UCLouvain

lchm1254

2020

Elements of molecular spectroscopy

Due to the COVID-19 crisis, the information below is subject to change, in particular that concerning the teaching mode (presential, distance or in a comodal or hybrid format).

4 credits	30.0 h + 20.0 h	Q2

Teacher(s)	Hermans Sophie ;
Language :	French
Place of the course	Louvain-la-Neuve
Main themes	The course of molecular spectroscopy will describe the different analysis techniques based on the interaction between molecules and an electromagnetic wave, as well as mass spectrometry. General physics courses are therefore a prerequisite, as well as the course in physical chemistry. The theoretical bases of different spectroscopic methods will be discussed during the lecture (30h). The identification of organic compounds from their spectra will be acquired during exercise sessions (20h). These notions are a basis for synthetic chemistry, and therefore for many subsequent courses as well as for research. The advanced courses directly related to this one are the "practical work supplements" CHM1300, "NMR complements" CHM2152 and "advanced mass spectrometry" CHM2151.
Aims	At the end of this teaching and its evaluation, the student should be able to : 1 1. describe the basic principle of any spectroscopy, 2. explain the mode of operation, the advantages and disadvantages of each spectroscopy, 3. distinguish in a scientific text (book, article) the contribution of a particular spectroscopic technique, 4. extract the structure of an organic molecule from the interpretation of its IR, NMR, UV and mass spectra. - - - - *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 certification evaluation consists of a written examination in session.
Teaching methods	**Due to the COVID-19 crisis, the information in this section is particularly likely to change.** Theoretical lectures including active pedagogy sessions are completed by exercise sessions given by an assistant.
Content	Part I: General Introduction Chap. 1 molecular representation Chap. 2 wave-matter interaction and spectroscopy Chap. 3 general principles of spectroscopy Part 2: Common spectroscopies Chap. 4 infrared spectroscopy Chap. 5 nuclei and electrons in a magnetic field Chap. 6 nuclear magnetic resonance spectroscopy Chap. 7 mass spectrometry Chap. 8 microwave spectroscopy Chap. 9 UV-Visible spectroscopy Part 3: Additional concepts Chap. 10 Raman spectroscopies Chap. 11 molecular transitions and intensity Chap. 12 Fourier transform spectroscopies
Inline resources	All course resources are available on Moodle
Bibliography	• Colin N. Banwell, Elaine M. McCash, "Fundamentals of Molecular Spectroscopy" fourth edition, McGraw-Hill Book Company, 1994. • Laurence M. Harwood, Timothy D. W. Claridge, "Introduction to Organic Spectroscopy", Oxford Chemistry Primers n°43, Oxford University Press, 1997. • John M. Brown, "Molecular Spectroscopy", Oxford Chemistry Primers n°55, Oxford University Press, 1998. • Simon Duckett, Bruce Gilbert, "Foundations of Spectroscopy", Oxford Chemistry Primers n°78, Oxford University Press, 2000.

Faculty or entity in charge	CHIM

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Aims
Minor in Chemistry	MINCHIM	4		
Bachelor in Chemistry	CHIM1BA	4		
Master [120] in Biochemistry and Molecular and Cell Biology	BBMC2M	4		