UCL Université catholique de Louvain

LBIRC2104

2014-2015

Analytical chemistry II

5.0 credits	22.5 h + 30.0 h	1q

Teacher(s) :	Dupont Christine ; Garcia Yann (coordinator) ;
Language :	Français
Place of the course	Louvain-la-Neuve
Inline resources:	Icampus
Prerequisites :	Analytical chemistry I (LCHM1321)
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: - 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 :	The theoretical knowledge is evaluated by a written exam in two parts: (i) without documents in order to test the validity of learning outcomes (theoretical developments, problems solving). (ii) with all documents available in order to test that the learner is able to establish links between different parts of the course as well as with previous courses. Practical knowledge is continuously evaluated (tests, reports, documents).
Teaching methods :	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.
Bibliography :	- Mandatory reading : Course and practical exercises fascicules Reference book: Fundamentals of Analytical Chemistry, D. A. Skoog, D. M. West, F. J. Holler, S. R. Crouch, 8th ed., Thomson Brooks/ Cole, 2004. - recommended reading: Quantitative Chemical Analysis, D. C. Harris, 8th ed., W. H. Freeman & mp; Co., 2010
Other infos :	A related activity is offered in another UCL programme: LCHM2120
Cycle and year of study :	> Master [120] in Chemistry and Bio-industries
Faculty or entity in charge:	AGRO