UNIVERSITY OF PANNONIA

COURSE DATASHEET

Semester:	2014/15/1
Course:	X-ray diffraction
Code:	VEMKSIB152R
Responsible department:	Institute of Materials Engineering
Department code:	MKSI
Responsible instructor:	dr. Éva Makó Kristófné Dr.

Course objectives:

Introduction to theory, instrumentation, and application of X-ray powder diffractometers

Course content:

Historical background (discovery of X-ray, diffraction experiments from a single crystal, development of powder diffractometers). Characteristics and properties of X-radiation. Interactions of X-ray with materials. Principles of diffraction. The Bragg Law. Classification and component parts of instruments. X-ray tube. Detectors. Production of monochromatic radiation. Factors influencing accuracy of measurement. Specimen preparation. Crystallite size. Preferred orientation. Qualitative analysis. JCPDS PDF data base. Indexing system and JCPDS powder file card. Quantitative analysis. Internal-standard, spiking, and Rietveld methods. Use of reference intensity ratio. Computer analysis of diffraction data. Profile fitting of powder diffraction patterns. Determination of crystallite size and strain. Crystal structure analysis and refinement. Applications, and examples.

Requirements, evaluation and grading:

Attendance of lectures and practices

Required and recommended readings:

H. P. Klug and L. E. Alexander.: X-ray diffraction procedure. John Wiley & Sons, London, 1962 D. L. Bish and J. E. Post.: Reviews in Mineralogy, Volume 20: Modern powder diffraction, Mineralogical Society of America, Book Crafters, Inc., Chelsea, Michigan, USA, 1989