PROCESS MODELING AND SIMULATION

(Professional Elective-V)

Course Code: 15CH1139

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Course Outcomes :

At the end of the Course, the Student will be able to:

CO 1 Recall and discuss the fundamental laws useful in developing a model

CO 2 Examine a given system and write the governing mathematical model of the system

CO 3 Derive the model equations for complex chemical engineering systems

CO 4 Formulate an algorithm/ code to simulate the model for a given system

CO 5 Analyze the behavior of the system for various parameter values qualitatively

UNIT-I **(10 Lectures)**

Mathematical models for Chemical Engineering systems, fundamentals, introduction to fundamental laws.

UNIT-II **(10 Lectures)**

Examples of mathematical models of Chemical Engineering systems, constant volume CSTRs, two heated tanks, gas phase pressurized CSTR.

UNIT-III **(10 Lectures)**

Non-isothermal CSTR, single component vaporizer, batch reactor, reactor with mass transfer. ideal binary distillation column, batch distillation with holdup.

UNIT-IV (10 Lectures)

COMPUTER SIMULATION EXAMPLES:

Non-isothermal CSTR, VLE dew point, bubble point calculations, countercurrent heat exchanger.

UNIT-V (10 Lectures)

Computer simulation examples:

gravity flow tank, three CSTRs in series, binary distillation column, batch reactor.

TEXT BOOKS:

Luyben. W. L., "Process Modeling Simulation and Control for Chemical Engineers" 2nd Edition, McGraw Hill, New York, 1990.

REFERENCES:

1. Balu. K. and Padmanabhan, K., "Modeling and Analysis of Chemical Engineering Processes", IK International Private Limited, India, 2007.
2. Bequette W.B, "Process Control- Modeling, Design and Simulation", Prentice Hall India.
3. Babu B.V, "Process Plant Simulation", Oxford University Press, 2004.