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Department of Chemical Engineering	
Chemical Reaction Engineering (64320)	
Total Credits	**3**
major compulsory	
Prerequisites	P1 : Thermodynamics I (64335) OR Thermodynamics for Chem. Eng.I (64331)

Course Contents

This course aims at making students acquire sufficient knowledge about chemical reactions. This is to be accomplished by studying fundamentals of thermodynamics and kinetics chemistry of chemical reaction kinetic for homogeneous reactions, speed of reactions, single-stage reactors, continuous-stirred tank reactor, pipe reactor, time of its stay and measurements. Reactor performance in terms of input various such as temp and pressure is covered through the course. Analysis and interpretation of experimental reaction data to find a rate law expression.

	Intended Learning Outcomes (ILO's)	Student Outcomes (SO's)	Contribution
1	By the end of this course, the students will be able to apply knowledge of calculus, differential equation, numerical techniques, physics and basic engineering science to formulate the homogeneous reactor design equations.	A	25 %
2	By the end of this course, the students will be able to design an isothermal reactor, to meet desired needs in terms of best operating conditions to achieve a certain conversion and volume for a reaction.	C	30 %
3	By the end of this course, the students will be able to identify, formulate, &solve homogeneous reactor engineering problems.	E	25 %
4	By the end of this course, the students will be able to analyze and interpret experimental reaction data to find the rate law expression.	B	20 %

Textbook and/ or Refrences

H.Scott Fogler Elements of Chemical Reaction Engineering, Fourthe edition, 2006, ISBN 0-13-253220-4 (main text book)

Assessment Criteria	Percent (%)
First Exam	20 %
Second Exam	20 %
Quizzes	10 %
Final Exam	50 %

Course Plan

Week	Topic
1	Introduction to reaction engineering
2-3	Mole Balance: the rate of reaction, general mole balance equation, batch reactors, continuous flow reactors, industrial reactors.
3-5.5	Conversion and Reactor Sizing: Definition and conversion, batch reactor design equations, design equation of Flow Reactors, application of design equations for continuous flow reactors, reactors in series, some further definitions First Midterm Exam
5.5-7	Rate law and stoichiometry: Rate laws, the reaction order and rate law, stoichiometry and

	its application on batch and flow systems.
8-11	Isothermal reactor Design: Mole balance in terms of conversion, Design structure for isothermal reactors, design for CSTR, Tubular reactors, pressure drop in reactors, mole balances written in terms of concentration and molar flow rate. Second Midterm Exam
12-15	Collection analysis of rate data: The algorithm for data analysis, batch reactor data, differential method of analysis, integral method, nonlinear regression, method of initial rate, differential reactors.
16	Final Exam