NEUTRON PHYSICS

1	Course Title:	NEUTRON PHYSICS	
2	Course Code:	FZK3405	
3	Type of Course:	Optional	
4	Level of Course:	First Cycle	
5	Year of Study:	3	
6	Semester:	5	
7	ECTS Credits Allocated:	5.00	
8	Theoretical (hour/week):	3.00	
9	Practice (hour/week):	0.00	
10	Laboratory (hour/week):	0	
11	Prerequisites:	None	
12	Language:	Turkish	
13	Mode of Delivery:	Face to face	
14	Course Coordinator:	Prof. Dr. ORHAN GÜRLER	
15	Course Lecturers:		
16	Contact information of the Course Coordinator:	ogurler@uludag.edu.tr, 0 224 29 41 701, UÜ Fen Edebiyat Fakültesi, Fizik Bölümü 16059 Görükle Kampüsü Bursa	
17	Website:		
18	Objective of the Course:	The aim of the course is to inform about areas of application of the neutron physics	
19	Contribution of the Course to Professional Development:		
20	Learning Outcomes:		
		1	Physical properties of neutron, fundamentals of nuclear reactions with neutrons, neutron sources are learned.
		2	Slowing down of neutron are learned.
		3	Interaction with matter of neutrons are learned.
		4	Protection from neutrons are learned.
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21	Course Content:		

Course Content:

Week	Theoretical	Practice
1	Physical properties of neutron	
2	The principles of neutron physics	
3	Neutron Nuclear Reactions: Nuclear Fission, Neutron Capture, Elastic and Inelastic Scattering,	
4	Nuclear Cross Sections, Characteristics of Neutron Cross Sections,	

5	Slowing down of neutrons, thermal neutrons features	
6	Interaction of Neutron Beams with Matter, Differential Scattering Cross Sections,	
7	Elastic Scattering Kinematics. Physics of Fission Chain Reactions	
8	Neutron Chain Fission Reaction	
9	The Multiplication Factor and Nuclear Criticality,	
10	Simple Kinetics of Chain Reactions	
11	The Neutron Transport Equation	
12	Midterm exam and Guided Problem Solving	
13	Neutron detectors.	
14	General Review and Problem Solutions	

22	Textbooks, References and/or Other Materials:	K.H.Beckurts; K. Wirtz, Neutron physics, Springer-Verlag, 1964. Raymond L. Murray., Introduction to Nuclear Engineering,Prentice-Hall,INC.1954. Duderstadt J.J. and Martin W.R., Transport Theory, Wiley , New York,1979. Bell George I. and Glasstone Samuel, Nuclear Reactor

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	3.00	42.00
Practicals/Labs	0	0.00	0.00
Self study and preperation	13	4.00	52.00
Homeworks	0	0.00	0.00
Projects	0	0.00	0.00
Quiz	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	1	2.00	2.00
Final Exam	1	60.00	
Others	13	4.00	52.00
Final Exams	1	2.00	2.00
Contribution of Term (Year) Learning Activities to	40.00		
Total Work Load			152.00
Contribution of Final Exam to Success Grade	60.00		5.00
ECTS Credit of the Course			5.00

TERM LEARNING ACTIVITIES	NUMBER	WEIGHT
Quiz	0	0.00
Midterm exams	1	60.00
Final Exams	1	40.00

Total work load / 30 hr

Measurement and Evaluation Techniques Used in the Course	

24	**ECTS / WORK LOAD TABLE**

25	**CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS**															
	PQ1	**PQ2**	**PQ3**	**PQ4**	**PQ5**	**PQ6**	**PQ7**	**PQ8**	**PQ9**	**PQ10**	**PQ11**	**PQ12**	**PQ13**	**PQ14**	**PQ15**	**PQ16**
ÖK1	3	4	3	0	0	2	0	0	3	0	0	0	0	0	0	0
ÖK2	3	3	2	0	0	3	0	0	3	0	0	0	0	0	0	0
ÖK3	3	4	2	0	0	2	0	0	3	0	0	0	0	0	0	0

ÖK4	3	4	2	0	0	3	0	0	2	0	0	0	0	0	0	0

LO: Learning Objectives PQ: Program Qualifications					
Contribution Level:	**1 very low**	**2 low**	**3 Medium**	**4 High**	**5 Very High**