

MM 512 Fracture Mechanics				MECHANICAL ENGINEERING DEPARTMENT					
Semester	Methods of Education							Credits	
	Lecture	Recit.	Lab.	Project/Field Study	Homework	Other	Total	Credit	ECTS credit
1,2	42					146	188	3	7.5
Language	Turkish								
Compulsory / Elective	Optional								
Prerequisites	-								
Course Contents	Griffith crack theory, stress analysis of cracks, design philosophy, energy approach method, stress analysis approach method, crack-tip plastic zone size estimation, Plane-strain fracture toughness, plane-stress fracture toughness, plane-strain fracture toughness testing, fracture toughness of engineering alloys, toughness determination from crack opening displacement measurement, Fracture toughness and elastic plastic analysis with the J-integral. Fracture test methods: impact energy-fracture toughness correlations. Microstructural aspects of fracture toughness, environment-assisted cracking, cyclic stress-controlled fatigue, cyclic stress-controlled fatigue, fatigue life estimations, fatigue crack propagation, corrosion fatigue, stress-corrosion cracking.								
Course Objectives	A major objective of fracture mechanics is to study the load- carrying capacity of structures in the presence of initial defects where a dominant crack is assumed to exist. Thus a new design philosophy is introduced by fracture mechanics as opposed to the use of the traditional fracture criteria.								
Learning Outcomes and Competences	Learning the importance of fracture mechanics approach in analyzing the fracture of solids.								
Textbook and /or Reference	1.Fracture Mecanics, E.E.Gdoutos, Kluwer Academic Publs her, Netherlands (1993) 2.Strength &Fracture of Engineering Solids, David K. Felbeck, Anthony G. Atkins, Prentice Hall,Inc.,(1996). 3.Deformation & Fracture Mechanics of Engineering Materials, R.W. Hertzberg, John Wiley & Sons,Inc. (1989).								
Assessment Criteria					If any, mark as (X)		Percentage (%)		
	Midterm Exams				X		40		
	Quizzes								
	Homeworks								
	Projects								
	Term Paper								
	Laboratory Work								
	Other								
	Final Exam				X		60		
Instructors									
Week	Subject								
1	Historical Review,The Significance of Fracture Mekanics,The Griffith Energy Balance Approach								
2	The Stres Intensity Approach								
3	Determination of The Plastic Zone Size								
4	Lineer Elastic Fracture Mekanics:The Elastic Stres Field Equations								
5	Fracture Toughness:The Plane Strain Fracture Toughness(KIC),Plane Stres Fraction Toughness								
6	Determination of Stres Intensity Factors from Compliance								
7	First Midterm								
8	Elastic-Plastic Fracture Mechanics								
9	The J-Integral Method								
10	Other Fracture Test Methods:Impact Energy-Fracture Toghness Correlations								
11	Microstructural and Environmental Effects on Fracture								
12	Fatigue Crack Propagation and Fatigue Life Calculations								
13	Fatigue Crack Propagation and Fatigue Life Calculations								
14	Environment-Assisted Fracture;Corrosion Fatigue,Stres-Corrosion Cracking								