AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title	Quantum Physics								
Course Code	FZK515		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 description of the symmetries in nature and the group Theory which is the mathematical method of analysing those symmetries								
Course Content	What is the Concept of Symmetry, Symmetry Groups, Group Representations								
Work Placement									
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	Symmetry (An Intoduction to group Theory and Its Apllications), R. Mc Weeny, Dover Publications, 2002
2	Group Theory in Physics, Wu-Ki Tung, World Scientific, London, 1985
3	Mathenatical Physics, Amodern Introduction to Its Foundations, S. Hassani, New York, Springer 1998

Week	Weekly Detailed Course Contents	
1	Theoretical	Basic assumptions of group theory
	Preparation Work	Hassani S, Mathematical Physics A Modern Introduction to Its Foundations, Section 23.1
2	Theoretical	Operation table, orders and generators
	Preparation Work	Mc Weeny R, Symmetry, Section 1.3,1.4
3	Theoretical	Sub-groups, co-sets and classes
	Preparation Work	Mc Weeny R, Symmetry, Section 1.5
4	Theoretical	Invariant sub-groups and division group
	Preparation Work	Mc Weeny R, Symmetry, Section 1.6
5	Theoretical	Homomorphism, isomorphism
	Preparation Work	Mc Weeny R, Symmetry Section 1.7
6	Theoretical	Group representation
	Preparation Work	Tung W.K., Group Theory in Physics, Section3.1
7	Theoretical	Point and space groups
	Preparation Work	Mc Weeny R, Symmetry, Section 3.1,3.2
8	Intermediate Exam	Midtern Exam
9	Theoretical	Sample structures which have point and space group symmetries
	Preparation Work	Mc Weeny R, Symmetry, Section 3.1,3.3
10	Theoretical	Representation of point groups
	Preparation Work	Mc Weeny R, Symmetry, Chapter 4
11	Theoretical	Representation of translation groups
	Preparation Work	Eugen Merzbacher Quantum Mechanics (3. Edition), Section 4.5
12	Theoretical	Irreducible representations (Irreducibility)
	Preparation Work	Tung W.K., Group Theory in Physics, Section 3.2, 3.3
13	Theoretical	Irreducible representations (Orthogonality relations, Schur lemma)

13	Preparation Work	Tung W.K., Group Theory in Physics, Section 3.4
14	Theoretical	Irreducible representations (Different irreducible representation numbers)
	Preparation Work	Tung W.K., Group Theory in Physics, Section 3.5, 3.6
15	Theoretical	Irreducible representation (Reduction of representations)
	Preparation Work	Tung W.K., Group Theory in Physics, Section 3.7, 38
16	Final Exam	Final Exam

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	3	3	84
Assignment	12	1	2	36
Midterm Examination	1	7	5	12
Final Examination	1	13	5	18
			Total Workload (Hours)	150
			[Total Workload (Hours) / 25*] = **ECTS**	6

**25 hour workload is accepted as 1 ECTS*

Learning Outcomes

1	To be able to explain the symmetry concept
2	To be able to present the basic assumptions of being group
3	To be able to explain what the representation of a group is
4	To be able to represent symmetry groups of simple molecules
5	To be able to explain the irreducible representations

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	5	4	3	4	4
P2	3	1	4	4	3
P3	3	3	3	3	3
P4	3	1	1	1	2
P5	1	1	1	3	1
P6	4	2	1	5	4
P7	1	1	1	1	1
P8	2	1	1	1	2