

Molecular structural characterization and analysis

Titulaires

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Mnémonique du cours

CHIM-H407

Crédits ECTS

5 crédits

Langue(s) d'enseignement

Anglais

Période du cours

Deuxième quadrimestre

Campus

Solbosch et Autre campus

Contenu du cours

Introduction

- I. Molecules
- II. Non Covalent Interactions
- III. Importance of Separation Sciences

A. Separation Sciences

- A.I. HPLC instrumentation and hyphenation to detectors
- A.II. Types of Liquid Chromatography
- A.III. Optimization of HPLC separations
- A.IV. Band broadening in LC
- A.V. Kinetic performance limits
- A.VI. Multi-dimensional separations
- A.VII. Chip Technology
- A.VIII. Gas chromatography

B. Molecular Structure Characterization

- B.I. Spectroscopy: general considerations
- B.II. Electronic spectroscopies
- B.III. Vibrational spectroscopies
- B.IV. NMR spectroscopy

Objectifs (et/ou acquis d'apprentissages spécifiques)

The aim of the course is to give you insight into the chromatographic methods available for the isolation and purification of (bio)molecules of industrial importance. In addition, we aim to teach you the fundamentals and application possibilities of different spectroscopic methods available for the determination and characterization of molecular structures.

Pré-requis et co-requis

Connaissances et compétences pré-requis

Basic knowledge in organic chemistry and intermolecular interactions.

Méthodes d'enseignement et activités d'apprentissages

Interactive course with powerpoint presentation.
Seminars and practicals illustrate the theory seen during classes.

Contribution au profil d'enseignement

This teaching unit contributes to the following competences:

- > In-depth knowledge and understanding of exact sciences with the specificity of their application to engineering and bioengineering
- > A creative, problem-solving, result-driven and evidence-based attitude, aiming at innovation and applicability in industry and society
- > The flexibility and adaptability to work in an international and/or intercultural context
- > An integrated insight in (bio)chemical process technology and materials' technology
- > Insight in chemistry as a link between process and materials technology

Références, bibliographie et lectures recommandées

Separation Sciences

www.chromacademy.com

HPLC Columns: Theory, Technology, and Practice; U.D. Neue Wiley-VCH (1997)

Contemporary Instrumental Analysis; K.A. Rubinson and J.F. Rubinson Prentice-Hall (2000)

Molecular Structure Determination

Introduction to Organic Spectroscopy; L.M. Harwood and T.D.W. Claridge

Oxford Chemistry Primers, Oxford Science Publications (1997)

Molecular Spectroscopy; J.M. Brown

Oxford Chemistry Primers, Oxford Science Publications (1998)

Spectrometric Identification of Organic Compounds; R. M. Silverstein, F. X. Webster

John Wiley & Sons Inc (7th edition, 2005 or any other edition)

Understanding NMR Spectroscopy, J. Keeler

Wiley-Blackwell; 2nd Edition (2010)

Support(s) de cours

Podcast et Université virtuelle

Autres renseignements

Lieu(x) d'enseignement

Solbosch et Autre campus

Contact(s)

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Méthode(s) d'évaluation

Examen écrit et Travail de groupe

Méthode(s) d'évaluation (complément)

The exercises and practicals illustrate the content of the courses and are as important as the theory.

Written examination Spectroscopy: students have to elucidate the structure of a molecule on the basis of spectra (IR, UV-Vis, NMR) and to be able to answer to theoretical questions regarding the conditions to record a quantitative spectrum.

Construction de la note (en ce compris, la pondération des notes partielles)

A graded practical will account for 20 % of the final mark. Modalities will be given during class.

A written examination, covering all the material seen during classes and exercise sessions, accounts for the remaining 80% of the final mark.

This grade is the weighted average of two grades, one for each of the teaching units (40% separation science - 60% spectroscopy).

Langue(s) d'évaluation principale(s)

Anglais

Programmes

Programmes proposant ce cours à l'école polytechnique de Bruxelles

MA-IRBC | **Master : bioingénieur en chimie et bioindustries** | finalité Spécialisée/bloc 2 et MA-IRMA | **Master : ingénieur civil en chimie et science des matériaux** | finalité Spécialisée/bloc 1

Programmes proposant ce cours à la faculté des Sciences

MA-IRBC | **Master : bioingénieur en chimie et bioindustries** | finalité Spécialisée/bloc 2