

MECHATRONICS ENGINEERING
COURSE SYLLABUS

Course Details				
Code		Academic Year		Semester
MAB207		2		3
Title		T	A	L
Material Technology		3	2	6
Language	German			
Level	Undergraduate	✓	Graduate	Postgraduate
Department / Program	Mechatronics Engineering			
Forms of Teaching and Learning				
Course Type	Compulsory	✓	Elective	
Objectives	To gain knowledge about the basics of material technology and their applications in engineering			
Content	<ul style="list-style-type: none"> Structures of atoms and molecules Materials in engineering Metals as engineering materials Crystal structures Phase diagrams Microstructure Mechanical properties of materials Mechanical testing methods 			
Prerequisites				
Coordinator	Assist. Prof. Dr. Mehmet İPEKOĞLU			
Lecturer(s)	Assist. Prof. Dr. Mehmet İPEKOĞLU			
Assistant(s)	TA Halil İbrahim TANRIVERDİ			
Work Placement				
Recommended or Required Reading				
Books / Lecture Notes	<ul style="list-style-type: none"> Bargel, H.-J., G. Schulze, "Werkstoffkunde", Springer, 1999. Bergmann, W., "Werkstofftechnik Teil I: Grundlagen", 5. Auflage, Carl Hanser, 2003, Bergmann, W., "Werkstofftechnik Teil II: Anwendung", 3. Auflage, Carl Hanser, 2002. 			
Other Sources				
Additional Course Material				
Documents				
Assignments				
Exams				
Course Composition				

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Mathematics und Basic Sciences	10		%
Engineering	60		%
Engineering Design			%
Social Sciences			%
Educational Sciences			%
Natural Sciences	30		%
Health Sciences			%
Expert Knowledge			%
Assessment			
Activity	Count		Percentage (%)
Midterm Exam	1		30
Quiz			
Assignments	1		10
Attendance			
Recitations			
Projects	1		20
Final Exam	1		40
		Total	100
ECTS Points and Work Load			
Activity	Count	Duration	Work Load (Hours)
Lectures	14	3	42
Self-Study	14	4	56
Assignments	1	18	18
Presentation / Seminar Preparation			
Midterm Exam	1		
Recitations	14	2	28
Laboratory			
Projects	1	24	24
Final Exam	1		
		Total Work Load	168
		ECTS Points (Total Work Load / Hours)	6
Learning Outcomes			
1	Knowledge about material technology		
2	Perspectives about the basics and various applications of materials science		
3	Structure-property relationships of materials		

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4	Learning about and differentiating between materials in engineering
5	Learning material properties as basis of material selection
6	Learning about mechanical test methods
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Weekly Content

1	History of materials science, materials in engineering, classification of materials
2	Atomic structure, bonds, bonds in different materials
3	Crystal structure, unit cells, crystallographic directions and planes, Miller indices
4	Irregularities in crystal structure, 0-1-2 dimensional crystal defects
5	Solid state diffusion
6	Phase diagrams
7	Microstructure
8	Mechanical properties, stress-strain
9	Relationship between microstructure and mechanical properties
10	Elasticity, plasticity, viscoelasticity
11	Tensile test
12	Ductility, brittleness
13	Hardness, hardness measurement
14	Hardness measurement, hardness-strength relationship
15	

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

	P1	P2	P3	P4	P5	P6	P7
1							
2							
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6							
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9							
10							
11							
12							
Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High						
Compiled by:	Assist. Prof. Dr. Mehmet İPEKOĞLU						
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