Freshwater Resources: Natural systems, Human Impact and Conservation

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GENERAL

SCHOOL	School of Environment		
ACADEMIC UNIT	Department of Environment		
LEVEL OF STUDIES	Graduate		
COURSE CODE	ENV512	SEMESTER	Spring
COURSE TITLE	Freshwater Resources: Natural systems, Human Impact and Conservation		

INDEPENDENT TEACHING ACTIVITIES	TEACHING HOURS	CREDITS
Lectures	16	
Workshops	4	
Course Total		2
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE	skills development
PREREQUISITE COURSES:	-
COURSE WEBSITE (URL)	https://aegeanmoodle.aegean.gr

LEARNING OUTCOMES

Learning outcomes
• *understand the basic characteristics of surface water and groundwater systems and their interaction* • *understand the factors and processes that control the quantity and quality of flows in natural river ecosystems* • *be able to assess the effect of human activities on water availability and quality in surface and groundwater systems* • *prioritize the key stream health indicators and identify signs of stream degradation (such as erosion, nutrient enrichment, or habitat loss)* • *be able to apply a standardized protocol for assessing stream conditions based primarily on physical attributes* • *to discuss conservation practices and strategies for stream restoration and management*
General Competences
• *Respect for the natural environment* • *analysis and synthesis of data and information, with the use of the necessary technology* • *Decision-making* • *Project planning and management*

- *Teamwork*

SYLLABUS

The course aims to provide knowledge and understanding of the characteristics of surface water and groundwater natural systems (and their interaction), the impact of human activities on water availability/quality, an overview of environmental threats to freshwater ecosystems, focusing on floods, climate change, stream erosion, and river/coastal pollution and the strategies for water conservation and pollution prevention as well as participatory approaches, such as stakeholder analysis and Pro-Action Café, to develop adaptation solutions.
Topics covered include the: (i) factors and processes that control the water flow and availability in natural hydrosystems; (ii) environmental threats to surface water and groundwater ecosystems, water availability and water quality; (iii) natural processes and pollutant properties that control the fate of pollutants and the role and effectiveness of natural attenuation; (iv) prevention and conservation tools, participatory approaches and strategies; and (v) sample applications using a webGIS database, the Stream Visual Assessment Protocol (SVAP) for the assessment of the key stream health indicators, the Vulnerability and Capacity Assessment (VCA) tool for the community preparedness and an interactive numerical groundwater model.

The topics of the Lectures and in-class activities include:

1. Course Description, Introduction to Water Systems and Management approaches
2. Overview of environmental threats to freshwater ecosystems
3. Monitoring the ecological quality of surface water according the WFD 2000/60 EU
4. Stream environmental status assessment protocols (workshop supported by field work)
5. Stakeholders' analysis and participatory approaches to assist impacted communities to adopt adaptation solution (workshop)
6. Surface and Ground water interaction, Groundwater facts and misconceptions, Groundwater characteristics & ecosystem services
7. Water flow in natural systems, human activities and their impact on water availability and quality.
8. Groundwater Utilization, Effects & Consequences
9. Groundwater pollution, Contaminant Transport Processes & Natural attenuation potential
10. Prevention & Conservation, Application of selected tools for optimizing management practices – minimizing risk of contamination and/or for designing remediation scheme using a numerical model (+ workshop)

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	*Face-to Face*
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	Use of ICT in teaching, laboratory education, communication with students
TEACHING METHODS	

Activity	*Semester workload*
Lectures	16 hours
Workshops	2 hours
Laboratory practice	
Essay writing	
Study and analysis of bibliography	10 hours
Field Work	4 hours

	Project and Reports	*18 hours*
	Course total	***50 hours***
STUDENT PERFORMANCE EVALUATION	Students will be graded based on: • Individual Assignment/report 40% of final mark • Individual Final project 60% of final mark	

ATTACHED BIBLIOGRAPHY

- *Selected Bibliography available online*
- *Surface water and Groundwater Modeling – IGW model software/tutorial and* Stream Visual Assessment Protocol (*SVAP) and Vulnerability and Capacity Assessment (VCA) tutorials*