PSE-852 Process Modelling and Simulation

Credit Hours: 3

Pre-requisites: Nil

Course Objectives:

- Introduction to the concepts and tools for mathematical modeling and simulation of refinery, petrochemical and other process systems.
- Specifically, the students will acquire knowledge of types of modeling tool in MATLAB and gain experience of applying the standard simulation environment of Aspen PLUS.

Course Contents:

- Introduction to Modeling and Simulation,
- Modeling and Simulation through MATLAB and Aspen PLUS of the following process units:
  - Batch Reactor
  - Continuous Stirred Tank Reactor Bioreactor
  - Compartmental Distillation Model
  - Ideal Binary Distillation Column
  - Activity Coefficient Models
  - Binary Batch Distillation Column
  - Binary Continuous Distillation Column
  - Multi-component Batch Distillation Column
  - Equilibrium Flash Vaporization
  - Equation of State Models
  - Refinery Debutanizer Column
  - Reactive Distillation Column
  - Heat exchangers and furnaces design.

Course Outcomes:

The students will learn:
- How the mathematical models of chemical processes are developed and simulated.
- The integrated treatment of process description mathematical modeling and dynamic simulation of realistic problems using the robust process model approach and its simulation with efficient numerical techniques.

Recommended Reading (including Textbooks and Reference books)
- Jana, Amiya K. *Chemical process modelling and computer simulation*. PHI Learning Pvt. Ltd., 2018.
- Verma, Ashok Kumar. Process modelling and simulation in chemical, biochemical and environmental engineering. CRC Press, 2014.