

CH406 MODELING, SIMULATION AND OPTIMIZATION

Credits: 6 (L = 4, P = 4)

(Pre-requisite: None)

Course Details:

Modeling:

Fundamentals of mathematical models, principles of formulation, lumped and distributed parameters models- hydraulic tank, mixing vessel, simultaneous mass and energy balance, continuous stirred tank heater and reactor, batch reactor, reactor with mass transfer, heat exchanger, single component vaporizer, multi-component flash drum, ideal binary distillation column.

Optimization:

Basic concepts; one variable optimization (Newton's method, Secant methods, dichotomous search, Fibonacci, golden section method); two or more variables (direct, indirect, Secant methods and linear programming).

Simulation:

Continuous and dynamic simulation (packages and languages), techniques of digital simulation, developing description of information flow, process to information flow diagram and information flow diagram to numerical form, idea of computer aided design, digital simulation of continuous stirred tank reactor, binary distillation column.

Reference Books:

Process Modeling, Simulation and Control for Chemical Engineers:

Mc Graw Hill

W.L. Luyben

Optimization of Chemical Process:

McGraw-Hill International edition

Edgar and Himmelblau

Chemical Process Simulation:

Wiley Eastern Ltd., New Delhi.

Asghar Hussain

Modeling and Simulation in Chemical Engineering:

Wiley Inter Science, New York

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