

AYDIN ADNAN MENDERES UNIVERSITY COURSE INFORMATION FORM

Course Title	Modern Physic	cs Laboratory							
Course Code	FİZ251		Couse Level		First Cycle (Bachelor's Degree)				
ECTS Credit 2	Workload	50 (Hours)	Theory	/	0	Practice	0	Laboratory	3
Objectives of the Course To perform and report the e Franck-Hertz experiment, M specific electron charge, wh				ents s Dil-Dr firm t	such as det op experim he results o	ermining Pland lent , observing of Quantum the	ck's constan g the atomic eory.	t (Photoelectric eff Spectra, determin	fect), hing the
Course Content Solutions of centripetal field the atomic physics application			of hidro ons of p	ogen pertur	atom, som bation theo	e terms of ator ory, molecular	nic hamilton physics	ian, atomic spectr	oscopy,
Work Placement N/A									
Planned Learning Activities and Teaching Methods			Explan	ation	(Presentat	tion), Experime	ent, Demons	stration, Discussion	า
Name of Lecturer(s) Prof. Melis GÖKÇE									

Assessment Methods and Criteria						
Method	Quantity	Percentage (%)				
Final Examination	1	50				
Quiz	5	10				
Report	5	40				

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 and spectra from the Balmer series of hydrogen.					
	Laboratory	Determining the wavelengths and spectra 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					
14	Laboratory	An overview					

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Laboratory	5	1	3	20
Individual Work	5	1	1	10
Quiz	5	0.5	0.5	5



					oourse information i onn
Final Examination	1		12	3	15
Total Workload (Hours)					50
			[Total Workload (Hours) / 25*] = ECTS	2
*25 hour workload is accepted as 1 ECTS					

Learn	ing Outcomes
1	Students explain the data of the photoelectric effect experiment based on the results of quantum theory.
2	Students show through experiment that the electric charge has a quantized structure.
3	Students prove the existence of atomic line spectra through experiment.
4	Students prove through experiment that the energy levels of the atom have a quantized structure.
5	Students demonstrate through experiments the behavior of the electron in the region of space where both the electric field and the magnetic field exist.

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	

