AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title	Advanced Quantum Mechanics						
Course Code	FZK602		Couse Level	Third Cycle (Doctorate Degree)			
ECTS Credit	7	Workload	175 *(Hours)*	Theory	3	Practice	0	Laboratory	0
Objectives of the Course	To introduce the physical structure of Microsystems using quantum mechanics						
Course Content	Path Integrals, Scattering Theory, Quantum Dynamics, Symmetries in Quantum Mechanics						
Work Placement	N/A						
Planned Learning Activities and Teaching Methods		Explanation (Presentation), Discussion, 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	Quantum Mechanics, Eugen Merzbacher
2	Quantum Mechanics, B.H. Bransden & C.J. Joachim
3	Quantum Mechanics, Arno Bohm
4	Introduction to Quantum Mechanics R. Shankar

Week	Weekly Detailed Course Contents	
1	Theoretical	Introduction to Path Integrals
2	Theoretical	Calculation of Green Functions Using Path Integrals
3	Theoretical	Introduction to Scattering Theory
4	Theoretical	Born Approximation
5	Theoretical	Resonances
6	Theoretical	Principles of Quantum Dynamics 1
7	Theoretical	Principles of Quantum Dynamics 2
8	Theoretical	Quantum Dynamics of a Particle
9	Theoretical	The Path Integral Formulation of Quantum Dynamics
10	Theoretical	Spin, Spin and Rotation, Spin Operators
11	Theoretical	Spin Systems and Their Quantum Dynamics
12	Theoretical	Rotations and Symmetry Operations (Introduction)
13	Theoretical	Rotations and Symmetry Operations (Tensor Operators and Wigner)
14	Theoretical	Perturbation Theory
15	Theoretical	Final Examination

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	3	3	84
Assignment	10	0	4	40
Quiz	4	1	1	8
Midterm Examination	1	15	4	19

Final Examination	1	20	4	24
		Total Workload (Hours)		175
		[Total Workload (Hours) / 25*] = **ECTS**		7

*25 hour workload is accepted as 1 ECTS

Learning Outcomes

1	Student should know the basics of scattering theory in quantum physics
2	Student should be able to do quantum mechanical analysis of three dimensional quantum systems
3	Student should have grasped symmetry concept and its applications to Quantum Physics
4	Student must have learned the fundamentals of quantum dynamics
5	Student should be ready Many Body Physics course

Programme Outcomes *(Physics Doctorate)*

1	
2	
3	
4	
5	
6	
7	
8	

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	5	4	4	5	4
P2	5	5	5	4	5
P3	4	4	4	4	5
P4	4	3	3	3	4
P5	3	4	4	3	4
P6	4	5	3	4	5
P7	3	4	4	4	3
P8	4	4	5	4	4