AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title	Quantum Mechanics								
Course Code	FZK512		Couse Level	Second Cycle (Master's Degree)					
ECTS Credit	6	Workload	150 *(Hours)*	Theory	3	Practice	0	Laboratory	0
Objectives of the Course	To introduce the physical structure of microsystems using quantum mechanics								
Course Content	Angular momentum, addition of angular momentum, spherical symmetric potentials and their applications, indistinguishable particles, Helium atom, Hund rules, perturbation theory								
Work Placement									
Planned Learning Activities and Teaching Methods	Explanation (Presentation), Individual Study, Problem Solving								
Name of Lecturer(s)									

Assessment Methods and Criteria		
Method	Quantity	Percentage (%)
Midterm Examination	1	20
Final Examination	1	30
Quiz	2	8
Attending Lectures	14	28
Assignment	14	14

Recommended or Required Reading	
1	Introduction to Quantum Mechanics R. Shankar 2.Ed
2	Quantum Mechanics, Eugen Merzbacher, 3. Ed
3	Quantum Mechanics, Arno Bohm, 3. Ed.
4	Introduction to Quantum Mechanics, D.J. Griffiths
5	Kuantum Mekaniği Temel Kavramlar ve Uygulamaları, A. Verçin, T. Dereli

Week	Weekly Detailed Course Contents	
1	Theoretical	Orbital angular momentum
	Preparation Work	Shankar R, Introduction to Quantum Mechanics, Chapter 11
2	Theoretical	Algebraic approach to the angular momentum
	Preparation Work	Merzbacher E, Quantum Mechanics, Section 12.2, 12.3
3	Preparation Work	Shankar R, Introduction to Quantum Mechanics, Chapter 14
4	Theoretical	Addition of angular momentum
	Preparation Work	Merzbacher E, Quantum Mechanics, Section 17.4, 17.5
5	Theoretical	Wigner-Eckart theorem
	Preparation Work	Bohm A, Quantum Mechanics, Section 5.3
6	Theoretical	Spherically symmetric potentials
	Preparation Work	Shankar R, Introduction to Quantum Mechanics, Section13.1-13.3
7	Theoretical	Atoms with a single electron
	Preparation Work	Shankar R, Introduction to Quantum Mechanics, Section13.4, 13.5
8	Intermediate Exam	Midterm Exam
9	Theoretical	Indistinguishable particles
	Preparation Work	Dereli T. Verçin A, Kuantum Mekaniği, Section 10.1-10.4
10	Theoretical	An elemantary introduction to quantum statistics
	Preparation Work	Griffiths D.J. , Introduction to Quantum Mechanics, Section 5.4,
11	Theoretical	Helium atom and Hund rules
	Preparation Work	Dereli T. Verçin A, Kuantum Mekaniği Section, 10.5-10.6
12	Theoretical	Time independent perturbation theory
	Preparation Work	Shankar R, Introduction to Quantum Mechanics, Section 17.1, 17.2
13	Theoretical	Time independent perturbation theory- Degenerate cases
	Preparation Work	Shankar R, Introduction to Quantum Mechanics, Section 17.3,

14	Theoretical	Time dependent perturbation theory
	Preparation Work	Shankar R, Introduction to Quantum Mechanics, Section 18.1-18.3
15	Theoretical	Photons and electromagnetic fields
	Preparation Work	Shankar R, Introduction to Quantum Mechanics, Section 18.4
16	Final Exam	Final Exam

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	2	3	70
Assignment	14	2	0	28
Quiz	2	4	0.5	9
Midterm Examination	1	15	3	18
Final Examination	1	22	3	25
			Total Workload (Hours)	150
			[Total Workload (Hours) / 25*] = **ECTS**	6

**25 hour workload is accepted as 1 ECTS*

Learning Outcomes

1	Student should be able to derive the algebra of angular momentum
2	Student should be able to use approximation methods in quantum mechanics
3	Student should be able to explain atomic structure using quantum mechanics
4	Student should know the quantum mechanics of the indistinguishable particles and discuss the effects to the statistical mechanics
5	Student should know the simple quantized theory of the electromagnetic fields based on the harmonic oscillator algebra

Programme Outcomes *(Physics Master)*

1	The student should conceive the concepts in physics and may apply them on her/his own
2	The student should be able to conceive the relationship between the different physics laws and integrity of them and apply them in solving different physics problems
3	The student should know the basic principles of classical, quantum and relativistic physics and use them in the solutions of problems
4	The student should be able to do research in a specific area of physics
5	The student should be able to prepare reports on papers on the subject of her/his research and present her/his research subject in scientific conferences
6	The student should be able to explain the relationship between complicated problems and basic physics laws.
7	The student should be able to use computers for solving complicated physics problems
8	The student should be able to interrelate between the theory and the experiment. If she/he is experimentalist he/she has to explain the theory behind her/his work. If she /he is a theorist she/he should has to know the experiments in her/his subject.

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

	L1	L2	L3	L4	L5
P1	4	4	5	5	5
P2	3	4	5	5	5
P3	2	5	5	5	5
P4	2	4	3	3	3
P5	1	1	1	1	1
P6	4	3	2	2	2
P7	1	1	2	2	2
P8	1	3	2	2	2