

## Enquiry for Course Details

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|---|---|--|-----------------|
| <b>CHEM4242 Analytical chemistry (6 credits)</b>                  |   | Academic Year  | 2023            |
| Offering Department   | Chemistry   | Quota  | 50              |
| Course Co-ordinator   | Dr H B Jiang, Chemistry < hbjiang@hku.hk >  |  |                 |
| Teachers Involved   | (Dr H B Jiang, Chemistry)   |  |                 |
| Course Objectives   | This course focuses on the basic principle, practice and methodology in chemical and biochemical analysis. The course emphasizes on the integration of analytical concepts and technologies to solve practical analytical and bioanalytical problems. This course will be particularly useful for students who plan to pursue their career related to analytical and bioanalytical chemistry.   |  |                 |
| Course Contents & Topics  | Sample preparation and enrichment techniques for biomedical, pharmaceutical and forensic chemical analysis; Theoretical background and practical techniques of biological sample analysis;<br><br>Advanced instrumental techniques and analytical methods; Recent developments in microscopy and imaging techniques; Introduction to spatial omics technologies.  |  |                 |
| Course Learning Outcomes  | On successful completion of this course, students should be able to:  |  |                 |
|   | CLO 1   | apply statistical methods to assess analytical measurement data quality and interpret their significance, validate analytical methods and results  |                 |
|   | CLO 2   | demonstrate understanding on the working principle of different analytical techniques and recognize their advantages and limitations   |                 |
|   | CLO 3   | integrate different analytical techniques to solve analytical and bioanalytical problems   |                 |
| Pre-requisites (and Co-requisites and Impermissible combinations) | Pass in CHEM3241 or CHEM3242  |  |                 |
| Course Status with Related Major/Minor /Professional Core         | 2023 Major in Chemistry ( Disciplinary Elective )<br>2023 Major in Chemistry (Intensive) ( Disciplinary Elective )<br>2023 Minor in Chemistry ( Disciplinary Elective )<br>2022 Major in Chemistry ( Disciplinary Elective )<br>2022 Major in Chemistry (Intensive) ( Disciplinary Elective )<br>2022 Minor in Chemistry ( Disciplinary Elective )<br>2021 Major in Chemistry ( Disciplinary Elective )<br>2021 Major in Chemistry (Intensive) ( Disciplinary Elective )<br>2021 Minor in Chemistry ( Disciplinary Elective )<br>2020 Major in Chemistry ( Disciplinary Elective )<br>2020 Major in Chemistry (Intensive) ( Disciplinary Elective )<br>2020 Minor in Chemistry ( Disciplinary Elective )<br>2019 Major in Chemistry ( Disciplinary Elective )<br>2019 Major in Chemistry (Intensive) ( Disciplinary Elective )<br>2019 Minor in Chemistry ( Disciplinary Elective ) |  |                 |
| Course to PLO Mapping   | 2023 Major in Chemistry < PLO 2,3,4,5 ><br>2023 Major in Chemistry (Intensive) < PLO 2,3,4,5 ><br>2022 Major in Chemistry < PLO 2,3,4,5 ><br>2022 Major in Chemistry (Intensive) < PLO 2,3,4,5 ><br>2021 Major in Chemistry < PLO 2,3,4,5 ><br>2021 Major in Chemistry (Intensive) < PLO 2,3,4,5 ><br>2020 Major in Chemistry < PLO 2,3,4,5 ><br>2020 Major in Chemistry (Intensive) < PLO 2,3,4,5 ><br>2019 Major in Chemistry < PLO 2,3,4,5 ><br>2019 Major in Chemistry (Intensive) < PLO 2,3,4,5 >  |  |                 |
| Offer in 2023 - 2024  | Y   | 2nd sem  | Examination May |
| Offer in 2024 - 2025  | Y   |  |                 |
| Course Grade  | A+ to F   |  |                 |
| Grade Descriptors   | A   | Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities, logical thinking and capability to apply knowledge learnt to solve a wide range of complex issues and problems related to chemical analysis. Apply highly effective organization and presentation skills as shown in class work.                             |                 |
|   | B   | Demonstrate a substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities, logical thinking, and capability to apply knowledge learnt to solve a wide range of complex issues and problems related to chemical analysis. Apply effective organization and presentation skills as shown in class work.                          |                 |
|   | C   | Demonstrate a general command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of analytical and critical abilities, logical thinking, and ability to apply knowledge learnt to solve a wide range of complex issues and problems related to chemical analysis. Apply effective organization and presentation skills as shown in class work.   |                 |
|   | D   | Demonstrate a partial but limited command of knowledge and skills required for attaining some of the course learning outcomes in Food and Water Analysis. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems related to chemical analysis. Apply limited or barely effective organization and presentation skill as shown in class work. |                 |
|   | Fail  | Demonstrate little or no evidence for the command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems related to chemical analysis. Organization and presentation skills are minimally effective or ineffective as shown in class work.   |                 |

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| <b>Course Type</b>                                       | Lecture with laboratory component course   |                           |  |  |
| <b>Course Teaching &amp; Learning Activities</b>         | <b>Activities</b>  | <b>Details</b>            | <b>No. of Hours</b>                        |  |
|  | Laboratory   |                           | 24   |  |
|  | Lectures   |                           | 24   |  |
|  | Tutorials  |                           | 6  |  |
|  | Reading / Self study   |                           | 100  |  |
| <b>Assessment Methods and Weighting</b>                  | <b>Methods</b>   | <b>Details</b>            | <b>Weighting in final course grade (%)</b> | <b>Assessment Methods to CLO Mapping</b> |
|  | Assignments  |                           | 20   | CLO 1,2,3                                |
|  | Examination  |                           | 50   | CLO 1,2,3                                |
|  | Laboratory reports   | (experiment & lab report) | 15   | CLO 1,2                                  |
|  | Presentation   |                           | 15   | CLO 1,2,3                                |
| <b>Required/recommended reading and online materials</b> | D.A. Skoog, D.M. West, F.J. Holler, S.R. Crouch: Fundamentals of Analytical Chemistry (Cengage Learning, latest edition)<br>A. Manz, P. S. Dittrich, N. Pamme, D. Iossifidis: Bioanalytical Chemistry (Imperial College Press, latest edition)<br>References to specialist texts and other published materials will be made throughout the course. |                           |  |  |
| <b>Course Website</b>                                    | NIL  |                           |  |  |
| <b>Additional Course Information</b>                     | Laboratory classes are mandatory. Students must complete ALL experiments and laboratory reports to pass this course.   |                           |  |  |