

Course Name/Code Advance ILT 535 Surface Analysis Methods					ADVANCED TECHNOLOGIES					
Semester	Teaching and Learning Methods							Credit		
	Theory	App.	Lab.	Project	Term paper	Other	Total	Credit	ECTS Credit	
1-2	42		80		20	46	188	3	7.5	
Language	Turkish									
Compulsory/ Elective	Elective									
Prerequisites	None									
Course Content	Introduction to surface analysis. Vacuum technologies and their importance in surface analysis. Secondary Ion Mass Spectroscopy-Surface mass spectroscopy. X-ray absorption and emission Spectroscopy and Surface Structure Analysis. X-Ray Sources and synchrotron radiation. Binding energy and chemical shifting. Basic Principles of X-ray Photoelectron Spectroscopy (XPS) and its applications. Auger Electros Spectroscopy (AES), Kinetic Energies of Auger Peaks compared to the Auger and photon emissions. Basic principles of operations and application fields of the Scanning Electron Microscope (SEM), the Transmission Electron Microscope (TEM) and the Atomic force Microscope (AFM).									
Course Objectives	The objectives of this course will be to enable students to learn and understand the most common surface analysis techniques used in the industry and research.									
Learning outcomes and competences	Ability to use technical /modern materials to be required in her/his studies, ability to present oral and written forms in her/his field, ability to work on interdisciplinary studies, ability to rapidly distinguish the truly required knowledge, ability to do analyze of results. Learning surface analysis techniques on the spot.									
Textbook and /or References	1. C.L.Wilkins and J.O.Lay,Jr. "Identification of Microorganisms by Mass Spectrometry" JOHN WILEY&SONS 2006, ISBN 0471654426 2. L.D.S.Yadav "Organic Spectroscopy" Kluwer Academic Publishers 2005, ISBN 1402025742 3. J.C.Vickerman "Surface Analysis" JOHN WILEY&SONS 2004, ISBN 0471972924 4. H.Bubert and H.Jenett "Surface and Thin Film Analysis" WILEYVCH 2003, ISBN 3-527304584									
Assessment Criteria							<i>If any, mark as (X)</i>	<b>Percentage (%)</b>		
	<b>Midterm Exams</b>						X	20		
	<b>Quizzes</b>									
	<b>Homeworks</b>									
	<b>Projects</b>									
	<b>Term paper</b>						X	10		
	<b>Laboratory Work</b>						X	30		
	<b>Other</b>									
<b>Final Exam</b>						X	40			
Prepared by	Prof.Dr. İbrahim USLU									
Week	Subject									
1	Introduction to surface analysis.									
2	Vacuum Technologies and their importance in surface analysis									
3	Secondary ion mass spectroscopy (SIMS) – Surface mass spectroscopy									
4	X-ray absorption and emission Spectroscopy and Surface Structure Analysis.									
5	X-Ray Sources and synchrotron radiation.									
6	Midterm exam.									
7	Binding energy and chemical shift.									
8	Functioning Principles and fields of application of the X-ray Photoelectron Spectroscopy (XPS).									
9	Basic principles of operations and application fields of the Scanning Electron Microscope (SEM).									
10	Basic principles of operations and application fields of the Transmission Electron Microscope (TEM) and the Atomic force Microscope (AFM).									
11	Laboratory applications of the SEM									
12	Laboratory applications of the AFM									
13	Laboratory applications of the XPS and the XRD instruments									
14										