

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.


3 credits

30.0 h

Q1

Teacher(s)	Fustin Charles-André ;Garcia Yann ;
Language :	French
Place of the course	Louvain-la-Neuve
Aims	<p>1 This course not only aims at giving a large introduction to the main instrumental analysis methods of solids but also aims at directing an analysis towards the most appropriate solutions. The emphasis is shed on principles, application ranges, possibilities and limitations of each technique.</p> <p>-----</p> <p><i>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".</i></p>
Evaluation methods	<b>Due to the COVID-19 crisis, the information in this section is particularly likely to change.</b> oral exam or written exam depending on the number of registered students
Teaching methods	<b>Due to the COVID-19 crisis, the information in this section is particularly likely to change.</b> Classes and potential visit of experimental facilities
Content	Content I. Thermal analysis methods: thermogravimetric analysis (TGA), thermodifferential analysis (TDA), differential scanning calorimetry (DSC) II. Surface techniques analysis methods and microscopies: X-ray photoelectrons spectroscopy (XPS), Auger electron spectroscopy (AES). Secondary ions mass spectrometry (SIMS). Specific surface measurement (BET). Scanning electronic microscopy (SEM). Transmission electronic microscopy (TEM). Atomic force microscopy (AFM), Scanning tunneling microscopy (STM) III. X-Ray diffraction and X-ray fluorescence IV. X-Ray absorption spectroscopy : EXAFS, XANES and WAXS V. Mössbauer spectroscopy
Inline resources	Moodle
Bibliography	<p><b>Instrumental Methods of Analysis</b>, H.H. Willard, L.L. Merritt Jr. J.A. Dean, F. A. Settle Jr., 7th ed., New York, Wadsworth Publishing Company, 1988.</p> <p>A booklet containing a copy of the overhead transparencies used by the teachers.</p> <p>Other books that are chapter specific are advised below:</p> <p>Most of the chapters:</p> <p><b>Principles of Instrumental Analysis – 6th Ed.</b>, D.A. Skoog, F.J. Holler, S.R. Crouch, Thomson, Books/Cole, 2007</p> <p>Thermal analysis methods:</p> <p><b>DSC, An Introduction for practitioners</b>, G. Höhne, W. Hemminger, H.-J. Flammershein, Springer Verlag, 1996, MOST A1 library : n° 714</p> <p><b>Introduction to Instrumental Analysis</b>, R. D. Braun, Mc Graw-Hill, Int. Ed. 1987, Singapore, ISBN 0-07-100147-6, MOST A1 library : n° 669</p> <p><b>Materials characterization : Introduction to microscopic and spectroscopic methods</b>, Yang Leng, Wiley, 2008, Réf : A187077 (BST)</p> <p>X-ray absorption, diffraction and fluorescence</p> <p><b>EXAFS : Basic Principles and Data Analysis</b>, K.T. Boon, Springer Verlag, 1986, MOST A1 library : n° 713</p> <p><b>Nuclear instruments and their uses – Vol. I : Ionization, detectors, scintillators</b>, Ed. A.H. Snell, John Wiley &amp; Sons, New York, 1962</p> <p><b>Principles and practice of X-ray spectrometric analysis</b>, E. P. Bertin, Plenum Press, New York, 1975.</p> <p>Mössbauer Spectroscopy</p> <p><b>Mössbauer spectroscopy and Transition Metal Chemistry, Fundamentals and Applications</b>, P. Gütlich, E. Bill, A. X. Trautwein, Springer, 2011, Ref : <b>A 1 15 QC462.T86 .G (BST)</b>, also available in MOST A1 library.</p> <p><b>Mössbauer spectroscopy</b>, N. N. Greenwood, T. C. Gibb, London : Chapman and Hall, 1971, Ref : B602672 (BST)</p> <p><b>Mössbauer effects in lattice dynamics : experimental, technique and applications</b>, Yi-Long Chen, Wiley VCH, 2007, Ref : A115025 (BST)</p> <p><b>Mössbauer spectroscopy</b>, Tutorials for BAC3 level, Y. Yoshida, G. Langouche Eds., Springer, 2013, Ref. A 1 14 QC491.M (BST), also available in MOST A1 library.</p>

Other infos	Background: Molecular symmetry and crystal structures (CHM 1251A) - Fundamentals of molecular spectroscopy (CHM 1251B). The course could be partly or totally delivered by an invited lecturer.
Faculty or entity in charge	CHIM

<b>Programmes containing this learning unit (UE)</b>				
Program title	Acronym	Credits	Prerequisite	Aims
Master [60] in Chemistry	<a href="#">CHIM2M1</a>	3		
Master [120] in Chemistry	<a href="#">CHIM2M</a>	3		