

Enquiry for Course Details

CHEM3241 Analytical chemistry II: chemical instrumentation (6 credits)	Academic Year	2020
Offering Department	Chemistry	Quota
Course Co-ordinator	Dr W T Chan, Chemistry < wtchan@hku.hk >	
Teachers Involved	(Dr I K Chu, Chemistry) (Dr W T Chan, Chemistry)	
Course Objectives	To cover the basic principles and applications of chemical instrumentation. This course aims to provide working knowledge, in addition to the principles, of instruments that are commonly used in chemical laboratories.	
Course Contents & Topics	Optical methods: Beer's Law; UV-visible, infrared, and atomic spectrometry; fluorescence; atomic mass spectrometry; grating spectrometer; photon detectors and thermal detectors. Separation methods: partition; chromatography theories; high performance liquid chromatography (HPLC) and gas chromatography (GC); instrumental set up of HPLC and GC. Mass spectrometry: fundamental concept of mass spectrometry; electrospray ionization (ESI) and matrix-assisted laser desorption ionization (MALDI); time-of-flight (TOF) and quadrupole (Q) mass analyzers.	
Course Learning Outcomes	On successful completion of this course, students should be able to:	
	CLO 1	explain the principles of the optical methods, separation methods, and mass spectrometry
	CLO 2	describe the basic experimental set up and the properties of the basic components of the instruments used in the laboratory classes
	CLO 3	apply experimental skills in chemical analysis including sample preparation, standard solution preparation, instrument calibration, and matrix effects correction (standard additions)
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in CHEM2241	
Course Status with Related Major/Minor /Professional Core	2020 Major in Chemistry (Core/Compulsory) 2020 Major in Chemistry (Intensive) (Core/Compulsory) 2020 Major in Environmental Science (Disciplinary Elective) 2020 Minor in Chemistry (Disciplinary Elective) 2020 Minor in Environmental Science (Disciplinary Elective) 2019 Major in Chemistry (Core/Compulsory) 2019 Major in Chemistry (Intensive) (Core/Compulsory) 2019 Major in Environmental Science (Disciplinary Elective) 2019 Minor in Chemistry (Disciplinary Elective) 2019 Minor in Environmental Science (Disciplinary Elective) 2018 Major in Chemistry (Core/Compulsory) 2018 Major in Chemistry (Intensive) (Core/Compulsory) 2018 Major in Environmental Science (Disciplinary Elective) 2018 Minor in Chemistry (Disciplinary Elective) 2018 Minor in Environmental Science (Disciplinary Elective) 2017 Major in Chemistry (Core/Compulsory) 2017 Major in Chemistry (Intensive) (Core/Compulsory) 2017 Major in Environmental Science (Disciplinary Elective) 2017 Minor in Chemistry (Disciplinary Elective) 2017 Minor in Environmental Science (Disciplinary Elective) 2016 Major in Chemistry (Core/Compulsory) 2016 Major in Chemistry (Intensive) (Core/Compulsory) 2016 Major in Environmental Science (Disciplinary Elective) 2016 Minor in Chemistry (Disciplinary Elective) 2016 Minor in Environmental Science (Disciplinary Elective)	
Course to PLO Mapping	2020 Major in Chemistry < PLO 2,3,4,5 > 2020 Major in Chemistry (Intensive) < PLO 2,3,4,5 > 2020 Major in Environmental Science < PLO 2,3,4 > 2019 Major in Chemistry < PLO 2,3,4,5 > 2019 Major in Chemistry (Intensive) < PLO 2,3,4,5 > 2019 Major in Environmental Science < PLO 2,3,4 > 2018 Major in Chemistry < PLO 2,3,4,5 > 2018 Major in Chemistry (Intensive) < PLO 2,3,4,5 > 2018 Major in Environmental Science < PLO 2,3,4 > 2017 Major in Chemistry < PLO 2,3,4,5 > 2017 Major in Chemistry (Intensive) < PLO 2,3,4,5 > 2017 Major in Environmental Science < PLO 2,3,4 > 2016 Major in Chemistry < PLO 2,3,4,5 > 2016 Major in Chemistry (Intensive) < PLO 2,3,4,5 > 2016 Major in Environmental Science < PLO 2,3,4 >	

