AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title	Quantum Mechanics I								
Course Code	FİZ321		Couse Level	First Cycle (Bachelor's Degree)					
ECTS Credit	8	Workload	195 *(Hours)*	Theory	4	Practice	0	Laboratory	0
Objectives of the Course	An introduction to quantum mechanics which is fundamental theory of nature and to explain that the application of quantum mechanics to some of the simple microsystems.								
Course Content	Operators and eigenvalue equations, potential barriers, Tunnel effect								
Work Placement	N/A								
Planned Learning Activities and Teaching Methods	Explanation (Presentation), Discussion, Problem Solving								
Name of Lecturer(s)	Lec. Cenk AKYÜZ								

Assessment Methods and Criteria		
Method	Quantity	Percentage (%)
Midterm Examination	1	30
Final Examination	1	70
Quiz	4	10

Recommended or Required Reading	
1	Quantum Mechanics (Authors: Tekin Dereli, Abdullah Verçin)
2	Introduction to quantum mechanics (D. Griffiths)

Week	Weekly Detailed Course Contents	
1	Theoretical	Introduction to quantum mechanics, Black body radiation, Photoelectric effect
2	Theoretical	Compton scattering, Hydrogen atom and Bohr model
3	Theoretical	Operators and Eigenvalue equations
4	Theoretical	Set of orthonormal functions
5	Theoretical	The fundamental postulates of quantum mechanics
6	Intermediate Exam	Midterm
7	Theoretical	The time rate of change of expectation values, Uncertainty relations
8	Theoretical	Energy Eigenvalues equations in one dimensioned
9	Theoretical	Finite and Infinite potential well
10	Theoretical	Potential Barriers
11	Theoretical	Tunnel effect and applications
12	Theoretical	Harmonic oscillator, Energy Eigenvalues equations
13	Theoretical	Hermite Polynomial, eigenvalues and eigenfunctions
14	Theoretical	Creation and Annihilation operators
15	Theoretical	Creation and Annihilation operators for Harmonic oscillator.
16	Final Exam	Final Exam

Workload Calculation				
Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	6	4	140
Quiz	10	1	1	20
Midterm Examination	1	12	1.5	13.5
Final Examination	1	20	2	22
			Total Workload (Hours)	195
			[Total Workload (Hours) / 25*] = **ECTS**	8
**25 hour workload is accepted as 1 ECTS*				

Learning Outcomes	
1	It can be explained why is necessary of the quantum mechanics and should be difference between quantum and classic physics
2	To solve problems which is related to the motion of micro particles under various simple potential and can say meaning of its
3	Students can use the knowledge of quantum mechanics to explain some properties of atom and molecules
4	The concepts of quantum mechanics such as discrete, uncertainty, instability and expectation value should be explained by using examples
5	The relationship between the motion and properties of many body systems can be threaded and simple problems with related to this topic should be solved
6	The fundamental postulates of quantum mechanics should be explained
7	The properties of Schrödinger Wave Equation must be told
8	The approximate solution should be suggested to exactly unsolved problems

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	L6	L7	L8
P1		3	2	3	2			
P2		3	3	4	3	2	3	
P3		3	3	3	3	2	3	
P7	5	4	4	4	3	4	2	3
P8	3	4	4	5	3	4	3	
P9	4	5	5	4	4	3	4	
P10	3	4	4	3	5	2	3	
P12	2	4	4	4	4	4	5	
P13								3
P14	2	2	2	3	4	4	3	
P16	3	3	3	3	3	3	3	5
P17						2	2	5
P18	2	3	3	3	4	4	3	