AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title	Natural Energy Sources								
Course Code	MME604		Couse Level	Third Cycle (Doctorate Degree)					
ECTS Credit	9	Workload	228 *(Hours)*	Theory	3	Practice	0	Laboratory	0
Objectives of the Course	Purpose of this course is to advance knowledge the graduate student about energy resources, fossil and renewable energy resources, solar energy, use of biogas and production, natural gas, geothermal energy, wind energy, tidal energy, wave energy, biomass fuels, biodiesel fuels								
Course Content	Introduction alternative energy sources, teach the potential of alternative energy sources in the world and each environmental effects and economical analyse of them.								
Work Placement	N/A								
Planned Learning Activities and Teaching Methods	Explanation (Presentation), Demonstration, Discussion, Individual Study, Problem Solving								
Name of Lecturer(s)									

Prerequisites & Co-requisities	
Language Requisite	Yes

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	Advanced Renewable Energy Sources, G. N. Tiwari, Rajeev Kumar Mishra

Week	Weekly Detailed Course Contents	
1	Theoretical	Present-Day energy sources use, The use of energy in Turkey and World and its potential
2	Theoretical	The energy problems of modern societies, environmental problems, sustainability problems
3	Theoretical	Renewable energy sources and their origins
4	Theoretical	Solar thermal energy, active solar heating, passive solar heating
5	Theoretical	Solar photovoltaic, their technologic properties, the effect of economic and environmental
6	Theoretical	Biomass; general potential in the World and Turkey, techniques of energy conversion
7	Theoretical	Hydroelectricity, hydraulic turbines, the analysis of their economic and environmental
8	Intermediate Exam	Midterm exam
9	Theoretical	Tidal energy (ocean energy), techniques of energy conversion, economical factors
10	Theoretical	Wind energy, wind turbines, the analysis of their economic and environmental
11	Theoretical	Wave energy, technologies of energy conversion, the factors of economic and environmental
12	Theoretical	Nuclear energy, technologies of energy conversion, the factors of economic and environmental
13	Theoretical	Bio-fuels, bio-diesel, methyl esters, alcohols
14	Theoretical	Fuel batteries, their technology, the factors of economic and environmental
15	Theoretical	Energy estimating for future, cost and sustainability analysis for renewable energy sources
16	Final Exam	Final Exam

Workload Calculation				
Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	16	5	3	128
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	20	2	22
			Total Workload (Hours)	228
			[Total Workload (Hours) / 25*] = **ECTS**	9
**25 hour workload is accepted as 1 ECTS*				

Learning Outcomes	
1	To have knowledge about alternative energy sources except to conventional energy sources.
2	To examine the effects of environmental and economical of them
3	To learn the alternative energy source
4	To learn types of alternative energy sources
5	To learn sustainable energy

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