

DEPARTMENT OF ENERGY SCIENCE AND TECHNOLOGIES COURSE SYLLABUS

Course Details									
Code					Academic Year			Semester	
EBT310				2	2024			Spring	
Title					- /	Α	L	ECTS	
Renewable Energy – Materials, Component	s, Function			Э	}	1	0	6	
Language	German								
Level	Undergr X Graduate			e	Postgraduate				
Department / Program	Energy Scie	Energy Science and Technologies							
Forms of Teaching and Learning	Face to Face	e							
Course Type	Compulsor	у			Elective			х	
Objectives	Renewable energy sources Renewable energy technologies Materials in renewable energy Technologies Ceramics and ceramic-composites uses in energy Technologies Energy Storage Technologies Heat Pumps				ies				
Content	Renewable energy sources, wind and solar energy, fuel cells, wave and tidal energy, heat pumps, energy storage technologies, renewable energy materials, ceramics, ceramic-composites, polymers,								
Prerequisites	-								
Coordinator	Prof. Dr. Mi	chael Scheffle	۱r						
Lecturer(s)	Prof. Dr. Mi	chael Scheffle	er						
Assistant(s)									
Work Placement									
Recommended or Required Reading									
Books / Lecture Notes	Harald Bolt, Isolde Arzberger, Christina Berger; (2017). Werkstoffe und Materialien für die Energiewende. Sven Geitmann; (2010). Erneuerbare Energien mit neuer Energie in die Zukunft. Matthias Günther; (2014). Energieeffizienz durch Erneuerbare Energien Möglichkeiten, Potenziale, Systeme.				e und in die nergien				
Other Sources									
Additional Course Material									
Documents									



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Assignments		
Exams		
Course Composition		
Mathematics und Basic Sciences	25	%
Engineering	25	%
Engineering Design	25	%
Social Sciences		%
Educational Sciences		%
Natural Sciences	25	%
Health Sciences		%
Expert Knowledge		%
Assessment		
Activity	Count	Percentage (%)
Midterm Exam	1	40
Quiz		
Assignments		
Attendance		
Recitations		
Projects		
Final Exam	1	60
	Total	100
ECTS Deints and Work Load		

Activity	Count	Duration	Work Load (Hours)			
Lectures	13	3	39			
Self-Study	14	7	98			
Assignments	14	2	28			
Presentation / Seminar Preparation						
Midterm Exam	1	2	2			
Recitations						
Laboratory						
Projects						
Final Exam	1	2	2			
Total Work Load 169						
ECTS Points (Total Work Load / Hours) 6						
Learning Outcomes						
Students know selected subfields of energy technology. They can apply basic knowledge to practical						

Students know selected subfields of energy technology. They can apply basic knowledge to practical questions of technical energy conversion.



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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 t structure and efficience potential of renewable	he principl cy of differe e energy us	les of the ene ent energy sy se.	rgetic use of stems and ca	renewable energies, n evaluate the techn	know the techn ical and econor	nical nic
5	They can analyze and systems for a defined	make reco location.	mmendation	s on technical	, energetic, economi	ic and environm	nental
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 Renew	able Energ	ξγ				
2	Renewable Sources						
3	Renewable Energy Systems						
4	Solar Energy and Types of Solar Energy Systems						
5	Materials and Components of Solar Energy Systems						
6	Wind Energy and Off-shore/ On-shore Wind Turbines						
7	Materials and Component of Wind Turbines						
8	Midterm						
9	Energy Storage Technologies & Batteries						
10	Fuel Cells						
11	Ceramic and Ceramic based materials in Renewable Energy Technologies						
12	Polymers and Polymer based materials in Renewable Energy Technologies						
13	New Generation and Advanced Materials in Renewables						
14	New Generation and Advanced Materials in Renewables						
15	Final exam						
Contribution of Learning Outcomes to Program Objectives (1-5)							
	P1	P2	P3	P4	Р5	P6	P7
1	3	4	4	5	2	5	3
2	4	4	4	5	3	4	3
3	3	3	4	5	2	5	3
4	4	3	4	5	2	4	3
5	4	4	4	5	3	4	3
6	3	4	4	5	2	5	3
7	4	3	4	5	2	5	3
8	4	2	Δ	5	2	5	2



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9	3	3	4	5	3	4	3
10	3	4	4	5	2	5	3
11	3	3	4	5	3	4	3
12	4	4	4	5	2	5	3
Contribution Level 1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High							
P1 Working with mo P2 Having modern so P3 Having theoretica P4 Having foreign lan to be able to discuss P5 Having computati P6 Having appropria P7 Having knowledg	dern scientific sourc cientific knowledge a al and practical skills nguage skills to follor them with foreign c ional skills for resear te skills for academic e about work occupa	es. and scientific in the area of w the worldw olleagues. rch data analy c and industri ational work a	analysis abili f Energy Scier vide advance vsis purposes al jobs, being and safety.	ties and bein nce and Tech ments in the g ready to tak	g able to apply them nology. field of Energy Scier te responsibility in w	n to scientific pr nce and Technol vorking life.	oblems. logy and

Compiled by:	Res. Asst. Fuat Berke Gül
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