AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title	Fatigue of Materials								
Course Code	MME606		Couse Level	Third Cycle (Doctorate Degree)					
ECTS Credit	9	Workload	250 *(Hours)*	Theory	3	Practice	0	Laboratory	0
Objectives of the Course	Mechanical Behavior of Materials is a course that combines the subject matter of fracture mechanics, fatigue (low cycle and high cycle), static failure analysis, and other related topics. Fracture mechanics will mainly focus on linear elastic fracture mechanics. Fatigue principles addressing both elasticity and plasticity will be presented. Notch effects will be discussed in addition to variable amplitude loading conditions. Multi-axial fatigue will also be discussed. This course includes only plastic deformation and fatigue. Fracture will be disscused in the first part of this module.								
Course Content	Structural integrity means ensuring safe operation of a structure considering different design criteria as well as uncertainties during the design and operational phases. A structure should withstand static, dynamic and variable loading conditions in order to ensure that failure does not occur within a specified design life and under specified loading conditions.								
Work Placement	N/A								
Planned Learning Activities and Teaching Methods	Explanation (Presentation), Discussion, Case Study, Project Based Study, Individual Study, Problem Solving								
Name of Lecturer(s)									

Prerequisites & Co-requisities	
Language Requisite	Yes

Assessment Methods and Criteria		
Method	Quantity	Percentage (%)
Midterm Examination	1	30
Final Examination	1	40
Term Assignment	3	30

Recommended or Required Reading	
1	Fatigue of Materials 2nd edition S. Suresh, Massachusetts Institute of Technology

Week	Weekly Detailed Course Contents	
1	Theoretical	Introduction and general information about materials
2	Theoretical	Fatigue of materials: introduction and stress based approach
3	Theoretical	Fatigue of materials: introduction and stress based approach
4	Theoretical	Stress based approach to fatigue: notched members
5	Theoretical	Stress based approach to fatigue: notched members
6	Theoretical	Plastic deformation behavior and models for materials
7	Theoretical	Stress-strain analysis of plastically deforming members
8	Intermediate Exam	Midterm
9	Theoretical	Stress-strain analysis of plastically deforming members
10	Theoretical	Strain based approach to fatigue
11	Theoretical	Strain based approach to fatigue
12	Theoretical	Time dependent behavior: creep and damping
13	Theoretical	Time dependent behavior: creep and damping
14	Theoretical	Time dependent behavior: creep and damping
15	Theoretical	Time dependent behavior: creep and damping
16	Final Exam	Final Exam

Workload Calculation				
Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	6	3	126
Assignment	4	4	1	20

Term Project	3	16	4	60
Midterm Examination	1	20	1	21
Final Examination	1	20	3	23
			Total Workload (Hours)	250
			[Total Workload (Hours) / 25*] = **ECTS**	10
**25 hour workload is accepted as 1 ECTS*				

Learning Outcomes	
1	The student should have a thorough understanding of Mechanics of Materials since the course will have a Mechanical Engineering approach rather than focusing on metallurgical aspects.
2	Comprehension of short and long term stress based fatigue
3	Comprehension of plastic deformation behavior
4	Comprrehension of fatigue tests
5	Assessment of fund of knowledge about creep and damping

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
P1	3	5	5	3	5
P2	5	5	4	4	5
P3	3	5	4	4	5
P4	3	5	4	5	4
P5	4	3	5	3	4
P6	4	4	4	4	4
P7	5	4	3	4	5
P8	5	5	5	5	5
P9	3	5	4	5	5
P10	5	3	4	5	4
P11	4	5	5	5	3
P12	4	5	5	3	3
P13	4	3	5	4	5
P14	5	4	3	4	5