


3.00 credits

30.0 h

Q1

Teacher(s)	Fustin Charles-André ;Garcia Yann ;
Language :	English
Place of the course	Louvain-la-Neuve
Learning outcomes	<p>At the end of this learning unit, the student is able to :</p> <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>
Evaluation methods	oral or written exam according to the number of students
Teaching methods	classic or reverse classes.
Content	<p>I. Thermal analysis methods : thermogravimetric analysis (TGA), thermodifferential analysis (TDA), differential scanning calorimetry (DSC)</p> <p>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)</p> <p>III. X-Ray diffraction and X-ray fluorescence IV. X-Ray absorption spectroscopy : EXAFS, XANES and WAXS V. Mössbauer spectroscopy</p>
Inline resources	Moodle
Bibliography	<p>Instrumental Methods of Analysis, 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 all slides by the teachers is available on Moodle.</p> <p>Other books that are chapter specific are advised below:</p> <p>Most of the chapters</p> <p>Principles of Instrumental Analysis – 6th Ed., D.A. Skoog, F.J. Holler, S.R. Crouch, Thomson, Books/Cole, 2007</p> <p>Thermal analysis methods</p> <p>DSC, An Introduction for practitioners, G. Höhne, W. Hemminger, H.-J. Flammershein, Springer Verlag, 1996, MOST B3 library : n° 714</p> <p>Introduction to Instrumental Analysis, R. D. Braun, Mc Graw-Hill, Int. Ed. 1987, Singapore, ISBN 0-07-100147-6, MOST B3 library : n° 669</p> <p>Materials characterization : Introduction to microscopic and spectroscopic methods, Yang Leng, Wiley, 2008, Réf : A187077 (BST)</p> <p>X-ray absorption, diffraction and fluorescence</p> <p>EXAFS : Basic Principles and Data Analysis, K.T. Boon, Springer Verlag, 1986, MOST B3 library : n° 713</p> <p>Nuclear instruments and their uses – Vol. I : Ionization, detectors, scintillators, Ed. A.H. Snell, John Wiley & Sons, New York, 1962</p> <p>Principles and practice of X-ray spectrometric analysis, E. P. Bertin, Plenum Press, New York, 1975.</p> <p>Mössbauer Spectroscopy</p> <p>Mössbauer spectroscopy and Transition Metal Chemistry, Fundamentals and Applications, P. Gütlich, E. Bill, A. X. Trautwein, Springer, 2011, Ref : A 1 15 QC462.T86 .G (BST), also available in MOST B3 library.</p> <p>Mössbauer spectroscopy, N. N. Greenwood, T. C. Gibb, London : Chapman and Hall, 1971, Ref : B602672 (BST)</p> <p>Mössbauer effects in lattice dynamics : experimental, technique and applications, Yi-Long Chen, Wiley VCH, 2007, Ref : A115025 (BST)</p> <p>Mössbauer spectroscopy, Tutorials for BAC3 level, Y. Yoshida, G. Langouche Eds., Springer, 2013, Ref. A 1 14 QC491.M (BST), also available in MOST B3 library.</p>

<p>Other infos</p>	<p>Background : Molecular symmetry and crystal structures (CHM 1251A) - Fundamentals of molecular spectroscopy (CHM 1251B).</p> <p>Evaluation : oral exam</p> <p>Documents : - Instrumental Methods of Analysis, H.H. Willard, L.L. Merritt Jr. J.A. Dean, F. A. Settle Jr., 7th ed., New York, Wadsworth Publishing Company, 1988. ISBN 0534081428. - Fascicle containing a copy of the overhead transparencies used by the teacher</p> <p>The course could be partly or totally delivered by an invited lecturer.</p>
<p>Faculty or entity in charge</p>	<p>CHIM</p>

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Chemistry	CHIM2M	3		
Master [60] in Chemistry	CHIM2M1	3		