DEPARTMENT OF ENERGY SCIENCE AND TECHNOLOGIES
COURSE SYLLABUS

Course Details				
Code		**Academic Year**		**Semester**
MWT405		3		5
Title	**T**	**A**	**L**	**ECTS**
Functional Materials	2	1	0	6

Language	German					
Level	**Undergraduate**	**X**	**Graduate**		**Postgraduate**	
Department / Program	Energy Science and Technology					
Forms of Teaching and Learning	Face-to-face					
Course Type	**Compulsory**		**Elective**	**X**		
Objectives	The goal is to help students learn the fundamentals of dielectrics, as well as the magnetic and superconducting behaviors of materials.					
Content	The course covers topics such as dielectric and ferroelectric properties, optical properties, magnetism, etc.					
Prerequisites	None					
Coordinator	Associate Prof.Dr. Ergün KELEŞOĞLU					
Lecturer(s)	Associate Prof.Dr. Ergün KELEŞOĞLU					
Assistant(s)	None					
Work Placement	None					

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	1 Midterm, 1 Final

Course Composition		
Mathematics und Basic Sciences		%
Engineering		%
Engineering Design		%
Social Sciences	100	%

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Educational Sciences		%
Natural Sciences		%
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	12	4	48
Assignments	6	10	60
Presentation / Seminar Preparation			
Midterm Exam	1	2	2
Recitations	14	1	14
Laboratory	14	1	14
Projects			
Final Exam	1	2	2
		Total Work Load	**168**
		ECTS Points (Total Work Load / Hours)	**6**

Learning Outcomes

1	Students will learn the fundamentals of dielectrics, as well as the magnetic and superconducting behaviors of materials.

Weekly Content

1	Dielectric and Ferroelectric Properties: Phenomenology; Polarization of atoms and solids, temperature and frequency dependence; ferroelectric phase transition, ferroelectric properties
2	Optical Properties: Solid-state excitations: Electromagnetic waves in matter; Dielectric function; Optical transitions; Solid-state excitations (excitons, polaritons, etc.); Solid-state spectroscopy
3	Magnetism: Diamagnetism and paramagnetism; Collective magnetism; Magnetism in solids; Magnetic resonance
4	Topic Not Covered

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5	Topic Not Covered
6	Topic Not Covered
7	Topic Not Covered
8	Midterm Exam
9	Topic Not Covered
10	Topic Not Covered
11	Topic Not Covered
12	Topic Not Covered
13	Topic Not Covered
14	Topic Not Covered
15	Topic Not Covered
16	Final Exam

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

	P1	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**
Ö1	1								

Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High
https://obs.tau.edu.tr/oibs/bologna/progLearnOutcomes.aspx?lang=EN&curSunit=5706	
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