BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI
HYDERABAD CAMPUS
FIRST SEMESTER 2019-2020
Course Handout (Part II)

01/08/2019

In addition to part-I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

Course No. : CHE F311
Course Title : Kinetics and Reactor Design
Instructor-in-charge : Balaji Krishnamurthy

Course Description:
Kinetics of homogeneous, heterogeneous reactions; ideal reactors, non-ideal flow; selectivity; analysis and design of chemical reactors.

Scope and Objective of the course:

This course is an introduction to the chemical reaction kinetics, design and performance of various types of chemical reactors for chemically reacting systems which yield industrially important products. The emphasis in this course will be to understand the fundamentals of kinetics of homogeneous reactions, design and analysis of ideal reactors; and non-ideal flow.

Course learning outcomes: By the end of this course the student will be able to,

a) Develop performance equations for reactors and reactor design.

b) Decide on reactor design for appropriate processes.

c) Understand how non ideal reactors (reactors in the real world) operate differently from ideal reactors.

d) Learn how the chemical engineering industry depends on reactors and their design.

Text Book:

1. Scott Fogler, H. Scott "Elements of Chemical Reaction Engineering", Pearson Edu, 4th Ed, 2006.
2. Octave Levenspiel, Chemical Reaction Engineering. 3rd Ed

Reference Books:

1. Schmidt Lanny D., "The Engineering of Chemical Reactions", Oxford University Press, 2nd Ed., 2005.

Course Plan:

Lec.	Learning Objectives	Topics to be covered	Chapter in the Text Book
L1-L3	Introduction	Scope and objectives of the course, methodology, concept of mole balances	TB - 1&2
L4-L7	Kinetics of reactions	Different types of reactors, mole balances	TB - 1&2
L8-L12	Batch reactors	Conversion and reactor sizing	TB - 1&2
L13-L18	CSTR and PFR reactors	Equations governing conversions	TB -

			1&2
L-19-L23	Multiple reactor systems	Reactors in series and parallel	TB - 1&2
L-24-L28	Multiple reactions	Reactions of various orders	TB - 1&2
L29-L35	Solid catalyzed reactions	Pore diffusion factors fitting first and second order Catalyst deactivation	TB - 1&2
L36-L42	Basics of non-ideal reactor	Non ideal behavior	TB - 1&2

Evaluation Schedule:

Component	Duration (Minutes)	Weightage	Date & Time	Nature of Component
Midterm	90 minutes	30%	30/9, 3.30 -- 5.00 PM	CB
Surprise/quiz tests*	TBA	30%	TBA	OB
Comprehensive Exam.	3hr	40%	5/12 AN	CB/OB

Closed Book Test: No reference material of any kind will be permitted inside the exam hall.

Open Book Exam: Use of any printed / written reference material (books and notebooks) will be permitted inside the exam hall. Loose sheets of paper will not be permitted. Computers/mobile of any kind will not be allowed inside the exam hall. Use of calculators will be allowed in all exams. No exchange of any material will be allowed.

Number and Sequence of lecture may be changed depending on the situation/requirements.
Quiz/ surprise test will be conduct for 2 times and average of the marks will be taken as final.

Chamber Consultation Hour: To be announced in the class.

Notices: All notices concerning this course will be displayed on the Notice Board of Chemical Engineering or CMS

Make-up Policy: Make-up for the test (test-1 and test-2) may be granted only with prior permission and valid justification from the Instructor-in-charge. No makeup for the quiz/surprise tests will be granted.

Academic Honesty and Integrity Policy: Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

Instructor-in-charge
Kinetics and Reactor Design