

Course Details									
Code					Academic Year			Semester	
EBT307	7				3			5	
Title					т	Α	L	ECTS	
Introduction to Raw Materials an	id Energy				2	1	1	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	Teaching the raw materials and resources that provide heat, electricity and chemical energy production, transferring the process of extracting raw materials and resources as minerals, processing them and turning them into energy sources. Teaching the students all the stages of transformation of a raw material from its inception to its recycling and transformation into waste, by showing all the operational stages of energy systems using raw materials and resources.								
Content	Description of raw material, classification, mineral raw materials, raw materials for environmental protection, raw materials for energy field, zeolite. Determination of above- ground and underground energy resources, Extraction of energy resources and mining operations, Raw material usage methods, Nuclear power plants fuels. The Concept of Characterization of Energy Raw Materials, Basic Principles and Methods, Laboratory Characterization and Tests, Scientific Thought Method, Research Types and Data Collection Methods.								
Prerequisites	None								
Coordinator									
Lecturer(s)									
Assistant(s)									
Work Placement	None								
Recommended or Required Reading									
Books / Lecture Notes	 GAJEWSKI, W.: Werkstoffe für Katalysatoren im Umweltschutz cfi/Ber. DKG, Wiesbaden 68(1991)3. Pohl, W. (2005). Mineralische und Energie-Rohstoffe: eine Einführung zur Entstehung und nachhaltigen Nutzung von Lagerstätten. Schweizerbart. Fundamentals of Materials for Energy and Environmental Sustainability Edited by David Ginley and David Cahen, Cambridge University Press. 								
Other Sources	LASCHKA, D.; STRIEBEL, T.; DAUB, J.: Platin im Regenabfluß einer Straße. Umweltwissenschaften und Schadstoff-Forschung, 8(1996)3.				r Straße				



	HEINTZ, A.; REINHARDT, G.: Wiesbaden RÖSLER, H. J.: Grundstoffindustrie, Leipzig 19	Chemie und Umwelt Vie Lehrbuch der Mineralogie. 7	eweg & Sohn, Braunschweig/ - VEB Deutscher Verlag für
Additional Course Material			
Documents			
Assignments			
Exams			
Course Composition			
Mathematics und Basic Sciences	20)	%
Engineering	20	1	%
Engineering Design			%
Social Sciences			%
Educational Sciences			%
Natural Sciences	20)	%
Health Sciences			%
Expert Knowledge	40	%	
Assessment			
Activity	Cou	Percentage (%)	
Midterm Exam	1		30
Quiz			
Assignments			
Attendance			
Attendance Recitations			
Attendance Recitations Projects	1		20
Attendance Recitations Projects Final Exam	1		20 50
Attendance Recitations Projects Final Exam	1	Total	20 50 100
Attendance Recitations Projects Final Exam ECTS Points and Work Load	1	Total	20 50 100
Attendance Recitations Projects Final Exam ECTS Points and Work Load Activity	1 1 1 Count	Total	20 50 100 Work Load (Hours)
Attendance Recitations Projects Final Exam ECTS Points and Work Load Activity Lectures	1 1 1 Count 13	Total Duration 2	20 50 100 Work Load (Hours) 26

Self-Study	14	6	84
Assignments			
Presentation / Seminar Preparation			
Midterm Exam	1	2	2
Recitations	15	2	30
Laboratory			
Projects	1	30	30



Final Exam		-	1 2			2		
		Total Work Load			174			
			ECTS Poi	nts (Total Work	Load / Hour)	6	;	
Learning Outcomes								
1	1 Basic Principles of Characterization of Energy Raw Materials							
2	2 Energy Raw Materials Characterization Laboratory, It will then focus on electrochemical, chemical, and nuclear functional materials.							
3	 Importance of Characterization for Energy Raw Material Industries Introduction of green process with effective use of resources. Fast depletion of natural resources and environmental impacts. Synthesis and use of chemicals. Basic principles of equilibrium and rate concepts in physical and chemical processes. 							
4	Importance of	Characterizatio	n for Energy Rav	w Material Indus	tries			
Weekly Conter	nt							
1	1 Introduction to Characterization of Energy Raw Materials							
2	Critical raw materials and their role in achieving a sustainable transition							
3	3 Introduction Sampling and Physical Characterization Methods							
4 Analysis of the importance of material systems and dynamics and review environmental impacts of raw materials								
5	Particle Size Analysis Methods							
6	Laboratory-Particle Size Analysis							
7 Electrochemical energy conversion								
8 Midterm								
9	Catalytic conversion							
10	Nuclear fuels							
11	11 Basic Principles of Instrumental Analysis							
12 XRF and XRD Methods								
13	Laboratory-TGA-DTA							
14 Wet-type Chemical Analysis								
15 Final exam								
Contribution of Learning Outcomes to Program Objectives (1-5)								
	P1	P2	P3	P4	P5	P6	P7	
1	5	5	4	5	4	5	5	
2	4	5	5	4	5	4	5	
3	5	4	5	3	5	5	5	
4	4	5	4	5	5	3	4	
Contribution Lev	Contribution Level1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High							
P1 Working with modern scientific sources.								

P2 Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems. P3 Having theoretical and practical skills in the area of Energy Science and Technology.



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.
 P5 Having computational skills for research data analysis purposes.

P6 Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.

P7 Having knowledge about work occupational work and safety.

Compiled by:	Res. Asst. Yusuf Karakaş				
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