Jordan University of Science and Technology

Faculty of Engineering

Chemical Engineering Department

CHE433 Chemical Reaction Engineering Ii - JNQF Level: 7
First Semester 2023-2024

Course Catalog
3 Credit Hours. Energy balance for ideal reactors, non-isothermal reactor design, stability of CSTR?s, non-ideal reactors and residence time distribution, catalytic reaction mechanism, design of catalytic reactors, deactivation of catalyst.

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

Course References

Short name	Book name	Author(s)	Edition	Other Information
Ref#1	Chemical Reaction Engineering	1. Octave Levenspiel	3rd Edition	

Instructor	
Name	**Prof. Mamdouh Allawzi**
Office Location	CH2 L2
Office Hours	
Email	mallawzi@just.edu.jo

Class Schedule & Room

Section 1:
Lecture Time: Sun, Tue, Thu : 09:30 - 10:30
Room: CH2109

Prerequisites		
Line Number	**Course Name**	**Prerequisite Type**
223320	CHE332 Chemical Reaction Engineering 1	Prerequisite / Pass

Tentative List of Topics Covered		
Weeks	**Topic**	**References**
Weeks 1, 2, 3	steady state nonisothermal reactor design	From **Textbook**
Week 4	multiple steady state conditions	From **Textbook**
Week 5	non-isothermal multiple reactions	From **Textbook**
Weeks 6, 7, 8	catalysis and catalytic reactors	From **Textbook**
Week 9	design of reactors for gas solid reactions	From **Textbook**
Week 10	Data analysis for reactor design	From **Textbook**
Weeks 11, 12	Distribution of residence times for chemical reactors	From **Textbook**
Week 13	RTD in ideal reactors	From **Textbook**
Week 14	RTD in real reactors modeling	From **Textbook**

Mapping of Course Outcomes to Program Outcomes and NQF Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Size adiabatic and nonadiabatic CSTRs, PFRs, and PBRs. [1SO1, 1SO2] [1L7C1]	15%	
Determine Multiple Steady States (MSS) in a CSTR along with the ignition and extinction temperatures curve [1SO1, 1SO2] [1L7S1]. [1SO1, 1SO2] [1L7S1]	10%	
Analyze multiple reactions carried out in non-isothermal CSTRs, PFRs, and PBRs in order to determine the concentrations and temperature as a function of reactor length [1SO1, 1SO2] [1L7C2]. [1SO1, 1SO2] [1L7C2]	10%	
Define a catalyst, a catalytic mechanism and a rate limit step then design a heterogeneous reactor. [1SO1, 1SO2] [1L7K1]. [1SO1, 1SO2] [1L7K1]	5%	
Analyze catalyst decay and conversion for CSTRs and PFRs with temperature-time trajectories, moving bed reactors, and straight through transport reactors. [1SO1, 1SO2] [1L7K1]	10%	

Determine residence time distribution RTD [E(t), F(t)] and the mean residence time from tracer data. RTD for ideal reactors and predicts conversion using different models, [1SO1, 1SO2] [1L7S1]. [1SO1, 1SO2] [1L7S1]	10%	
Use software packages (e.g., Polymath and Matlab) to solve reaction engineering problems. [1SO2, 1SO7] [1L7C2]	10%	

Relationship to Program Student Outcomes (Out of 100%)						
SO1	SO2	SO3	SO4	SO5	SO6	SO7
30	35					5

Relationship to NQF Outcomes (Out of 100%)			
L7K1	L7S1	L7C1	L7C2
15	20	15	20

Evaluation	
Assessment Tool	**Weight**
first	25%
Second Exam	25%
Final Exam	40%
Activity	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. One point will be reduced for unexcused absence from the performance grade.
Homework	Homework problems are assigned during lecture 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.
Quizzes	Quizzes will be part of this course. No make-up quizzes will be conducted except in the case of a documented emergency
Student 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.

Date Printed: 2023-12-13