

MAK 206 - Strength of Materials (3-0-3)

Year, Semester: 2017, Spring	Pre-requisite(s): MAK 104	Lecture/Laboratory: 3/0
Lecturer: Prof. Dr. Mehmet Ali Güler Room No.:124 , mguler@etu.edu.tr	Assistant: Furkan Kaçar Room No: Teknoloji Merkezi Z07	Office hours: Monday 08:30-10:20 Friday 10:30-12:20
Timetable:	Section 1: Monday 10:30-12:20 (room no. 111); Friday 08:30-10:20 (room no. 111).	
Course Description:		
Concepts of stress and strain. Axial load, thermal stress. Torsion, power transmission, angle of twist. Bending, unsymmetric bending. Transverse shear. Combined loadings. Stress and strain transformations. Deflection of beams and shafts.		
Textbook and references:		
Textbook: R.C. Hibbeler, Mechanics of Materials, 8th Ed. (SI Units), Prentice Hall, 2011.		
Suggested references: F.P. Beer and E.R. Johnston, Mechanics of Materials, 2nd Ed., McGraw-Hill, 1992. E.P. Popov, Engineering Mechanics of Solids, Prentice-Hall, 1990.		
Course Objectives:		
The main objective of this course is to provide the students with:		
<ul style="list-style-type: none">• the ability to determine internal reactions (stress/strain) to external loadings;• the ability to determine the maximum stress/strain values in a structural member;• fundamental principles for the relations between the mechanical properties (elastic/plastic material constants), loading conditions, and the performance of a structural member.		
Course Outline:		
<ol style="list-style-type: none">1. STATICS: Equilibrium of a deformable body2. STRESS: Average normal and shear stresses, allowable stress, factor of safety, design of simple connections STRAIN: Deformation, normal and shear strains3. MECHANICAL PROPERTIES OF MATERIALS: Tension and compression tests, Hooke`s law, Poisson`s ratio4. AXIAL LOAD: Elastic deformation of an axially loaded member, principle of superposition, statically indeterminate axially loaded members, thermal stress5. TORSION: Torsional deformation of a circular shaft, the torsion formula, power transmission, angle of twist, statically indeterminate torque-loaded members6. BENDING: Shear and moment diagrams, the flexural formula, unsymmetric bending7. TRANSVERSE SHEAR: Shear in straight members, the shear formula8. COMBINED LOADINGS: State of stress caused by combined loadings9. STRESS AND STRAIN TRANSFORMATIONS: Plane-stress/plane-strain transformations, general equations for stress/strain transformations, Mohr`s circle10. DEFLECTION OF BEAMS AND SHAFTS: The elastic curve, finding the slope and displacement by integration		
<p>Please note that, the list above gives only the contents of the course, not the sections of the textbook. The sections of the textbook that the students must study to be able to follow the course will be declared by the instructor during the lectures, and will be announced at the website of the course.</p>		
Course Website	http://mguler.etu.edu.tr/MAK206_2013_Spring_Mukavemet_intro.htm	
Course Evaluation:		
Midterm:	30 %	
Quizzes:	30 % (5% x 6)	
Attendance:	5 %	
Final:	35 %	