NUCLEAR PHYSICS

1	Course Title:	NUCLEAR PHYSICS
2	Course Code:	FZK3004
3	Type of Course:	Compulsory
4	Level of Course:	First Cycle
5	Year of Study:	3
6	Semester:	6
7	ECTS Credits Allocated:	8.00
8	Theoretical (hour/week):	5.00
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. AHMET CENGİZ
15	Course Lecturers:	Prof.Dr. Gökay KAYNAK
16	Contact information of the Course Coordinator:	acengiz@uludag.edu.tr, 0 224 29 41695, U. Ü. Fen Edebiyat Fakültesi, Fizik Bölümü 16059 Görükle Bursa.
17	Website:	
18	Objective of the Course:	To use the fundamental physics information in field concerning nuclear physics. To comprehend structure and properties of nucleus.
19	Contribution of the Course to Professional Development:	
20	Learning Outcomes:	

	1	Understands the basis of nuclear physics.
	2	Learns the nuclear interactions and compares with the other interactions.
	3	Learns the stable and unstable nucleus.
	4	Learns the radioactive decay law
	5	Has information about nuclear models.
	6	Learns the theory of alpha decay.
	7	Learns the theory of beta decay.
	8	Learns the theory of gamma decay.
	9	Learns interaction of radiations with matter.
	10	Has information about detectors.

21	Course Content:	
	Course Content:	
Week	Theoretical	Practice
1	Introduction, the proton-electron model of nucleus, the discovery of the neutron, spin, Angular momentum, Parity	
2	Introduction, radioactive decay law, Radioactive equilibrium, Natural radioactive series, Radiation Units, Half-life.	

3	Introduction, conservation of energy in nuclear reactions, Nuclear reactions in CM coordinate system, threshold energy for endotermic reactions, cross section, mean free path, reaction velocity,differantial cross section, the relation between the CM and LAB coordinate systmes.	
4	Introduction, mass scale, isotopic mass measurements, mass measurement from nuclear decay data, nuclear density, Binding energy, the energy of surface tension, Coulomb event, Pairing energy, semi-empirical mass formula, izobaric event.Introduction, mass scale, isotopic mass measurements, mass measurement from nuclear decay data, nuclear density, Binding energy, the energy of surface tension, Coulomb event, Pairing energy, semi-empirical mass formula, izobaric event.Introduction, mass scale, isotopic mass measurements, mass measurement from nuclear decay data, nuclear density, Binding energy, the energy of surface tension, Coulomb event, Pairing energy, semi-empirical mass formula, izobaric event.	
5	Course review-Midterm exam-I	
6	The scattering of alpha particles, Half-life of Alpha emitters, fast neutron scattering, determination of nuclear size from mirror	

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	5.00	70.00
Practicals/Labs	0	0.00	0.00
Self study and preparation	14	3.00	42.00
Homeworks	4	10.00	40.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm Exams	2	20.00	40.00
Others	14	2.00	28.00
Final Exams	1	20.00	20.00
Total Work Load			240.00
Total workload / 30 hr			8.00
ECTS Credit of the Course			8.00

	measurement of life time.	
13	Fission and Fusion reactions	
14	General review	

22	Textbooks, References and/or Other Materials:	Çekirdek Fiziğinin Esasları, Atam P.Arya, Çeviren Doç.Dr. Yusuf Şahin Atatürk Üniversitesi Fen Fak. Yayını, 1995. Nükleer Fizik K.S.Krane, Çeviri Editörü Başar Şarer, Palme Yayıncılık 2001. Nükleer Fizik, Prof.Dr. Besim Tanyel, Ege Üniversitesi Fen Fakültesi Ders Kitapları Serisi, No.139, 1994 Çekirdek Fiziği Mehmet girin, Yıldız Teknik Üniversitesi, 2006 Nükleer Fizik Problemleri gevket ÖZKÖK, Çağlayan Kitapevi, 1979 Modern Fiziğin Kavramları A Beiser,Çeviren G. Önengüt, McGrawHill-Akademi 1997 Çekirdek Fiziğine Giriş W.N. Cottingham, D.A. Greenwood, Ceviren G.Açıkgöz, S. Yıldırım, literature 2001 Nükleer Fizik Problem Çözümleri K.S.Krane, Çeviri Editörü BaGar garer, Palme Yayıncılık 2001. Introductory Nuclear Physics, P.E. Hodgson, E. Gadioli and E. Gadioli Erba, Clarendon Press. Oxford, 1997. Nuclear and Particle Physics, W.S.C. Williams, Clarendon Press. Oxford, 1991. Nuclear Physics Principles and Applications J. Lilley, Wiley 2004 Nuclear and Particle Physics W.S.C.Williams, Clarendon Press Oxford 1991.
23	Assesment	

TERM LEARNING ACTIVITIES	**NUMBER**	**WEIGHT**
Midterm Exam	2	50.00
Quiz	0	0.00
Home work-project	0	0.00
Final Exam	1	50.00
Total	3	100.00
Contribution of Term (Year) Learning Activities to Success Grade		50.00
Contribution of Final Exam to Success Grade		50.00
Total		100.00
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	5	5	5	1	0	3	0	0	4	2	0	0	0	0	0	0
ÖK2	5	5	5	1	0	3	0	0	4	2	0	0	0	0	0	0

ÖK3	5	5	5	1	0	3	0	0	4	2	0	0	0	0	0	0
ÖK4	5	5	5	1	0	3	0	0	4	2	0	0	0	0	0	0
ÖK5	5	5	5	1	0	3	0	0	4	2	0	0	0	0	0	0
ÖK6	5	5	5	1	0	3	0	0	4	2	0	0	0	0	0	0
ÖK7	5	5	5	1	0	3	0	0	4	2	0	0	0	0	0	0
ÖK8	5	5	5	1	0	3	0	0	4	2	0	0	0	0	0	0
ÖK9	5	5	5	1	0	3	0	0	4	2	0	0	0	0	0	0
ÖK10	5	5	5	1	0	3	0	0	4	2	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**