



MARMARA UNIVERSITY - Faculty of Engineering
Environmental Engineering
SYLLABUS
FALL 2014-2015

Course Code	Course Name	Course Type	Weekly Course Hours			Credits	ECTS	Weekly Time & Classroom Schedule
			T	A	L			
ENVE-404	Environmental Engineering Instrumental Analysis	Compulsory	3			3	5	Wednesdays 13:30-14:30, MB243
Prerequisite		Prerequisite to						
Course Lecturer		Yr. Doc. Dr. Rosa Flores				Office Hours		Tuesdays 12:30-14:30pm and by appointment
E-mail		rflores@marmara.edu.tr						
Phone		216-348-0292-x 519				Office / Room No		MD 119
Teaching Assistant(s)								Phone
E-mail								Office / Room No
Course Objectives		Understanding the fundamental principles upon which modern analytical instruments are based, and learning how they are used to solve analytical problems						
Learning outcomes		<ul style="list-style-type: none"> Assess sources of error in chemical and instrumental analysis Recognize interferences in chemical and instrumental analysis. Comprehend the concept of and perform instrument and method calibration. Integrate a fundamental understanding of the underlying physics principles as they relate to specific instrumentation used for atomic, molecular, and mass spectrometry, and chromatography. Understand and be able to apply the theory and operational principles of analytical instruments. Distinguish between qualitative and quantitative measurements and be able to effectively compare and select methods for elemental and molecular analyses. 						
Textbooks and/or References		1) Mendham, J., Denney, R. C., Barnes, J. D., Thomas, M., Vogel's Textbook of Quantitative Chemical Analysis, 6th Edition, Pearson Education, 2000 2) Skoog, Leary, Principles of Instrumental Analysis, 4th Edition, Saunders College Publishing, 1992. 3) David Harvey. Analytical Chemistry 2.0. 2000. Available at https://dl.dropboxusercontent.com/u/9630480/Site/eTextProject/pdfFiles/AnalChem2.0.pdf						
Teaching Methods								
WEEK	Date	TOPICS					Reference No - Section	
Week 1		Introduction to Instrumental Methods					Handout	
Week 2		Signals and Noise					Handout	
Week 3		Limitations of Analytical Methods, Statistics					CH 4	
Week 4		Electromagnetic Radiation					Handout	
Week 5		Molecular Spectroscopy					CH 17	
Week 6		Atomic Absorption					CH 15	
Week 7		Atomic Emission					CH 16	
Week 8		Midterm Study						
Week 9		Midterm 1						
Week 10		Gas Chromatography					CH 9	
Week 11		Gas Chromatography					CH 9	
Week 12		Liquid Chromatography					CH 8	
Week 13		Midterm 2						
Week 14		Mass spectrometry					CH 19	
Evaluation Tools		Evaluation Tool	Quantity	Date	Weight in Total (%)	Weight in Semester Evaluation (%)		
		Final Exam	1		40			
		Final Make-up Exam (if exists)	1		40			
		Semester Evaluation			60	100		
		Midterm(s)	2		40			
		Quiz(zes)	4		0			
		Project(s)	0		0			
		Homework(s)	4		20			
		Laboratory	0					
		Other						
Program and Learning Outcome Relations		No	Program Outcomes			Relation (1: weak relation ; 3: strong relation)		
						1	2	3
		1	Having knowledge about mathematics, science and environmental engineering as the owner of the accumulation of sufficient information about the theoretical and applied knowledge in these areas. Ability to apply the model to solve theoretical and applied engineering problems.				x	
		2	Ability to identify, formulate and solve complex problems. For this purpose, selecting and applying appropriate methods, analysis and modeling skills are required.				x	
		3	Ability to design complex system, process, device or product under realistic constraints and conditions, to meet certain requirements. For this purpose to apply the methods of modern design..				x	
		4	Ability to select and use modern techniques and tools required for development of environmental engineering applications the ability to use information technology effectively.				x	
		5	Design experimental setup to investigate the environmental engineering problems, conduct experiments, collect data, analyze and interpret results.				x	
		6	Ability to work effectively with disciplinary and multi disciplinary teams, self-study skills.				x	
		7	Ability to communicate effectively in oral and written, knowledge about at least one foreign language.					x
		8	Awareness of need for lifelong learning information access, monitoring and continuous self-renewal ability in science and technology developments.					x
		9	Professional and ethical responsibility.					x
		10	Having knowledge about project management, risk management, change management . Recognition of the entrepreneurship, innovation and sustainable development in business life.			x		
		11	Having knowledge about environmental engineering applications on the universal and social dimension of health, environmental and safety impacts, contemporary issues, engineering solutions, and awareness of the legal consequences.					x
*** Lifelong Learning Programme (LLP) ***					Language of Instruction: English			
Evaluation Tools	Quantity	Student Workload Hours			Evaluation Tools	Quantity	Student Workload Hours	
Theoretical Hours	14	42			Applied Hours	0	0	
Midterm	2	20			Final	1	10	
Quiz	7	21			Project	0	0	
Laboratory	0	0			Homework	5	20	

Atelier	0	0	Seminar	0	
Field Study	0	0	Presentation	0	0
Other			Self Study		
TOTAL					113
Recommended ECTS Credit (Total Hours/25):				4.52	
1:weak, 2:moderate, 3:strong					