IM 285 GENERAL MATERIALS SCIENCE	CIVIL ENGINEERING

Semester	Credit Structure		
	Lecture	Recitation	Laboratory
3	2	0	

Language	English
Compulsory / Elective	Compulsory
Prerequisites	None
Catalog Description	Classification of engineering materials, atomic structure, atomic arrangements, crystal structures, structural imperfections and atomic movements. Mechanical properties. Behavior of materials under tension and compression. Concept of force, stress, deformation and strain. Types of fracture, elastic and plastic failure. Visco-elasticity, rheological models and fatigue. Creep, relaxation, brittleness, ductility, hardness and toughness characteristics of materials. Physical properties of materials.
Course Objectives	To introduce basic properties and importance of materials in civil engineering applications. To teach and apply basic methods employed for analysis of engineering problems involving materials.
Course Outcomes	Understanding of basic properties of materials. Learning the importance of materials used in civil engineering in practice. Learning the other general information related to the other engineering design.
Textbook and /or References	Introduction to Materials Science For Engineers, James, F. Shackelford, Prentice Hall, Fifth Edition, 2000 Materials Science and Engineering, An Introduction, William, D. Callister, Jr., Wiley & Sons, Inc., Fifth Edition, 2000

Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	35
	Quizzes	2	5
	Homeworks	4	5
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	2	5
	Other	-	-
	Final Exam	1	50

Course Category by Content (%)		
	Mathematics and Basic Sciences	30
	Engineering Science	50
	Engineering Design	20
	Social Sciences	0

Instructor	**Prof. Dr. Abdussamet ARSLAN**

COURSE PLAN	
Week	**Topics**
1	Introduction to general materials science, Classification of engineering materials
2	Atomic structure, atomic order, interatomic bonding
3	Crystal structure
4	Crystal structure imperfections
5	Interatomic distance and related properties
6	Mechanical properties, behaviors under tension and compression
7	Force, stress, strain and elongation concepts
8	Fracture types, brittle and ductile failure
9	Elastic and plastic deformations
10	Ductility, resilience, toughness
11	Brittleness, ductility and hardness
12	Creep and stress relaxation
13	Visco-elasticity, rheologic models and fatigue
14	Physical properties of materials

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	**1**	**2**	**3**
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data			X
3	An ability to design a system, component, or process to meet desired needs			X
4	An ability to function on multi-disciplinary teams			X
5	An ability to identify, formulate, and solve engineering problems			X
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X
Contribution of the course : 1: None 2: Partially 3: Completely				