DEPARTMENT OF ENERGY SCIENCE AND TECHNOLOGIES
COURSE SYLLABUS

Course Details				
Code	**Academic Year**			**Semester**
EBT317	4			7
Title	**T**	**A**	**L**	**ECTS**
Advanced Nuclear Energy	3	2	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**		**Elective**	**X**		
Objectives	This course aims to explore, explain, and evaluate the principles of nuclear reactors, nuclear energy processes, and nuclear fuel cycles. It will focus on energy production from nuclear reactions such as fission and fusion, and the conversion of this energy into electrical energy.					
Content	This course covers the principles of nuclear reactors, nuclear energy processes, and nuclear fuel cycles. Additionally, it includes energy production through fission and fusion reactions, the conversion of this energy into electrical energy, and related engineering applications.					
Prerequisites	-					
Coordinator	Asst. Prof. Dr. Elif Yunt					
Lecturer(s)	Asst. Prof. Dr. Elif Yunt					
Assistant(s)						
Work Placement	None					

Recommended or Required Reading	
Books / Lecture Notes	Einführung in die Kernphysik, Harry Friedmann, Wiley
Other Sources	J.R. and Baratta, A.J., Introduction to Nuclear Engineering, Lamarsh, 3rd Edition, Prentice- Hall.

Additional Course Material	
Documents	
Assignments	
Exams	

Course Composition		
Mathematics und Basic Sciences		%
Engineering	50	%
Engineering Design		%

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Social Sciences		%
Educational Sciences		%
Natural Sciences	50	%
Health Sciences		%
Expert Knowledge		%

Assessment

Activity	Count	Percentage (%)
Midterm Exam	1	30
Quiz	4	20
Assignments	2	10
Attendance		
Recitations		
Projects		
Final Exam	1	40
	Total	**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	14	3	42
Self-Study	10	9	90
Assignments	2	2	4
Presentation / Seminar Preparation			
Midterm Exam	1	2	2
Recitations	14	2	28
Laboratory			
Projects			
Final Exam	1	2	2
		Total Work Load	**168**
		ECTS Points (Total Work Load / Hours)	**6**

Learning Outcomes

1	The student can analyze, apply, and interpret nuclear energy calculations.
2	The student can understand, explain, and evaluate nuclear energy processes.
3	The student can understand, explain, and analyze the process of electricity generation from nuclear energy.

Weekly Content

1	Introduction to Nuclear Processes
2	Nuclear Energetics: Binding Energy and Q-Values

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3	Principles of Nuclear Reactors
4	Neutron Moderation
5	Nuclear Electric power
6	Water Reactors
7	Nuclear Fuel Cycle
8	Midterm
9	Thermoelectric Electrical Generators
10	Types of Nuclear Reactors
11	Nuclear Technology in Industry
12	Nuclear Technology in Research
13	Medical Applications of Nuclear Technology I
14	Medical Applications of Nuclear Technology II
15	Overview
16	Final Exam

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

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

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

Compiled by:	
Date of Compilation:	