ABDULLAH GÜL UNIVERSITY
GRADUATE SCHOOL OF ENGINNERING & SCIENCE
INDUSTRIAL ENGINEERING DEPARTMENT
COURSE DESCRIPTION AND APPLICATION INFORMATION

Course Name	Code	Semester	T+P Hour	Credit	ECTS
Sustainable Energy Systems	IE 554	Fall-Spring	3 + 0	3	10

Prerequisites	IE 511 Mathematical Modeling, IE 521 Probability Theory

Course Type	Elective
Course Language	English
Course Coordinator	Assist. Prof. Muhammed Sütçü
Course Instructor	Assist. Prof. Muhammed Sütçü
Course Assistant	
Course Objective	Energy systems, the sources of these energies, the techniques for bringing them out, and the technologies to make them ready to use will be discussed. How the 21st century energy needs can be met locally and globally will be presented. In addition, energy technologies will be discussed according to the geographical and strategic position of different countries. Students will learn to develop mathematical models on energy taking into account engineering, political, social, economic and environmental factors and will learn to analyze the results.
Course Learning Outcomes	1.Reaching, evaluating and interpreting the information with the scientific research in the field of Renewable and Fossil-based Energy 2.Ability to use science and engineering knowledge for developing new methods in the fields of Industrial Engineering and Energy systems 3.Designing and implementing analytical, modeling and experimental based research 4.Solving and interpreting the encountered problems with mathematical modeling methods 5.Collecting and interpreting the data, considering the social, scientific and ethical values 6.Completion of knowledge using scientific methods using data, integrating data with different disciplinary knowledge with the help of application and scientific methods 7. To gain leadership and leadership skills in disciplinary and interdisciplinary team work 8. To be able to contribute to the solution of social, scientific and ethical problems in energy systems 9. To be able to define, interpret and create new information about the interaction between the related disciplines of the field of Energy Systems and Industrial Engineering
Course Content	

WEEKLY SUBJECTS AND RELATED PRELIMINARY PREPARATION PAGES

Week	Subjects	Preliminary
1	Revision of renewable technologies	
2	Economics of energy systems	
3	Fossil based fuels	
4	Climate change and climate modeling	
5	Wind power	
6	Hydroelectric Energy	
7	Solar energy	
8	Galvanic Energy and Progress Report Presentations	
9	Thermoelectric Energy and Fuel Cells	
10	Midterm	
11	Energy conversions	
12	Integration of renewable energy production into electrical systems	
13	Energy Storage Technologies	
14	Economic evaluation of renewable and conventional energies	
15	Final Project Presentations	
16	Final exam	

SOURCES

Lecture Notes	Lecture notes and slides of this course will be shared with the students during the semester via Canvas

Other Sources	*Textbook:* There is no compulsory book pertaining to the course. Instead, articles selected from the literature according to the topic will be read every week. *Supplementary Books:* No books are available. Academic articles and book chapters selected from different sources for reading

Sources Sharing	
Documents	Lecture notes, slides, and modular model set
Homeworks	5-6 homeworks will be given during the semester related to the topic being processed every week.
Exams	1 midterm and 1 final exam
Project	A research project on energy systems to be carried out during the term

EVALUATION SYSTEM		
ACTIVITIES	**NUMBER**	**WEIGHT**
Midterm Exam	1	%20
Quizzes	5	%15
Homework	5	%15
Project	1	%20
Final Exam	1	%30
TOTAL		%100
Within Semester Activities Succes Rate		%70
Final Exam Succes Rate		%30
TOTAL		%100

Course Category	
Natural Science and Mathematics	%20
Engineering Science	%80
Social Science	%0

LEARNING OUTCOMES AND PROGRAM QUALIFICATIONS RELATIONSHIP

No	Program Qualification	Contribution Level				
		1	2	3	4	5
1	To be able to access, evaluate and interpret information by doing scientific research in the field of renewable and fossil energy					x
2	Ability to use science and engineering knowledge for new method development in the areas of Industrial Engineering and Energy systems					x
3	Design and implement analytical, modeling and experimental based research					x
4	Solving and interpreting the encountered problems with mathematical modeling methods					x
5	Observing social, scientific and ethical values during the collection and interpretation of data				x	
6	Completion of information by means of scientific methods using data and integration of this knowledge with inormation of different disciplines with the help of application and scientific methods			x		
7	To gain leadership and leadership skills in disciplinary and interdisciplinary team work					x
8	To be able to contribute to the solution of social, scientific and ethical problems in energy systems					x
9	To be able to define, interpret and create new information about the interaction between the related disciplines in the field of Energy Systems and Industrial Engineering					x

* It is in the increasing order from 1 to 5.

ECTS / WORK LOAD TABLE

Activities	Activity	Duration (Hour)	Total Work Load
Course Duration (includes exam week: 16x total course hours)	16	3	48

Out-of-class study time (Pre-study, practice)	16	5	90
Internet browsing, library work	16	4	64
Presentations	2	15	30
Homework	5	12	60
Midterm	1	20	20
Total Work Load			312
Total Work Load / 30			10.4
Course ECTS CREDİT			10