INSTITUTE	**FACULTY OF TECHNOLOGY**
PROGRAM	**MASTER OF TECHNOLOGY in CHEMICAL ENGINEERING**
SEMESTER	**1**
COURSE TITLE	**PROCESS MODELLING AND SIMULATION LABORATORY**
COURSE CODE	**01CM0113**
COURSE CREDITS	**2**

Objective:

1 To learn Process Modeling and Simulation of Chemical operations and processes.

Course Outcomes: After completion of this course, student will be able to:

1 Carry out property estimations or parameter estimation using Software
2 Apply simulations for various performance checks of equipments or parameters.
3 Analyze the parameters or designs or control systems using software.
4 Study or evaluate any linear and non-linear systems

Pre-requisite of course: Process Modelling and Simulation, Optimization in Chemical Engineering

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
0	0	4	0	0	0	50	50

Contents : Unit	Topics	Contact Hours
Total Hours		

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Experiment 1** Estimate thermodynamic properties (property estimations)	2
2	**Experiment 2** Analyzing thermodynamic properties using simulation software.	4
3	**Experiment 3** Analyze the designing aspects (physical) of distillation column	4

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Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
4	**Experiment 4** Analyze the designing aspects (chemical Processes) for the distillation column	4
5	**Experiment 5** Apply simulation tool to heat exchanger for calculating heat transfer coefficient.	2
6	**Experiment 6** Analyze the design of flash drum using simulation tool for binary mixtures.	4
7	**Experiment 7** Study the equilibrium reactor simulation, for its parameters.	4
8	**Experiment 8** Apply the equilibrium reactor simulation, for its parameters.	4
9	**Experiment 9** Evaluate linear and non-linear programming problems.	4
10	**Experiment 10** Create the mathematical models for the design of plug flow reactor	2
11	**Experiment 11** Apply simulation to design a plug flow reactor.	2
12	**Experiment 12** Create mathematical models for the design of cyclone separator	2
13	**Experiment 13** Apply simulation to design a cyclone separator.	2
14	**Experiment 14** Create the optimum design parameters of Gravity Flow tank.	2
15	**Experiment 15** Analyzing control system stability using Bode diagrams.	2
16	**Experiment 16** Perform simulations for CSTR's in series (open loop)	2
17	**Experiment 17** Perform simulations for CSTR's in series (closed loop)	2
18	**Experiment 18** Conducting simulation studies of different unit operations using software.	4
Total Hours		**52**

Textbook :

1 Process plant simulation. , Babu, B. V. , Oxford University Press, USA., 2004

References:

1 Process modeling, simulation and control for chemical engineers, Process modeling, simulation and control for chemical engineers, Luyben, W. L., McGraw-Hill Higher Education., 1989

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking / Creative**
10.00	20.00	25.00	25.00	10.00	10.00

Instructional Method:

1. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by white board, may also use any of tools such as collaborative learning, demonstration, role play, Quiz, brainstorming, MOOCs, Active Learning Assignments etc.
2. The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room
3. Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.
4. Students will use supplementary resources such as online videos, VirtualLaboratory NPTEL videos, e-courses

Supplementary Resources:

1. https://archive.nptel.ac.in/courses/103/105/103105215/#

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