

DEREE COLLEGE SYLLABUS FOR: ES 4223 WATER RESOURCES: THREATS AND SUSTAINABLE MANAGEMENT	
3/0/3	
UK LEVEL: 6 UK CREDITS: 15 (Updated: Fall 2023)	
PREREQUISITES:	ES1000 Environmental Science: Ecosystems and Biodiversity, ES1010 Environmental Science: Energy Resources and Pollution
CATALOG DESCRIPTION:	The course examines world water resources and their major threats such as the increasing demand for water, overuse and depletion of freshwater resources, changes to the hydrologic cycle and water pollution. It also discusses current legislation on water and sustainable management of water resources.
RATIONALE:	Water is the foundation of all life on earth and wise management of water resources is a critical issue for the sustenance of human society and the development of major economic activities (agriculture, aquaculture, tourism, food production). This course is designed for environmental studies majors and aims to give them a more thorough understanding of issues related to water resources, from their occurrence and use to their management and conservation. Students acquire the skills to research and analyze case studies of water resources management and propose sustainable solutions. The world demand for water, water conflicts and future perspectives are also discussed. The course prepares environmental studies majors for careers as environmental managers or consultants in the public, the private sector or in nongovernmental organizations.
LEARNING OUTCOMES:	<p><i>As a result of taking this course, the student should be able to:</i></p> <ol style="list-style-type: none"> 1. Demonstrate knowledge and understanding of the science of water resources and of world water problems such as increasing demand for water, overuse and depletion of water resources, as well as water pollution issues. 2. Demonstrate knowledge of legislation on water resources, of the concepts of sustainable water resources management and integrated water resources management and apply it to an analysis of selected case studies. 3. Critically evaluate the actions of governments, regional and local authorities, private companies, nongovernmental organizations, local community groups and other actors in addressing water problems in selected case studies. 4. Assess a specific water resources issue by collecting data and information, critically appraise adopted methods and processes and propose relevant solutions, finally, planning and composing a project report. 5. Demonstrate ability to communicate research findings effectively in several forms (e.g. written, graphical and verbal), and defend them in a professional manner.
METHOD OF TEACHING AND LEARNING:	<p>In congruence with the teaching and learning strategy of the college, the following tools are used:</p> <ul style="list-style-type: none"> • Lectures and class discussions. • Homework assignments. • Office hours held by the instructor to provide further assistance to

	<p>students.</p> <ul style="list-style-type: none"> • Use of library facilities for further study and preparation for the exams • Use of the Blackboard course management platform to further support communication, by posting lecture notes, assignment instruction, timely announcements, formative quizzes and online submission of assignments. 								
ASSESSMENT:	<p>Summative:</p> <table border="1"> <tr> <td>1st assessment: In-class paper on selected topics (2 hrs)</td><td>40%</td></tr> <tr> <td>Final assessment: In-class Portfolio. Summative: 3 components from selected items, tested in class: Journal Analysis; Case Study Analysis; Flipped class; Exam paper (multiple choice & essay questions)</td><td>60%</td></tr> </table> <p>Formative:</p> <table border="1"> <tr> <td>Critical Essays</td><td>0</td></tr> <tr> <td></td><td></td></tr> </table> <p>The formative tests aim to prepare students for the examinations. The in-class paper tests Learning Outcomes 4, and 5. The exam portfolio tests Learning Outcomes 1, 2 and 3 .</p>	1 st assessment: In-class paper on selected topics (2 hrs)	40%	Final assessment: In-class Portfolio. Summative: 3 components from selected items, tested in class: Journal Analysis; Case Study Analysis; Flipped class; Exam paper (multiple choice & essay questions)	60%	Critical Essays	0		
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INDICATIVE READING:	<p>REQUIRED READING:</p> <ul style="list-style-type: none"> • Cech, T. V. 2005. <i>Principles of Water Resources, History, Development, Management, and Policy</i>. John Wiley and Sons, Inc (available as e-textbook) • Holden, J. 2014. <i>Water Resources: An Integrated Approach</i>. Routledge (available as e-textbook) <p>RECOMMENDED READING:</p> <ul style="list-style-type: none"> • Pennington, K. L. and Cech, T. V. 2010. <i>Introduction to Water Resources and Environmental Issues</i>. Cambridge University Press. • Selected reports from the European Environment Agency • Selected articles from scientific journals 								
INDICATIVE MATERIAL: (e.g. audiovisual, digital material, etc.)	<p>REQUIRED MATERIAL: N/A</p> <p>RECOMMENDED MATERIAL:</p>								
COMMUNICATION REQUIREMENTS:	Verbal skills using academic/professional English								
SOFTWARE REQUIREMENTS:	MS Office and Blackboard CMS Enter any additional s/w requirements.								
WWW RESOURCES:	<ul style="list-style-type: none"> • European Environment Agency on Water: http://www.eea.europa.eu/themes/water/water-resources • European Commission: Water Framework Directive: http://ec.europa.eu/environment/water/waterframework/info/intro_en.htm • U.S. Environmental Protection Agency on Water http://www.epa.gov/ebtpages/water.html 								

	<ul style="list-style-type: none"> • Greek Ministry of Environment/ Water Resources http://www.ypeka.gr/Default.aspx?tabid=245&language=el-GR • World Water Council: http://www.worldwatercouncil.org/index.php?id=1 • UN Water: http://www.unwater.org/ • EYDAP Company: https://www.eydap.gr/en/ • Water Resources Management Journal http://www.springerlink.com/content/0920-4741 • Journal of Water Resources Planning and Management http://www.springerlink.com/content/0920-4741 • International Journal of Water Resources Development http://www.tandf.co.uk/journals/journal.asp?issn=0790-0627&linktype=offer • Water and Environment Journal http://www.wiley.com/bw/journal.asp?ref=1747-6585 • International Journal of Water Resources and Environmental Management http://www.academicjournals.org/journal/IJWREE • United Nations Sustainable Development Goals: https://www.un.org/sustainabledevelopment/sustainable-development-goals/
INDICATIVE CONTENT:	<ol style="list-style-type: none"> 1. Perspectives on Water and Environmental Issues 2. The Changing Water Cycle <ol style="list-style-type: none"> a. Climate Change impacts and the water cycle b. Other human disturbances 3. The Water Environment of Early Civilizations 4. Surface Water Hydrology <ol style="list-style-type: none"> a. Rivers b. Lakes c. Wetlands 5. Groundwater Hydrology <ol style="list-style-type: none"> a. Overview and mechanisms b. Use and abuse of groundwater aquifers 6. Water Quality 7. A world of Thirst <ol style="list-style-type: none"> a. Overuse of water b. Water stress c. Water scarcity 8. Agricultural Use of Water <ol style="list-style-type: none"> a. Overview b. Virtual water use c. Dams and Reservoirs d. Conservation methods in irrigation 9. Domestic water use <ol style="list-style-type: none"> a. Drinking water 10. Sanitation Stormwater Management 11. Integrated Water Resources Management 12. EU Legislation on Water Issues 13. The Economics of Water <ol style="list-style-type: none"> a. Water Pricing b. Water Privatization 14. Water Conflicts, Law and Governance