Course Information								
Course Code	**T**	**P**	**L**	**C**	**ECTS**	**Type** C/E	**Language** TR/ENG etc.	**Year/Semester**
FİZ4006	**4**	**2**	**0**	**5**	**6**	**C**	**TR**	**4th grade/spring**
Course Name (Turkish**)**	**Katıhal Fiziği**							
Course Name (English**)**	**Solid state physics**							

Unit/Program	Physics Department/Undergraduate Program
Course Prerequisite	There are no prerequisites
Course Objectives	To be able to teach physics students the basics of solid state (condensed matter) physics
Course Outline	Definition of crystal, types of lattices, types of bonding, band theory of solids
Textbook/ Material / Resources	Introduction to Solid State Physics, Tahsin Nuri DURLU, Print Set Offset, ANKARA Introduction to Solid State Physics, Mustafa DİKİCİ, Ondokuz Mayis University Press, SAMSUN Introduction to Solid State Physics, Charles Kittel, Palme Publishing House
Internship Status	

Course Precedents

University Name	**Program Name**	**Course Name**	**T-P-L-C; ECTS**	**Type**

The instructor who proposed the course (Title, Name and Surname)	*Signature*
Instructors who can teach the course (Title, Name and Surname)	*Signature*

Academic justification for the opening of the course? (The effect of course outcomes on program outcomes, etc.)

Brief explanation of the course (theoretical lecture, applications, laboratory, studio, off-campus activity, using software, etc.)

External Stakeholder Opinions About the Course (It is expected that the opinions to be obtained from the business world that will employ your graduates or from real or legal persons outside the University who have expertise on the subject of the course will be specified. Proof documents must be attached to this form.)

Stakeholder Name	**Opinion** (It should be given as a summary, it should not exceed two lines.)

Weekly Course Content Distribution		
Week	**Theory**	**Application/Laboratory**
1	What is Solid State Physics? Types of Matter, Classification of Solids	
2	Introduction to Crystallography, What is Crystal? Unit Lattice Cell, Lattice Types, Miller Indices, Symmetry in Crystals	
3	Diffraction in Crystals, X-Rays, Neutrons-Electrons, Bragg's Law, Opposite Lattice, Problem Solutions	
4	Experimental Diffraction Methods, Powder Diffraction Method, Laue Method, Rotary Crystal Method	
5	Crystal Bonding, Ionic bonding, Covalent bonding, Metallic bonding, Atomic Radius	
6	Mesh Dynamics, Single and Diatomic Lattice Vibrations, Cauntum of Lattice Vibrations	
7	Thermal Properties, Specific Heat Capacitance, Einstein Model, Debye Model, Thermal Conductivity, Non-Harmonic Interactions, Thermal Expansion, Lattice Thermal Resistance,	
8	Electrons in Metals, Classical Electron Gas Theory, Maxwell-Boltzman Velocity Distribution, Drude Model, Lorentz Model, Failures of Classical Models	
9	ARASINAV	
10	Energy Levels of Electrons, Fermi-Dirac Distribution of Electron Gas	
11	Heat Capacitance of Electron Gas, Ohm's Law, Electrical Resistivity of Metals, Motion in Magnetic Field, Problem Solutions	
12	Band theory of solids Approximate Free Electron Model, Magnitude of Energy Range, Bloch Functions, Chronic-Penney Model, Electron Wave Equation in Periodic Potential, Solution of Wave Equation for Periodic Lattice, Number of Trajectories in a Band	
13	Semiconductor Crystals, Equation of Motion, Voids, Effective Mass, Original Carrier Density, Mobility of Original Carriers, Impurity Transmission, Transmitters and Acceptors in Semiconductors	
14	Thermoionic Phenomena in Semiconductors, Absolute Thermoelectric Power, Semi-Metals, Amorphous Conductors, Energy Levels in Semiconductors	
15	FINAL EXAM	
16		

Assessment			
Evaluation Criteria	**Activity**	**Custom**	**Contribution to Success Grade (%)**
	Midterm Exams	1	40
	Quizzes		
	Assignments		
	Projects		
	Term Paper		
	Laboratory		
	Other		
	Final Exam	1	60
		Sum:	100
Remarks			

Content Design and Subject Weight (%)	Mathematics and Basic Sciences	100
	Engineering Sciences	
	Social Sciences	
	Health Sciences	

	Educational Sciences	
	Culture and Art Sciences	
	Design Information	

Workload (ECTS) Calculation			
Events	**Number**	**Duration (Hours)**	**Total workload (Hours)**
Fieldwork			
Midterm Exam Application	1	2	2
Self-Study (including pre-class and exam preparation)			
Make-up Exam	1	2	2
Experiment and Observation			
Class Participation (Theory)	14	6	84
Homework			
Final Exam Practice	1	2	2
Laboratory			
Article Review			
Writing an Article			
Reading			
Case Study			
Performance			
Problem Solution	14	2	28
Project Preparation			
Project Submission			
Quiz			
Report Preparation			
Submitting Reports			
Role/Drama Work			
Seminar			
Oral Exam			
Team/Group Work	8	3	24
Argument	8	1	8
Application/Practice			
Other			
TOTAL WORKLOAD:			**150**
ECTS CREDİTS OF THE COURSE: *(The number obtained as a result of Total Workload/25 is calculated by rounding to the whole number.)*			**6**

The Relationship Between Course Learning Outcomes and Program Outcomes

Learning Outcomes (LO) *(Course Outcomes)* / **Program Outcomes (PO)**		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
1	Will be able to explain the concepts related to crystal systems, diffraction in crystals and inverse space.	**5**	**5**	**5**	**3**	**3**	**3**	**2**	**3**	**4**	**2**	**1**
2	Will be able to explain the concepts related to bonding in crystals.	**5**	**5**	**5**	**3**	**3**	**3**	**2**	**3**	**4**	**2**	**1**
3	Will be able to explain the concepts related to phonons and thermal properties of phonons.	**5**	**5**	**5**	**3**	**3**	**3**	**2**	**3**	**4**	**2**	**1**
4	Will be able to explain the concepts related to free electron gas model and band models.	**5**	**5**	**5**	**3**	**3**	**3**	**2**	**3**	**4**	**2**	**1**
5	Will be able to explain the concepts related to semiconductors.	**5**	**5**	**5**	**3**	**3**	**3**	**2**	**3**	**4**	**2**	**1**

Organizer: Prof. Dr. Mediha KÖK
Preparation Date: 20.05.2024