

# Chimie analytique

## Lecturers

Jon USTARROZ TROYANO (Coordinator) and Thomas DONEUX

## Course mnemonic

CHIM-F302

## ECTS credits

10 credits

## Language(s) of instruction

French

## Course period

First term

## Campus

Plaine

## Course content

### Theoretical course :

#### 1<sup>st</sup> PART : *Electroanalytical methods*

Electrolyte solutions ; Debye-Huckel theory ; Structure of electrolyte solutions and solvation ; Mass transport in electrolyte solutions ; Conductivity of electrolyte solutions ; Conductimetry, Voltammetry

#### 2<sup>nd</sup> PART : *Spectrochemical methods : surface analysis and elemental analysis*

Introduction to surface analysis ; Electron spectroscopies : X-Ray Photoelectron Spectroscopy (XPS) - Auger Electron Spectroscopy (AES) ; Microscopies : electron microscopies (SEM, TEM) and scanning probe microscopies.

Methods for elemental analysis : X-Ray atomic spectroscopies – X-Ray Fluorescence Spectroscopy (XRF)

### Practical work :

Instrumental analysis – atomic absorption and emission experiments, electrophoresis, gas chromatography and HPLC. Ion selective electrodes, conductimetry and voltammetry.

## Objectives (and/or specific learning outcomes)

Course with the objective of completing the competences on analytical chemistry acquired during BA2.

Objectif of the practical work : Familiarize students with instrumental analysis methods. Evaluate the capabilities and the limits of each method by carrying out dedicated experiments.

## Pre-requisites and co-requisites

### Co-requisites courses

CHIM-F201 | Chimie analytique 1 | 10 crédits and CHIM-F201 | Chimie analytique 1 | 5 crédits

## Teaching method and learning activities

Lectures (Powerpoint presentations + board)

Practical work in the analytical chemistry laboratory

## References, bibliography and recommended reading

D. A. Skoog, F. J. Holler, T. A. Nieman, "*Principles of Instrumental Analysis*", Harcourt Brace & Company, 1998. Traduction chez De Boeck (2003): Principe d'analyse instrumentale.

D.A. Skoog, D.M. West, F.J. Holler S.R. Crouch "*Fundamentals of Analytical Chemistry*", Saunders College Publishing, New York, 8th Ed., 2004 - Traduction C. Buess-Herman, J. Dauchot-Weymeers, "Chimie Analytique", De Boeck Université, 2012.

H. Girault "*Electrochimie physique et analytique*" Presses polytechniques et universitaires romandes -2001.

M Robson Wright "*An introduction to Aqueous Electrolyte Solutions*" Wiley 2007

A.J. Bard, L.R. Faulkner, "*Electrochemical Methods - Fundamentals and Applications*" New York, Wiley, 2001

J.-P. Eberhart "*Analyse structurale et chimique des matériaux*", Dunod

## Course notes

Université virtuelle

## Other information

### Place(s) of teaching

Plaine

### Contact(s)

jon.ustarroz@ulb.be

Plaine BAT. A local A3.126

## Evaluation method(s)

Other

### Evaluation method(s) (additional information)

Oral examination for the theoretical part (lectures).

Evaluation of laboratory work : evaluation of the practical skills during experimental work, reports and understanding of methods by written examination

### Determination of the mark (including the weighting of partial marks)

Final mark : mark oral examination (2/3) + mark practical work (1/3)

### Main language(s) of evaluation

French

## Programmes

Programmes proposing this course at the faculty of Sciences

BA-CHIM | Bachelor in Chemistry | unit 3

