



ChE 325 - Unit Operations

Code and Name: ChE 325 – Unit Operations

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

Textbook:

- Unit Operations of Chemical Engineering, **McCabe** W.L., Smith Julian C. and Harriott, P., 7th Edition, McGraw-Hill, 2005

Other References:

- Geankoplis C.J. "Transport Processes and Separation Process Principles", 4th edition, Prentice Hall, 2003
- Chemical Engineering, Coulson J.M., Richardson J.F., Backhurst J.R. and J.H. Harker, Volume 2, 4th Ed., Butterworth Heinemann, 1991
- Chemical Engineers' Handbook, Perry J. H., 6th edition, McGraw-Hill, 1984

Course Description:

Chemical unit operations encompass all the processes that run through the influence of mechanical forces or force fields. The basic operations include: characterization of solid particles; storage of solids; drag and drag coefficients; flow through beds of solids; mechanics of particle motion; settling; fluidization; size reduction; screening; filtration; gravity sedimentation processes; separation by centrifuges; separation by cyclones; crystallization processes; separation by filtration and evaporation.

Pre-requisites: ChE223 Fluid Mechanics, ChE 213 Principles of Chemical Engineering II

Co-requisites: None

Course Learning Outcomes:

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

1. Recognize flow past immersed objects (1)
2. Define thermal processes, evaporations (1)
3. Explain the size reduction mechanism by analyzing the data (1)
4. Analyze the particle size distribution. (2)
5. The relation between velocity and particle separation (5)

Topics to be covered:

- Drags and drag coefficients
- Flow through beds of solids
- Mechanics of particle motion, Settling, Fluidization
- Evaporation
- Properties of Particulate Solids
- Properties of Masses of Particles & Storage of solids
- Filtration
- Gravity sedimentation processes
- Separation by centrifuges

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.

