Course Specification
(Bachelor)

Course Title:	Kinetic Chemistry
Course Code:	CEM 346
Program:	Bachelor of Science in chemistry - track of Chemistry
Department:	Chemistry
College:	College of Science
Institution:	Almajmaah University
Version:	☐ New ☒ Updated*
Last Revision Date:	24/12/2024

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A. General information about the course:

1. Course Identification

1. Credit hours: (3 hours)					
2. Course type					
A.	☒ University	☐College	☐ Department	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (3rd year – 6th level)					
4. Course General Description:					
This course introduces fundamental principles of chemical kinetics and different ways to determine rate law of reaction and Arrhenius parameters and present briefly collision and transition state theories.					
5. Pre-requirements for this course (if any)**:**					
CEM 241					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
Upon the completion of this course the student will be able to: • List the factors that affect reaction rates. • Use experimental data to determine the rate law expression and use these data to calculate rate constants, half-life and reaction order. • Determine the order of chemical reactions by using half-life method. • Relate theoretical aspects of the course to the experimental results. • Identify applications of kinetics in industry and general life. • Master basic mathematical skills related to this course. • Apply different kinds of equations involved in this course to find kinetic parameters.					

- Identify suitable experimental methods for following a chemical reaction kinetically.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	4 hours per week	100%
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	28
2.	**Laboratory/Studio**	28
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	
Total		56

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Read, evaluate, and interpret numerical, chemical and general scientific information about kinetics chemistry.	**K1**	-Lectures. -Conduct scientific research. -Seminars. -Discussions -Brainstorming-	-Final exam -Midterm exam - Short tests -Quizzes. -Homework

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.2	Recognize the fundamental concepts, basic principles and theories related to kinetics chemistry.	**K2**		-Class exercises -Evaluation of research
...				
2.0	**Skills**			
2.1	The ability to search and use the chemical literature in both printed and electronic formats.	**S4**	-Lectures -Laboratories -Active learning - E-learning -Self-learning -Cooperative Education -Examinations	- Final exam - Midterm exam - Short tests -Quizzes. - Homework - Class exercises - Evaluation of research -Practical tests
...				
3.0	**Values, autonomy, and responsibility**			
3.1	Act responsibly and ethically in carrying out assigned tasks	**V1**	-Simulation programs -Cooperative work -Working in groups	-Practical tests - Practical reports - Note card -Research papers
3.2	Work effectively in groups and exercise leadership when appropriate	**V2**		
...				

C. Course Content

No	List of Topics	Contact Hours
1.	Definitions of kinetic Chemistry (Kinetics of particles)	**3**
2.	The rate of reaction and effected factor	**3**
3.	The order of a chemical reaction and the molecularity of reaction	**2**
4.	Integrated law of rate of reaction(Zero order, first order, second order, third order, general n order) , half life	**4**

5.	Determination the order of reaction from integrate method, isolation method, fractional life time method.	4
6.	Complex interactions(chain reaction ,reverse reactions, parallel reactions, Sequence reactions)	4
7.	Effect of temperature Arrhenius equation	2
8.	Activation energy (Effect of the catalyst)	2
9.	Theories that explain the occurrence of chemical reactions	4
10	**Practical**	
11.	Measure the speed of chemical reaction (first order, second order….)	9
12	effect of concentration on the speed of reaction , determined the order of reaction	9
13.	Effect of temperature on the speed of reaction, Measuring activation energy	6
---	Revision	4
Total		**56**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Homework	Continues	5%
2.	Quizzes	End of topic	5%
3.	First midterm exam	6th	10%
4.	Second midterm exam	11th	10%
5.	E. exam	12th	10%
6.	Practical	Continues	10%
7.	Final Practical exam	13th	10%
8.	Final Theoretical exam	16th	40%
...			

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	General Chemistry: Principles and Structure, James E. Brady ,Wiley,2000,471528746-978-13
Supportive References	
Electronic Materials	Physical Chemistry 11th ed. Peter Atkins and etc. Oxford University Press. 2018
Other Learning Materials	PowerPoint presentation. Interactive and multimedia soft-books

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms, E- learning, laboratories and balckboard
Technology equipment (projector, smart board, software)	data show, Smart Board
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Faculty	Direct
Effectiveness of Students assessment	Students	Direct
Quality of learning resources	Faculty	Direct
The extent to which CLOs have been achieved	Faculty	Direct
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Chemistry council
REFERENCE NO.	16
DATE	8/12/2024