DEPARTMENT OF ENERGY 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	Department of Energy Science and Technology (German)					
Forms of Teaching and Learning	Face to Face					
Course Type	**Compulsory**	**X**	**Elective**			
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		%
Natural Sciences		%

DEPARTMENT OF ENERGY SCIENCE AND TECHNOLOGY
COURSE SYLLABUS

Health Sciences		%
Expert Knowledge		%

Assessment

Activity	Count	Percentage (%)
Midterm Exam	1	40
Quiz	0	0
Assignments	0	0
Attendance	0	0
Recitations	0	0
Projects	0	0
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.

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

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

	P1	P2	P3	P4	P5	P6	P7
1	1				3		
2							

DEPARTMENT OF ENERGY SCIENCE AND TECHNOLOGY
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3							
4							
5							
6							
7							
8							
9							
10							
11							
12							

Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High
Compiled by:	
Date of Compilation:	