AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title	Modern Physics Laboratory								
Course Code	FİZ251		Couse Level	First Cycle (Bachelor's Degree)					
ECTS Credit	2	Workload	51 *(Hours)*	Theory	0	Practice	0	Laboratory	3
Objectives of the Course	To perform and report the experiments such as determining Planck's constant (Photoelectric effect), Franck-Hertz experiment, Millikan Oil-Drop experiment , observing the atomic Spectra, determining the specific electron charge, which confirm the results of Quantum theory.								
Course Content	Solutions of centripetal field of hidrogen atom, some terms of atomic hamiltonian, atomic spectroscopy, the atomic physics applications of perturbation theory, molecular physics								
Work Placement	N/A								
Planned Learning Activities and Teaching Methods	Experiment, Demonstration, Discussion								
Name of Lecturer(s)	Assoc. Prof. Melis GÖKÇE								

Assessment Methods and Criteria		
Method	Quantity	Percentage (%)
Final Examination	1	70
Quiz	6	20
Assignment	6	20

Recommended or Required Reading	
1	Atom ve molekül fiziği, Erol Aygün, Mehmet Zengin.
2	Atom ve molekül fiziği, B. H. Bransden and C. J. Joachain

Week	Weekly Detailed Course Contents	
1	Theoretical	To be defined the work principles in Laboratory and to be formed the work groups
2	Theoretical	The photoelectric effect and determining Planck's constant
	Laboratory	The photoelectric effect and determining Planck's constant
3	Theoretical	Writing the report of experiment performed and to prepare for the next experiment
4	Theoretical	Determining the specific electron charge
	Laboratory	Determining the specific electron charge
5	Theoretical	Writing the report of experiment performed and to prepare for the next experiment
6	Theoretical	Determining the elemental electric charge (electron charge) and Millikan Oil-Drop experiment
	Laboratory	Determining the elemental electric charge (electron charge) and Millikan Oil-Drop experiment
7	Theoretical	Writing the report of experiment performed and to prepare for the next experiment
8	Theoretical	Determining the wavelengths of H?, H? and H? from the Balmer series of hydrogen.
	Laboratory	Determining the wavelengths of H?, H? and H? from the Balmer series of hydrogen.
9	Theoretical	Writing the report of experiment performed and to prepare for the next experiment
10	Theoretical	Franck-Hertz Experiment.
	Laboratory	Franck-Hertz Experiment.
11	Theoretical	Writing the report of experiment performed and to prepare for the next experiment
12	Theoretical	Spectrometer. The determining the unknown wavelength in terms of the spectrum of hydrogen light source
	Laboratory	Spectrometer. The determining the unknown wavelength in terms of the spectrum of hydrogen light source
13	Theoretical	Writing the report of experiment performed

Workload Calculation				
Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	1	2	3	5
Assignment	6	3	0.5	21
Quiz	6	3	0.5	21

Final Examination	1	2	2	4
			Total Workload (Hours)	51
			[Total Workload (Hours) / 25*] = **ECTS**	2
**25 hour workload is accepted as 1 ECTS*				

Learning Outcomes	
1	1. To able to clarify the experimental data regarding with the photoelectric effect by depending on the results of Quantum theory and be aware of lacking the classic physics.
2	To be able to show in experiment the Electric Charge Quantization.
3	To be able to confirm in experiment the present of the atomic line spectra.
4	To be able to confirm in experiment the quantization of the energy levels of atom.
5	To be able to observe and define the behavior of an electron in a region of space in present of both the electrical and magnetic fields.

Programme Outcomes *(Physics)*	
1	To understand the importance of physics by understanding the general concepts of physics, matter and energy
2	To be able to define the movements of matter and to distinguish the characteristics of movements under different force (potential)
3	Be able to say the meaning of Lagrange and Hamiltonian formulations of the movement and apply them to simple problems,
4	To be able to express the fundamental concepts such as time, space, force, momentum and energy in the movements of matter close to the speed of light and be able to solve and interpret the simple problems related to
5	To be able to establish the relationship between electric and magnetic forces and to be able to illustrate their applications to technology and solve problems related to the movement of particles in electric and magnetic fields
6	Be able to say the basic laws of electromagnetics and apply them to problems, illustrate their applications to simple technology
7	To be able to tell the reasons of the differences between the classical cases and the quantum scale and explain the reasons
8	Explain the concepts of discontinuity, uncertainty, matter-antimatter, indecisiveness of quantum physics with examples and explain simple problems related to the subject.
9	To be able to solve the problems of micro-particles under different simple potentials and be able to say their meanings
10	To be able to establish the relationship between the movements and properties of multi-particle systems and the laws of probability and solve simple problems
11	To be able to illustrate the laws, meanings and applications of thermodynamics and use them
12	Be able to use their knowledge about quantum physics and mechanics in explaining some properties of atoms and nuclei
13	To be able to show the meanings of some theoretical concepts by experimenting, and develop a strong relationship between thought and the real world, develop analytical thinking
14	To be able to apply the meanings of the basic laws of physics, their comprehension of universality and the relations between them and the unity of the laws of nature.
15	Use computer to solve physics problems
16	To be able to understand the problems by using their analytical knowledge skills and to propose solutions by dealing with the laws of physics
17	Be able to use the knowledge of physics to understand new technologies
18	To be able to tell the relations between symmetry and conservation laws in laws of physics

Contribution of Learning Outcomes to Programme Outcomes *1:Very Low, 2:Low, 3:Medium, 4:High, 5:Very High*

	L1	L2	L3	L4	L5
P5					5
P7	4				
P8		3	5		
P12	3	5		5	
P13	5	4		4	