Offer in 2020 - 2021	Y	1st sem	Examination	Dec																				
Offer in 2021 - 2022	Y																							
Course Grade	A+ to F																							
Grade Descriptors	<table border="1"> <tr> <td>A</td> <td colspan="3">- Demonstrate thorough grasp of the subject. - Show evidence of strong analytical abilities, logical and independent thinking, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. - Demonstrate highly proficient lab skills and techniques and critical use of data and results to draw appropriate and insightful conclusions. - Demonstrate highly effective organization and presentation skills</td> </tr> <tr> <td>B</td> <td colspan="3">- Demonstrate substantial grasp of the subject. - Show evidence of analytical abilities and logical thinking, some evidence of independent thinking, and ability to apply knowledge to familiar and some unfamiliar situations. - Demonstrate proficient lab skills and techniques and correct use of data and results to draw appropriate conclusions. - Demonstrate effective organization and presentation skills.</td> </tr> <tr> <td>C</td> <td colspan="3">- Demonstrate general but incomplete grasp of the subject. - Show evidence of some analytical abilities and logical thinking, little evidence of independent thinking, and ability to apply knowledge to most familiar situations. - Demonstrate adequate lab skills and techniques and mostly correct but some erroneous use of data and results to draw appropriate conclusions. - Demonstrate moderately effective organization and presentation skills.</td> </tr> <tr> <td>D</td> <td colspan="3">- Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. - Show evidence of limited analytical abilities, little or no evidence of independent thinking, and limited ability to apply knowledge to solve problems. - Demonstrate partially effective lab skills and techniques and limited ability to use data and results to draw appropriate conclusions. - Demonstrate limited or barely effective organization and presentation skills.</td> </tr> <tr> <td>Fail</td> <td colspan="3">- Demonstrate little or no grasp of the knowledge and understanding of the subject. - Show little or no evidence of analytical abilities, logical and independent thinking, and very little or no ability to apply knowledge to solve problems. - Demonstrate minimally effective or ineffective lab skills and techniques and misuse of data and results and/or unable to draw appropriate conclusions. - Demonstrate incoherent organization and poor presentation skills.</td> </tr> </table>				A	- Demonstrate thorough grasp of the subject. - Show evidence of strong analytical abilities, logical and independent thinking, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. - Demonstrate highly proficient lab skills and techniques and critical use of data and results to draw appropriate and insightful conclusions. - Demonstrate highly effective organization and presentation skills			B	- Demonstrate substantial grasp of the subject. - Show evidence of analytical abilities and logical thinking, some evidence of independent thinking, and ability to apply knowledge to familiar and some unfamiliar situations. - Demonstrate proficient lab skills and techniques and correct use of data and results to draw appropriate conclusions. - Demonstrate effective organization and presentation skills.			C	- Demonstrate general but incomplete grasp of the subject. - Show evidence of some analytical abilities and logical thinking, little evidence of independent thinking, and ability to apply knowledge to most familiar situations. - Demonstrate adequate lab skills and techniques and mostly correct but some erroneous use of data and results to draw appropriate conclusions. - Demonstrate moderately effective organization and presentation skills.			D	- Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. - Show evidence of limited analytical abilities, little or no evidence of independent thinking, and limited ability to apply knowledge to solve problems. - Demonstrate partially effective lab skills and techniques and limited ability to use data and results to draw appropriate conclusions. - Demonstrate limited or barely effective organization and presentation skills.			Fail	- Demonstrate little or no grasp of the knowledge and understanding of the subject. - Show little or no evidence of analytical abilities, logical and independent thinking, and very little or no ability to apply knowledge to solve problems. - Demonstrate minimally effective or ineffective lab skills and techniques and misuse of data and results and/or unable to draw appropriate conclusions. - Demonstrate incoherent organization and poor presentation skills.		
A	- Demonstrate thorough grasp of the subject. - Show evidence of strong analytical abilities, logical and independent thinking, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. - Demonstrate highly proficient lab skills and techniques and critical use of data and results to draw appropriate and insightful conclusions. - Demonstrate highly effective organization and presentation skills																							
B	- Demonstrate substantial grasp of the subject. - Show evidence of analytical abilities and logical thinking, some evidence of independent thinking, and ability to apply knowledge to familiar and some unfamiliar situations. - Demonstrate proficient lab skills and techniques and correct use of data and results to draw appropriate conclusions. - Demonstrate effective organization and presentation skills.																							
C	- Demonstrate general but incomplete grasp of the subject. - Show evidence of some analytical abilities and logical thinking, little evidence of independent thinking, and ability to apply knowledge to most familiar situations. - Demonstrate adequate lab skills and techniques and mostly correct but some erroneous use of data and results to draw appropriate conclusions. - Demonstrate moderately effective organization and presentation skills.																							
D	- Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. - Show evidence of limited analytical abilities, little or no evidence of independent thinking, and limited ability to apply knowledge to solve problems. - Demonstrate partially effective lab skills and techniques and limited ability to use data and results to draw appropriate conclusions. - Demonstrate limited or barely effective organization and presentation skills.																							
Fail	- Demonstrate little or no grasp of the knowledge and understanding of the subject. - Show little or no evidence of analytical abilities, logical and independent thinking, and very little or no ability to apply knowledge to solve problems. - Demonstrate minimally effective or ineffective lab skills and techniques and misuse of data and results and/or unable to draw appropriate conclusions. - Demonstrate incoherent organization and poor presentation skills.																							
Course Type	Lecture with laboratory component course																							
Course Teaching & Learning Activities	Activities		Details	No. of Hours																				
	Laboratory			28																				
	Lectures			24																				
	Tutorials			6																				
	Reading / Self study			100																				
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping																				
	Examination		60	CLO 1,2,3																				
	Laboratory reports	including an oral examination	25	CLO 1,2,3																				
	Test		15	CLO 1,2,3																				
Required/recommended reading and online materials	D.A. Skoog, F.K. Holler, S.R. Crouch: Principles of Instrumental Analysis (Thomson, latest edition). D.A. Skoog, D.M. West, F.J. Holler, and S.R. Crouch: Fundamentals of Analytical Chemistry (Thomson, latest edition)																							
Course Website	NIL																							
Additional Course Information	Laboratory classes are mandatory. Students must complete ALL experiments and laboratory reports to pass this course.																							

← Back / 🏠 Home