

DEPARTMENT OF ROBOTICS AND INTELLIGENT SYSTEMS ENGINEERING

Course Details				
Code	Academic Year			Semester
RIS513	1			1
Title	T	A	L	ECTS
Advanced Materials	3	0	0	7
Language	English			
Level	Undergraduate		Graduate	Postgraduate
		x		
Department / Program	Robotics and Intelligent Systems			
Forms of Teaching and Learning				
Course Type	Compulsory		Elective	x
Objectives	To gain knowledge about advanced materials and their current and future applications in engineering			
Content	<ul style="list-style-type: none"> Principles of materials science and engineering Structure-property relationships Properties of materials Engineering materials and their classification Current status and future prospects in advanced materials 			
Prerequisites	-			
Coordinator	Assist. Prof. Dr. Mehmet İPEKOĞLU / Assist. Prof. Dr. Ali Can KAYA			
Lecturer(s)	Assist. Prof. Dr. Mehmet İPEKOĞLU / Assist. Prof. Dr. Ali Can KAYA			
Assistant(s)	To be assigned.			
Work Placement	-			
Recommended or Required Reading				
Books / Lecture Notes	Available			
Other Sources	W. D. Callister Jr., Rethwisch, D. G., Materials Science and Engineering: An Introduction, 10 th Ed., Wiley, 2018.			
Additional Course Material				
Documents	Online			
Assignments	Online			
Exams	Online/in-presence			
Course Composition				
Mathematics und Basic Sciences				%20
Engineering				%60
Engineering Design				%

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Social Sciences		%
Educational Sciences		%
Natural Sciences		%20
Health Sciences		%
Expert Knowledge		%

Assessment

Activity	Count	Percentage (%)
Midterm Exam		
Quiz		
Assignments	1	20
Attendance		
Recitations		
Projects	1	40
Final Exam		40
Total		100

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	14	3	42
Self-Study	14	10	140
Assignments	1	12	12
Presentation / Seminar Preparation			
Midterm Exam			
Recitations			
Laboratory			
Projects	1	24	24
Final Exam	1	2	2
Total Work Load			220
ECTS Points (Total Work Load / Hour)			8

Learning Outcomes

1	Principles of materials science and engineering
2	Engineering materials and their classification
3	Structure-property relationships in materials
4	Comparison of mechanical, thermal, electrical, magnetic and optical properties of materials as the basis of material selection
5	Current and potential application of advanced materials
6	

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Weekly Content

1	Introduction
2	Atomic structure and interatomic bonding
3	The structure of crystalline solids
4	Imperfections in solids
5	Solid state diffusion
6	Phase diagrams and microstructure
7	Mechanical properties of metals
8	Electrical properties
9	Thermal properties
10	Magnetic and optical properties
11	Polymers
12	Ceramics and glasses
13	Special Topics in Advanced Materials : Cellular metals
14	Special Topics in Advanced Materials : Biomaterials
15	Future Prospects in Advanced Materials

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

	P1	P2	P3	P4	P5	P6	P7
1							
2							
3							
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12							



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