



ChE 461 - Chemical processes and plant design

Code and Name: ChE 461 - Chemical processes and plant design

Credit Hours: 3 (Lecture: 3, Tutorial: 1)

Textbook:

- Chemical Engineering Design: Principles, Practice and Economics of Plant and Process Design, G. Towler & R. Sinnott, 2nd Edition, Elsevier , 2013

Other References:

- *Plant Design and Economics for Chemical Engineers*, M. S. Peters and K. D. Timmerhaus, 3rd ed., McGraw-Hill, 1991

Course Description:

The course provides a comprehensive guide to process and plant design for typical chemical engineering industries. It covers the theories and procedures for the design of chemical engineering equipment.

Pre-requisites: GE303 Engineering Economics, ChE325 Unit Operations, ChE341 Material Sci. and Eng.

Co-requisites: None

Course Learning Outcomes:

With relation to ABET Student Outcomes (SOs: 1-7)

1. Recognize the main safety measures to be applied in a chemical plant (4)
2. Describe the main environmental issues related to the chemical processes (4)
3. Prepare material balance for a real process (1)
4. Summarize different methods of energy efficient design (2)
5. Analyze PFD and PID's (1)
6. Design main units in a chemical plant with complete details (2)
7. Explain different methods for equipment control (1)
8. Prepare a proper layout for any chemical process (2)
9. Predict the most suitable material of construction for a given task (2)
10. Analyze a topic of recent subjects in chemical process design (7)

Topics to be covered:

- Introduction to Design
- Process Flowsheet Development
- Utilities and Energy Efficient Design
- Instrumentation and Process Control
- Materials of Construction
- Safety and Loss Prevention
- General Site Considerations
- Equipment Selection, Specification and Design
- Design of Pressure Vessels
- Separation Columns (Distillation – Absorption – Extraction)
- Heat Transfer Equipment
- Transport and Storage of Fluids

Grading Policy:

The grading for the course are 60% coursework and 40% Final Exam. The course work consists of two Midterm Exams, where each midterm exam is worth 20%. It also includes quizzes, homework, and projects for the remaining 20% that is modified by the course instructor.

