DEPARTMENT OF MATERIALS SCIENCE AND TECHNOLOGY
COURSE SYLLABUS

Course Details				
Code	**Academic Year**			**Semester**
MWT201	2			3
Title	**T**	**A**	**L**	**ECTS**
Structure of Materials	2	2	1	6

Language	German					
Level	**Undergraduate**	**X**	**Graduate**		**Postgraduate**	
Department / Program	Materials Science and Technology					
Forms of Teaching and Learning	Face to face					
Course Type	**Compulsory**	**X**	**Elective**			
Objectives	The students develop a first understanding of the structural structure and properties of ideal crystals. First principles for the correlation of the structure of solids with their chemical and physical properties are available for further study.					
Content	Introduction (historical development, behavior of matter, chemical bonds), overview of crystal symmetry (crystallographic axis system, basic concepts of morphology, crystal growth, crystallographic projections, symmetry principle, Bravais lattice, point groups, space groups), X-ray diffraction (generation of X-rays, the Bragg equation) , Introduction to the basics of crystal chemistry (thermodynamics of crystals, phase transitions, lattice energy, crystal chemical terms, bond types, radii and radii ratios, crystal structures), thermal, mechanical and electrical properties of crystals.					
Prerequisites	-					
Coordinator	-					
Lecturer(s)	Asist Prof.Dr. Duygu Ekinci					
Assistant(s)	-					
Work Placement	No					

Recommended or Required Reading	
Books / Lecture Notes	Binnewies, Jäckel, Willner, Rayner-Canham, „Allgemeine und Anorganische Chemie“, Spektrum Akademischer Verlag (2010).
Other Sources	• Riedel, Janiak, „Anorganische Chemie" DeGruyter, Berlin (2011). • Kleber, Bautsch und Bohm, Einführung in die Kristallographie, Verlag Technik GmbH Berlin (1998). • Borchardt-Ott: „Kristallographie“, Springer Lehrbuch (2002). • Buerger: „Kristallographie. Eine Einführung in die geometrische und röntgenographische Kristallkunde“, De Gruyter Lehrbuch (1977) • Binnewies, Jäckel, Willner, Rayner-Canham, „Allgemeine und Anorganische Chemie“, Spektrum Akademischer Verlag (2010).

Additional Course Material	
Documents	-
Assignments	-

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Exams	-

Course Composition	
Mathematics und Basic Sciences	%
Engineering	%
Engineering Design	%
Social Sciences	100%
Educational Sciences	%
Natural Sciences	%
Health Sciences	%
Expert Knowledge	%

Assessment

Activity	Count	Percentage (%)
Midterm Exam	1	40%
Quiz		
Assignments		
Attendance		
Recitations		
Projects		
Final Exam	1	60%
	Total	**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	14	2	28
Self-Study	14	5	70
Assignments	5	10	50
Presentation / Seminar Preparation			
Midterm Exam	1	2	2
Recitations	14	2	28
Laboratory	14	1	14
Projects			
Final Exam	1	2	2
		Total Work Load	**194**
		ECTS Points (Total Work Load / Hours)	**6**

Learning Outcomes

1	The students develop a first understanding of the structural structure and properties of ideal crystals.

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Weekly Content	
1	Introduction (historical development, behavior of matter, chemical bonds)
2	Overview of the crystal symmetry (crystallographic axis system, basic concepts)
3	Morphology, crystal growth, crystallographic projections, symmetry principle, Bravais Grid.
4	Definition of symmetry, introduction of symmetry operators
5	X-ray diffraction I (generation of X-rays, the X-ray spectrum, X-ray diffraction, Bragg's equation)
6	X-ray diffraction II (generation of X-rays, the X-ray spectrum, X-ray diffraction, Bragg's equation)
7	Seminar I
8	Thermal, mechanical and electrical properties of crystals - I
9	Thermal, mechanical and electrical properties of crystals - II
10	Seminar II
11	Introduction to the basics of crystal chemistry
12	Thermodynamics of crystals, Phase transitions, lattice energy
13	Terms, bond types, radii, and radii ratios, crystal structures
14	Seminar IV

Contribution of Learning Outcomes to Program Objectives (1-5)

	P1	P2	P3	P4	P5	P6	P7	P8
1	0	0	2	0	1	2	0	0

Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High
Program Learning Outcomes:	https://obs.tau.edu.tr/oibs/bologna/progLearnOutcomes.aspx?lang=en&curSunit=207
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