

MM 505 Theory Of Plasticity				MECHANICAL ENGINEERING DEPARTMENT					
Semester	Methods of Education							Credits	
	Lecture	Recit.	Lab.	Project/Field Study	Homework	Other	Total	Credit	ECTS credit
1,2	12	30				146	188	3	7.5
Language	Turkish								
Compulsory / Elective	Optional								
Prerequisites	-								
Course Contents	Principal, normal and shear stresses and strains. Equilibrium equations. Elasto-plastic deformation of rods. Mechanisms of plastic deformations and stability. Plastic deformation of hollow sphere. Elastic flow: Finite deformation rate tensor. Extrusion of plates and strips. Plastic flow on a rigid surface. Mechanical theory of creep. Dynamical resistance of materials. Stress-strain curves for dynamic loadings. Theory of impact loadings. Elasto-plastic waves in rods. Reflection of longitudinal elastic waves. Impact of a rod on stationary rigid target. Penetration. Mechanical behavior under oscillatory loads. Torsional vibrations of rods. Transverse vibrations of rods. Fatigue & fatigue failures.								
Course Objectives	Mechanics of deformable bodies involves the study of stress, strain, and temperature distribution in a solid or fluent body subjected to mechanical and thermal loading.								
Learning Outcomes and Competences	Students are provided by knowledge of formulation and analysis of the basic boundary/initial-value problems at the proper level of mathematical methods that enable them to understand the general underlying principles.								
Textbook and /or Reference	1. Lubliner, J., (1990). Plasticity Theory. MacMillan. 2. Chakraberty, J., (1999). Applied Plasticity. Springs.								
Assessment Criteria					If any, mark as (X)		Percentage (%)		
	Midterm Exams				X		30		
	Quizzes								
	Homeworks								
	Projects								
	Term Paper								
	Laboratory Work								
	Other								
	Final Exam				X		70		
Instructors									
Week	Subject								
1	Principal, Normal and Shear Stresses and Strain								
2	Equilibrium Equations. Elasto-Plastic Deformation of Rods.								
3	Mechanisms of Plastic Deformations and Stability. Plastic Deformation of a Hollow Sphere								
4	Plastic Flow: Finite Deformation Rate Tensor								
5	Extrusion of Plates and Strips. Plastic Flow on a Rigid Surface								
6	Mechanical Theory of Creep. Dynamical resistance of Materials								
7	Stress-Strain Curve: for Dynamic Loadings. Theory of Impact Loadings								
8	Elasto-Plastic Waves in Rods. Reflection of Longitudinal elastic Waves								
9	Impact of a Rod on a Stationary Rigid Target								
10	Penetration								
11	Mechanical Behaviour Under Oscillatory Loads								
12	Torsional Vibrations of Rods								
13	Transverse Vibrations of Rods								
14	Fatigue and Fatigue Failures								