

CHEM2341 Inorganic chemistry I (6 credits)		Academic Year	2023
Offering Department	Chemistry	Quota	120
Course Co-ordinator	Dr H Y Au Yeung, Chemistry < hoyuay@hku.hk >		
Teachers Involved	(Dr A M Y Yuen, Chemistry) (Dr H Y Au Yeung, Chemistry) (Prof H Z Sun, Chemistry)		
Course Objectives	To provide students with the basic principles and knowledge of inorganic chemistry and to introduce their relevance to biological processes and materials science. This course provides the foundation for further studies in inorganic chemistry.		
Course Contents & Topics	Acid-base concept; structure and bonding of transition metal complexes and main group compounds; electronic absorption and magnetic properties of metal complexes; chemical reactions of metal complexes: redox and substitution; chemistry of selected main group elements and transition metal complexes and their relevance to biology and materials.		
Course Learning Outcomes	On successful completion of this course, students should be able to:		
	CLO 1	understand the basic principles and concepts of inorganic chemistry and appreciate their relevance to selected examples of biological processes and materials science	
	CLO 2	demonstrate knowledge and understanding of the acid-base concept and definition	
	CLO 3	demonstrate knowledge and understanding of the structure and bonding of main group compounds and transition metal complexes and their relevance to the electronic absorption and magnetic properties of transition metal complexes	
	CLO 4	demonstrate knowledge and understanding of the thermodynamic stability of metal complex formation and the thermodynamic and kinetic aspects of substitution and redox reactions	
	CLO 5	demonstrate knowledge and understanding of the role of main group elements and transition metal complexes in bioinorganic chemistry	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in CHEM1042; and Pass in CHEM1043, or already enrolled in this course		
Course Status with Related Major/Minor /Professional Core	2023 Major in Chemistry (Core/Compulsory) 2023 Major in Chemistry (Intensive) (Core/Compulsory) 2023 Minor in Chemistry (Disciplinary Elective) 2022 Major in Chemistry (Core/Compulsory) 2022 Major in Chemistry (Intensive) (Core/Compulsory) 2022 Minor in Chemistry (Disciplinary Elective) 2021 Major in Chemistry (Core/Compulsory) 2021 Major in Chemistry (Intensive) (Core/Compulsory) 2021 Minor in Chemistry (Disciplinary Elective) 2020 Major in Chemistry (Core/Compulsory) 2020 Major in Chemistry (Intensive) (Core/Compulsory) 2020 Minor in Chemistry (Disciplinary Elective) 2019 Major in Chemistry (Core/Compulsory) 2019 Major in Chemistry (Intensive) (Core/Compulsory) 2019 Minor in Chemistry (Disciplinary Elective)		
Course to PLO Mapping	2023 Major in Chemistry < PLO 2,3,4 > 2023 Major in Chemistry (Intensive) < PLO 2,3,4 > 2022 Major in Chemistry < PLO 2,3,4 > 2022 Major in Chemistry (Intensive) < PLO 2,3,4 > 2021 Major in Chemistry < PLO 2,3,4 > 2021 Major in Chemistry (Intensive) < PLO 2,3,4 > 2020 Major in Chemistry < PLO 2,3,4 > 2020 Major in Chemistry (Intensive) < PLO 2,3,4 > 2019 Major in Chemistry < PLO 2,3,4 > 2019 Major in Chemistry (Intensive) < PLO 2,3,4 >		
Offer in 2023 - 2024	Y	1st sem	2nd sem
		Examination	Dec May
Offer in 2024 - 2025	Y		
Course Grade	A+ to F		

Grade Descriptors	<p>A Demonstrate thorough knowledge and understanding of essential facts, concepts, principles, and theories relating to the basic foundation knowledge of inorganic chemistry, especially those related to acid-base concept; structure and bonding of main group compounds and metal complexes; electronic absorption spectroscopy, magnetic properties as well as thermodynamic and kinetic aspects of metal complexes and their reactions; and their relevance to biological processes and materials science. Show strong ability to apply and integrate knowledge and theory relating to the basic foundation knowledge of inorganic 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 inorganic chemistry. Demonstrate highly effective basic laboratory skills and techniques, especially in the synthesis and characterization of inorganic compounds and metal complexes.