Fizik Bölümü / PHYSICS /

Course Code	Course Name	Teorical	Practice	Laboratory	Credits	ECTS
FZK-3003	Quantum Physics	4.00	2.00	0.00	5.00	6.00

Course Detail

Course Language	:	Turkish
Qualification Degree	:	Bachelor
Course Type	:	Compulsory
Preconditions	:	Not
Objectives of the Course	:	Development of quantum physics, Wave-particle duality, Schrödinger's equation, operators, probability, expectation values, uncertainty principle, time independent Schrödinger's equation.
Course Contents	:	Development of quantum physics: Blackbody radiation, photoelectric effect, compton effect, atomic structure, wave-particle duality, Schrödinger's equation, operators, probability, expectation values, uncertainty principle, time independent Schrödinger's equation, one dimensional systems: Eigenvalue calculation for particle in a box, the step potential, the infinite and square well potentials, the potential barrier and tunneling, bound states of square well potential, delta functions and delta function potentials, harmonic oscillator, general outline of wave mechanics, operators, eigenfuctions and eigenvalues (Hamiltonian), Dirac notation, time dependence and classical limit, operator methods in quantum mechanics
Recommended or Required Reading	:	Bekir Karaoğlu, 2008, Kuantum Mekaniğine Giriş, Seçkin Yayıncılık Stephen Gasiorowicz, 2003, Quantum Physics, Wiley Richard L. Liboff, 2002, Introduction to Quantum Mechanics, Addsion Wesley
Planned Learning Activities and Teaching Methods	:	Midterm exam (40%), final exam (60%)
Recommended Optional Programme Components	:	Knowledge of the fundamental physics courses is important.
Course 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) to have the ability of applying the basic science knowledge.

2 2) to have the ability of understanding the physical fundamentals and analysis methods of interactions and properties of atomic scale particles

3 3) to gain the ability of understanding the quantum mechanics and its applications

4 4) to understand the relationships among the classical physics and quantum physics.

Preconditions

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Weekly Contents

	Teorical	Practice	Laboratory	Preparation Info	Teaching Methods
1.Week	* Development of quantum physics:Blackbody radiation, photoelectric effect, Compton effect	*Prroblem solving			* Oral lectures with interactive discussions and presentations
2.Week	* Development of quantum physics:Atomic structure,	*Prroblem solving			* Oral lectures with interactive discussions and presentations
3.Week	* Wave-particle duality.	*Prroblem solving			* Oral lectures with interactive discussions and presentations
4.Week	* Schrödinger equation	*Prroblem solving			* Oral lectures with interactive discussions and presentations
5.Week	* Operators, probability, uncertainty principle, expectation values	*Prroblem solving			* Oral lectures with interactive discussions and presentations
6.Week	* Schrödinger’s equation, time independent	*Prroblem solving			* Oral lectures with interactive discussions and presentations
7.Week	* One dimensional potentials: The step potential The infinite and square well potentials	*Prroblem solving			* Oral lectures with interactive discussions and presentations
8.Week	* The potential barrier and tunneling Bound states of square well potential	*Prroblem solving			* Oral lectures with interactive discussions and presentations
9.Week	* Delta functions and delta function potentials	*Prroblem solving			* Oral lectures with interactive discussions and presentations
10.Week	* General outline of wave mechanics Operators, eigenfuctions and eigenvalues (Hamiltonian)	*Prroblem solving			* Oral lectures with interactive discussions and presentations
11.Week	* General outline of wave mechanics Operators, eigenfuctions and eigenvalues (Hamiltonian)	*Prroblem solving			* Oral lectures with interactive discussions and presentations
12.Week	* Dirac notation, Time dependence and classical limit	*Prroblem solving			* Oral lectures with interactive discussions and presentations
13.Week	* Operator methods in quantum mechanics Energy spectrum of harmonic oscillator Time dependent operators	*Prroblem solving			* Oral lectures with interactive discussions and presentations
14.Week	* Operator methods in quantum mechanics Energy spectrum of harmonic oscillator Time dependent operators	*Prroblem solving			* Oral lectures with interactive discussions and presentations

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	2.00	28.00
Preparation for midterm	1	20.00	20.00
Preparation for final	1	20.00	20.00
		Total :	184.00
		Sum of Workload / 30 (Hour) :	6
		ECTS :	6.00

Program And OutcomeRelation

	P.O. 1	P.O. 2	P.O. 3	P.O. 4	P.O. 5	P.O. 6	P.O. 7	P.O. 8	P.O. 9	P.O. 10	P.O. 11	P.O. 12	P.O. 13	P.O. 14	P.O. 15	P.O. 16	P.O. 17	P.O. 18	P.O. 19	P.O. 20	P.O. 21	P.O. 22	P.O. 23	P.O. 24
L.O. 1	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. 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

Ders/Program Çıktıları İlişkisi

P.O. 1	P.O. 2	P.O. 3	P.O. 4	P.O. 5	P.O. 6	P.O. 7	P.O. 8	P.O. 9	P.O. 10	P.O. 11	P.O. 12	P.O. 13	P.O. 14	P.O. 15	P.O. 16	P.O. 17	P.O. 18	P.O. 19	P.O. 20	P.O. 21	P.O. 22	P.O. 23	P.O. 24	P.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	0