



Course Specifications

Course Title:	Kinetic Chemistry
Course Code:	4022144-3
Program:	Chemistry
Department:	Chemistry
College:	Applied Sciences
Institution:	Umm Al-Qura University

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A. Course Identification

1. Credit hours: 3
2. Course type a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/> b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered: 5 th level/3 rd year
4. Pre-requisites for this course (if any): Thermodynamics + Volumetric and Gravimetric Analytical Chemistry.
5. Co-requisites for this course (if any):

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	√	74 %
2	Blended	---	---
3	E-learning	√	26 %
4	Distance learning	---	---
5	Other	---	---

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	22
2	Laboratory/Studio	30
3	Tutorial	--
4	Others (E-learning + Exams + office hours)	15
	Total	67

B. Course Objectives and Learning Outcomes

1. Course Description The course deals with the basic principles of chemical kinetics including reaction rate, rate laws, methods of following a reaction, analyzing the experimental data of a given reaction, description of the fundamentals of catalysis and influence of the catalyst on the reaction rate.
2. Course Main Objective By the end of this course the students will be able to describe and explain: 1. Principles of kinetic chemistry. 2. Determination of the rate law from the experimental data. 3. Sequence of the elementary steps "mechanism" of a reaction. 4. Effect of catalyst on the reaction rate.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding	
1.1	Demonstrate broad knowledge and understanding of the underlying theories, principles, and concepts in kinetic chemistry.	K1
1.2	Identify the processes, practices, and/or chemical terminology in kinetic chemistry.	K2
2	Skills :	
2.1	Apply the theories, principles, and concepts in various contexts in kinetic chemistry.	S1
2.2	Solve complex problems related to kinetic chemistry.	S2
2.3	use and adapt chemical kinetics practical experiments	S3
2.4	Use computers and internet to find all information related to chemical kinetics and their applications	S5
3	Values:	
3.1	Work individually and in a team to perform a specific experiment or preparing a report on kinetic chemistry.	V3

C. Course Content

No	List of Topics	Contact Hours
1	General concepts in chemical kinetics.	2
2	Factors affecting the rate of reaction.	2E
3	Conventional techniques of following a reaction.	2
4	Integration of simple rate laws.	2
5	Types of reaction orders.	2
6	Determining the rate law from experimental data.	2
7	Dependence of rate on temperature.	2E
8	Theories of chemical reactions.	2
9	Kinetics of complex reactions.	2
10	Effect of catalyst on the reaction rate.	2
11	Kinetics of catalysis by enzymes.	2
12	Kinetics of photochemical reactions.	2
13	Kinetics of reactions in solutions.	4E
14	General revision and Mid-Term Exam.	2
Total		30

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge and Understanding		
1.1	Demonstrate broad knowledge and understanding of the underlying theories, principles, and concepts in kinetic chemistry.	Lectures	Mid-term and final Exams

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.2	Identify the processes, practices, and/or chemical terminology in kinetic chemistry.	Lectures Lab work E-Learning	Mid-term and final Exams Practical Lab exam Assignments and activities on blackboard
2.0	Skills		
2.1	Apply the theories, principles, and concepts in various contexts in kinetic chemistry.	Lectures Web based study.	Mid-term and final Exams
2.2	Solve complex problems related to kinetic chemistry.	E-Learning Mind Mapping	Assignments and activities on blackboard
2.3	use and adapt chemical kinetics practical experiments	Lab work	Practical Lab exam
2.4	Use computers and internet to find all information related to aliphatic compounds and their applications	Self-Directed private Study	Assignments and activities on blackboard
3.0	Values		
3.1	Work individually and in a team to perform a specific experiment or preparing a report on the organic synthesis	Lab work	Practical Lab report and Exam

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	E-learning	All weeks	5%
2	Assignments and activities	All weeks	5%
3	Mid-term Exam	6	20%
4	Practical Lab Work (Reports and Exams)	11	30%
5	Final Exam.(2 hours exam)	12	40%

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

- Weekly office hours for discussion with the students.
- Academic advising for students.
- Availability of Staff members to provide counseling and advice.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	<ul style="list-style-type: none"> • An Introduction to Chemical Kinetics, Margaret Robson Wright, New York, John Wiley & Sons, 2004. • Kinetics of Chemical Reactions, Guy Marin, Gregory S. Yablonsky, John Wiley, 2011.
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	<ul style="list-style-type: none"> • Chemical Kinetics, Luis Arnaut, Sebastiao Formosinho, Hugh Burrows, 1st ed., Elsevier Science, 2006.
Essential References Materials	<ul style="list-style-type: none"> • Physical Chemistry, Amazon logo Silbey, R. R. Alberty, M. Bawendi, 4th ed., John Wiley & Sons, 2004. • Physical Chemistry, Peter Atkins & Julio de Paula, 10th ed., W. H. Freeman and Company, 2014. • Principles of Chemical Kinetics, Second Edition, James E. House, 2nd ed., Academic Press, 2007.
Electronic Materials	<ul style="list-style-type: none"> • http://www.chemweb.com • http://www.sciencedirect.com • http://www.rsc.org • Websites on the internet relevant to the topics of the course
Other Learning Materials	Not required

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Well-equipped lecture halls.
Technology Resources (AV, data show, Smart Board, software, etc.)	Computer and data show.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	No other requirements.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Quality of learning resources	Students	Complete the questionnaire evaluation of the course periodically.
Effectiveness of teaching and assessment.	Program Leaders	Observation of students performing a task.
Extent of achievement of course learning outcomes.	Peer Reviewer	Checking selected exam papers, and student assignments.

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	Quality committee and department counsel
Reference No.	1 st meeting
Date	2022

Head of Chemistry Department



Dr Moataz Morad

