

Republic of Iraq
The Ministry Of Higher Education
& Scientific Research



University: Diyala
College: Engineering
Department: Chemical Engineering
Stage: Third
Lecturer name: Salah N. Farhan
Qualification: pH-D chemical Eng.
Place of work: Chemical Eng. Dept.

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Course Instructor	Salah N. Farhan				
E-mail	drsalahchem@gmail.com				
Title	Reactor Design				
Course Coordinator	Annual				
Course Objective	a) Establish reaction mechanism b) Collect rate data free of transport limitations. c) Correlate rate data by mathematical equation or otherwise. d) Formulate suitable models for reactor design and select reactor type (i.e. ideal flow pattern). e) Account for nonideality of real reactors and for the effect of physical transport processes. f) Select reactor size and operating conditions. g) Specify key reactor elements. h) Specify auxiliary equipment. i) Specify methods of control. j) Specify start-up and shut-down procedures.				
Course Description	Stoichiometric Coefficients and Reaction, progress variables Thermodynamics of chemical reactions, basic concepts in chemical Kinetics determination of the reaction rate expression, basic concepts in molecular Interpretations of kinetic phenomena , chemical systems involving multiple reactions, elements of Heterogeneous catalysis, liquid phase reactions, Basic Concepts in Reactor Design and Ideal Reactor Models, Selectivity and Optimization Considerations in the Design of Isothermal Reactors, Temperature and Energy Effects in Chemical Reactors, Deviations from Ideal Flow Conditions, Reactor Design for Heterogeneous Catalytic Reactions, Illustrative Problems in Reactor Design.				
Textbook	١- Fogler, H.S. , “Element of chemical Reaction Engineering” Prentic Hall (٢٠٠٠). ٢- Levespiel,O., “Chemical Reaction Engineering” Wiley&Sons (١٩٩٩). ٣- Smith,J.M.,” Chemical Engineering Kinetics” ٣rd ed., McGraw Hill (١٩٨١).				
Course Assessments	Term Tests	Laboratory	Quizzes	Project	Final Exam
	As (٤٠٪)	As (٠٪)	As (١٠٪)	----	As (٥٠٪)
General Notes	Type here general notes regarding the course				

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Course Weekly Outline

Week	Date	Topes Covered	Lab. Experiment Assignments	Notes
١	٢٢,٢٤-٩-٢٠١٤	Overview of Chemical Reaction Engineering. Homogeneous Reactions in Ideal Reactors		
٢	٢٩-٩,١-١٠-٢٠١٤	Basic Concepts- Representation of Chemical Reactions		
٣	٦,٨-١٠-٢١٠٤	Thermodynamics of Chemical Reactions-Part-I		
٤	١٣,١٥-١٠-٢٠١٤	Thermodynamics of Chemical Reactions-Part II		
٥	٢٠,٢٢-١٠-٢٠١٤	Chemical Reaction Kinetics - Overview		
٦	٢٧,٢٩-١٠-٢٠١٤	Chemical Reaction Kinetics and Reactor Design		
٧	٣,٥-١١-٢٠١٤	Chemical Reactor Design		
٨	١٠,١٢-١١-٢٠١٤	Problem solving- Thermodynamics & kinetics		
٩	١٧,١٩-١١-٢٠١٤	Complex Reactions Introduction		
١٠	٢٤,٢٦-١١-٢٠١٤	Complex Reactions Yield & Selectivity		

11	1,3-12-2014	Complex Reactions - Quasi Steady State and Quasi Equilibrium Approximations		
12	8,10-12-2014	Complex Reactions - Kinetics of chain Reactions & Polymerization		
13	10,17-12-2014	Catalytic reactions - Introduction		
14	22,24-12-2014	Catalytic reactions - Adsorption & Desorption		
15	29,31-12-2014	Catalytic reactions- Kinetics		
16	0,7-1-2015	Monomolecular Reaction Network and Lumping Analysis		
Half – year break				
17	16,18-2-2015	Problem solving-Complex reactions		
18	23,25-2-2015	Gas-solid Catalytic Reactions - External diffusion		
19	2,4-3-2015	Gas-solid Catalytic Reactions Transport in Catalyst Pellet		
20	9,11-3-2015	Gas-solid Catalytic Reactions - Diffusion & Reaction I		
21	16,18-3-2015	Gas - Solid Catalytic Reactions - Diffusion & Reaction II		
22	23,25-3-2015	Gas - solid Catalytic Reactions- Diffusion &		

		Reaction III		
۲۳	۳۰-۳,۱-۴-۲۰۱۵	Gas - solid Catalytic Reactions – Non isothermal effects		
۲۴	۶,۸-۴-۲۰۱۵	Chemical Reactor Design- Mass & Energy Balances		
۲۵	۱۳,۱۵-۴-۲۰۱۵	Chemical Reactor Design- Mass and Energy Balances for Heterogeneous Reactions		
۲۶	۲۰,۲۲-۴-۲۰۱۵	Case Study - Ethane dehydrogenation		
۲۷	۲۷,۲۹-۴-۲۰۱۵	Case Study - Hydrogenation of Oil		
۲۸	۴,۶-۵-۲۰۱۵	Auto thermal reactors		
۲۹	۱۱,۱۳-۵-۲۰۱۵	CSTR - Multiple Steady States		
۳۰	۱۸,۲۰-۵-۲۰۱۵	Stability Analysis - Basics		
۳۱	۲۵,۲۷-۵-۲۰۱۵	Nonideal flow and reactor performance.		

INSTRUCTOR Signature:

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