

Enquiry for Course Details

CHEM3342 Bioinorganic chemistry (6 credits)		Academic Year	2023
Offering Department	Chemistry	Quota	50
Course Co-ordinator	Prof H Z Sun, Chemistry < hsun@hku.hk >		
Teachers Involved	(Dr H Y Au Yeung, Chemistry) (Prof H Z Sun, Chemistry)		
Course Objectives	This course is a continuation from Basic Inorganic Chemistry and Basic Organic Chemistry, giving further and more details of inorganic chemistry in biological system, with examples relevance to biological processes and medical science, suited to the needs of those intending to extend their studies in (bio)chemistry and biomedical science.		
Course Contents & Topics	Bioinorganic Chemistry of selected topics of interest. Examples include the inorganic chemistry (and biochemistry) behind the requirement of biological cells for metals such as zinc, iron and copper; and metals in medicine such as mechanisms by which organisms obtain required metal ions from their environment, and use of metal-containing compounds in treating diseases such as cancer.		
Course Learning Outcomes	On successful completion of this course, students should be able to:		
	CLO 1	understand the principles and concepts of inorganic/organic chemistry in biological system	
	CLO 2	understand structure, bonding, and spectral properties of selected metals in proteins and nucleic acids	
	CLO 3	understand chemical mechanisms of selected metal homeostasis (i.e. uptake, transport and storage)	
	CLO 4	understand the role of metal complexes medicine	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in CHEM2341		
Course Status with Related Major/Minor /Professional Core	2U000C00 Course not offered under any Major/Minor/Professional core 2023 Minor in Chemistry (Disciplinary Elective) 2022 Minor in Chemistry (Disciplinary Elective) 2021 Minor in Chemistry (Disciplinary Elective) 2020 Minor in Chemistry (Disciplinary Elective) 2019 Minor in Chemistry (Disciplinary Elective)		
Course to PLO Mapping			
Offer in 2023 - 2024	Y	2nd sem	Examination May
Offer in 2024 - 2025	Y		
Course Grade	A+ to F		
Grade Descriptors	A	Demonstrate thorough knowledge and understanding of essential facts, concepts, principles, and theories relating to the basic foundation knowledge of bioinorganic chemistry, especially those related to hard-soft acid-base theory; chelation; structure and bonding of metals in biological systems; thermodynamic and kinetic aspects of metal ions in biological processes and their relevance to metal homeostasis; metal-based drugs. Show strong ability to apply and integrate knowledge and theory relating to the basic foundation knowledge of bioinorganic chemistry. Show strong ability to analyze novel problems and critical use of data and experimental results to draw appropriate and insightful conclusions relating to the basic principles and knowledge of bioinorganic chemistry. Demonstrate highly effective basic techniques, especially in the characterization of inorganic active site and overall metallo-biomolecules.	
	B	Demonstrate substantial command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the basic foundation knowledge of bioinorganic chemistry, especially those related to hard-soft acid-base theory; chelation; structure and bonding of metals in biological systems; thermodynamic and kinetic aspects of metal ions in biological processes and their relevance to metal homeostasis; metal-based drugs. Show evidence to apply and integrate knowledge and theory relating to the basic foundation knowledge of bioinorganic chemistry. Show evidence to analyze novel problems and correct use of data and experimental results to draw appropriate conclusions relating to the basic principles and knowledge of bioinorganic chemistry. Demonstrate effective basic techniques, especially in the characterization of inorganic active site and overall metallo-biomolecules.	
	C	Demonstrate general but incomplete command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the basic foundation knowledge of bioinorganic chemistry, especially those related to hard-soft acid-base theory; chelation; structure and bonding of metals in biological systems; thermodynamic and kinetic aspects of metal ions in biological processes and their relevance to metal homeostasis; metal-based drugs. Show evidence of some abilities to apply and integrate knowledge and theory relating to the basic foundation knowledge of bioinorganic chemistry. Show ability to analyze problems to most familiar situations and mostly correct but erroneous use of data and experimental results to draw appropriate conclusions relating to the basic principles and knowledge of bioinorganic chemistry. Demonstrate moderately effective basic techniques, especially in the characterization of inorganic active site and overall metallo-biomolecules.	
	D	Demonstrate partial but limited command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the basic foundation knowledge of bioinorganic chemistry, especially those related to hard-soft acid-base theory; chelation; structure and bonding of metals in biological systems; thermodynamic and kinetic aspects of metal ions in biological processes and their relevance to metal homeostasis; metal-based drugs. Show evidence of limited abilities to apply and integrate knowledge and theory relating to the basic foundation knowledge of bioinorganic chemistry. Show limited ability to analyze problems to most familiar situations and mostly correct but erroneous use of data and experimental results to draw appropriate conclusions relating to the basic principles and knowledge of bioinorganic chemistry. Demonstrate partially effective basic techniques, especially in the characterization of inorganic active site and overall metallo-biomolecules.	
	Fail	Demonstrate little or no evidence of command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the basic foundation knowledge of bioinorganic chemistry, especially those related to hard-soft acid-base theory; chelation; structure and bonding of metals in biological systems; thermodynamic and kinetic aspects of metal ions in biological processes and their relevance to metal homeostasis; metal-based drugs. Show little or no evidence of abilities to apply and integrate knowledge and theory relating to the basic foundation knowledge of bioinorganic chemistry. Show little or no ability to analyze problems to most familiar situations and erroneous use of data and experimental results to draw appropriate conclusions relating to the basic principles and knowledge of bioinorganic chemistry. Demonstrate minimally effective basic techniques, especially in the characterization of inorganic active site and overall metallo-biomolecules.	
Course Type	Lecture-based course		

Course Teaching & Learning Activities	Activities		Details	No. of Hours
	Lectures			36
	Tutorials		including literature survey & presentation	12
	Reading / Self study			100
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments		25	CLO 1,2,3,4
	Examination		50	CLO 1,2,3,4
	Test	(quiz/test)	25	CLO 1,2,3,4
Required/recommended reading and online materials	<p>Lippard, S. J. and Berg, J. M. Principles of Bioinorganic Chemistry (University Science Books; Mill Valley, CA, 1994</p> <p>Bertini, I.; Gray, H. B.; Stiefel, E. I.; Valentine, J. S., editors. Biological Inorganic Chemistry: Structure and Reactivity, University Science Books, 2007</p> <p>Metals and Life, Moore C., RSC Publishing, 2010.</p> <p>Bioinorganic Chemistry: Inorganic Elements in the Chemistry of Life, Kaim W. & Schwederski B., John Wiley & Sons, 2013.</p>			
Course Website	NIL			
Additional Course Information				