Course code	Course Name	L-T-P-Credits	Year of Introduction
CH467	PROCESS MODELING AND SIMULATION	3-0-0-3	2016

Prerequisite : Nil

Course Objectives

- To give student an understanding of Process Modelling and Simulation

Syllabus

Definitions And Classification Of Modelling, Fundamental Laws Of Chemical Engineering, Mathematical Models For Chemical Engineering Systems, Continuous Flow Tanks, Mixing Vessels, Steam Jacketed Vessel, Batch Distillation, Gas Flow System, Simulation Of Gravity Flow Tank, CSTR In Series, Non-Isothermal CSTR, Binary Distillation Column, Batch Reactor, Jacketed Tubular Reactor, Countercurrent Liquid-Liquid Heat Exchanger

Expected Outcome

- The students will be able to develop mathematical models of Chemical engineering processes and do simulation.

References:

1. Amiya K.Jana, Computer Process Modelling and Computer Simulation, Prentice Hall of India
2. Biquette W.B., Process Dynamics - Modeling Analysis and Simulation, Prentice Hall of India
3. Franks R.G.E., Mathematical Modeling in Chemical Engineering, John Wiley
4. John Ingham et.al., Chemical Engineering Dynamics - Modeling with PC Simulation, VCH Publishers
5. Luyben W.L., Process Modeling, Simulation and Control for Chemical Engineers, Mc Graw Hill International Edition

Course Plan

Module	Contents	Hours	Sem. Exam Marks
I	Definitions of Modelling, uses of Mathematical modelling, -classification of modelling techniques- -basic modelling principles	7	15%
II	Fundamental laws of chemical engineering: Energy equations, continuity equation, equation of motion, transport equations, equations of state, equilibrium states and chemical kinetics-examples	7	15%
	FIRST INTERNAL EXAMINATION		
III	Mathematical models for chemical engineering systems: continuous flow tanks- Mathematical models for mixing vessel- mixing with reaction - reversible reaction	7	20%
IV	Steam jacketed vessel-boiling of single component liquid-open and closed vessel- batch distillation Gas flow system-hydraulic transients between two reservoirs	7	20%

SECOND INTERNAL EXAMINATION			
V	Reaction kinetics-general modeling scheme-batch reactor-ideal binary distillation column Distributed system: jacketed tubular reactor - countercurrent liquid-liquid heat exchanger	7	15%
VI	Simulation of gravity flow tank- CSTR in series - non-isothermal CSTR- binary distillation column	7	15%
END SEMESTER EXAMINATION			

Question Paper Pattern

Maximum Marks: 100 Exam Duration: 3 Hours

Part A: There shall be **Three questions** uniformly covering Modules 1 and 2, each carrying 15 marks, of which the student has to answer any **Two questions**. At the most 4 subdivisions can be there in one main question with a total of 15 marks for all the subdivisions put together.
(2 x15= 30 Marks)

Part B: There shall be **Three questions** uniformly covering Modules 3 and 4, each carrying 20 marks, of which the student has to answer any **Two questions**. At the most 4 subdivisions can be there in one main question with a total of 20 marks for all the subdivisions put together.
(2 x20= 40 Marks)

Part C: There shall be **Three questions** uniformly covering Modules 1 and 2, each carrying 15 marks, of which the student has to answer any **Two questions**. At the most 4 subdivisions can be there in one main question with a total of 15 marks for all the subdivisions put together.
(2 x15= 30 Marks)