

	UNIVERSITAS PADJADJARAN FACULTY OF MATHEMATICS AND NATURAL SCIENCES MASTER PROGRAM IN CHEMISTRY		COURSE CODE: 140120-UND202 502055
Module designation	Structure Elucidation of Inorganic Materials		
Semester(s) in which the module is taught	2		
Lecturers	Prof. Dr. Atiek R. Noviyanti; Dr. Solihudin		
Medium of instruction	Bahasa Indonesia		
Relation to curriculum	Elective Course		
Teaching methods	Participatory Learning Method (A learning approach in which students actively participate in the learning process—for example, through presentations and discussions—rather than just passively receiving information.		
Workload	Lecture and Discussion : 24 hours Tutorial : 4 hours Assignment : 5 hours Test and Examination : 4 hours Independent Study : 53 hours Total workload : 90 hours		
Credit points	2 (2-0) 2 credit = $2 \times 1.81 \text{ ECTS} = 3.62 \text{ ECTS}$		
Required and recommended prerequisites for joining the module	-		
Module objectives/intended learning outcomes	LO1: Students are able to understand the differences between crystalline and non-crystalline solid materials. LO2: Students are able to understand how to characterize materials in terms of their structure, morphology, and chemical and physical properties using diffraction, optical spectroscopy, and microscopy methods. LO3: Students are able to understand how to characterize unknown materials.		
Contents	1. Identification of Crystalline and Amorphous Solid Compounds 2. Crystal Defects and Impurities 3. Structural Characterization Using X-Ray Diffraction (XRD)		

	4. Refinement of Crystalline Solid Structures from XRD Data Using Software 5. Identification Using Spectroscopic Techniques 6. Infrared (IR) and Raman Spectroscopy 7. Visible and Ultraviolet (UV-Vis) Spectroscopy 8. Nuclear Magnetic Resonance (NMR) Spectroscopy 9. Thermal Analysis (TA): Differential Scanning Calorimetry (DSC) and Thermogravimetric Analysis (TGA) 10. Optical Microscopy 11. Scanning Electron Microscopy (SEM) 12. Transmission Electron Microscopy (TEM) 13. Scanning Probe Microscopy (SPM) 14. Photoelectron Spectroscopy
Examination forms	Written test, assignment, presentation
Study and examination requirements	A minimum of 80% attendance in lectures is required. The final grade will be evaluated based on quiz (10%), individual assignment (10%), mid-term exam (15%), final term exam (15%), class participation (20%), and the project (30%)
Reading lists	1. Leng, Y., 2013. <i>Materials Characterization: Introduction to Microscopic and Spectroscopic Methods</i>. 2nd ed. Chichester: John Wiley & Sons. 2. Kumar, C. Sateesh; Singh, M. Muralidhar; Krishna, Ram (2023) <i>Advanced Materials Characterization: Basic Principles, Novel Applications, and Future Directions</i>. CRC Press.