ATOMIC AND MOLECULAR PHYSICS

1	Course Title:	ATOMIC AND MOLECULAR PHYSICS
2	Course Code:	FZK3007
3	Type of Course:	Compulsory
4	Level of Course:	First Cycle
5	Year of Study:	3
6	Semester:	5
7	ECTS Credits Allocated:	7.00
8	Theoretical (hour/week):	4.00
9	Practice (hour/week):	0.00
10	Laboratory (hour/week):	0
11	Prerequisites:	-
12	Language:	Turkish
13	Mode of Delivery:	Face to face
14	Course Coordinator:	Doç.Dr. AHMET PEKSÖZ
15	Course Lecturers:	Doç. Dr. Ahmet PEKSÖZ Yrd. Doç. Dr. Cengiz AKAY Yrd. Doç. Dr. Hüseyin OVALIOĞLU
16	Contact information of the Course Coordinator:	peksoz@uludag.edu.tr, (0224) 29 41 713, UÜ Fen Edebiyat Fakültesi, Fizik Bölümü 16059 Görükle Kampüsü, Bursa.
17	Website:	
18	Objective of the Course:	To make students aware of basic concepts of atomic and molecular physics in some of historical flow.
19	Contribution of the Course to Professional Development:	
20	Learning Outcomes:	

	1	Recognizes atoms and elementary particles, the Planck constant.
	2	Learns equivalents of physical quantities at atomic and molecular level.
	3	Understands atomic energy levels.
	4	Calculates the interaction formats of atoms with photons depending on photon energy.
	5	Calculates and comments material particles, electron diffraction and Compton event.
	6	Applies Heisenberg uncertainty principle to various situations.
	7	Applies Schrödinger's wave mechanics to various obstacle problems.
	8	Interpret and calculate vibrational spectra of molecules.
	9	Interpret and calculate rotation spectra of molecules.
	10	Learns applications of atomic and molecular physics.

21	Course Content:	
	Course Content:	
Week	Theoretical	Practice
1	Introduction, Atoms and elementary particles, Photoelectric effect	

2	Magnitudes of physical quantities in quantum physics, Determining magnitudes of atomic and molecular physics	
3	Energy levels, Spectral terms	
4	Finite broadening of energy levels, Doppler broadening	
5	Photons, Compton Event, Bremstrahlung	
6	Couple formation and Disappearance, Photons can be divided? First Midterm exam	
7	Material particles, De Broglie waves	
8	The wave equation and the principle of superposition	
9	Uncertainty Principle and Theory of Measurements, Heisenberg's uncertainty relations	
10	Measurements and statistics communities, Amplitude and violence	
11	Schrödinger's wave mechanics, Schrödinger's nonrelativistic wave equation	
12	Some simple obstacle problems, Theory of alpha radioactivity Second Midterm exam	
13	Theory of stationary states, Quantization as	

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	4.00	56.00
Practicals/Labs	0	0.00	0.00
Self study and preperation	18	4.00	72.00
Homeworks	20	4.00	80.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	1	2.00	2.00
Others	0	0.00	0.00
Final Exams	1	2.00	2.00
Total Work Load			212.00
Total work load/ 30 hr			7.07
ECTS Credit of the Course			7.00

22 Textbooks, References and/or Other	1. Quantum Physics, E.H. Wichmann, Berkeley, Volume 4. 2. Atomic Physics, Y. Şahin and Y. Kurucu, Ege Publishing, Ankara, 2005.
23 Assesment	
Midterm Exam	40.00
Home work-project	0.00
Total	100.00
Success Grade	
Contribution of Final Exam to Success Grade	60.00
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	4	3	3	3	3	0	0	4	3	3	0	0	0	0	0

ÖK2	5	4	4	3	4	3	0	0	4	4	4	0	0	0	0	0
ÖK3	4	4	3	3	3	3	0	0	3	3	3	0	0	0	0	0
ÖK4	4	5	4	4	4	4	0	0	4	4	3	0	0	0	0	0
ÖK5	4	5	5	5	4	4	0	0	4	3	3	0	0	0	0	0
ÖK6	5	5	5	4	4	3	0	0	4	4	3	0	0	0	0	0
ÖK7	4	5	4	5	4	3	0	0	3	4	3	0	0	0	0	0
ÖK8	4	4	4	4	3	4	0	0	4	3	3	0	0	0	0	0
ÖK9	5	4	4	4	4	4	0	0	4	3	3	0	0	0	0	0
ÖK10	4	4	4	5	5	5	0	0	3	4	4	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**