

COURSE OUTLINE

1. GENERAL

SCHOOL	APPLIED ECONOMIC AND SOCIAL SCIENCES		
ACADEMIC UNIT	AGRIBUSINESS AND SUPPLY CHAIN MANAGEMENT		
LEVEL OF STUDIES	<i>Undergraduate</i>		
COURSE CODE	AGR908	SEMESTER	9th
COURSE TITLE	Introduction to water resources management		
INDEPENDENT TEACHING ACTIVITIES	WEEKLY TEACHING HOURS	CREDITS	
Lectures	5	5	
COURSE TYPE	Special Background//Skills Development		
PREREQUISITE COURSES	NO		
LANGUAGE OF INSTRUCTION and EXAMINATIONS	Greek		
IS THE COURSE OFFERED for ERASMUS STUDENTS?	YES (in English)		
COURSE WEBSITE (URL)	https://oeclass.aua.gr/eclass/		

2. LEARNING OUTCOMES

Learning Outcomes
<p>The course aims at acquiring basic knowledge on sustainable water resources management and on irrigation planning and application.</p> <p>Upon successful completion of the course the student will be able to:</p> <ul style="list-style-type: none"> • understand the basic concepts of the hydrological cycle, water sources and the soil-plant-atmosphere relationship • understand and handle issues related to sustainable management and application of irrigation water • calculate the crops' water needs • recognize the components of an irrigation network as well as their use and connection • select and install the most suitable irrigation system <p>understand the basic concepts and importance of drainage in agriculture</p>
General Competences
Adapting to new situations
Decision-making
Working independently
Teamwork
Working in an international environment
Working in an interdisciplinary environment

Project planning and management

Production of free, creative and inductive thinking

3. SYLLABUS

Theoretical part

1. Introduction (hydrologic cycle, importance of irrigation, irrigation in Greece, sustainable agricultural water use)
2. Soil and water relationship
3. Soil water and plant relationship
4. Irrigation systems
5. Crop water needs (evapotranspiration, calculation methods, crop coefficients, crop irrigation needs)
6. Irrigation planning (irrigation dose, range, etc)
7. Irrigation water quality
8. Irrigation methods. Selection Criteria. Advantages and disadvantages of irrigation systems
9. Irrigation efficiency. Irrigation water management in Greece (institutional framework, Land Reclamation Organizations, management problems)
10. Principles of agricultural land drainage
11. Irrigation practices in vineyards, olives, kiwi and vegetables
12. Irrigation practices in citrus, deciduous trees, maize and cotton
13. Innovative irrigation techniques (deficit irrigation, partial rhizosphere drying, precision irrigation)

Laboratory exercises

1. Determination of soil moisture
2. Determination of soil water velocity and parameters of ground water movement
3. Quality parameters of irrigation water (hydraulic conductivity, pH)
4. Irrigation network connection components
5. Construction of a small irrigation network
6. Irrigation water losses
7. Getting to know the FAO's software "The ETo calculator" for the calculation of evapotranspiration
8. Determination of plants water status by direct and indirect techniques
9. Study of the effects of water scarcity on different types of plants growing in containers
10. Calculation of irrigation dose, duration and range for specific crops
11. Irrigation studies
12. Use of irrigation network for the fertilization of crops (fertigation)

Use of irrigation network for weed control (herbigation)

A combination of teaching and learning methods will be used, aiming at the active participation of the students and the practical application of the thematic units under examination; there will also be lectures using audiovisual media, discussions, and analyses

of case studies on real business issues, experiential (group) activities, as well as projections of relevant videos. The students will also undertake an individual or group project. Furthermore, articles, audiovisual lecture materials, web links/addresses, useful information, case studies and exercises for further practice are posted in digital form on the AUA Open e-Class platform.

