UCLouvain

lbirc2104

2019

Analytical chemistry II

In view of the health context linked to the spread of the coronavirus, the methods of organisation and evaluation of the learning units could be adapted in different situations; these possible new methods have been - or will be - communicated by the teachers to the students.

5 credits	22.5 h + 30.0 h	Q1

Teacher(s)	Dupont Christine ;Garcia Yann (coordinator) ;
Language :	French
Place of the course	Louvain-la-Neuve
Main themes	Instrumental analysis methods based on electrolysis. UV-VIS-IR Molecular absorption spectroscopy: instruments, performances, applications. Atomic spectroscopy: methods, instruments, performances, applications. Acid-base reactions in non aqueous media. Electromagnetic radiation diffraction: principles, applications.
Aims	a. Contribution of the activity to the AA referencial (AA of the programme) The course contributes to develop and evaluate the learning outcomes listed below from the BIRC21 master programme: 1.1., 1.3, 2.3, 3.4, 3.5, 3.6, 3.7, 3.8, 6.1, 6.2, 6.5, 7.1 b. Specific formulation for this activity of AA from the programme (**maximum 10**) At the end of this activity, the student will be able to: 1 - describe active principles for spectroscopic and electrochemical analyses methods as well as experimental aspects, limitations and related performances; - discuss the medium effect on acid-base reactions; - apply a professional practice to chemistry laboratory for current analyses methods: critics and adaptation of analytical protocols, performances (influence of methods, instrumentation and operators) ; - correlate theory to experiment; - structure and synthetize the information gathered in lab reports of different kind (brief or full reports) ; - apply statistical tools for data treatment ; - propose a reliable work plan to solve an analytical chemistry problem. At the end of the class, the student will have developed personal skills which comprises: laboratory good practices, work planning, team work, creativity and initiative towards practical processes - - - - *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".*
Evaluation methods	**Due to the COVID-19 crisis, the information in this section is particularly likely to change.** The theoretical knowledge is evaluated by a written exam (15 points over 20). Practical knowledge is continuously evaluated (tests, reports, documents) with 5 points over 20.
Teaching methods	**Due to the COVID-19 crisis, the information in this section is particularly likely to change.** The teaching module comprises courses to promote interaction between teachers and students, and 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. For laboratory work, the student undertakes a personal work (concentration evaluation, critical reading of documents). In this respect, 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 laboratory work.
Content	**A. Course and seminars** Electrolysis-based analyses methods: analytical applications, voltamperometry. Molecular absorption spectroscopy: dispersive instruments and FT-IR spectrometers, tuning, performances, applications. Atomic spectroscopy: overview, apparatuses, performances, matrix effects. Acid-base reactions in non-aqueous media: solvent types and pH calculations. Application of X-ray diffraction and fluorescence in analytical chemistry. **B. Exercises and demonstrations** - Data analysis from electrochemical methods - Demonstrations : atomic absorption spectroscopy, X-ray diffraction **C. Laboratory work**

	a) Development of a measuring protocol for the determination of the enzyme activity that includes the use of colorimetry, the solubilization of the enzyme and the incubation protocol. Method: Realization of two measuring cycles; brain storming between two student's pairs. b) Titration in non-aqueous media c) Proteins titration ' comparison of performances from two different methods based on UV-visible spectroscopy.
Inline resources	Moodle
Bibliography	- Supports de cours utiles : syllabus pour le cours et fascicule pour les exercices pratiques Livre de référence : Fundamentals of Analytical Chemistry, D. A. Skoog, D. M. West, F. J. Holler, S. R. Crouch, 8th ed., Thomson Brooks/Cole, 2004. - support de cours facultatif : Quantitative Chemical Analysis, D. C. Harris, 8th ed., W. H. Freeman & Co., 2010
Other infos	A related activity is offered in another UCL programme: LCHM2120 This course can be given in English.
Faculty or entity in charge	AGRO

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Aims
Master [120] in Chemistry and Bioindustries	BIRC2M	5		