MUTAH UNIVERSITY
Faculty of Engineering
Department of Chemical Engineering

Chemical Reaction Engineering I

COURSE SYLLABUS

Course Code	Course Name	Credits	Contact Hours
0404491	Chemical Reaction Engineering 2	3	3/week

INSTRUCTOR/COORDINATOR	
Name	Dr. Nabeel Jarrah
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Website	

TEXTBOOK
H. Scott Fogler (2016) Elements of Chemical Reaction Engineering, 5th edition, Pearson Education
Other Supplemental Materials
Octave Levenspiel (1999) Chemical Reaction Engineering, 3rd edition, John Wiley & Sons.

SPECIFIC COURSE INFORMATION
A. Brief Description of the Content of the Course (Catalog Description)
This course aims to increase the comprehensiveness of the student's knowledge in the area of chemical reaction engineering. The course includes the following topics: nonisothermal chemical reactions, catalytic reactors, residence time and its measurements, design of reactors using residence time analysis, design of multi-phase reactors.
B. Pre-requisites (P) or Co-requisites (C)
0404392
C. Course Type (Required or Elective)
Required (Compulsory department course)

SPECIFIC GOALS

A. Specific Outcomes of Instruction

By the end of this course, the student should be able to:

1. Apply energy balance on a reactive system [SO-1].
2. Design an adiabatic and non-adiabatic CSTR, PFR, and PBR [SO-1, SO-2].
3. Determine equilibrium conversion of exothermic or endothermic reactions [SO-1].
4. Decide the number of inter stages of cooling [SO-1, SO-2].
5. Determine Multiple Steady States in a CSTR [SO-1, SO-2].
6. Define a catalyst, a catalytic mechanism and a rate limit step [SO-1].
7. Analyze experimental data of a catalyzed reaction and determine the Langmuir- Hinschelwood kinetics [SO-6].
8. Design an isothermal catalytic reactor with Langmuir- Hinschelwood kinetics [SO-2].
9. Describe the different types of catalyst deactivation and analyze the methods to offset them [SO-1, SO-2].
10. Determine residence time distribution RTD [E(t), F(t)] and the mean residence time from tracer data [SO-1, SO-2 and SO-6].
11. Calculate conversion from RTD data using segregation model [SO-1, SO-2 and SO-6].

B. Student Outcomes Addressed by the Course

1	2	3	4	5	6	7				
✓	✓				✓					

BRIEF LIST OF TOPICS TO BE COVERED

List of Topics	No. of Weeks	Contact Hours
Nonisothermal Reactor Design–The Steady State Energy Balance	2	6
Adiabatic and non-adiabatic CSTR and PFR reactors	4	12
Equilibrium Conversion	1	3
Reactor stability	2	6
Catalysis and catalytic reactors	4	12
Residence Time Distributions of Chemical Reactors	3	9
Total	16	48

METHODS OF ASSESSMENT

No.	Method of assessment	Week and Date	%
1	First Exam	6th week	**20**
2	Second Exam	12th week	**20**
3	HW and Quizzes	Biweekly	**10**
3	Final Exam	16th week	**50**
Total			**100**