CRYTAL STRUCTURE AND ANALYSIS TECHNICS

1	Course Title:	CRYTAL STRUCTURE AND ANALYSIS TECHNICS
2	Course Code:	FZK4208
3	Type of Course:	Optional
4	Level of Course:	First Cycle
5	Year of Study:	4
6	Semester:	8
7	ECTS Credits Allocated:	6.00
8	Theoretical (hour/week):	3.00
9	Practice (hour/week):	0.00
10	Laboratory (hour/week):	0
11	Prerequisites:	Recommended Solid State Physics, Material Physics
12	Language:	Turkish
13	Mode of Delivery:	Face to face
14	Course Coordinator:	Prof. Dr. Mürsel Alper
15	Course Lecturers:	Prof. Dr. Mürsel ALPER, Yrd. Doç. Dr. Mürşide ŞAFAK HACIİSMAİLOĞLU
16	Contact information of the Course Coordinator:	malper@uludag.edu.tr, (0224) 29 41 697, UÜ Fen Edebiyat Fakültesi, Fizik Bölümü 16059 Görükle Kampüsü Bursa
17	Website:	
18	Objective of the Course:	To study crystal structures of materials and learn structural analysis techniques. To learn the valuation and interpretation of the results from these techniques. To be able to calculate Structure Factor of a crystal structure, To learn and apply the diffraction techniques. To determine the structure of an unknown crystal and find its crystallographic direction
19	Contribution of the Course to Professional Development:	
20	Learning Outcomes:	

	1	Learning crystal structures. Calculating structural factors of unit cells and knowing their effects on the intensities of XRD beams.
	2	Having information X-rays and X-ray diffraction (XRD). Learning XRD methods
	3	Learning the structural analysis of crystals by XRD
	4	Learning chemical analysis by XRD and X-ray spectrometers
	5	Learning structural analysis by electron and neutron diffraction
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21	Course Content:	

Course Content:		
Week	Theoretical	Practice
1	X-Rays and Properties	

2	Geometry of Crystals	
3	X-Ray Diffraction and Diffraction Methods	
4	Directions of Diffracted Beams	
5	Intensities f Diffracted Beams	
6	Factors Affecting Intensities of Difracted Beams	
7	Determination of Crystal Structure	
8	Indexing Patterns of Cubic Crystals	
9	Indexing Patterns of Noncubic Crystals	
10	Structural Determination of Some Materials Midterm Exam,	
11	Precise Parameter Measurements	
12	Structural Analysis of Order-Disorder Materials	
13	Chemical Analysis by X-Ray Diffraction and X-ray Spectrometry	
14	Electron and Neutron Diffraction	
22	Textbooks, References and/or Other Materials:	1. M. ALPER, Kristal yapı ve Analiz Teknikleri Ders Notları 2. B. D. Cullity, Elements of X-ray Diffraction, Addison-Wesley Publishing, 1978, London
23	Assesment	

Activites			Number	Duration (hour)	Total Work Load (hour)
Theoretical			14	3.00	42.00
Quiz	0	0.00			
Practicals/Labs			0	0.00	0.00
Self study and preperation			14	6.00	84.00
Final Exam	1	60.00			
Homeworks			2	3.00	6.00
Projects			0	0.00	0.00
Contribution of Term (Year) Learning Activities to	40.00				
Field Studies			0	0.00	0.00
Midterm exam			60	1.50	1.50
Contribution of Final Exam to Success Grade	100				
Others			14	3.00	42.00
Final Exams	1	2.00	2.00		
Measurement and Evaluation Techniques Used in the					
Total Work Load					177.50
Total work load / 30 h		ECTS/WORK LOAD TABLE			5.92
ECTS Credit of the Course					6.00

25	CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS

	PQ1	PQ2	PQ3	PQ4	PQ5	PQ6	PQ7	PQ8	PQ9	PQ10	PQ11	PQ12	PQ13	PQ14	PQ15	PQ16
ÖK1	4	4	0	4	0	4	0	4	0	0	4	4	0	0	0	0
ÖK2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK3	5	5	4	5	4	4	4	0	4	4	4	4	0	0	0	0
ÖK4	4	4	4	5	5	5	0	0	5	0	0	0	0	0	0	0

| ÖK5 | 0 | 5 | 0 | 5 | 4 | 5 | 4 | 4 | 5 | 4 | 4 | 4 | 0 | 0 | 0 | 0 |

LO: Learning Objectives   PQ: Program Qualifications

Contribution Level:	1 very low	2 low	3 Medium	4 High	5 Very High