AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title	Mechanics of Composite Materials						
Course Code	MME629		Couse Level	Third Cycle (Doctorate Degree)			
ECTS Credit	8	Workload	200 *(Hours)*	Theory	3	Practice	0	Laboratory	0
Objectives of the Course	The aim of this course is to introduce characteristics of composite materials and obtaining superior, lightweight materials from the combination of engineering materials and their properties which cannot be achieved metals and their alloys. In addition, introduction of material technology for aerospace, aviation, automotive and sports applications is planned						
Course Content	History of Composites, Composite and Alloy Concepts, Metal Matrix Composite Materials, Polymer Matrix Composite Materials, Ceramic and Glass-Based Composite Materials, Carbon-Carbon Composites, Nano Composites, Mechanisms to Increase Strength in Composite Materials, Basic Strength and Elastic Analysis Methods for Composites, Mechanisms to Increase Toughness in Ceramic Composites, Aerospace, Automotive and Structural Applications of Composites, Composites for Future Applications						
Work Placement	N/A						
Planned Learning Activities and Teaching Methods		Explanation (Presentation), Discussion, Case 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	60
Assignment	1	10

Recommended or Required Reading

1	Prof. Dr. Y. Şahin, Kompozit Malzemelere Giriş, Seçkin Yayıncılık 2. Halit Y. Ersoy, Kompozit Malzeme, Literatür Yayınları

Week	Weekly Detailed Course Contents	
1	Theoretical	History of Composites, Composite and Alloy Concepts
2	Theoretical	Metal Matrix Composite Materials
3	Theoretical	Mechanical Properties and Applications of Metal Matrix Composites
4	Theoretical	Polymer Matrix Composite Materials
5	Theoretical	Mechanical Properties and Applications of Polymer Matrix Composites
6	Theoretical	Ceramic and Glass-Based Composite Materials
7	Theoretical	Thermal Shock and Fracture Toughness in Ceramic Composites
8	Intermediate Exam	Midterm Exam
9	Theoretical	Carbon-Carbon Composites
10	Theoretical	Nano Composites
11	Theoretical	Strength Increase Mechanisms of Composites
12	Theoretical	Basic Strength and Elastic Analysis Methods for Composites
13	Theoretical	Toughness Increase Mechanisms of Ceramic Composites
14	Theoretical	Aerospace, Automotive and Structural Applications of Composites
15	Theoretical	Composites for Future Applications
16	Final Exam	Final Exam

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	6	3	126
Assignment	7	3	1	28
Midterm Examination	1	20	3	23

Final Examination	1	20	3	23
		Total Workload (Hours)		200
		[Total Workload (Hours) / 25*] = **ECTS**		8

*25 hour workload is accepted as 1 ECTS

Learning Outcomes

1	Understands alloys, alloy concepts and differences
2	Understands production objectives and importance of composite materials
3	Understands the principles of use of metal matrix composites in place of metal matrix
4	Learns basic manufacturing methods of polymer and composites and understands the characteristics of adaptive criteria to industry
5	Learns mechanisms of increase in thermal shock and fracture toughness of ceramic composites and understands the importance in the practice
6	Understands the manufacturing, application and properties of carbon-based composites
7	Understands estimating the mechanical properties of composites and learns how to do the analysis of produced composites

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	L7
P1	5	4	5	4	5	3	5
P2	5	4	5	3	5	4	4
P3	5	4	4	3	5	5	4
P4	5	3	4	4	4	5	5
P5	4	3	4	5	4	4	5
P6	4	5	5	5	3	3	5
P7	3	5	5	4	3	3	4
P8	5	5	4	5	5	3	5
P9	3	4	3	5	5	4	5
P10	5	3	5	4	5	5	5
P11	3	5	5	3	5	5	5
P12	3	5	5	5	5	5	4
P13	4	4	5	5	4	5	3
P14	4	5	5	5	5	5	5