</p> <p>B Demonstrate substantial command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the basic foundation knowledge of inorganic chemistry, especially those related to acid-base concept; structure and bonding of main group compounds and metal complexes; electronic absorption spectroscopy, magnetic properties as well as thermodynamic and kinetic aspects of metal complexes and their reactions; and their relevance to biological processes and materials science. Show evidence to apply and integrate knowledge and theory relating to the basic foundation knowledge of inorganic 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 inorganic chemistry. Demonstrate effective basic laboratory skills and techniques, especially in the synthesis and characterization of inorganic compounds and metal complexes.</p> <p>C Demonstrate general but incomplete command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the basic foundation knowledge of inorganic chemistry, especially those related to acid-base concept; structure and bonding of main group compounds and metal complexes; electronic absorption spectroscopy, magnetic properties as well as thermodynamic and kinetic aspects of metal complexes and their reactions; and their relevance to biological processes and materials science. Show evidence of some abilities to apply and integrate knowledge and theory relating to the basic foundation knowledge of inorganic 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 inorganic chemistry. Demonstrate moderately effective basic laboratory skills and techniques, especially in the synthesis and characterization of inorganic compounds and metal complexes.</p> <p>D Demonstrate partial but limited command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the basic foundation knowledge of inorganic chemistry, especially those related to acid-base concept; structure and bonding of main group compounds and metal complexes; electronic absorption spectroscopy, magnetic properties as well as thermodynamic and kinetic aspects of metal complexes and their reactions; and their relevance to biological processes and materials science. Show evidence of limited abilities to apply and integrate knowledge and theory relating to the basic foundation knowledge of inorganic 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 inorganic chemistry. Demonstrate partially effective basic laboratory skills and techniques, especially in the synthesis and characterization of inorganic compounds and metal complexes.</p> <p>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 inorganic chemistry, especially those related to acid-base concept; structure and bonding of main group compounds and metal complexes; electronic absorption spectroscopy, magnetic properties as well as thermodynamic and kinetic aspects of metal complexes and their reactions; and their relevance to biological processes and materials science. Show little or no evidence of abilities to apply and integrate knowledge and theory relating to the basic foundation knowledge of inorganic 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 inorganic chemistry. Demonstrate minimally effective basic laboratory skills and techniques, especially in the synthesis and characterization of inorganic compounds and metal complexes.</p>																				
Course Type	Lecture with laboratory component course																				
Course Teaching & Learning Activities	<table border="1"> <thead> <tr> <th data-bbox="373 1014 906 1045">Activities</th> <th data-bbox="906 1014 1214 1045">Details</th> <th data-bbox="1214 1014 1388 1045">No. of Hours</th> </tr> </thead> <tbody> <tr> <td data-bbox="373 1056 906 1087">Laboratory</td> <td data-bbox="906 1056 1214 1087"></td> <td data-bbox="1214 1056 1388 1087">24</td> </tr> <tr> <td data-bbox="373 1098 906 1129">Lectures</td> <td data-bbox="906 1098 1214 1129"></td> <td data-bbox="1214 1098 1388 1129">24</td> </tr> <tr> <td data-bbox="373 1140 906 1171">Tutorials</td> <td data-bbox="906 1140 1214 1171"></td> <td data-bbox="1214 1140 1388 1171">6</td> </tr> <tr> <td data-bbox="373 1182 906 1203">Reading / Self study</td> <td data-bbox="906 1182 1214 1203"></td> <td data-bbox="1214 1182 1388 1203">100</td> </tr> </tbody> </table>	Activities	Details	No. of Hours	Laboratory		24	Lectures		24	Tutorials		6	Reading / Self study		100					
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Required/recommended reading and online materials	F. A. Cotton ; G. Wilkinson ; P. L. Gaus : Basic Inorganic Chemistry (John Wiley & Sons, 1995, 3rd ed.) P. Atkins, T. Overton, J. Rourke, M. Weller and F. Armstrong: Shriver & Atkins Inorganic Chemistry (Oxford University Press, 2006, 4th ed.)																				
Course Website	NIL																				
Additional Course Information	Laboratory classes are mandatory. Students must complete ALL experiments and laboratory reports to pass this course.																				