



## AYDIN ADNAN MENDERES UNIVERSITY COURSE INFORMATION FORM

Course Title		Surface Engineering							
Course Code		MME608		Course Level		Third Cycle (Doctorate Degree)			
ECTS Credit	9	Workload	230 ( <i>Hours</i> )	Theory	3	Practice	0	Laboratory	0
Objectives of the Course		Objectives of this course are: having the student’s ability to understand the engineering surface modifications methods and their properties and using these concepts in engineering application and search the literature and prepares an over view article on a coating. The Course of Surfaces Engineering as an Overview of the surface treatments and covers engineering surface and interfaces and the engineering coatings and the classics surface hardened methods and searching literature.							
Course Content		Objectives of this course are: having the student’s ability to understand the engineering surface modifications methods and their properties and using these concepts in engineering application and search the literature and prepares an over view article on a coating. The Course of Surfaces Engineering as an Overview of the surface treatments and covers engineering surface and interfaces and the engineering coatings and the classics surface hardened methods and searching literature.							
Work Placement		N/A							
Planned Learning Activities and Teaching Methods				Explanation (Presentation), Discussion, Project Based Study, Individual Study					
Name of Lecturer(s)									

### Prerequisites & Co-requisites

Language Requisite	Yes
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### Assessment Methods and Criteria

Method	Quantity	Percentage (%)
Midterm Examination	1	15
Final Examination	1	60
Quiz	4	15
Assignment	5	5
Term Assignment	1	5

### Recommended or Required Reading

1	Surface Engineering" Volume 5, ASM Handbook. ASM International Handbook Committee. 1994.
2	Tribology Hand Book" Micael Meale, 2. Edition 1999.
3	Contact Mechanics and Friction Physical Principles and Applications" Valentin L. Popov, 2010.
4	Principles of Materials Science and Engineering, William F. Smith, 1990.
5	CALLISTER, Jr.W. D.: "Material Science and Engineering", John Wiley and Sons Inc., New York, 2003

Week	Weekly Detailed Course Contents	
1	Theoretical	Introduction to The Surface Engineering.
2	Theoretical	The Surfaces and Mechanical Properties (Surface Energies, hardness, and ...).
3	Theoretical	The Surface layers (Atmospherics layers, hardness surface characteristics, diffusion layer...).
4	Theoretical	The classics surface hardening methods (quenching, nitriding and boring).
5	Theoretical	Some Engineering Coatings (electroplating, PVD, CVD...).
6	Theoretical	The surface parameters and measurements methods (Hardness Measurements, Microstructure, X-Ray, TEM, SEM ...).
7	Theoretical	Searching literature (WEB of Science, Science Direct, Electronics books and library YOK searching catalogs...).
8	Intermediate Exam	Midterm Exam
9	Theoretical	Searching literature (WEB of Science, Science Direct, Electronics books and library YOK searching catalogs...).
10	Theoretical	The surface parameters and measurements methods (Hardness Measurements, Microstructure, X-Ray, TEM, SEM ...).
11	Theoretical	The surface parameters and measurements methods.
12	Theoretical	Modern Surface Modifications Methods.



13	Theoretical	Presents a Modern Surface Modifications Method which was prepares by each student using search literature.
14	Theoretical	Presents a Modern Surface Modifications Method which was prepares by each student using search literature.
15	Theoretical	Presents a Modern Surface Modifications Method which was prepares by each student using search literature.
16	Final Exam	Final Exam

**Workload Calculation**

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	6	4	140
Assignment	5	0	3	15
Term Project	1	15	10	25
Quiz	4	3	1	16
Midterm Examination	1	20	2	22
Final Examination	1	10	2	12
Total Workload (Hours)				230
[Total Workload (Hours) / 25*] = ECTS				9

\*25 hour workload is accepted as 1 ECTS

**Learning Outcomes**

1	Learns the concept of surface.
2	Knows the importance in increasing the material life of the surfaces.
3	Analysis the techniques for improving surface properties
4	Makes the selection in terms of the usage sites of technologies.
5	Understands the surface processes in terms of the heat treatment.
6	Makes the selection of surface treatments according to usage.

**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	5	3	5	4
P2	4	5	4	4	5	5
P3	5	5	4	4	5	5



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

