



MARMARA UNIVERSITY - Faculty of Engineering

Environmental Engineering

SYLLABUS

2022 - 2023 FALL

Course Code	Course Name	Course Type	Weekly Course			Credits	ECTS	Weekly Time & Classroom Schedule		
			T	A	L					
ENVE 4095	GIS in Water Resources	Elective	3	0	0	5	5			
Prerequisite	Prerequisite to									
Course Lecturer	Assoc. Prof. Sedat Yalçınkaya			Office Hours Schedule						
E-mail	sedat.yalcinkaya@marmara.edu.tr			Office / Room No		M4 226				
Phone	216 777 36 01-3618			Phone						
Teaching Assistant(s)				Office / Room No						
E-mail										
Course Objectives	This course provides the student an introduction for application of geographic information systems in water resources. The course teaches digital mapping of water resources information, spatial analysis, hydrologic terrain analysis using digital elevation models, delineation of river and watershed networks, integration of time series and geospatial data for water resources. The course is divided into two sections; theoretical basis and practical teaching through useful and quantitative exercises.									
Teaching Methods	The course has four elements: lectures, practice sessions, homework exercises, and examinations. The course material is divided into modules with each module having one or two lectures, a practice session and a homework exercise involving extensive use of GIS software.									
Learning Outcomes	1) Understand the fundamental concepts of GIS for water resources. 2) An ability to analyze and interpret data to meet desired needs within realistic constraints such as economic, environmental, and sustainability. 3) An ability to identify, formulate, and solve water resources problems using GIS. 4) An ability to use the techniques, and modern engineering tools necessary for water resources and hydrology practices. 5) Students are expected to have a thorough conceptual and quantitative understanding of GIS applications in water resources by the end of the class.									
Textbooks and/or References	1 Materials for in-class exercises and lectures will be supplied 2 Maidment D R, "Arc Hydro: GIS for Water Resources" 2002, https://learn.arcgis.com/en/arcgis-book/ 3									
WEEK	TOPICS									Reference No -
Week 1	Introduction to GIS in Water Resources. Review the course curriculum, course outline.									
Week 2	Introduction to ArcGIS									
Week 3	Exercise 1: Introduction to ArcGIS									
Week 4	Data sources for GIS in water resources									
Week 5	Exercise 2: Building a base map									
Week 6	Geodesy, map projections and coordinate systems									
Week 7	Spatial analysis using grids									
Week 8	Midterm Exam									
Week 9	Exercise 3: Spatial analysis in hydrology									
Week 10	Digital Elevation Based Watershed and Stream Network Delineation									
Week 11	Exercise 4: Watershed and Stream Network Delineation									
Week 12	Hydrologic Terrain Analysis									
Week 13	HAND for flood inundation mapping									
Week 14	Exercise 5: Height Above Nearest Drainage Inundation Analysis									
Evaluation Tools	Final Exam	1		40						
	Final Make-up Exam (if exists)	1		40						
	Semester Evaluation			60						
	Midterm(s)	1		20						
	Quiz(ze)s									
	Project(s)									
	Homework(s)	5		40						
	Laboratory									
Field Visits to WTPs										
Courses vs. Program Outcome Relations	No	Program Outcomes			Relations*					
	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.			1	2	3			X
	2	Ability to identify, formulate and solve complex problems. For this purpose, selecting and applying appropriate methods, analysis and modeling skills.								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 the 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 dimensions 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 Tool	Quantity	Student Workload Hours			Evaluation Tool	Quantity	Student Workload Hours			
Theoretical Hours	13	39			Applied Hours					
Midterm	1	15			Final	1	25			
Quiz					Project					
Laboratory					Homework	5	40			
Atelier					Seminar					
Field Study					Presentation					
Other					Self Study					
TOTAL :						20	119,00			
Recommended ECTS Credit (Total Hours / 20) :						5,0				
* 1: weak, 2: moderate, 3: strong										