



AYDIN ADNAN MENDERES UNIVERSITY COURSE INFORMATION FORM

Course Title		Fracture Mechanics in Engineering Materials							
Course Code		MME628		Course Level		Third Cycle (Doctorate Degree)			
ECTS Credit	8	Workload	201 (Hours)	Theory	3	Practice	0	Laboratory	0
Objectives of the Course		Fracture mechanics course is interested three different engineering disciplines - Design engineer responsibilities for designing structures considering fracture behavior. - Material Engineering is responsible for studying and setting suitable mechanical features and developing material properties. - Control Engineers aim to research to defects causing fracture in structures. Fracture mechanics are important for all engineering disciplines.							
Course Content		Introduction, fracture in metals, Theoretical cohesive strength of metals, stress concentrations, Griffith criterion of fracture, Lineer elastic fracture mechanics, The fracture toughness parameters, Fracture toughness test methods and Fatigue fracture.							
Work Placement		N/A							
Planned Learning Activities and Teaching Methods				Explanation (Presentation), Demonstration, Discussion, Individual Study, Problem Solving					
Name of Lecturer(s)									

Prerequisites & Co-requisites

Language Requisite	Yes
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Assessment Methods and Criteria

Method	Quantity	Percentage (%)
Midterm Examination	1	30
Final Examination	1	50
Assignment	1	20

Recommended or Required Reading

1	Fracture Mechanics - An Introduction (E.E. Gdoutos), ISBN: 978-1-4020-2863-2 (Print) 978-1-4020-3153-3 (Online), 2005
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Week	Weekly Detailed Course Contents	
1	Theoretical	Definition, importance and history of fracture mechanics.
2	Theoretical	Fracture and kinds of fracture in metals. The parameters which effect of fracture.
3	Theoretical	Theoretical cohesive strength of metals.
4	Theoretical	Stress concentrations.
5	Theoretical	Griffith criterion of fracture.Mechanisms of crack growth
6	Theoretical	Lineer elastic fracture mechanics
7	Theoretical	The fracture toughness parameters
8	Theoretical	The relations of between the fracture toughness parameters
9	Theoretical	Importance of K in practice
10	Intermediate Exam	Midterm
11	Theoretical	Fracture toughness test methods
12	Theoretical	Fracture toughness test methods
13	Theoretical	Fatigue fracture
14	Theoretical	Fatigue fracture
15	Final Exam	Final exam

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	13	7	2	117
Assignment	7	2	1	21
Individual Work	1	15	2	17
Midterm Examination	1	20	3	23



Final Examination	1	20	3	23
Total Workload (Hours)				201
[Total Workload (Hours) / 25*] = ECTS				8
*25 hour workload is accepted as 1 ECTS				

Learning Outcomes

1	Learning the history of Fracture Mechanics
2	Defining the stress distributions and plastic zone at the linear elastic crack end
3	Defining the stress concentration factor and knows the applications
4	Learning the conditions of crack propagation under exhaustive and fatigue load
5	Learning the basic materials testing and properties in fracture mechanics
6	Solving fracture problems with individual finite elements (2D)

Programme Outcomes (Mechanical Engineering (English) Doctorate)

1	1. In Mathematics, natural sciences and mechanical engineering, department has the sufficient infrastructure; the ability to use the theoretical and practical information for engineering solutions
2	2. The ability to identify, define, and solve the formula for complex engineering problems; the ability to select and apply for the appropriate analytical methods and modelling techniques
3	3. To meet desired needs of a system, system component, or process, analysing and designing skill under realistic constraints; in this respect, the ability to apply the methods of modern design
4	4. The ability to use and choose modern techniques and tools for required engineering applications and; the ability to use information technology effectively
5	5. The ability to design the experiment, collect the data for the experiment and interpret to analysing results
6	6. The ability to use computer software and hardware information, access to information and other information sources
7	7. The ability to work individually and with multidisciplinary teams effectively, taking responsibility self-confidence for complex situations
8	8. The ability to communicate with foreign colleagues by having high level of foreign language knowledge in the field of engineering
9	9. Monitoring the science and technology developments and the ability to renew itself with innovative ideas constantly
10	10. Professional and ethical responsibility awareness
11	11. Having an adequate information and awareness in the subjects of occupational safety, occupational health, social security rights, quality control and management issues of environmental protection
12	12. The ability to appreciate the effects of engineering solutions and applications in universal and social dimensions
13	13. The ability to be enlightened to the experts or non-expert audience groups on the issues related with engineering problems and solutions written and oral
14	14. The ability to have adequate knowledge and skills in the project development and application, manage the activities planning, including the projects to the employees having the responsibility of the project by increasing vocational awareness

Contribution of Learning Outcomes to Programme Outcomes 1:Very Low, 2:Low, 3:Medium, 4:High, 5:Very High

	L1	L2	L3	L4	L5	L6
P1	4	5	4	5	4	5
P2	4	5	4	5	4	5
P3	5	5	5	5	4	5
P4	5	4	4	5	5	4
P5	4	5	3	4	5	4
P6	4	4	5	4	5	4
P7	5	3	5	4	4	3
P8	3	3	5	3	3	4
P9	5	5	4	3	5	5
P10	5	5	3	5	5	5
P11	5	5	5	3	4	5
P12	4	4	5	5	5	5
P13	5	5	5	5	5	4
P14	5	5	5	5	5	5

