

Module Descriptions

A **module** is a self-contained **learning unit** within a higher education program that includes thematically related courses and is assigned a **fixed number of credits**. It follows specific **learning objectives**, includes an **assessment component**, and contributes to achieving the qualifications of a degree program. In some countries, "modules" are also named "courses".

Please provide a module description for each module. In addition to the compulsory and elective modules, this also includes credited internships and the final thesis.

Please summarize all module descriptions in one document (Module Handbook) and create a table of contents so that the modules can be found easily.

Module designation	Green Materials Chemistry	
Semester(s) in which the module is taught	6 th	
Person responsible for the module	Dr. Cahyorini Kusumawardani M.Si.	
Language	Bahasa Indonesia	
Relation to curriculum	Compulsory / elective / specialisation	
Teaching methods	Lecture, discussion, project	
Workload (incl. contact hours, self-study hours)	Total workload: 100 minutes/week for class learning 170 minutes/week for independent learning	
Credit points	2 SKS (3,2 ECTS)	
Required and recommended prerequisites for joining the module	Creative, Innovative, Entrepreneurship	



Module objectives/intended learning outcomes	On successful completion of the course students should be able to:		
	 Students are able to demonstrate responsibilithemselves and their surroundings through the environmentally friendly chemicals. Students are able to analyze theoretical concapplications related to the structure, properties synthesis, and characterization of materials, as would modification of materials, including environmental nanomaterials and polymers. Students are able to present arguments regardly solutions to environmental problems caused by modification of ematerials. Students are able to develop collaborative skills decisions related to issues arising from the non-environmentally friendly materials. Students are able to communicate ideas abord developments in materials science and various material synthesis and modification, including polyrical materials. 	cepts and analysis, vell as the lly friendly mg various aterial use co-friendly in making e use of out global nethods of	
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Content	 Concept and terminology of material chemistry Material structure, crystal structure, chemistry binding, and the relation with material properties Metal material, metal oxide, metal alloy, structure of metal material, metal binding, properties and application of metal material Polymer material, polymer structure, chemistry binding in polymer, synthesis of polymer, properties and application of polymer, smart polymer Ceramics material, ceramics structure, chemistry binding in ceramics, synthesis of ceramics, properties and application of ceramics Biomaterial's classification, modifications, and applications Conductor, Isolator, semiconductor, and superconductor materials: modifications, and applications Nanomaterial and Nanotechnology Nanomaterial for drug delivery Herb nanomaterial medicine 		
Examination forms	Project report and presentation, written tests		
Study and examination requirements	Minimum attendance at lectures is 75% Final score (NA) is calculated as follows:		
	Learning Weight (%) Technique of Asset	esment	
	1, 2 5 Participation		
	5 10 Task		
	1,5 10 Mid-term Written Te	est	
	1,5 15 Final Term		
	3, 4 30 Case Study		
	3, 4 30 Team Based Project	t	



Reading list	Lawrence, HV (2006), Material Science, Addison-Wesley Longman
	2. Lawrence, HV (1992), Elements of Material Science and Engineering, Pearson Education
	3. Burns, G.; Glazer, A.M. (1990). Space Groups for Scientists and Engineers (2nd ed.). Boston: Academic Press, Inc
	4. Fahlman BD (2019), Material Chemistry, 2nd Edition, Central Michigan University, Springer, USA
	5. Allcock HR (2019), Introduction to Material Chemistry, 2nd Edition, New York, Wiley
	 Moore J.A., Carraher C.E. (1983) Modification of Polymers. In: Carraher C.E., Moore J.A. (eds) Modification of Polymers. Polymer Science and Technology, vol 21. Springer, Boston, MA

Prepared by	Verified by:	Authorized by:
		Program Study Coordinator