AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title		Energy Absorption Behaviour of Engineering Structures							
Course Code		MME529		Couse Level		Second Cycle (Master's Degree)			
ECTS Credit	8	Workload	198 *(Hours)*	Theory	3	Practice	0	Laboratory	0
Objectives of the Course		The objective of the course is to teach the principles of energy absorption of materials and structures with emphasis on the underlying theory, assumptions, and modelling issues as well as providing detailed knowledge to engineers.							
Course Content		Applications of energy absorbing of materials and structures, design and selection of energy absorbing materials and structures, behavior of materials under static and dynamic loadings, experimental techniques, axial crushing of thin walled structures, impact on structures and inertial effects, cellular materials, composite materials, finite element simulations of impact/crushing							
Work Placement		N/A							
Planned Learning Activities and Teaching Methods				Explanation (Presentation), Demonstration, Discussion, Case Study, Project Based Study, Individual Study, Problem Solving					
Name of Lecturer(s)									

Assessment Methods and Criteria		
Method	Quantity	Percentage (%)
Midterm Examination	1	10
Final Examination	1	60
Assignment	5	20
Term Assignment	1	10

Recommended or Required Reading	
1	Energy Absorption of Structures and Materials, G. Lu, T. X. Yu, 2003, Woodhead Publishing ISBN-13: 978-1855736887, ISBN-10: 1855736888

Week	Weekly Detailed Course Contents	
2	Theoretical	Applications and design of EA structures and materials
3	Theoretical	Behavior of materials under static and dynamic loadings
4	Theoretical	Analysis of EA capacity
5	Theoretical	Determination of EA capacity by experimental techniques
6	Theoretical	Axial crushing of thin walled structures
7	Theoretical	Impact on structures and inertial effects
8	Intermediate Exam	Midterm Exam
9	Theoretical	Cellular materials
10	Theoretical	Composite materials
11	Theoretical	Finite element simulations of impact/crash/blast
12	Theoretical	Finite element simulations of impact/crash/blast
13	Theoretical	Finite element simulations of impact/crash/blast
14	Theoretical	Modelling examples
15	Theoretical	Modelling examples
16	Final Exam	Final Exam

Workload Calculation				
Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	9	2	4	54
Lecture - Practice	5	3	4	35
Assignment	5	3	5	40
Term Project	1	15	10	25
Midterm Examination	1	20	2	22

Final Examination	1	20	2	22
			Total Workload (Hours)	198
			[Total Workload (Hours) / 25*] = **ECTS**	8
**25 hour workload is accepted as 1 ECTS*				

Learning Outcomes	
1	Have knowledge about behavior of materials and structures subjected to dynamic loadings.
2	Have knowledge about recent materials and structures used for energy absorption
3	Have knowledge about structures used in automotive and defence industries.
4	Ability to create simulations of impact, crash and blast by the finite element method.
5	To able to simulate impact

Programme Outcomes *(Mechanical Engineering (English) Master)*	
1	To be able to access wide and deep information with scientific researches in the field of Engineering, evaluate, interpret and implement the knowledge gained in his/her field of study
2	To be able to complete and implement “limited or incomplete data” by using the scientific methods
3	To be able to consolidate engineering problems, develop proper method(s) to solve and apply the innovative solutions to them
4	To be able to develop new and original ideas and method(s), to develop new innovative solutions at design of system, component or process
5	To be able to gain comprehensive information on modern techniques, methods and their borders which are being applied to engineering
6	To be able to design and apply analytical, modeling and experimental based research, analyze and interpret the faced complex issues during the design and apply process
7	To be able to gain high level ability to define the required information and data
8	To be able to work in multi-disciplinary teams and to take responsibility to define approaches for complex situations
9	To be able to transfer of the process and results of studies at national and international environments systematic and clear verbal or written
10	To be able to be aware of social, scientific and ethical values guarding adequacy at all professional activities and at the stage of data collection, interpretation, and announcement
11	To be able to become aware of new and developing application of profession and ability to analyze and study on those applications
12	To be able to interpret engineering application’s social and environmental dimensions and it’s compliance with the social environment

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