



Course Specification

(Bachelor)

Course Title: Inorganic Biochemistry

Course Code: CEM 457

Program: CHEMISTRY

Department: CHEMISTRY

College: COLLEGE OF SCIENCE

Institution: MAJMAAH UNIVERSITY

Version: TP-153

Last Revision Date: 10 December 2024



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A. General information about the course:

1. Course Identification

1. Credit hours: (.....)

2. Course type

A. University College Department Track Others
 B. Required Elective

3. Level/year at which this course is offered: (.....)

4. Course General Description:

The overall objective of CHEM 457 is to provide a general knowledge upon the general bases of inorganic biochemistry, an emerging subject and interdisciplinary field between inorganic chemistry and biochemistry. The task of inorganic biochemistry is to research the interaction between the metal complex (or metal ion) with biological ligand at the molecular level.

5. Pre-requirements for this course (if any):

CEM 352

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:

- Understand the roles of naturally occurring inorganic elements in biology.
- understand how metal ions interact with biological environments and how these interaction influences the properties of metal centers.
- apply principles of coordination chemistry to explain how nature tailors' properties of metal centers for specific applications

2. Teaching mode (mark all that apply)



No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	30	100%
2	E-learning		
3	Hybrid <ul style="list-style-type: none"> • Traditional classroom • E-learning 		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	30
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	
5.	Others (specify)homework,study	60
Total		90

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	Define the concepts and principles of Biological Inorganic Chemistry- Biochemistry.	K1	- Lectures. - Discussions - Brainstorming	-Midterms exam - Quizzes - Homework - Final exam -Electronic exam Class exercises



Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.3	Explain the role of metal ions in biological systems, the structure and function of metalloproteins and metalloenzymes, the role of metal ions in nucleic acids and metalloporphyrins. Link between the knowledge and skills acquired academic and professional contexts related to the science of bioinorganic chemistry.	K3	Lecture Discussion Brainstroming	-Homework -Written exam - Electronic exam
...				
2.0	Skills			
2.3	Demonstrate the ability to use modern technology and statistical applications that are used in the various fields of chemistry	S3	Lectures	-Quizzes. - Homework - Class exercises -presentation (rubic)
3.0	Values, autonomy, and responsibility			
3.1	Apply standards of integrity, transparency, and ethical behavior in various Academic and professional fields	V1	Team work reports and presentations (data collection, internet search, data processing, analysis and reporting). - Cooperative work - Working in groups	-Research papers. - Presentation



C. Course Content

No	List of Topics	Contact Hours
1.	An introduction to bioinorganic chemistry and its relationship with other branches of chemistry as well as of other sciences	4
2.	Biological function of inorganic elements	4
3.	Oxygen carriers and oxygen transporter proteins.	4
4.	Important metallic enzymes.	4
5.	Heem protein and copper protein in oxidation and reduction processes.	2
6.	Electron Transmission and Metabolism.	2
7.	Stabilization of plant air nitrogen and nitrogenase (iron-sulfur proteins)	2
8.	Absorption and transport of the essential inorganic elements	2
9.	Inhibition and poisoning	4
10	Medicinal uses of inorganic compounds	2
Total		30

D. Students Assessment Activities

No	Homework	Continues	5%
1.	Homework	Continues	5%
2.	Quizzes	End of topic	5%
3.	Presentation	One/semester	10%
4.	midterm exam 1	7 th	15%
5.	midterm exam 2	12 th	15%
6.	E. exam	15 th	10%
7.	Final Theoretical exam	18 th	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	Bioinorganic Chemistry, I. Bertini, H. B. Gray, S. J. Lippard And J. S. Valentine, 1994, Mill Valley.
Supportive References	Principles of Bioinorganic Chemistry, S. J. Lippard & J. M. Berg, 1994, Mill Valley.
Electronic Materials	J. Inorganic Chemistry
Other Learning Materials	Relevant Website



2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms, E- learning, 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	Students	Course Evaluation Survey Quality of Exam Survey
	Faculty	CLO Mapping with teaching & assessment. Course Blueprinting Grade Analysis Psychometric Analysis
	Peers	Grade Verification
Effectiveness of Students assessment	Faculty member / Quality assurance committee	Direct assessment outcome analysis Course report preparation
Quality of learning resources	Students / Faculty	Academic advising survey Student experience survey
The extent to which CLOs have been achieved	Quality assurance committee	Outcome analysis
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Chemistry Department council
REFERENCE NO.	17
DATE	14-6-1446 H

