UCL Université catholique de Louvain

# LBIRC2104

*2010-2011*

# Analytical chemistry II

| 5.0 credits | 22.5 h + 30.0 h | 1q |
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| Teacher(s) : | Dupont Christine ; Garcia Yann (coordinator) ; |
| Language : | Français |
| Place of the course | Louvain-la-Neuve |
| Main themes : | The main topics of this course concern electrochemical and spectrochemical analyses, as well as X-ray diffraction methods. For each of the chapters, the theory is described and the important practical steps of these analytical methods are underlined. This course aims to develop professional approach towards the genesis of analytical information (instrumentation, protocols, performances, cautions). |
| Aims : | This course aims to extend the fundamental formation given by 'Analytical Chemistry I' (CHM 1321) to current instrumental analysis methods, particularly spectroscopic and electrochemical analysis methods. The philosophy and strategy given in CHM 1321 are pursued with an excellent presentation of the principle of the techniques, instrumentation and various applications. This course not only provides excellent practice in analytical techniques, but also allows the rigorous development of experimental schemes and analysis methods, relying on physical chemistry and analytical reasoning.<br><br>The practical exercises have been designed to reach various objectives:<br>-To help the understanding of the course<br>- To familiarize the students with the theory-experience relationship<br>- To train the students to a professional practice in a chemistry laboratory which includes the elaboration of analytical protocols, discussion and critics of results and analytical performances (influence of methods, instrumentation and operators)<br>-To develop the students ability to prepare a workplan, to favour team work and encourage them to reflect their work and gain a global overview on analytical methods<br>-To instil in the students a sense of initiative towards practical processes, improve skills and develop creativity<br>*The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".* |
| Content : | Course and seminars: Molecular absorption spectroscopy, atomic spectrometry and voltamperometric methods: equipment, performances and applications. Electrolysis-based analysis methods: analytical applications. Acid-base reactions in non-aqueous media: solvent types and pH calculations. Application of X-ray diffraction and fluorescence.<br><br>Exercises: A series of practical exercises are proposed that cover the following topics:<br>a) Coulometry and voltamperometric techniques<br>b) Titration in non aqueous media<br>c) Development of a measuring protocol for the determination of the enzyme activity that includes the use of colorimetry, the solubilisation of the enzyme and an incubation protocol.<br>d) Proteins titration<br>e) Atomic absorption<br><br>Teaching and learning methods<br><br>The teaching module comprises courses to promote significant interaction with the students, and delivery of seminars devoted to problem solving and the study of practical cases concerning topics independently examined by the students (as a direct extension of previous courses or new subjects). The goal of these seminars is to encourage students' reflection and to stimulate more personal and active learning. Written exercises are proposed to test the understanding of the subject.<br><br>Finding necessary background information, care in preparation of standard solutions and the evaluation and discussion of the quality of results are key factors for the success of the practical exercises. Personal work is strongly encouraged by a critical reading of the reports (scientific and technical plan) and the set up of a work plan to be improved or extended. Estimation of analysis costs is also considered. |

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| Other infos : | Prerequisite:<br>- Analytical chemistry I: CHM 1321.<br>- Seminars and exercises in analytical chemistry I: BIR1320.<br><br>Evaluation:<br>Course: written exam in two parts (without documents and with all documents available).<br>Exercises: continuous evaluation of reports and laboratory notebook. Tests.<br><br>Recommended readings:<br>-Fundamentals of Analytical Chemistry, D. A. Skoog, D. M. West, F. J. Holler, S. R. Crouch, 8th ed., Thomson Brooks/Cole, 2004. ISBN: 0-03-035523-0<br>- Quantitative Chemical Analysis, D. C. Harris, 6th ed., W. H. Freeman & Co., 2003. ISBN 0-7167-4464-3<br>- Course and practical exercises fascicules. |
| Cycle and year of study : | > Master [120] in Chemistry and Bio-industries |
| Faculty or entity in charge: | AGRO |