

UG
Course Code: **CH403**
Credit: **3**
Version: **1**
Prerequisite Course: **Nil**

Department: **Chemical Engineering**
Course Name: **Modelling and Simulation**
L-T-P: **3-0-0**
Approved on:

Introduction and fundamentals of process modeling and simulation; industrial usage of process modeling and simulation; Macroscopic mass, energy and momentum balances; incorporation of fluid thermodynamics, chemical equilibrium, reaction kinetics and feed/product property estimation in mathematical models.

Simulation of steady state lumped, modeling of chemical process equipments like reactors, distillation, absorption, extraction columns, evaporators, and heat exchangers.

Unsteady state lumped systems and dynamic simulation; Computer algorithms for numerical solution of steady state and unsteady state models.

Microscopic balances for steady state and dynamic simulation; process modeling with dispersion; axial mixing; diffusion, etc.

Modeling and simulation of complex industrial systems in petroleum, petrochemicals, polymer, basic chemical industries; Commercial steady state and dynamic simulators; Simulation of process flowsheets.

Introduction to application of artificial intelligence based modeling methods using Artificial Neural Networks, Fuzzy logic, etc.

Text/Reference Books

1. Luyben, W. L., "*Process Modeling, Simulation and Control for Chemical Engineers*," McGraw Hill.
2. Babu, B.V., "*Process Plant Simulation*," Oxford University Press, 2004.
3. Ramirez, W.F., "*Computational Methods for Process Simulation*," Butterworth-Heinemann, 1997.
4. Ingham, J., Dunn, I. J., Heinzle, E., Prenosil, J.E., Snape, J.B., "*Chemical Engineering Dynamics: An Introduction to Modelling and Computer Simulation*," 3rd ed., Wiley-VCH Verlag GmbH & Co. KGaA, 2007.
5. Holland, C. D., "*Fundamentals and Modeling of Separation Processes*," Prentice Hall, 1975.
6. Himmelblau, D. M., & Bischoff, K. B., "*Process analysis and simulation: Deterministic systems*," John Wiley, New York, 1968.
7. Aris, R. and Varma, A. (Editors), "*The Mathematical Understanding of Chemical Engineering Systems: Selected Papers of N. R. Amundson*," Pergamon Press, 1980.