibers and adhesives.

433-CHE-3- Materials of Chemical Engineering

Pre-requisites: 102-CHM-4

This course explores the properties of materials, including their structure, energy, and bonding. It covers topics like electron interactions, phase equilibria, chemical reactions, symmetry, and diffraction. Real-world examples of applications are also discussed.

534-CHE-3- Natural Gas Processing

Pre-requisites: 431-CHE-3

The course focuses on balancing natural gas production, processing, and transportation. It covers upstream processing and refining, including equipment and facility design. It also discusses unconventional gas production and the various applications of natural gas.

535-CHE-3- Plastics and Non-Metallic materials

Pre-requisites: 432-CHE-3

The course focuses on plastics and non-metallic materials, including their production, applications, and structure-property relationships. It covers a wide range of topics, such as rechargeable batteries, graphene, carbon nanotubes, conducting polymers, and sensing materials.

536-CHE-3- Advanced materials and Catalysts

Pre-requisites: 433-CHE-3

This course covers the advanced principles and applications of materials and catalysis in modern technology. Students will learn about the design, synthesis, and characterization of advanced materials, as well as the principles of heterogeneous catalysis and its application to a variety of industrial processes.

537-CHE-3- Petrochemicals Technology

Pre-requisites: 534-CHE-3

This course aims to introduce the production technologies of synthesis gas, olefins, and aromatic. It also covers the manufacture of important petrochemicals derived from base chemicals and synthesis gas. Moreover, it covers the production technologies of important polymers and plastics

538-CHE-3- Plastics and Rubber Industries

Pre-requisites: 535-CHE-3

The course provides a broad understanding of plastics and rubbers, covering their types, properties, manufacturing, and applications. It also explores chemistry, processing, design, quality, and environmental issues related to these materials.

539-CHE-3- Sustainable Energy Development

Pre-requisites: 536-CHE-3

This course offers a detailed look at alternative energy sources, their design, and their impacts. Students will learn about solar, wind, hydroelectric, geothermal, and biomass energy, and their potential economic, environmental, and social benefits.