	MATERIAL CHA	RACT	ERIZATION TECHNIQUES						
1	Course Title:	MATERI	AL CHARACTERIZATION TECHNIQUES						
2	Course Code:	FZK2416							
3	Type of Course:	Optional							
4	Level of Course:	First Cyc	le						
5	Year of Study:	2							
6	Semester:	4							
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:	It is necessary to know the materials physics.							
12	Language:	Turkish							
13	Mode of Delivery:	Face to face							
14	Course Coordinator:	Doç. Dr. MÜRŞİDE ŞAFAK HACIİSMAİLOĞLU							
15	Course Lecturers:	Prof. Dr. Mürsel ALPER							
16	Contact information of the Course Coordinator:	Doç. Dr. Mürşide HACIİSMAİLOĞLU, msafak@uludag.edu.tr, 02242941697							
		Uludağ Üniversitesi, Fen Edebiyat Fakültesi, Fizik Bölümü, 16 Görükle, BURSA							
17	Website:								
18	Objective of the Course:	To learn the properties of the materials and their characterization techniques To examine the relationships between the properties of the materials To have an idea about the fabrication of new types of materials and their characterization techniques.							
19	Contribution of the Course to Professional Development:	 Learns and recognizes types and properties of materials. Learns the techniques used to determine the properties of materials. Learns and knows which property of the material should be measured with which technique. Learns to establish relationships between material properties and interpret the properties. Learns in which application area the materials will be used. 							
20	Learning Outcomes:								
		1	Learns and recognizes types and properties of materials.						
		2	Learns the techniques used to determine the properties of materials.						
		3	Learns and knows which property of the material should be measured with which technique.						
		4	Learns to establish relationships between material properties and interpret the properties.						
		5	Learns in which application area the materials will be used.						
		6							
		7							
		8							
		9							
		10							
21	Course Content:								

	Course Content:										
Week	Theoretical		Ρ	ractice							
1	Material Fabrication Methods (vacuu techniques MBE-sputtering-thermal evaporation, atomic layer deposition, ablation)	m laser									
2	Material Fabrication Methods (non-va techniques, electrochemical techniqu	acuum ies)									
3	Material Types and Interaction of Electromagnetic Wave with Matter										
4	Structural Characterization - X-ray dir (XRD) technique	ffraction									
5	Structural Characterization - Microson Techniques (electron microscopes: T SEM, STEM, scanning electron micro (SEM), transmission electron microso (TEM))	opy EM, oscope cope									
6	Structural Characterization - Microsco Techniques (atomic force microscope Magnetic force microscope -MFM)	opy e AFM,									
7	Structural Characterization - Fourier Transform Infrared Spectroscopy (FT Raman spectroscopy	IR),									
8	Elemental Analysis-Energy dispersive spectroscopy (EDX), Wavelength dis X-ray spectroscopy (WDX), X-ray photoelectron spectroscopy (XPS)	e X-ray persive									
Activit	es			Number	Duration (hour)	Total Work Load (hour)					
Theore	iofaviscosity, elastic-plastic properties			14	3.00	42.00					
Practica	als/Labs			0	0.00	0.00					
Self_stu	dy and preperation Electrical and Electronic Characteriza	ation-		14	6.00	84.00					
Homew	vorks			2	6.00	12.00					
Project	Magnetic Characterization Magnetic	is		0	0.00						
Field S	tudies			0	0.00	0.00					
Miqtapern	Magnetotransport Characterization -			1	2.00	2.00					
Others			-	8	4.00	32.00					
Fi 22 E	Pextbooks, References and/or Other		1.	Materials Characteriz	ation: Introduction t	₽M&roscopic					
Total W	Vork Load					174.00					
Total w	ork load/ 30 hr		2.	Characterization of M	aterials Vol 1 and 2	1€:1600n N.					
ECTS	Credit of the Course					6.00					
			Temel Ilkeleri, Ziya Engin Erkmen, Nobel Akademik Yayıncılık, 2019								
23	Assesment		_								
TERM LEARNING ACTIVITIES NUMBE				WEIGHT							
Midterm Exam 1			40.00								
Quiz		0	0.00								
Home work-project 0				0.00							
Final Exam 1				60.00							
Total 2				100.00							
Contrib Succes	oution of Term (Year) Learning Activitiess Grade	es to	4(0.00							

Contribution of Final Exam to Success Grade							60.	60.00								
Total							10	100.00								
Measurement and Evaluation Techniques Used in the Course							ne Th	The system of relative evaluation is applied.								
24 ECTS / WORK LOAD TABLE																
25	CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS															
	PQ1	PQ2	PQ3	PQ4	PQ5	PQ6	PQ7	PQ8	PQ9	PQ1 0	PQ11	PQ12	PQ1 3	PQ14	PQ15	PQ16
ÖK1	0	0	0	4	4	0	0	0	3	0	4	0	0	0	0	0
ÖK2	0	4	3	0	0	0	0	0	0	0	4	0	0	0	0	0
ÖK3	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK4	3	3	3	0	0	0	0	0	3	0	0	0	0	0	0	0
ÖK5	3	4	3	0	0	0	0	0	3	0	4	0	0	0	0	0
LO: Learning Objectives PQ: Program Qualifications																
Contrib 1 very low 2			2 low		3 Medium			4 High			5 Very High					

ution Level: