

## ADVANCED MICROSCOPY

1	Course Title:	ADVANCED MICROSCOPY	
2	Course Code:	FZK5513	
3	Type of Course:	Optional	
4	Level of Course:	Second Cycle	
5	Year of Study:	1	
6	Semester:	1	
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:	There is no course prerequisite	
12	Language:	Turkish	
13	Mode of Delivery:	Face to face	
14	Course Coordinator:	Prof. Dr. SERTAN KEMAL AKAY	
15	Course Lecturers:	Prof. Dr. Sertan Kemal AKAY	
16	Contact information of the Course Coordinator:	Prof. Dr. Sertan Kemal AKAY E-mail: kakay@uludag.edu.tr İş tel: 0 224 29 41 719 Adres: Bursa Uludağ Üniversitesi Fen Edebiyat Fakültesi Fizik Bölümü, 16059 Görükle Kampüsü BURSA	
17	Website:		
18	Objective of the Course:	Explain the basic concepts of microscopy	
19	Contribution of the Course to Professional Development:	Can benefit from following the latest technological developments in the field	
20	Learning Outcomes:		
		1	Information on Microscopes is obtained
		2	Understands the working principles of the microscopes
		3	Learns the techniques of image-making on microscope
		4	Learns information about the electron microscope
		5	Gain information about the atomic force microscope
		6	Gain information about the transmission electron microscope
		7	Understands the importance of scientific studies of the microscope
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		9	
		10	
21	Course Content:		
		<b>Course Content:</b>	
Week	Theoretical	Practice	
1	Optical Microscopy		
2	Operating Principles of Atomic Force Microscopy		
3	Operating Principles of Scanning Electron Microscopy		

4	Operating Principles of Transmission Electron Microscopy	
5	Microscopy, Lenses, Lens Types, Working principle of the lenses, Resolution, Depth Determination and Lighting Techniques	
6	Introduction to Electron microscopy, Electron Gun, High and Low Potential Significance Operation Lenses	
7	Image, and Detectors, Detectors used In Physical Properties	
8	Focus Adjustment, Labor and Working Distance Determination of Significance	
9	Significance of Transmission Electron Microscopes in Nanotechnology	
10	Crystal Structure	
11	Crystal Structure Determination	
12	Determination of Atomic-Dimensional Surface Morphology and Chemical Component	
13	Nanotechnology Importance of Atomic Force Microscope	
14	The Importance of Getting Atomic Force Microscopy Image	

22	Textbooks, References and/or Other Materials:	1.Introduction to Scanning Tunneling Microscopy, C. J. Chen
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Activites		Number	Duration (hour)	Total Work Load (hour)
Theoretical	Methods and Applications, R. Weisendanger	14	3.00	42.00
Practicals/Labs		0	0.00	0.00
Self study and preparation		14	3.00	42.00
<b>TERM LEARNING ACTIVITIES</b>	<b>NUMBE</b>	<b>WEIGHT</b>		
Homeworks		14	5.00	70.00
Midterm Exam	0	0.00	0.00	0.00
Projects		0	0.00	0.00
Field Studies		0	0.00	0.00
Home work-project	0	0.00	0.00	0.00
Midterm exams		0	0.00	0.00
Others		0	0.00	0.00
Total	1	100.00	20.00	20.00
Final Exams				
Total Work Load				174.00
Expected Grade				
Total work load/ 30 hr				5.80
Contribution of Final Exam to Success Grade				400.00
ECTS Credit of the Course				6.00
Total		100.00		
Measurement and Evaluation Techniques Used in the Course	Bağıl değerlendirme sistemi uygulanmaktadır			

24	<b>ECTS / WORK LOAD TABLE</b>
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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	0	4	0	4	0	4	5	4	0	4	0	0	0	0	0
ÖK2	4	0	4	0	4	0	4	5	4	0	4	0	0	0	0	0

ÖK3	4	0	4	0	4	0	4	5	4	0	4	0	0	0	0	0
ÖK4	4	0	4	0	4	0	4	5	4	0	4	0	0	0	0	0
ÖK5	4	0	4	0	4	0	4	5	4	0	4	0	0	0	0	0
ÖK6	4	0	4	0	4	0	4	5	4	0	4	0	0	0	0	0
ÖK7	4	0	4	0	4	0	4	5	4	0	4	0	0	0	0	0
LO: Learning Objectives    PQ: Program Qualifications																
Contribution Level:	1 very low			2 low			3 Medium			4 High			5 Very High			