PCH202 PROCESS MODELING AND SIMULATION

L	T	P	Cr
3	0	2	4

Course Objective:
Learn to develop mathematical models of phenomena involved in various chemical engineering processes and solutions for these models.

Introduction: Process modeling and simulation, Industrial usage of process modeling and simulation, Macroscopic and microscopic mass, energy and momentum balances.

Process Models: Classification of mathematical models: Transport phenomena, population balance, Models for flash vessels, reactors, heat exchangers, distillation columns, absorption columns etc.

Process Simulation: Problem formulation, Flow sheeting problem, Specification problem, Optimization problem, Synthesis problem, Simulation approaches: Modular, equation solving, Decomposition of networks: Partitioning, tearing, signal flow graphs, System stability, Sensitivity, Determinacy.

Process Simulator(s): Commercial simulation packages (Aspen Plus/Aspen Hysys) for steady state simulation, Modeling and simulation of complex industrial systems in petroleum, petrochemicals, polymers etc.

Course learning outcomes (CLOs):

The students will be able to

1. analyze physical and chemical phenomena involved in various processes
2. develop mathematical models for chemical processes
3. use the various simulation approaches
4. use process simulators like ASPEN PLUS and ASPEN HYSYS

Recommended Books:

1. *Luyben, W.L., Process Modeling, Simulation, and Control for Chemical Engineers, McGraw-Hill (1990).*
2. *Himmelblau, D.M. and Bischoff, K.B., Process Analysis and Simulation: Deterministic Systems, John Wiley (1968).*
3. *Himmelblau, D.M and Bischoff, K.B., Process Analysis and Simulation: Stochastic Systems, John Wiley (1968).*

Evaluation Scheme:

S.No.	Evaluation Elements	Weightage (%)
1.	MST	25
2.	EST	40
3.	Sessional (may include Assignments/Projects/Tutorials/Quizes/Lab Evaluations)	35