

# 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:		
		<b>Course Content:</b>	
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			0	0.00	42.00
Quiz			0	3.00	0.00
Practicals/Labs			0	0.00	0.00
Self study and preperation			1	6.00	84.00
Final Exam			60	1.50	6.00
Homeworks			2	3.00	6.00
Projects			0	0.00	0.00
Contribution of Term (Year) Learning Activities to			40	0.00	0.00
Field Studies			0	0.00	0.00
Midterm exams			60	1.50	1.50
Contribution of Final Exam to Success Grade			60	1.50	1.50
Others			14	3.00	42.00
Final Exams			1	2.00	2.00
Measurement and Evaluation Techniques Used in the			1	2.00	2.00
Total Work Load					177.50
24			ECTS/ WORK LOAD TABLE		5.92
Total work load/ 300					6.00
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																
Contrib ution Level:	1 very low			2 low			3 Medium			4 High			5 Very High			