lchm2120

2021

Analytical Chemistry II and exercises

6.00 credits	30.0 h + 40.0 h	Q1

Teacher(s)	Garcia Yann ;
Language :	English
Place of the course	Louvain-la-Neuve
Main themes	The main topics of this course concern electrochemical and spectrochemical analyses, as well as separation 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). A series of practical exercises, presented in a concise and clear manner, on titrimetric and instrumental methods (electroanalytical, potentiometric, spectroscopic and chromatographic) are proposed. The students should rely on their course and on the available literature in order to correctly select the appropriated reactants and define the relevant operating modes. At the end of these exercises, the students should be able to propose clear analysis schemes that can be applied to samples of average complexity.
Learning outcomes	**At the end of this learning unit, the student is able to :** This course aims to extend the fundamental formation of 'Analytical Chemistry I' (CHM 1321) to current instrumental analysis methods. The philosophy and strategy of this programme are identical to those described in CHM 1321. 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. 1 The objectives of the practical exercises are the following : - To help the understanding of the course - To familiarize the students with the theory-experience relationship - To train the students in a professional practice in a chemistry laboratory - To instil a sense of initiative towards practical processes in the students
Evaluation methods	Oral exam to test the student ability to establish links between chapters and check its capacity to interact in a real chemical analysis situation (10 points). Tests are organised within the year to evaluate the students progression on major items of the class and to check its ability to realize umerical exercices (5 points). Continuous evaluation of practical exercices through quality of results, reports, tests and lab notebook (5 points).
Teaching methods	The teaching module alternates classic or reverse classes to promote significant interactions with the students. The goal is to encourage students' reflection and to stimulate more personal and active learning. Written exercises are proposed to test the understanding of the general topic on Moodle. Researching 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.
Content	**Class** 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. Practical aspects of chromatography in liquid and gas phases. **Exercises** Analysis of samples where application of most of the techniques covered during the course is required. A complete analysis of a 'real' sample is proposed, for which the well-thought-out use of titrimetric and instrumental methods is necessary in order to determine the concentration of several ions of a solution. This process will allow the students: (i) to develop and discuss schemes and analysis methods with rigorous analytical reasoning. (ii) to obtain professional laboratory experience of current techniques.
Inline resources	Moodle

Bibliography	- Skoog and West's Fundamentals of Analytical Chemistry, F. J. Holler, S. R. Crouch, 9th ed., Brooks/Cole, 2014. - Quantitative Chemical Analysis, D. C. Harris, 8th ed., W. H. Freeman & Co., 2010 - Méthodes instrumentales d'analyse chimique et applications, G. Burgot, J. -L. Burgot, 2e ed, Lavoisier, 2006. - Syllabus pour le cours et fascicule pour les exercices pratiques rédigés par votre enseignant. - Pour les exercices pratiques : littérature mise à disposition et recherchée par l'étudiant(e).
Other infos	**Background** : - Analytical chemistry I: CHM 1321. - Exercises of analytical chemistry I: CHM 1322. - Quantitative treatment of chemical data: CHM 1381. **Evaluation** : Course: written and oral exams. Exercises: continuous evaluation of reports and laboratory notebook. **Documents** : - 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 - Quantitative Chemical Analysis, D. C. Harris, 6th ed., W. H. Freeman & Co., 2003. ISBN 0-7167-4464-3 - Course and practical exercises fascicules. - For the practical exercises: literature to be searched or at the student disposal. The course could be partly or totally delivered by an invited lecturer.
Faculty or entity in charge	CHIM

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Chemistry	CHIM2M	6		
Master [60] in Chemistry	CHIM2M1	6		