ChE 462 - Process Synthesis and Modeling

Code and Name: ChE 462 – Process Synthesis and modeling
Credit Hours: 3 (Lecture: 3, Tutorial: 1)

Textbook:
- Analysis, Synthesis, and Design of Chemical Processes, R. Tourton, R.C.Bailie, W.B.Whiting, J.A Shaeiwitz, and D. Bhattacharyya, 4th Edition, Prentice Hall, 2014,

Other References:

- Plant Design and Economics for Chemical Engineers, M. S. Peters and K. D. Timmerhaus, 3rd ed., McGraw-Hill, 1991
- Preliminary Chemical Engineering Plant Design, W. D. Baasel, 2nd ed., van Nostrand Reinhold, 1990
- Process Design Principles, W.D. Seider et al, 1st edition, 1999

Course Description:

Conceptualization of chemical processes, engineering economic analyses, computer-aided design of chemical processes with emphasis on process economics, profitability analysis, and optimum operating conditions

Pre-requisites: CHE 311 Chemical Reaction Engineering, CHE 325 Unit Operations
Co-requisites: None

Course Learning Outcomes:

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

1. Apply experience based principles in confirming the process design suitability (2)
2. Calculate Capital and manufacturing costs (4)
3. Determine the process cycle time using overlapping and nonoverlapping operations (1)
4. Analyze the profitability of a project (1)
5. Identify the suitability of a batch and a continuous process (1)
6. Explain potential solutions to the contemporary issue in terms of process synthesis (4)

Topics to be covered:

- Diagrams for Understanding Chemical Processes
- The Structure and Synthesis of Process Flow Diagrams
- Batch process and Chemical Product Design
- Tracing Chemicals and Understanding Process Conditions
- Estimation of Capital Costs, and Manufacturing cost
- Engineering Economic Analysis and Profitability Analysis
- Utilizing Experience-Based Principles to Confirm Stability of a Process Design
- Synthesis of PFD and a Process Using a Simulator

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.