

DEPARTMENT OF MATERIALS SCIENCE AND TECHNOLOGY
COURSE SYLLABUS

Course Details					
Code		Academic Year		Semester	
MWT405		4		7	
Title		T	A	L	ECTS
Functional Materials		2	1	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		Elective	X	
Objectives	To get knowledge about the basics of dielectric, magnetic and superconducting behavior of materials.				
Content	Dielectric and ferroelectric properties, optical properties, magnetism				
Prerequisites					
Coordinator	Asist Prof.Dr. Sibel Özenler				
Lecturer(s)					
Assistant(s)					
Work Placement	No				
Recommended or Required Reading					
Books / Lecture Notes	1. K.Nitzsche, H.-J.Ullrich, „Funktionswerkstoffe der Elektrotechnik und Elektronik“ 2. O. Kasap, “Principles of Electronic Materials and Devices” 3. W.Buckel, R.Kleiner „Supraleitung“				
Other Sources					
Additional Course Material					
Documents					
Assignments					
Exams					
Course Composition					
Mathematics und Basic Sciences				%	
Engineering				%	
Engineering Design				%	
Social Sciences				100%	
Educational Sciences				%	

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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	13	4	52
Assignments	5	10	50
Presentation / Seminar Preparation			
Midterm Exam	1	2	2
Recitations	14	1	14
Laboratory	14	2	28
Projects			
Final Exam	1	2	2
		Total Work Load	176
		ECTS Points (Total Work Load / Hours)	6
Learning Outcomes			
1	To get knowledge about the basics of dielectric, magnetic and superconducting behavior of materials.		
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Weekly Content

1	Dielectric and Ferroelectric Properties: Phenomenology; Polarizability of Atoms and solids, temperature and frequency dependence; ferroelectric Phase transition, ferroelectric properties
2	Optical properties: Solid state excitations: Electromagnetic waves in the Matter; Dielectric function; Optical transitions; Solid state excitations (excitons, Polaritons etc.); Solid State Spectroscopy
3	Magnetism: dia- and paramagnetism; Collective magnetism; Magnetism in the Solid (Hund's rules, crystal field); Magnetic resonance
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Contribution of Learning Outcomes to Program Objectives (1-5)

	P1	P2	P3	P4	P5	P6	P7
All	1				3		
1							
2							
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12							

Contribution Level

1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High



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Compiled by:	
Date of Compilation:	