



نموذج توصيف مقرر
Course Description Form

Name of College\Faculty :

اسم الكلية:

Name of Department:

اسم القسم العلمي:

Course Name	Bioinorganic Chemistry	اسم المقرر
Course No.	442	رقم المقرر
No. of Credits	3	عدد الوحدات
Theoretical Hours	2.5 hours/week	عدد الساعات النظرية
Practical Hours	0	عدد الساعات المحلّية
Course topics	مواضيع المقرر	

1. Introduction to bioinorganic chemistry.
2. Essential metal ions and their biological roles.
3. Fundamental concepts in inorganic chemistry.
4. Metal-ligand complexes and formation constants.
5. Biological ligands.
6. Protein structures.
7. Nucleic acids structures.
8. Metal binding sites in proteins and nucleic acids.
9. Oxygen carrier metalloproteins.
10. Hydrolytic enzymes.
11. Electron transfer proteins.
12. Metal ion and biomolecular folding.
13. Metal ions as probes of metalloproteins structures.
14. Metal ions and complexes in medicine.
15. The frontiers of bioinorganic Chemistry.

Chapter	Title	Section Excluded
1	Overview of Bioinorganic Chemistry	-
2	Principles of Coordination Chemistry Related to Bioinorganic Research	-
3	Properties of Biological Molecules	-
5	Choice, Uptake, and Assembly of Metal-Containing Units in Biology	-
6	Control and Utilization of Metal-Ion Concentration in Cells	-
7	Metal Ion Folding and Cross-Linking of Biomolecules	-
8	Binding of Metal Ions and Complexes to Biomolecule-Active Centers	8.4
9	Electron-Transfer Proteins	-
10	Substrate Binding and Activation by Nonredox Mechanisms	10.4
11	Atom- and Group-Transfer Chemistry	-
12	Protein Tuning of Metal Properties to Achieve Specific Functions	12.7.d

Text book: (Name, Author , Year , Publisher) **عنوان الكتاب : (الاسم ، المؤلف ، سنة الطبع ، دار النشر)**

Principles of Bioinorganic Chemistry” by S.J. Lippard, University Science Book, 1994

References: (Name , Author , Year . Publisher)	عنوان المرجع : (الاسم ، المؤلف ، سنة الطبع ، دار النشر)
1. Bioinorganic chemistry: Inorganic Elements in the Chemistry of life by W. Kim, John Wiley & Sons. 2. Metals in Biological Systems by K.D. Robinson, Ellis Horwood. 3. Bioinorganic Chemistry by R.W. Hay, Ellis Horwood.	

Prerequisites CHEM 336				متطلبات المقرر		
Grading	Exams	55	%		الاختبارات	آلية رصد المقرر
	Quizzes	0	%		امتحانات قصيرة	
	H.W.	5	%		واجبات	
	Project (field study)	0	%		مشاريع (دراسة ميدانية)	
	Final	40	%		الاختبار النهائي	
				%		

Course objectives					
No.	Course Objectives (Learning Outcomes)	Example(s) of relevant (Topics and activities)	Recommended Level to satisfy the objectives		
			High	Medium	Low
1	Describes the roles of naturally occurring metals in biological system.	Essential metal ions and their biological roles; Metal–ligand complexes and formation constants; Metal binding sites in proteins and nucleic acids; Oxygen carrier metalloproteins.	X		
2	Demonstrate how metal complexes can be used to analyze DNA structures.	Nucleic acids structures; Metal binding sites in	X		



		proteins and nucleic acids; Metal ions as probes of metalloprotein structures; The frontiers of bioinorganic chemistry.			
3	Identify metal binding sites in protein and nucleic acids.	Protein structures; Nucleic acids structures; Metal binding sites in proteins and nucleic acids; Metal ions as probes of metalloprotein structures.	X		
4	Use chemical thermodynamics to explain complex formation between metal and biological molecules.	Fundamental concepts in inorganic chemistry; Metal–ligand complexes and formation constants; Biological ligands; Essential metal ions and their biological roles.	X		
5	Describe the functions of selected metalloprotein.	Oxygen carrier metalloproteins; Electron transfer proteins; Hydrolytic enzymes; Metal ions as probes of metalloprotein structures.	X		
Fields	Bioinorganic Chemistry				

Skills	1. Analytical interpretation of metal–ligand interactions and coordination environments in biological systems. 2. Critical evaluation of experimental and spectroscopic data to identify the role of metals in biomolecules. 3. Correlation of chemical properties (oxidation state, geometry, ligand type) with biological function such as catalysis or electron transfer. 4. Application of inorganic chemistry principles to explain metal ion transport, storage, and enzymatic mechanisms in biological systems.
Coordinator (Name and Rank) :	Convener of the Inorganic and Analytical Chemistry group
Signature and stamp :	
Date:	8/11/2025