DEPARTMENT OF ENERGY SCIENCE AND TECHNOLOGY
COURSE SYLLABUS

Course Details								
Code					**Academic Year**			**Semester**
EBT201					2			3
Title					**T**	**A**	**L**	**ECTS**
Renewable Energy Technologies					3	1	0	6
Language	German							
Level	**Undergraduate**	**X**	**Graduate**		**Postgraduate**			
Department / Program	Energy Science and Technology							
Forms of Teaching and Learning	Face-to-face							
Course Type	**Compulsory**	**X**	**Elective**					
Objectives	To enable students to have an idea about energy management by improving their knowledge and skills about renewable energy and new technologies in this field.							
Content	Meteorology and geographical effects, Wind Turbines: Systematics, basic calculations, structure and behavior of components, Electricity generating wind turbines: Application areas, system examples, functional structures, Control methods, Storage, Economic evaluation, Legal aspects, Accumulators, Fundamentals of photovoltaic systems, Fuel Cells, Adaptation and application of DC voltage sources (solar panels, fuel cells, batteries, ...)							
Prerequisites	None							
Coordinator	Asist Prof.Dr. Meltem Karaismailoğlu Elibol							
Lecturer(s)	Asist Prof.Dr. Meltem Karaismailoğlu Elibol							
Assistant(s)	Res. Asst. Elvan Burcu Koşma							
Work Placement	None							

Recommended or Required Reading	
Books / Lecture Notes	Crastan, V. (2012): Elektrische Energieversorgung 1, Springer Verlag. Crastan, V.(2011): Elektrische Energieversorgung 2, Springer Verlag
Other Sources	

Additional Course Material	
Documents	
Assignments	
Exams	

Course Composition		
Mathematics und Basic Sciences	30	%
Engineering	40	%

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Engineering Design	10	%
Social Sciences	-	%
Educational Sciences	-	%
Natural Sciences	20	%
Health Sciences	-	%
Expert Knowledge	-	%

Assessment

Activity	Count	Percentage (%)
Midterm Exam	-	-
Quiz	-	-
Assignments	-	-
Attendance	-	-
Recitations	-	-
Projects	1	40
Final Exam	1	60
	Total	**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	14	3	42
Self-Study	14	3	42
Assignments	2	25	50
Presentation / Seminar Preparation	1	1	1
Midterm Exam			
Recitations	14	1	14
Laboratory			
Projects	1	15	15
Final Exam	1	3	3
		Total Work Load	**167**
		ECTS Points (Total Work Load / Hour)	**6**

Learning Outcomes

1	Students know selected subfields of energy technology. They can apply basic knowledge to practical questions of technical energy conversion.
2	Students will be able to describe, compare and evaluate technical systems and components for generating energy from solar, wind, biomass, hydrogen, geothermal energy and water.
3	Defining the physical relationships and technical characteristics of energy production from solar, wind, biomass, hydrogen, geothermal and hydroelectric energy; storage of electricity and its connection with electricity grids distribution.

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4	Students understand the principles of the energetic use of renewable energies, know the technical structure and efficiency of different energy systems and can evaluate the technical and economic potential of renewable energy use.
5	They can analyze and make recommendations on technical, energetic, economic and environmental systems for a defined location.
6	Students understand renewable energy technologies so that they can understand the technology and framework conditions and apply them to new questions and evaluate various future options for improving the efficiency of energy supply. They will be able to identify advantages and disadvantages over conventional energy systems.

Weekly Content	
1	Introduction to energy systems and sources
2	Energy, sustainability and environment
3	Quantitative evaluation of energy and energy arithmetic
4	Solar Energy Technologies
5	Solar Energy Technologies
6	Geothermal Energy Technologies
7	Biomass Technologies
8	Midterm Week
9	Hydrogen
10	Fuel Cells
11	Fuel Cells
12	Next Generation Batteries
13	Wind Energy Technologies
14	Hydrothermal Energy Technologies
15	Final Exam

Contribution of Learning Outcomes to Program Objectives (1-5)

	P1	P2	P3	P4	P5	P6	P7	P8	P9
1	3	1	4	4	4	2	5	5	5
2	3	3	4	5	4	1	5	5	5
3	3	2	4	5	4	1	4	4	5
4	4	1	4	4	4	1	4	3	5
5	4	2	4	4	4	1	2	4	5
6	4	2	4	4	4	1	3	4	5

Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High

Program Learning Outcomes: With the successful completion of this program, students will be able to

1 : Awareness of the necessity of lifelong learning; accessibility, monitoring and self-adaptation in science and technology.
2 : Capability to identify, define, formulate and solve energy systems problems; the ability to select and apply appropriate analysis methods for this purpose.
3 : Ability to utilize scientific and engineering knowledge.
4 : Ability to design and conduct experiments and to analyze and interpret data.
5 : Ability to work in groups and perform interdisciplinary research.

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6 : The capability to design a system, component, or process to meet applicable constraints (economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability). **7 :** The opportunity to gain theoretical and practical knowledge in the field of energy, as well as the ability to contribute to it by keeping up with the developments. **8 :** The ability to have the necessary tools in academic and professional settings, as well as effective communication and responsibility. **9 :** Opportunity to gain German language skills to the extent of reading, interpreting, and presenting academic texts.	
Compiled by:	Res. Asst. Elvan Burcu Koşma
Date of Compilation:	04.04.2024