

MM 523 Continuum Mechanics				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	Location and identification of a material body. Spatial and material coordinates. Motion and deformation. Deformation gradient and strain tensors. Deformation of material line, area, and volume elements. Invariants of deformation measures and their time rates. Kinematics and kinetics of deformation. Internal forces and Cauchy stress principle. Balance laws for mass, momentum, angular momentum, energy, and entropy production. Local balance laws. Thermodynamic restriction on the behavior of elastic solids and viscous fluids. Constitutive axioms and resulting restrictions on general material behavior								
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 termal loading.								
Learning Outcomes and Competences	Students are provided by the 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. Şuhubi, E.S., (1994). Sürekli-Ortamlar Mekaniği (Giriş). İTÜ Fen-Ed. Fak. Yayınları. 2. Dawson, T.H. (1976). Theory and Practice of Solid Mechanics. Plenum.								
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	Coordinate Systems.Base Vectors.Tensors								
2	Deformation gradient and tensor.Tarnsformation of deformation tensor								
3	Principal strains.Strain invariants								
4	Mation.Material Derivatives of line ,area and Volume elements								
5	Material derivates of line,surface and volume integrals								
6	Fundamentals laws of continuum mechanics								
7	Conservation of mass.Continuity equation								
8	Linear Momentum and angular momentum principle								
9	Conservation of energy.First Law of Thermodynamics								
10	Entrophy.Second Law Of Thermodynamics								
11	Local Balance Laws								
12	Thermodynamics restriction on the behaviour of elastic solids								
13	Thermodynamics restriction on the behaviour of Viscous Fluids								
14	Constitutive Equations								