DEPARTMENT OF ENERGY SCİENCE AND TECHNOLOGY
COURSE SYLLABUS

Course Details							
Code				**Academic Year**			**Semester**
EBT316				2			**3**
Title				**T**	**A**	**L**	**ECTS**
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**	*			
Objectives	Main topics of nuclear engineering education such as reactor physics, reactor technology, reactor safety, health physics, radiation physics and technology will be investigated						
Content	Radiation physics and technology. Nuclear reactor systems and types; basic reactor physics; criticality calculations; fuel cycles; reactivity changes; reactor kinetics. Instrumentation and control, radiation protection. Reactor materials, shielding, energy withdrawal. Reactor safety and economics. Waste treatment. Reactor design.						
Prerequisites	None						
Coordinator	Asst. Prof. Elif Yunt						
Lecturer(s)							
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						%

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Engineering Design	-	%
Social Sciences	-	%
Educational Sciences	-	%
Natural Sciences	50	%
Health Sciences	-	%
Expert Knowledge	-	%

Assessment

Activity	Count	Percentage (%)
Midterm Exam	1	%40
Quiz	4	%20
Assignments	-	-
Attendance	-	-
Recitations	--	-
Projects	-	-
Final Exam	1	%40
	Summe	**100**

ECTS Points and Work Load

	Count	Duration	Work Load (Hours)
Activity	14	5	70
Lectures	14	8	112
Self-Study			
Assignments			
Presentation / Seminar Preparation	1	2	2
Midterm Exam			
Recitations			
Laboratory			
Projects	1	2	2
		Total Work Load	**186**
		ECTS Points (Total Work Load / Hours)	**6**

Learning Outcomes

1	To learn the foundations of nuclear physics
2	To have knowledge about nuclear technologies.
3	To have knowledge about radiation, radiation units, usage areas.
4	To have knowledge about nuclear energy production
5	To be familiar with the terminology of nuclear technologies.

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6	To have basic knowledge about energy production by nuclear fission.
7	To know the formation and results of nuclear reactions
8	To have basic knowledge about nuclear safety and waste management.
9	To have knowledge about radiation safety.
10	
11	
12	
Weekly Content	
1	Introduction to Nuclear Physics
2	Radioactivity
3	Binding Energy and Nuclear Power
4	Decay Series
5	Impact cross section
6	Quantum mechanical aspects
7	Dosimetry and Biological effects of Radiation
8	Midterm
9	Nuclear fission
10	Types of Nuclear Reactors
11	Nuclear Fusion and Fusion reactors
12	Security assesment and risks
13	Interaction of radiation with matter: Charged particles and Matter
14	Interaction of radiation with matter: Neutrons and Matter
15	Radiation Detectors

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

	P1	P2	P3	P4	P5	P6	P7
1	5	5	5	5	5	5	5
2	5	5	5	5	5	5	5
3	5	5	5	5	5	5	5
4	5	5	5	5	5	5	5
5	5	5	5	5	5	5	5
6	5	5	5	5	5	5	5
7	5	5	5	5	5	5	5
8	5	5	5	5	5	5	5
9	5	5	5	5	5	5	5

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10							
11							
12							

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

Compiled by:	Asst. Prof. Dr. Elif Yunt
Date of Compilation:	27.02.2024