

Enquiry for Course Details

CHEM3445 Integrated laboratory (6 credits)		Academic Year	2023
Offering Department	Chemistry	Quota	20
Course Co-ordinator	Dr A M Y Yuen, Chemistry < maiyan@hku.hk >		
Teachers Involved	(Dr A M Y Yuen, Chemistry) (Dr J He, Chemistry)		
Course Objectives	This course aims to provide students with experience using techniques employed in synthetic organic and organometallic chemistry. This advanced synthesis course covering a variety of synthetic methods, including vacuum and inert atmosphere techniques to prepare organic and organometallic compounds; methods for separation of mixtures and isolation of products by use of column and thin-layer chromatography, sublimation and extraction techniques. Experiments on characterization and identification by chemical and spectroscopic methods form an important part of the course. The use of the chemical literature in molecular design and synthesis planning is also included.		
Course Contents & Topics	The course will include the following laboratory skills and practices: laboratory safety practice; molecular design, synthesis planning, experimental set up, purification, and characterization of organic compounds using modern instrumentation techniques.		
Course Learning Outcomes	On successful completion of this course, students should be able to:		
	CLO 1	Demonstrate a good practice of laboratory safety and exercise proper procedures for safe handling and usage of chemicals	
	CLO 2	Demonstrate proficiency in synthetic chemical laboratory techniques	
	CLO 3	Apply modern instrumentation techniques to characterize organic compounds and draw conclusions from the results	
	CLO 4	Analyze the influence of chemical structure on the physical and chemical properties of organic molecules	
	CLO 5	Demonstrate problem-solving skills, critical thinking and analytical reasoning	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in CHEM3443 or already enrolled in this course		
Course Status with Related Major/Minor /Professional Core	2023 Major in Chemistry (Intensive) (Core/Compulsory) 2023 Minor in Chemistry (Disciplinary Elective) 2022 Major in Chemistry (Intensive) (Core/Compulsory) 2022 Minor in Chemistry (Disciplinary Elective) 2021 Major in Chemistry (Intensive) (Core/Compulsory) 2021 Minor in Chemistry (Disciplinary Elective) 2020 Major in Chemistry (Intensive) (Core/Compulsory) 2020 Minor in Chemistry (Disciplinary Elective) 2019 Major in Chemistry (Intensive) (Core/Compulsory) 2019 Minor in Chemistry (Disciplinary Elective)		
Course to PLO Mapping	2023 Major in Chemistry (Intensive) < PLO 1,3,4,5 > 2022 Major in Chemistry (Intensive) < PLO 1,3,4,5 > 2021 Major in Chemistry (Intensive) < PLO 1,3,4,5 > 2020 Major in Chemistry (Intensive) < PLO 1,3,4,5 > 2019 Major in Chemistry (Intensive) < PLO 1,3,4,5 >		
Offer in 2023 - 2024	Y Summer	Examination	No Exam
Offer in 2024 - 2025	Y		
Course Grade	A+ to F		
Grade Descriptors	A	Demonstrate extensive knowledge and thorough command of concepts and principles which are required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Competently conduct experiment with efficient lab skills and techniques. Critically appraise data to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills.	
	B	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show substantial grasp and mastery of the subject knowledge. Demonstrate evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Show effective lab skills and techniques and critical analysis of experimental data. Apply effective organizational and presentational skills.	
	C	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show general but incomplete grasp of the subject knowledge. Demonstrate evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Show moderately effective lab skills and techniques. Demonstrated some ability to analyze experimental data critically. Apply moderately effective organizational and presentational skills.	
	D	Demonstrate partial but limited command of knowledge and skills required for attaining course learning outcomes. Ability to recall some of factual information of the subject. Show a partial comprehension of basic concepts and principles and weak ability to apply them. Demonstrate evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Demonstrate partially effective lab skills and techniques. Apply limited or barely effective organizational and presentational skills.	
	Fail	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Show evidence of little or no grasp of the knowledge and understanding of the subject. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Demonstrate minimally effective or ineffective lab skills and techniques. Organization and presentational skills are minimally effective or ineffective.	
Course Type	Lecture with laboratory component course		

Course Teaching & Learning Activities	Activities		Details	No. of Hours
	Laboratory			48
	Tutorials			12
	Reading / Self study			100
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Laboratory reports	(Practical Examination 25%; Lab report 10%; Lab performance 10%)	45	CLO 1,2,3,4,5
	Presentation		20	CLO 3,4,5
	Test	(test/quiz)	35	CLO 1,2,3,4,5
Required/recommended reading and online materials	John W. Lehman: Operational Organic Chemistry - A Problem-Solving Approach to the Laboratory Course (Pearson, latest edition)			
Course Website				
Additional Course Information	Laboratory classes are mandatory. Students must complete ALL experiments and laboratory reports to pass this course.			