

MM 432 Engineering Materials				DEPARTMENT OF MECHANICAL ENGINEERING					
Semester	Methods of Education							Credits	
	Lecture	Recit.	Lab.	Project / Field Study	Homework	Other	Total	Credit	ECTS Credit
8	42	0	25		8	-	75	3	3.0
Language	Turkish								
Compulsory / Elective	Elective								
Prerequisites	MM 207 E								
Course Contents	Heat treatment of metals. Surface properties, corrosion and metal coatings. Nonmetallic materials; polymers, ceramics. Composite materials. Selection of engineering materials.								
Course Objectives	To introduce basic properties, structure and processing techniques of engineering materials, the importance of modern material needs in engineering applications, to teach and apply basic methods for analysis of engineering problems involving materials.								
Learning Outcomes and Competences	Understanding of the relationship between structure, processing and properties of materials. Learning the characteristics of engineering materials, the manufacturing techniques and methods of design and material selection.								
Textbook and /or Reference	1. Material Science and Engineering: An Introduction, W.D. Callister, Jr., John Wiley and Sons Inc., Toronto, 7th Edition, 2007. 2. Foundations of Materials Science and Engineering, W.F. Smith, J. Hashemi, McGraw-Hill, 4th Edition, 2006. 3. The Science and Engineering of Materials, D.R. Askeland, PWS Publishing Co., Boston, 4th Edition, 2003. 4. The Principles of Materials Selection for Engineering Design, Pat.L. Mangonon, Prentice Hall, NJ, 1999.								
Assessment Criteria						If any, mark as (x)		Percentage (%)	
	Midterm Exams					X		40	
	Quizzes					X		10	
	Homeworks					X		10	
	Projects								
	Term Paper								
	Laboratory Work								
	Other								
Final Exam					X		40		
Instructors	Assoc.Prof. Ibrahim USLAN								
Week	Subject								
1	INTRODUCTION: Introduction to engineering materials, modern material needs.								
2	PHASE DIAGRAMS: Phase diagrams, iron-iron carbide phase diagram.								
3	PHASE DIAGRAMS: Isothermal transformation, continuous cooling transformation.								
4	ANNEALING: Processes annealing, stress relief.								
5	HEAT TREATMENT OF STEELS: Hardenability, influence of quenching, medium, specimen size and geometry.								
6	CERAMICS: Glasses, clay products and advanced ceramics.								
7	POLYMERS: Hydrocarbon, polymer molecules.								
8	COMPOSITES: Particle reinforced composites, fiber reinforced composites, processing of composites								
9	COMPOSITES: Processing of composites								
10	CORROSION: Electrochemical consideration, forms of corrosion.								
11	CORROSION: Corrosion prevention and oxidation.								
12	MATERIALS SELECTION: Factors in materials selection, criteria for material selection								
13	MATERIALS SELECTION: Performance and efficiency of materials.								
14	NONFERROUS METALS								