Course Information								
Course Code	**T**	**P**	**L**	**C**	**ECTS**	**Type** C/E	**Language** TR/ENG etc.	**Year/Semester**
FİZ4026	**3**	**0**	**0**	**3**	**5**	**E**	**TR**	**4/SPRING**
Course Name (Turkish**)**	Süper İletkenliğe Giriş							
Course Name (English**)**	Introduction to Superconductivity							

Unit/Program	Physics Department/Undergraduate Program
Course Prerequisite	No
Course Objectives	To teach superconductivity and basic properties of superconductors
Course Outline	Type-I Superconductors, Type-II Superconductors, Other Properties of Superconductors, BCS Theory, Flux Quantization, Josephson Tunneling, High Temperature Superconductivity.
Textbook/ Material / Resources	Introduction to Superconductivity Physics, Assoc. Prof. Dr. İman Askerzade, Gazi Bookstore 2005
Internship Status	No

Course Precedents

University Name	**Program Name**	**Course Name**	**T-P-L-C; ECTS**	**Type**
Duzce University	**Physics**	**Superconductivity**	**3-0-0-3; 6**	**E**
Pamukkale University	**Physics**	**Introduction to Superconductivity**	**3-0-0-3; 4,5**	**E**

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.)
Face-to-face courses will be taught under the supervision of the relevant faculty member.

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	Definitions and characteristics of diamagnetism, paramagnetism and ferromagnetism	
2	Properties of Superconductors, basic definition, Critical Magnetic Field, Meissner phenomenon, London equations, Pippart's Theory	
3	BCS theory, the main differences between Type I and II superconductors	
4	Magnetic properties of type I superconductors; Depth of penetration, their behavior under a magnetic field, critical current of a superconducting wire	
5	Ginzburg-Landau theories	
6	Type II Magnetic properties of superconductors, behavior near the critical magnetic field Hc1, interaction between vortex lines, magnetization curves	
7	Flux needling, drift and flow, critical field model, thermally activated flux drift	
8	Energy Range Measurements; Single Particle Tunneling, Absorption of Electromagnetic Radiation, Flux Quantization	
9	Midterm Exam	
10	High Temperature Superconductivity	
11	Crystal structure investigations of High Temperature Superconductors	
12	Magnetic Levitation Force	
13	Applications of Superconductors	
14	Applications of Superconductors	
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	90
	Engineering Sciences	10
	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)	14	2	28
Make-up Exam	1	2	2
Experiment and Observation			
Class Participation (Theory)	14	3	42
Homework			
Final Exam Practice	1	2	2
Laboratory			
Article Review			
Writing an Article			
Reading			
Case Study			
Performance			
Problem Solution			
Project Preparation			
Project Submission			
Quiz			
Report Preparation			
Submitting Reports			
Role/Drama Work			
Seminar			
Oral Exam			
Team/Group Work	12	3	36
Argument	14	1	14
Application/Practice			
Other			
TOTAL WORKLOAD:			**126**
ECTS CREDİTS OF THE COURSE: *(The number obtained as a result of Total Workload/25 is calculated by rounding to the whole number.)*			**5**

Program Outcomes (PO) / **Learning Outcomes (LO)** *(Course Outcomes)*		1	2	3	4	5	6	7	8	9	10	11
1	Explain the thermodynamics of superconductivity.	**5**	**5**	**5**	**4**	**3**	**3**	**4**	**5**	**5**	**3**	**3**
2	Rounds 1 and 2 Explain type superconductors.	**5**	**5**	**5**	**4**	**3**	**3**	**4**	**5**	**5**	**3**	**3**
3	Learns the application areas of superconductors	**5**	**5**	**5**	**4**	**3**	**3**	**4**	**5**	**5**	**3**	**3**

Organizer: Prof. Dr. Fethi DAĞDELEN
Preparation Date: 20.05.2024