

Enquiry for Course Details

CHEM2341 Inorganic chemistry I (6 credits)		Academic Year	2022
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	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) 2018 Major in Chemistry (Core/Compulsory) 2018 Major in Chemistry (Intensive) (Core/Compulsory) 2018 Minor in Chemistry (Disciplinary Elective)		
Course to PLO Mapping	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 > 2018 Major in Chemistry < PLO 2,3,4 > 2018 Major in Chemistry (Intensive) < PLO 2,3,4 >		
Offer in 2022 - 2023	Y	1st sem	2nd sem
		Examination	Dec May
Offer in 2023 - 2024	Y		
Course Grade	A+ to F		

Grade Descriptors	<table border="1"> <tr> <td data-bbox="394 80 491 277">A</td> <td data-bbox="491 80 1495 277">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.</td> </tr> <tr> <td data-bbox="394 277 491 452">B</td> <td data-bbox="491 277 1495 452">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.</td> </tr> <tr> <td data-bbox="394 452 491 627">C</td> <td data-bbox="491 452 1495 627">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.</td> </tr> <tr> <td data-bbox="394 627 491 824">D</td> <td data-bbox="491 627 1495 824">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.</td> </tr> <tr> <td data-bbox="394 824 491 1025">Fail</td> <td data-bbox="491 824 1495 1025">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.</td> </tr> </table>	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.	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.	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.	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.	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.										
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.																				
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.																				
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.																				
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.																				
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.																				
Course Type	Lecture with laboratory component course																				
Course Teaching & Learning Activities	<table border="1"> <thead> <tr> <th data-bbox="394 1079 967 1115">Activities</th> <th data-bbox="967 1079 1295 1115">Details</th> <th data-bbox="1295 1079 1495 1115">No. of Hours</th> </tr> </thead> <tbody> <tr> <td data-bbox="394 1115 967 1151">Laboratory</td> <td data-bbox="967 1115 1295 1151"></td> <td data-bbox="1295 1115 1495 1151">24</td> </tr> <tr> <td data-bbox="394 1151 967 1187">Lectures</td> <td data-bbox="967 1151 1295 1187"></td> <td data-bbox="1295 1151 1495 1187">24</td> </tr> <tr> <td data-bbox="394 1187 967 1223">Tutorials</td> <td data-bbox="967 1187 1295 1223"></td> <td data-bbox="1295 1187 1495 1223">6</td> </tr> <tr> <td data-bbox="394 1223 967 1258">Reading / Self study</td> <td data-bbox="967 1223 1295 1258"></td> <td data-bbox="1295 1223 1495 1258">100</td> </tr> </tbody> </table>	Activities	Details	No. of Hours	Laboratory		24	Lectures		24	Tutorials		6	Reading / Self study		100					
Activities	Details	No. of Hours																			
Laboratory		24																			
Lectures		24																			
Tutorials		6																			
Reading / Self study		100																			
Assessment Methods and Weighting	<table border="1"> <thead> <tr> <th data-bbox="394 1292 647 1328">Methods</th> <th data-bbox="647 1292 976 1328">Details</th> <th data-bbox="976 1292 1174 1328">Weighting in final course grade (%)</th> <th data-bbox="1174 1292 1495 1328">Assessment Methods to CLO Mapping</th> </tr> </thead> <tbody> <tr> <td data-bbox="394 1328 647 1386">Assignments</td> <td data-bbox="647 1328 976 1386"></td> <td data-bbox="976 1328 1174 1386">15</td> <td data-bbox="1174 1328 1495 1386">CLO 1,2,3,4,5</td> </tr> <tr> <td data-bbox="394 1386 647 1422">Examination</td> <td data-bbox="647 1386 976 1422"></td> <td data-bbox="976 1386 1174 1422">50</td> <td data-bbox="1174 1386 1495 1422">CLO 1,2,3,4,5</td> </tr> <tr> <td data-bbox="394 1422 647 1458">Laboratory reports</td> <td data-bbox="647 1422 976 1458"></td> <td data-bbox="976 1422 1174 1458">15</td> <td data-bbox="1174 1422 1495 1458">CLO 1,2,3,4,5</td> </tr> <tr> <td data-bbox="394 1458 647 1494">Test</td> <td data-bbox="647 1458 976 1494"></td> <td data-bbox="976 1458 1174 1494">20</td> <td data-bbox="1174 1458 1495 1494">CLO 1,2,3,4,5</td> </tr> </tbody> </table>	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	Assignments		15	CLO 1,2,3,4,5	Examination		50	CLO 1,2,3,4,5	Laboratory reports		15	CLO 1,2,3,4,5	Test		20	CLO 1,2,3,4,5
Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping																		
Assignments		15	CLO 1,2,3,4,5																		
Examination		50	CLO 1,2,3,4,5																		
Laboratory reports		15	CLO 1,2,3,4,5																		
Test		20	CLO 1,2,3,4,5																		
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.																				