

Enquiry for Course Details

| | | | |
|---|---|--|-----------------|
| CHEM3241 Analytical chemistry II: chemical instrumentation (6 credits) | | Academic Year | 2021 |
| Offering Department | Chemistry | Quota | 104 |
| Course Co-ordinator | Dr Y Li, Chemistry < yingli0e@hku.hk > | | |
| Teachers Involved | (Dr I K Chu, Chemistry) (Dr Y Li, 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 | 2021 Major in Chemistry (Core/Compulsory) 2021 Major in Chemistry (Intensive) (Core/Compulsory) 2021 Major in Environmental Science (Disciplinary Elective) 2021 Minor in Chemistry (Disciplinary Elective) 2021 Minor in Environmental Science (Disciplinary Elective) 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) | | |
| Course to PLO Mapping | 2021 Major in Chemistry < PLO 2,3,4,5 > 2021 Major in Chemistry (Intensive) < PLO 2,3,4,5 > 2021 Major in Environmental Science < PLO 2,3,4 > 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 > | | |
| Offer in 2021 - 2022 | Y | 1st sem | Examination Dec |
| Offer in 2022 - 2023 | Y | | |
| Course Grade | A+ to F | | |

| | | | | |
|---|---|--|--|--|
| Grade Descriptors | 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. | | | |