

Course Information								
Course Code	T	P	L	C	ECTS	Type C/E	Language TR/ENG etc.	Year/Semester
FİZ2006	3	0	0	3	5	E	TR	2/SPRING
Course Name (Turkish)	X-Işımları Difraksiyonu							
Course Name (English)	X-Ray Diffraction							

Unit/Program	Physics Department/Undergraduate Program			
Course Prerequisite	No			
Course Objectives	Student's comprehension of the events related to the occurrence of X-Rays. Students understand the causes and consequences of the events that occur as a result of the interaction of X-rays with matter.			
Course Outline	To examine the properties of X-rays, their usage properties, and the events that occur as a result of their interaction with matter			
Textbook/ Material / Resources	X-Ray Diffraction, . B.D.Cullity Addison-Wesley Pup. Company, 1978.Translation: Diffraction of X-Rays.Prof.Dr.Ali Sümer, ITU Publications			
Internship Status	No			
Course Precedents				
University Name	Program Name	Course Name	T-P-L-C; ECTS	Type
Bursa Uludag University	Physics	X-Ray Diffraction	3-0-0-3; 6	E
Harran University	Physics	X-Ray Diffraction	3-0-0-3; 4	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	Introduction, electromagnetic spectrum continuous spectrum	
2	Causes of continuous spectrum, short wave limit, white x-rays, hard and soft x-rays	
3	Characteristic spectrum, critical voltage K shell transitions L Shell transitions Moseley's Law	
4	X-Ray absorption, linear absorption coefficient, mass absorption coefficient, mass absorption change of the coefficient depending on the wavelength and element, Formation of absorption edges.	
5	Filtering of X-Rays, absorbing elements and balanced percolation	
6	Detection of X-Rays, generation of X-Rays, radiation protection	
7	Crystal geometry, types of mesh, mesh directions and planes, plane sets distances between. Crystal unit cells. Positions of atoms in the crystal unit cell	
8	The interaction of X-rays with matter means that X-rays interact with gases, liquid and amorphous solids, and interaction with crystalline solids, Laue test and Diffraction, Diffraction methods, Spectroscopy of X-Rays, elemental analysis	
9	Midterm Exam	
10	The scattering of X-Rays from an electron, the scattering from an atom is the atomic form factor and a Crystal Structure Factor of Crystal Dispersion from Unit Cell	
11	The intensities of the diffraction bundles are determined by the intensity of the position of the atoms in the unit cell and The influence of their breed	
12	Crystal structure analysis by X-Rays of crystals containing atoms of the same type of element Analysis	
13	Structure analysis of crystals containing different types of element atoms	
14	Applications related to various crystal structure analysis examples	
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)	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 CREDITS 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)		1	2	3	4	5	6	7	8	9	10	11
Learning Outcomes (LO) (Course Outcomes)												
1	Learn the mechanisms of formation of X-rays	5	5	5	4	3	3	4	5	5	3	3
2	Learn the interaction of X-rays with matter	5	5	5	4	3	3	4	5	5	3	3
3	Learns reflection, absorption and refraction of X-rays	5	5	5	4	3	3	4	5	5	3	3

Organizer: Assoc. Prof. Dr. Köksal YILDIZ
Preparation Date: 20.05.2024