

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						
Lecturer(s)						
Assistant(s)						
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				%	
Engineering Design	10				%	
Social Sciences	-				%	
Educational Sciences	-				%	

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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	20	40
Presentation / Seminar Preparation	1	1	1
Midterm Exam			
Recitations	14	3	42
Laboratory			
Projects	1	10	10
Final Exam	1	3	3
Total Work Load			180
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.		
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.		

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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
1	3	1	4	3	1	2	3
2	3	3	4	4	2	4	4
3	3	2	4	5	3	4	5
4	4	1	4	4	3	5	5
5	4	2	4	5	2	4	5
6	4	2	4	4	2	4	4
Contribution Level		1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High					
<p><b>P1 Working with modern scientific sources.</b></p> <p><b>P2 Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.</b></p> <p><b>P3 Having theoretical and practical skills in the area of Energy Science and Technology.</b></p> <p><b>P4 Having foreign language skills to follow the worldwide advancements in the field of Energy Science and Technology and to be able to discuss them with foreign colleagues.</b></p> <p><b>P5 Having computational skills for research data analysis purposes.</b></p> <p><b>P6 Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.</b></p> <p><b>P7 Having knowledge about work occupational work and safety.</b></p>							
Compiled by:		Res. Asst. Elvan Burcu Koşma					
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