

Enquiry for Course Details

CHEM4148 Frontiers in Modern Chemical Science (6 credits)		Academic Year	2021
Offering Department	Chemistry	Quota	60
Course Co-ordinator	Prof X D Li, Chemistry < xiangli@hku.hk >		
Teachers Involved	(Dr J Y Tang, Chemistry) (Prof X D Li, Chemistry)		
Course Objectives	Modern chemistry is thought to be the "central science" as it plays a critical role in related biological, physical, medical, and engineering disciplines. This course aims to introduce students to the newest concepts and technological breakthroughs in chemical sciences. Throughout the course, students will be introduced to how the interplay among molecules, materials, and interfaces leads to unprecedented functionalities that contribute to innovations in biology and medicine, smart materials, and sustainable energy schemes.		
Course Contents & Topics	Current topics focus on the interdisciplinary area of chemistry with biology, and material sciences. Covered topics include chemical genetics, epigenetics and proteomics; chemical biology for drug discovery and development; stimuli-responsive nanomaterials; autonomous macromolecular motion; future power landscape; renewable energy conversion and utilization. Examples in protein posttranslational modifications, active colloidal, thermoelectric materials, molecular machines, advanced rechargeable batteries, and next-generation fuel cells and electrolyzers will be discussed.		
Course Learning Outcomes	On successful completion of this course, students should be able to:		
	CLO 1	understand important principles and topical trends in chemical sciences	
	CLO 2	demonstrate understanding of future directions in biomedical chemistry, nanomaterials, and energy sciences and applying this knowledge in comparing and contrasting various emergent technologies	
	CLO 3	interpret and analyse recent published research data in the field of chemistry and extract relevant chemical information to explain the observed properties and phenomena associated to the chemical systems	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in CHEM3341 and CHEM3441.		
Course Status with Related Major/Minor /Professional Core	2021 Major in Chemistry (Disciplinary Elective) 2021 Major in Chemistry (Intensive) (Disciplinary Elective) 2021 Minor in Chemistry (Disciplinary Elective) 2020 Major in Chemistry (Disciplinary Elective) 2020 Major in Chemistry (Intensive) (Disciplinary Elective) 2020 Minor in Chemistry (Disciplinary Elective) 2019 Major in Chemistry (Disciplinary Elective) 2019 Major in Chemistry (Intensive) (Disciplinary Elective) 2019 Minor in Chemistry (Disciplinary Elective) 2018 Major in Chemistry (Disciplinary Elective) 2018 Major in Chemistry (Intensive) (Disciplinary Elective) 2018 Minor in Chemistry (Disciplinary Elective) 2017 Major in Chemistry (Disciplinary Elective) 2017 Major in Chemistry (Intensive) (Disciplinary Elective) 2017 Minor in Chemistry (Disciplinary Elective)		
Course to PLO Mapping	2021 Major in Chemistry < PLO 1,2,3,5 > 2021 Major in Chemistry (Intensive) < PLO 1,2,3,5 > 2020 Major in Chemistry < PLO 1,2,3,5 > 2020 Major in Chemistry (Intensive) < PLO 1,2,3,5 > 2019 Major in Chemistry < PLO 1,2,3,5 > 2019 Major in Chemistry (Intensive) < PLO 1,2,3,5 > 2018 Major in Chemistry < PLO 1,2,3,5 > 2018 Major in Chemistry (Intensive) < PLO 1,2,3,5 > 2017 Major in Chemistry < PLO 1,2,3,5 > 2017 Major in Chemistry (Intensive) < PLO 1,2,3,5 >		
Offer in 2021 - 2022	Y	2nd sem	Examination May
Offer in 2022 - 2023	Y		
Course Grade	A+ to F		

Grade Descriptors	A	Demonstrate thorough knowledge and understanding of essential facts, concepts and principles in chemical sciences, especially those relating to biomedical chemistry, nanomaterials, and energy sciences. Show strong ability to apply and integrate knowledge in chemical sciences in explaining the formation and properties of chemical species and in designing different chemical systems. Show strong ability to analyse and interpret experimental data to draw appropriate conclusions relating to the advanced principles and properties of chemical systems.		
	B	Demonstrate substantial knowledge and understanding of essential facts, concepts and principles in chemical sciences, especially those relating to biomedical chemistry, nanomaterials, and energy sciences. Show evidence to apply and integrate knowledge in chemical sciences in explaining the formation and properties of chemical species and in designing different chemical systems. Show evidence to analyse and interpret experimental data to draw appropriate conclusions relating to the advanced principles and properties of chemical systems.		
	C	Demonstrate general but incomplete amount of knowledge and understanding of essential facts, concepts and principles in chemical sciences, especially those relating to biomedical chemistry, nanomaterials, and energy sciences. Show some ability to apply and integrate knowledge in chemical sciences in explaining the formation and properties of chemical species and in designing different chemical systems. Show some ability to analyse and interpret experimental data to draw appropriate conclusions relating to the advanced principles and properties of chemical systems.		
	D	Demonstrate partial but incomplete command of knowledge and understanding of essential facts, concepts and principles in chemical sciences, especially those relating to biomedical chemistry, nanomaterials, and energy sciences. Show evidence of limited ability to apply and integrate knowledge in chemical sciences in explaining the formation and properties of chemical species and in designing different chemical systems. Show evidence of limited ability to analyse and interpret experimental data to draw appropriate conclusions relating to the advanced principles and properties of chemical systems.		
	Fail	Demonstrate little or no evidence of command of knowledge and understanding of essential facts, concepts and principles in chemical sciences, especially those relating to biomedical chemistry, nanomaterials, and energy sciences. Show little or no ability to apply and integrate knowledge in chemical sciences in explaining the formation and properties of chemical species and in designing different chemical systems. Show little or no ability to analyse and interpret experimental data to draw appropriate conclusions relating to the advanced principles and properties of chemical systems.		
Course Type	Lecture-based course			
Course Teaching & Learning Activities	Activities	Details	No. of Hours	
	Lectures		36	
	Tutorials		12	
	Reading / Self study		100	
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments	(20% Tests/Assignments; 5% participation)	25	CLO 1,2,3
	Examination		40	CLO 1,2,3
	Presentation		35	CLO 1,2,3
Required/recommended reading and online materials	References to specialized texts and other published materials will be made throughout the course.			
Course Website				
Additional Course Information	This course is also offered to RPg students, and the course code for RPg students is CHEM6118.			