Fizik Bölümü / PHYSICS / **Course Code Course Name Teorical** Laboratory Credits Practice ECTS FZK-3002 **Quantum Mechanics** 4.00 2.00 7.00 0.00 5.00 Course Detail Course Language : Turkish **Qualification Degree** : Bachelor Course Type : Compulsory Preconditions : Not **Objectives of the Course** : To learn quantum mechanics. **Course Contents** : Angular Momentum, The Schrodinger Equation in Three Dimension, Hydrogen Atom, The Interaction of Charged Particles with the Electromagnetic Field, Matrix Representation of Operators, Spin, The Interaction of Charged Particles with the Electromagnetic Field, Time-Independent Perturbation Theory, Identical Particles. **Recommended or Required** : Stephen Gasiorowicz, "Quantum Physics", 2003, John Wiley & Sons Inc., Amerika R. H. Dicke and J. P. Wittke, "Introduction to Quantum Mechanics", 1992, Reading Addison Wesley, San Francisco D. J. Griffiths, "Introduction to Quantum Mechanics", 2005, Pearson Education Inc., Amerika R.L.Liboff, "Indroductory Quantum Mechanics", 2003, Pearson Education, Inc., San Francisco Planned Learning Activities and : Written exam, homework and presentations. (60% Final, 40% midterm) **Teaching Methods Recommended Optional** : Knowledge of the fundamental physics courses is important. **Programme Components** Instructors : Prof. Dr. Kıvanç Sel Instructor's Assistants : Assoc. Prof. Dr. Kıvanç SEL **Presentation Of Course** : Face to face Course Outcomes Upon the completion of this course a student : 1 1) Apply the operator notation in solutions 2 2) Solve the problems of potentials and the harmonic oscillators 3 3) Explain the properties of general formalism of quantum mechanics

4 4) Define three dimensional quantum systems

5 5) Make calculation with approximation methods

Preconditions			
Course Code	Course Name	Teorical Practice Laboratory Credits	ECTS

Weekly Contents Teorical Practice Laboratory **Preparation Info Teaching Methods** \* Lecture, Problem solving, 1.Week \* Angular Momentum, The Angular Momentum Commutation Relations Homework 2.Week \* Raising and Lowering Operators \* Lecture, Problem solving, for Angular Momentum Homework \* The Schrodinger Equation in \* Lecture, Problem solving, 3.Week Three Dimensions and the Homework Hydrogen Atom, The Central Potential \* The Hydrogen Atom, The Energy \* Lecture, Problem solving, 4.Week Homework Spectra \* The Free Particle, Particle in an 5.Week \* Lecture, Problem solving, Infinite Spherical Well Homework \* Lecture, Problem solving, \* The Interaction of Charged 6.Week Particles with the Electromagnetic Homework Field, Classical Electrodynamics \* The Schrodinger Equation for an \* Lecture, Problem solving, 7.Week Electron in Interaction with an Homework Electromagnetic Field \* Midterm exam \* Lecture, Problem solving, 8.Week Homework 9.Week \* Matrix Representations of Angular \* Lecture, Problem solving, Momentum Operators, General Homework Relations in Matrix Mechanics 10.Week \* Spin, Eigen states of Spin 1/2 \* Lecture, Problem solving, Homework 11.Week \* The Intrinsic Magnetic Moment of \* Lecture, Problem solving, Spin 1/2 Particles, Paramagnetic Homework Resonance 12.Week \* Addition of Two Spins, The \* Lecture, Problem solving, Addition of Spin 1/2 and Orbital Homework Angular Momentum 13.Week \* Matrix Representation of \* Lecture, Problem solving, Operators, Matrices in Quantum Homework Mechanics 14.Week \* Degenerate perturbation theory, \* Lecture, Problem solving, Stark effect Homework Assesment Methods %

1 Mid Term Exam 1 : 40.000

2 Final : 60.000

## ECTS Workload

Activities	Count	Time(Hour)	Sum of Workload
Vize	1	2.00	2.00
Final	1	2.00	2.00
Attending lectures	14	6.00	84.00
Individual study before lecture	14	2.00	28.00
Individual study after lecture	14	4.00	56.00
Preparation for midterm	1	20.00	20.00
Preparation for final	1	20.00	20.00
			Total: 212.00

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ECTS: 7.00

## Program And OutcomeRelation

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L.O. 2	5	4	0	2	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L.O. 3	5	4	0	2	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L.O. 4	5	4	0	2	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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