

Vocational School / Construction Technology
2024 - 2025 Academic Year
MATERIALS SCIENCE
Syllabus

Course Description					
Name	Code	Semester	T+A Hour	Credit	ECTS
MATERIALS SCIENCE	İNŞ1127160	Fall Semester	3+0	3	4
Prerequisites Courses					
Recommended Elective Courses					
Language of Instruction	Turkish				
Course Level	Short Cycle (Associate's Degree)				
Course Type	Required				
Course Coordinator	Assist.Prof. Serkan BAŞLAYICI				
Name of Lecturer(s)	Assist.Prof. Serkan BAŞLAYICI				
Assistant(s)					
Aim	The aims of the course is to give fundamental knowledge about type of materials, their usage, properties and characteristics, which are important in engineering design. It is also aimed to give a theoretical background about the analysis of behavior of engineering materials.				
Course Content	This course contains; Introduction and Terminology,Classification of Materials,Material Structure and Atomic Structure,Atomic and Ionic levels,Atomic and Ionic packing and defects,Atomic and Ionic mobility, Diffusion,Mechanical properties and behaviors,Mechanical properties and behaviors,Mechanical Tests,Strengthening process of metals,Forming process of metals,Failure mechanism,Ceramic materials and properties,Polymer materials and properties.				
Course Learning Outcomes			Teaching Methods	Assessment Methods	
1) To classify engineering materials.			10, 14, 16, 6, 9	A	
2) To describe the effects of atomic bonding, atomic package, crystallography, and bonds on material properties and behaviors.			6, 9	A	
3) To define fundamental properties of materials and the factors which are effects the properties.			14, 16, 9	A	
4) Define and choose the mechanical test methods for materials.			12, 16, 17, 6, 9	A	
Teaching Methods	10: Discussion Method, 12: Problem Solving Method, 14: Self Study Method, 16: Question - Answer Technique, 17: Experimental Technique, 6: Experiential Learning, 9: Lecture Method				
Assessment Methods	A: Traditional Written Exam				
Lecture Schedule					
Sequence	Topics	Preliminary Preparation			
1	Introduction and Terminology				
2	Classification of Materials				
3	Material Structure and Atomic Structure				
4	Atomic and Ionic levels				
5	Atomic and Ionic packing and defects				
6	Atomic and Ionic mobility, Diffusion				
7	Mechanical properties and behaviors				
8	Mechanical properties and behaviors				
9	Mechanical Tests				
10	Strengthening process of metals				
11	Forming process of metals				
12	Failure mechanism				
13	Ceramic materials and properties				
14	Polymer materials and properties				
Evaluation Methods		Weight(%)			
Midterm Exam		40			
General Exam		60			

Resources
Lecture notes will be given to studentsWilliam D. Callister "Materials Science and Engineering", Eight Edition ISBN:978-6051334189 Donald R. Askeland "The Science and Engineering of Materials", Sixth Edition ISBN:978-0495668022 Kaşif Onaran "Malzeme Bilimi" ISBN:9789755400141 Kaşif Onaran "Malzeme Bilimi Problemleri ve Çözümleri" ISBN:9789755400273