AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title	Solid State Physics I								
Course Code	FİZ445		Couse Level	First Cycle (Bachelor's Degree)					
ECTS Credit	7	Workload	179 *(Hours)*	Theory	4	Practice	0	Laboratory	0
Objectives of the Course	To provide the understanding of cristal types and bonds and also, the background is done for future work.								
Course Content	Crystal structure, wave diffraction and the reciprocal lattice, crystal binding and elastic constants, phonons, free electron Fermi gas.								
Work Placement	N/A								
Planned Learning Activities and Teaching Methods	Explanation (Presentation), Discussion, Problem Solving								
Name of Lecturer(s)	Assoc. Prof. Yelda KADIOĞLU								

Assessment Methods and Criteria		
Method	Quantity	Percentage (%)
Midterm Examination	1	30
Final Examination	1	70
Quiz	3	10

Recommended or Required Reading	
1	Introduction to Solid State Physics (C. Kittel)
2	Solid State Physics (J.R. Hook and H. E. Hall)

Week	Weekly Detailed Course Contents	
1	Theoretical	Periodic Array of Atoms, fundamental Types of Lattices.
2	Theoretical	Index System for Crystal Planes, Simple Crystal Structures.
3	Theoretical	Nonideal Crystal Structures. Crystal Structure Data. Diffraction of Waves by Crystals.
4	Theoretical	Scattered Wave Amplitude. Brillouin Zones. Fourier Analysis of the Basis.
5	Theoretical	Quiz, Crystals of Inert Gases. Ionic Crystals. Covalent Crystals.
6	Theoretical	Metals. Hydrogen Bonds. Atomic Radii.
7	Theoretical	Analysis of Elastic Strains.
8	Intermediate Exam	Midterm exam
9	Theoretical	Phonons I. Crystal Vibrations
10	Theoretical	Phonons I. Crystal Vibrations
11	Theoretical	Quiz, Phonons II. Thermal Properties
12	Theoretical	Phonons II. Thermal Properties
13	Theoretical	Free electron Fermi gas
14	Theoretical	Quiz, Free electron Fermi gas

15	Theoretical	Free electron Fermi gas

Workload Calculation				
Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	7	3	140
Quiz	3	4	1	15
Midterm Examination	1	10	2	12
Final Examination	1	10	2	12
			Total Workload (Hours)	179
			[Total Workload (Hours) / 25*] = **ECTS**	7
**25 hour workload is accepted as 1 ECTS*				

Learning Outcomes	
1	To be able to know types of crystal
2	To be able to know the properties of reciprocal lattice
3	To be able to say types of crystal binding
4	To be able to understand energy bant diyagrams and formation steps of this process.
5	To be able to explain lattice vibrations and phonon dispersiyon diagrams

Programme Outcomes *(Physics)*	
1	To understand the importance of physics by understanding the general concepts of physics, matter and energy
2	To be able to define the movements of matter and to distinguish the characteristics of movements under different force (potential)
3	Be able to say the meaning of Lagrange and Hamiltonian formulations of the movement and apply them to simple problems,
4	To be able to express the fundamental concepts such as time, space, force, momentum and energy in the movements of matter close to the speed of light and be able to solve and interpret the simple problems related to
5	To be able to establish the relationship between electric and magnetic forces and to be able to illustrate their applications to technology and solve problems related to the movement of particles in electric and magnetic fields
6	Be able to say the basic laws of electromagnetics and apply them to problems, illustrate their applications to simple technology
7	To be able to tell the reasons of the differences between the classical cases and the quantum scale and explain the reasons
8	Explain the concepts of discontinuity, uncertainty, matter-antimatter, indecisiveness of quantum physics with examples and explain simple problems related to the subject.
9	To be able to solve the problems of micro-particles under different simple potentials and be able to say their meanings
10	To be able to establish the relationship between the movements and properties of multi-particle systems and the laws of probability and solve simple problems
11	To be able to illustrate the laws, meanings and applications of thermodynamics and use them
12	Be able to use their knowledge about quantum physics and mechanics in explaining some properties of atoms and nuclei
13	To be able to show the meanings of some theoretical concepts by experimenting, and develop a strong relationship between thought and the real world, develop analytical thinking
14	To be able to apply the meanings of the basic laws of physics, their comprehension of universality and the relations between them and the unity of the laws of nature.
15	Use computer to solve physics problems
16	To be able to understand the problems by using their analytical knowledge skills and to propose solutions by dealing with the laws of physics
17	Be able to use the knowledge of physics to understand new technologies
18	To be able to tell the relations between symmetry and conservation laws in laws of physics

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

	L1	L2	L3
P7	4	4	4
P8	5	5	5
P10	4	4	4
P12	4	4	4
P14	3	3	3
P16	2	2	2
P18	4	4	4