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Face -to-face, Distance learning																			
USE OF INFORMATION and COMMUNICATIONS TECHNOLOGY	<ul style="list-style-type: none"> • Support of the learning process through the University's AUA Open eClass platform (integrated e-Course Management System) • Support of lectures using presentation software • Use of audiovisual material • Use of web applications <p>Communication with students: face-to-face at office hours, email, eclass platform</p>																			
TEACHING METHODS	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;"><i>Activity</i></th> <th style="text-align: center;"><i>Workload</i></th> </tr> </thead> <tbody> <tr> <td>Lectures (direct)</td> <td style="text-align: center;">39</td> </tr> <tr> <td>Laboratory Practice</td> <td style="text-align: center;">26</td> </tr> <tr> <td>Essay Writing</td> <td style="text-align: center;">20</td> </tr> <tr> <td>Autonomous study</td> <td style="text-align: center;">36</td> </tr> <tr> <td>Advisory Support</td> <td style="text-align: center;">0,5</td> </tr> <tr> <td>Examination</td> <td style="text-align: center;">2</td> </tr> <tr> <td>Laboratory Examination</td> <td style="text-align: center;">2</td> </tr> <tr> <td><i>Total</i> <i>(About 25 hours of study per ECTS)</i></td> <td style="text-align: center;">125,5</td> </tr> </tbody> </table>		<i>Activity</i>	<i>Workload</i>	Lectures (direct)	39	Laboratory Practice	26	Essay Writing	20	Autonomous study	36	Advisory Support	0,5	Examination	2	Laboratory Examination	2	<i>Total</i> <i>(About 25 hours of study per ECTS)</i>	125,5
<i>Activity</i>	<i>Workload</i>																			
Lectures (direct)	39																			
Laboratory Practice	26																			
Essay Writing	20																			
Autonomous study	36																			
Advisory Support	0,5																			
Examination	2																			
Laboratory Examination	2																			
<i>Total</i> <i>(About 25 hours of study per ECTS)</i>	125,5																			
STUDENT PERFORMANCE EVALUATION	<p>The evaluation process is in the language that the course is taught (Greek or English) and consists of:</p> <ol style="list-style-type: none"> i. Compulsory written final examination at the end of the semester (weighting factor 70% at least) which may includes: <ul style="list-style-type: none"> • Multiple choice questionnaires • Open-ended questions • Problem solving • Oral examination <p>Evaluation criteria: correctness, completeness, clarity</p> ii. Optional written exam or essay during the semester (weighting factor 30%) which may includes: <ul style="list-style-type: none"> • Multiple choice questionnaires • Open-ended questions • Problem solving • Essay/report 																			

	<ul style="list-style-type: none"> • Oral examination Evaluation criteria: correctness, completeness, clarity <p>Special learning difficulties:</p> <p>Students with special learning difficulties in writing and reading (as they are certified and characterized by a competent body) are examined based on the procedure provided by the Department.</p> <p>Specifically-Defined Criteria:</p> <p>The evaluation criteria are made known during the first lesson and are clearly stated on the course website and the AUA Open e-class platform. The answers to the exam questions are posted on the AUA Open e-Class platform after the exam. The students are allowed to see their exam paper after its grading (during the announced office hours) and receive explanations about the grade they received.</p>
--	---

5. ATTACHED BIBLIOGRAPHY

Suggested Bibliography in Greek Language:

- Χατζουλάκης, Κ.Σ. (2019). *Η άρδευση των καλλιεργειών: Μέθοδοι, σχεδιασμός, καινοτόμες τεχνικές, ανάγκες σε νερό, ποιότητα νερού, εφαρμογές*. Εκδόσεις ΑγροΤύπος, Αθήνα
- Τερζίδης, Γ.Α., Παπαζαφειρίου, Ζ.Γ. (1997). *Γεωργική Υδραυλική*. Εκδόσεις Ζήτη. Θεσσαλονίκη
- Παπαζαφειρίου, Γ.Ζ. (1999). *Οι ανάγκες σε νερό των καλλιεργειών*. Εκδόσεις Ζήτη, Θεσσαλονίκη
- Παπαμιχαήλ, Μ.Δ., Μπαμπατζιμόπουλος, Σ.Χ. (2014). *Εφαρμοσμένη Γεωργική Υδραυλική*. Εκδόσεις Ζήτη, Θεσσαλονίκη
- Πουλοβασίλης, Α. (2010). *Εισαγωγή στις αρδεύσεις*. Εκδόσεις Έμβρυο, Αθήνα
- Τσακίρης, Γ. (2006). *Υδραυλικά Έργα: Σχεδιασμός & Διαχείριση. Τόμος II: Εγγειοβελτιωτικά Έργα*. Εκδόσεις Συμμετρία, Αθήνα

Suggested Bibliography in English Language:

- Bartram, J., Ballance, R. (1996). *Water Quality Monitoring: A Practical Guide to the Design and Implementation of Freshwater Quality Studies and Monitoring Programmes*. Taylor & Francis, UK
- Ali, M.H. (2010). *Fundamentals of irrigation and on farm water management*. Springer-Verlag, NY
- Waller, P., Yitayew, M. (2015). *Irrigation and Drainage Engineering*. Springer International Publishing, Switzerland
- FAO (2002). *Irrigation Manual: Surface Irrigation Systems, Volume II, Module 7*. Harare.
- FAO (2002). *Irrigation Manual: Sprinkler Irrigation Systems, Volume III, Module 8*. Harare.
- FAO (2002). *Irrigation Manual: Localized Irrigation Systems, Volume IV, Module 9*. Harare.

Related academic Journals:

- *Agricultural Water Management*
- *Irrigation Science*
- *Irrigation and Drainage*

- *International Journal of Irrigation and Water Management*
- *Journal of Irrigation and Drainage Engineering*

Instructor's Notes