

Course name: MCE504 Engineering Plasticity		Department: Mechanical Engineering						
Semester Fall	Methods of Education							Credit (ECTS) 7.5
	Lecture	Recitation/ (Etud)	Lab	Project/Field Study	Homework	Other	Total	
1	42	42		40	42	20	186	
Language	English							
Compulsory/Elective	Elective							
Prerequisites	None							
Course Contents	Stress and strain, yield criteria of metals, plastic stress-strain relations , work hardening, plastic instability, plastic deflections of beams, collapse load of structures, Mechanics of metal forming							
Course Objectives	To give the basic mechanical concepts to the graduate students who are interested in plastic forming of metals.							
Learning Outcomes and Competences	The students learn the concepts of stress and strain, perceive the forces and stresses occurring in the process of metal forming, understand the basic principle of computer simulations in metal forming area							
Textbook and /or References	1-Metal Forming; W.F.Hosford, R.M.Cadell 2-Mechanics of sheet metal forming; Z.Marciniak, J.L.Duncan, S.J.Hu 2-Engineering Plasticity; W. Johnson, P.B.Mellor							
Assessment Criteria				If any, mark as (X)	Percentage (%)			
	Midterm Exams			X	30			
	Quizzes							
	Homeworks			X	10			
	Projects				20			
	Term Paper							
	Laboratory work							
	Other							
Final Exam			X	40				
Instructors	Prof. Dr. Osman Yiğit							
Week	Subject							
1	Stress, stress tensor, stress transformations, equilibrium equations							
2	Strain, strain tensor, geometry of large and small strains							
3	Yield criteria, Tresca criterion, Von Mises criterion							
4	Effective stress and effective strain, plastic stress-strain relations							
5	Work hardening and methods of determining work-hardening expressions							
6	Plastic instability							
7	Plastic deflection of beams							
8	Collapse load of structures							
9	Bending of shapes and tubes							
10	Elastic-plastic stresses in rotating disks							
11	Midterm examination							
12	Deep drawing of a circular blank							
13	Strain rate and temperature							
14	Computer simulations in metal forming							