Jordan University of Science and Technology

Faculty of Engineering

Chemical Engineering Department

CHE732 Adv. Chem. Reaction Eng. - JNQF Level: 9
Second Semester 2023-2024

Course Catalog
3 Credit Hours. Kinetics of complex homogeneous and heterogeneous reactions. Advanced treatment of chemical reactor systems, including non-isothermal and non-ideal flow systems. Tracer-based modeling of reactors. Segregation. Reactor stability. External diffusion, internal diffusion. Fluid -Fluid reaction.
Teaching Method: Blended

Text Book	
Title	Elements of Chemical Reaction Engineering
Author(s)	H. Scott Fogler
Edition	4th Edition
Short Name	Textbook
Other Information	Prentice Hall International Inc

Course References

Short name	Book name	Author(s)	Edition	Other Information
Ref#1	Chemical Reaction Engineering	Octave Levenspiel	3rd Edition	John Wiley and Sons Inc., New York, 1998.

Instructor	
Name	**Prof. Mamdouh Allawzi**
Office Location	CH2 L2
Office Hours	Sun : 09:30 - 12:30 Mon : 10:00 - 14:00 Tue : 09:30 - 12:30 Thu : 09:30 - 12:30
Email	mallawzi@just.edu.jo

Class Schedule & Room
Section 1: Lecture Time: Sun, Tue : 08:30 - 09:30 Room: قاعة الماجستير

Tentative List of Topics Covered		
Weeks	**Topic**	**References**
Weeks 1, 2	Non isothermal reactors	From **Textbook**
Weeks 3, 4	Unsteady state reactor design	From **Textbook**
Weeks 5, 6, 7	Catalysis and Catalytic Reactors	From **Textbook**
Weeks 8, 9	Non-ideal reactor mixing patterns	From **Textbook**
Weeks 10, 11	Mass transfer resistances. External diffusion effects	From **Textbook**
Week 12	External mass-transfer resistance: Gas-liquid reactions	From **Textbook**
Weeks 13, 14	Reaction and diffusion in porous catalysts. Effective diffusivity, internal and overall effectiveness factor, Thiele modulus, apparent reaction rates	From **Textbook**
Weeks 15, 16	Fluid-Fluid reaction	From **Ref#1**

Mapping of Course Outcomes to Program Outcomes and NQF Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Size the steady state and unsteady state non-isothermal reactors [L9K1] [1L9K1]	10%	
Analyze multiple reactions carried out in CSTRs, PFRs, and PBRs that are not operated isothermally to determine the concentrations and temperature [1L9S3]	10%	
Define the catalytic reaction rate mechanism and size of the catalytic reactors [L9C6] [1L9C6]	10%	
Analyze the external diffusion and reaction in spherical catalysts. Mass transfer in a packed bed [1L9K1]	15%	
Define the internal diffusion, Internal and overall effectiveness factor, and Thiele modulus. Size the slurry reactor and fluidized bed reactor [1L9K1]	15%	
Analyzed the Fluid -Fluid reaction and reactor design for gas-liquid reaction. Define the shrinking core module [1L9S3]	15%	

Relationship to Program Student Outcomes (Out of 100%)						
SO1	SO2	SO3	SO4	SO5	SO6	SO7

Relationship to NQF Outcomes (Out of 100%)		
L9K1	L9S3	L9C6
40	25	10

Policy	
Attendance	Attendance will be checked at the beginning of each class. University regulations will be strictly followed for students exceeding the maximum number of absences
Homework	Homework problems are assigned during lectures and usually due one week later. Late homework will not be accepted. Try to solve the problems independently. The assigned problems will be collected, graded, and returned to you in lecture.
Students conduct	It is the responsibility of each student to adhere to the principles of academic integrity. Academic integrity means that a student is honest with him/herself, fellow students, instructors, and the University in matters concerning his or her educational endeavors. Cheating will not be tolerated in this course. University regulations will be pursued and enforced on any cheating student.

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