

### **COURSE OUTLINE Water - Energy – Food Nexus**

EDUCATION LEVEL	7		
CODE	WBCC-503	SEMESTER	1 <sup>st</sup>
TITLE	Water - Energy – Food Nexus		
TEACHING ACTIVITIES	HOURS/WEEK	ECTS	
Lectures, Literature review and analysis, Practice exercises	3	6	
TYPE OF COURSE	General background (compulsory course)		
PREREQUISITE KNOWLEDGE	-		
LANGUAGE OF INSTRUCTION AND ASSESSMENT	Greek		
AVAILABILITY TO ERASMUS STUDENTS	-		
WEBSITE (URL)	<a href="https://eclass.uoa.gr/courses/GEOL571/">https://eclass.uoa.gr/courses/GEOL571/</a>		

#### LEARNING OUTCOMES

##### Learning Outcomes/Subject Specific Competences

The course consists of a theoretical part, literature review and analysis and practice exercises that contribute to the understanding real world applications of Water – Food - Energy Nexus.

The course covers subjects related to a) the interconnections and processes of the Water, Energy, Food nexus, both at the cross-sectoral and geographical level, at various scales as well as the target setting, assessment, calculation and decision-making approaches in the context of evaluation of environmental footprints related to the Water, Energy, Food nexus. Emphasis is made on the demand for water for the production of agricultural products, since agriculture is the main user of water worldwide.

Upon successful completion of the course, postgraduate students will be able to:

Describe on the one hand the global risks from the lack of natural resources and on the other hand, the way in which the proper exploitation and utilization of the nexus can lead to the sustainability of management and the rational distribution of resources.

Identify how environmental management relates to the economy, policy making and supply chain at both local and global scales.

To explain the degree of interaction of each of the three factors involved in the nexus and the way or ways in which the lack or sufficiency of each of them affects the other two respectively.

To complete the evaluation process of relevant environmental footprints of products and services.

##### Generic Competences

Search, analyze and synthesize data and information

Literature review

Decision making

Process understanding

Individual and team work

Project planning and management

Cultivating respect for the natural environment

#### COURSE CONTENT

Water, energy and food are essential resources for sustaining life and are fundamental to national, regional and global economies. These three resources are interconnected in many ways, and the term 'nexus' describes their interaction. For the sustainable management of the above resources, it is necessary to overcome the barriers between individual sectors and disciplines to develop integrated strategies. The approach taken in this course is based on the more general understanding that separate environmental resources are at the same time closely related. In this way, through the course, the principles and application of the relationship of water resources – energy, food – energy and water – food are identified and explored at the local, national, regional and global scale.

Educational objects:

Structure and adoption of cross-sectoral connections and processes, within the framework of the Water, Energy, Food nexus.

Understanding the Water, Energy, Food nexus at local regional and global scales, and identifying interconnections at different scales.

Understanding systems approaches in the Water, Energy, Food nexus.

Case study: evaluation of the nexus through environmental footprints of agricultural products.

Development of the ability to interdisciplinary analysis of issues and topics concerning the nexus.

#### LEARNING ACTIVITIES - TEACHING and ASSESSMENTS METHODS

MODE OF DELIVERY	Distance learning
USE OF INFORMATION AND	Using of I.C.T. in teaching, in practice exercises and in the communication

COMMUNICATION TECHNOLOGY	with students. Use of e-class platform and online tools of Food Agriculture Organisation (FAO) and Water Footprint Network (WFN).	
PLANNED LEARNING ACTIVITIES	Activity	Semester Workload
	Lectures	3 h x 13 weeks
	Literature review and analysis	55 h
	Practice Exercises – evaluation of environmental footprints	55 h
	Total	149 h
ASSESSMENT METHODS AND CRITERIA	Multiple choice examination 100%	

TEXTBOOKS - BIBLIOGRAPHY

Aldaya M.M., Chapagain A.K., Hoekstra A.Y., Mekonnen M.M., 2011. The Water Footprint Assessment Manual - Setting the Global Standard. Water Footprint Network, [https://waterfootprint.org/resources/TheWaterFootprintAssessmentManual\\_English.pdf](https://waterfootprint.org/resources/TheWaterFootprintAssessmentManual_English.pdf)

Dodd F. and J. Bartram, eds. 2016. The Water, Food, Energy, and Climate Nexus: Challenges and An Agenda for Action. London: Routledge

European Union (EU), 2000. Directive of the European Parliament and of the Council of October 2000 establishing a framework for community action in the field of water policy (Water Framework Directive (WFD) 60/2000) [https://environment.ec.europa.eu/topics/water/water-framework-directive\\_en](https://environment.ec.europa.eu/topics/water/water-framework-directive_en)

International Standards Organisation (ISO), 2022. ISO 14040:2006 Environmental management Life cycle assessment - Principles and framework. <https://www.iso.org/standard/37456.html>

Salam P.A., Shrestha S., Pandey V.P., Anal A.K. (eds.), 2017. Water-Energy-Food Nexus: Principles and Practices, Hoboken: John Wiley & Sons.

Steduto, P.; Hsiao, T.C.; Fereres, E.; Raes, D. Crop Yield Response to Water; Food and Agriculture Organization of the United Nations (FAO), Ed.; Food and Agriculture Organization of the United Nations (FAO): Rome, Italy, 2012; ISBN 978-92-5-107274-5 <https://www.fao.org/3/i2800e/i2800e00.htm>

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