

Module title		Abbreviation
Material Sciences 1 (Basic introduction)		o8-FU-MaWi1-212-mo1
Module coordinator		Module offered by
holder of the Chair of Chemical Technology of Material Synthesis		Chair of Chemical Technology of Material Synthesis
ECTS	Method of grading	Only after succ. compl. of module(s)
5	numerical grade	--
Duration	Module level	Other prerequisites
2 semester	undergraduate	--
Contents		
<p>Part A Structure of materials The students learn about the atomic structure of solid materials.</p> <p>Part B Metallic Materials The students learn about the structure of metallic materials as well as their mechanical properties including deformation and failure mechanism as well as the analysis of mechanical properties. In addition, the corrosion and corrosion protection of metallic materials is introduced.</p> <p>Part C Numerical Methods The students are introduced to numerical methods like finite element methods (FEM) and Monte-Carlo-Simulation.</p>		
Intended learning outcomes		
<p>The students know the structure of solids, thermodynamic properties like enthalpy and entropy, the laws of diffusion and lattice defects. They are familiar with deformation and corrosion mechanisms in metals. The students acquire knowledge about thermodynamic of solids. They understand phase transitions, alloys and phase separation of metals. The students can explain the deformation as well as hardening due to dislocations of metals. The students can apply FEM to simple problems and perform simulations based on the Monte-Carlo-method.</p>		
Courses (type, number of weekly contact hours, language – if other than German)		
V (2) + Ü (1) + V (2)		
Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus)		
<p>a) written examination (approx. 90 to 180 minutes) or b) oral examination of one candidate each (20 to 30 minutes) or c) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate) or d) log (approx. 20 pages) or e) presentation (approx. 30 minutes) Language of assessment: German and/or English</p>		
Allocation of places		
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Additional information		
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Workload		
150 h		
Teaching cycle		
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Referred to in LPO I (examination regulations for teaching-degree programmes)		
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Module appears in

Bachelor' degree (1 major) Functional Materials (2021)
Bachelor' degree (1 major) Quantum Technology (2021)
Master's degree (1 major) Chemistry (2024)