



Course Specifications

Course Title:	Chemical Kinetics
Course Code:	2043103-3
Program:	Bachelor in Chemistry
Department:	Department of Chemistry
College:	College of Sciences
Institution:	Taif University

Table of Contents

A. Course Identification	3
6. Mode of Instruction (mark all that apply)	3
B. Course Objectives and Learning Outcomes	3
1. Course Description	3
2. Course Main Objective.....	3
3. Course Learning Outcomes	3
C. Course Content	4
D. Teaching and Assessment	5
1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods	5
2. Assessment Tasks for Students	5
E. Student Academic Counseling and Support	5
F. Learning Resources and Facilities	5
1. Learning Resources	5
2. Facilities Required.....	6
G. Course Quality Evaluation	6
H. Specification Approval Data	6

A. Course Identification

1. Credit hours: 3 (2 Theoretical, 1 Lab)
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: 8 th Level/3 rd Year
4. Pre-requisites for this course (if any): General Chemistry 2 (2042101-3)
5. Co-requisites for this course (if any): NA

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	3 Theoretical and 2 Practical hours/ Week	100%
2	Blended	-	-
3	E-learning	-	-
4	Distance learning	-	-
5	Other	-	-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	30
2	Laboratory/Studio	30
3	Tutorial	-
4	Others (specify)	-
	Total	60

B. Course Objectives and Learning Outcomes

1. Course Description

This course is designed to help students understand fundamental principles of chemical kinetics focusing mainly on the speeds, or rates, and the mechanisms of chemical reactions.

2. Course Main Objective

The main purpose of this course is to introduce students to fundamentals and different chemistry concepts concerned with reaction rates and the sequence of steps by which reactions occur.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding:	
1.1	Recognize the concepts of reaction rates and rate laws	K1
1.2	Describe the effect of a catalyst on the energy for a reaction	K2
2	Skills:	
2.1	Apply the integrated rate laws and reaction mechanism	S1

CLOs		Aligned PLOs
2.2	Classify reactions based on their order and molecularity	S2
3	Values:	
3.1	Illustrate the concept of personal responsibility for achieving duties by teamwork	V1

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to Chemical Kinetics	3
2	Rate Laws and Reaction Order	3
3	Experimental Determination of Rate Law	3
4	Integrated Rate Law for First-Order Reaction	3
5	Half-Life of First-Order Reaction- Radioactive Decay Rates	3
6	Second-Order Reactions. Zeroth-Order Reactions	3
7	Reaction Mechanisms Rate Laws for Elementary and Overall Reactions	3
8	Reaction Rates and Temperature: The Arrhenius Equation	3
9	Collision Theory	3
10	Catalysis	3
Total		30

Lab Content

No	List of Topics	Contact Hours
1	Introduction to kinetic Chemistry Lab: Safety, Instrumentations and factors affects the rate of chemical reaction	2
2	Studying the effect of concentration on reaction rate	2
3	Studying the effect of temperature on reaction rate	2
4	Test for first order reaction	2
5	Test for second order reaction	2
6	The effect of HCl concentration on the reaction rate and determination the reaction order with respect to HCl	2
7	Effect of particle size on reaction rate	2
8	Effect of the Catalyst: the effect of adding manganese sulfate on the rate of reaction of potassium permanganate with oxalic acid	2
9	Kinetic study of hydrochloric acid-catalyzed ethyl acetate decomposition	2
10	Calculation of the activation energy for the hydrolysis reaction of ethyl acetate in acidic medium	2
Total		20

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	Recognize the concepts of reaction rates and rate laws.	Lecture	Written exam
1.2	Describe the effect of a catalyst on the energy for a reaction.	Lecture	Written exam
2.0	Skills		
2.1	Apply the integrated rate laws and reaction mechanism.	Discussion	Homework Assignments
2.2	Classify reactions based on their order and molecularity.	Problem-Solving	Practical tasks and Exam
3.0	Values		
3.1	Illustrate the concept of personal responsibility for achieving duties by teamwork.	Collaborative Learning	Individual presentations

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Homework Assignments	Throughout Semester	5%
2	Individual presentations	Throughout Semester	5%
3	Mid Term Exam	6	20%
4	Practical tasks	Throughout Semester	25%
5	Final practical Exam	10/11	5%
6	Final exam	11/12	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 :

Commitment to the rules of the Academic Advising Department at the university in accordance with the academic guidance manual approved by the university and the attached forms, there are different arrangements made by teaching staff to support student consultations including;

- Office hours: 8 hours per a week for each academic member.
- Academic guidance: an academic member has a number of students to guide them throughout degree journey.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	<ul style="list-style-type: none">Chemistry, John E. McMurry and Robert C. Fay, 2015. Pearson Education, Latest Edition. ISBN: 978-0-13-389179-9 https://tinyurl.com/2p94b6bf
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Essential References Materials	<ul style="list-style-type: none"> Essentials of Physical Chemistry, B. S. Bahl, G. D. Tuli and Arun Bahl, S. Chand (India), Latest Edition. 2014, ISBN: 9788121929783. https://tinyurl.com/bdd4aysh
Electronic Materials	<ul style="list-style-type: none"> Saudi Digital Library (SDL) https://apps.tu.edu.sa/sdl/default.aspx
Other Learning Materials	<ul style="list-style-type: none"> Cyber education chemistry software Online videos for kinetic chemistry experiments

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	A classroom with movable tables and chairs conducive to group discussion and teamwork.
Technology Resources (AV, data show, Smart Board, software, etc.)	Data show, smart board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	--

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of Teaching and assessment	Students	Survey (indirect method)
Extent of achievement of course learning outcomes	Program leader	Reports (Direct method)
Quality of learning resources	Peer referees Students	Reports (Direct method) Survey (indirect method)

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	Department Council/ Quality assurance committee
Reference No.	2-5-1444
Date	01/11/2022