

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
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
COURSE TYPE	skills development		
PREREQUISITE COURSES:	-		
COURSE WEBSITE (URL)	https://aegeanmoodle.aegean.gr		

LEARNING OUTCOMES

Learning outcomes
<ul style="list-style-type: none"> • <i>understand the basic characteristics of surface water and groundwater systems and their interaction</i> • <i>understand the factors and processes that control the quantity and quality of flows in natural hydrosystems</i> • <i>be able to assess the effect of human activities on water availability and quality in surface and groundwater systems.</i> • <i>understand the role of natural attenuation processes in water quality management</i> • <i>discuss water conservation tools and strategies</i> • <i>be able to process water quality data</i> • <i>be able to assess the eutrophication risk of surface water systems</i>
General Competences
<ul style="list-style-type: none"> - <i>Respect for the natural environment</i> - <i>analysis and synthesis of data and information, with the use of the necessary technology</i> - <i>Decision-making</i> - <i>Project planning and management</i> - <i>Team work</i>

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 and climate change on water availability/quality, and the strategies for water conservation and pollution prevention. Topics covered include the: (i) factors and processes that control the water flow and availability in natural hydrosystems; (ii) human activities and their impact on 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 and strategies; and (v) sample applications using a webGIS database, the excel program for the assessment of the physicochemical and the trophic status of the lentic systems 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. Introduction to surface water hydrology, water quality and eutrophication risk
3. Monitoring the ecological quality of surface water according the WFD 2000/60 EU
4. Physicochemical and trophic status of the lentic/lentic ecosystems
5. Models to estimate terrestrial fluxes and management recommendations (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	<i>Face-to Face</i>	
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	4 hours
	Laboratory practice	
	Essay writing	
	Study and analysis of bibliography	10 hours
	Project and Reports	20 hours
	Course total	50 hours
STUDENT PERFORMANCE EVALUATION	Students will be graded based on: <ul style="list-style-type: none"> • Group 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 and HBV models software and tutorials*