AGRICULTURAL HYDRAULICS I

COURSE OUTLINE

1. GENERAL			
SCHOOL	School of Agricultural Sciences		
ACADEMIC UNIT	Department of Agriculture		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	0810.4.005.0	**SEMESTER**	2nd
COURSE TITLE	Agricultural Hydraulics I		

INDEPENDENT TEACHING ACTIVITIES if credits are awarded for separate components of the course	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures	3	3
Practice Exercises	1	1
Laboratory Exercises	1	1
Total	**5**	**5**

COURSE TYPE general background, special background, specialised general knowledge, skills development	Special background
PREREQUISITE COURSES	None
LANGUAGE OF INSTRUCTION and EXAMINATIONS	English
OFFERED TO ERASMUS STUDENTS	Yes (in English)
COURSE WEBSITE (URL)	https://eclass.hmu.gr/courses/TGH245/

2. LEARNING OUTCOMES

Learning outcomes

The aim of the course is for students to acquire comprehensive knowledge regarding irrigation, to be able to identify and connect irrigation components, and to understand the relationship between the quantity and quality of irrigation water and the type of plant, the soil quality, and the irrigation method and dose. Furthermore, through the irrigation course, students gain the ability to carry out complete irrigation studies. Upon successful completion of the course, students will be able to:

- Calculate the water requirements of crops
- Calculate and measure soil moisture conditions and the hydraulic characteristics of the soil
- Have a basic knowledge of the quality characteristics of irrigation, mainly regarding electrical conductivity and the leaching fraction
- Identify all the components of an irrigation network and know their use and assembly/connection
- Calculate the linear and local (friction and minor) losses in an irrigation network
- Have a basic knowledge of selecting and installing the appropriate irrigation systems (surface irrigation methods, sprinkler irrigation, micro-irrigation)
- Be able to carry out an irrigation study

General Competences

- Search for, analysis and synthesis of data and information, using the necessary technologies as well
- Decision-making
- Project planning and management
- Autonomous (independent) work
- Teamwork
- Promotion of free, creative and inductive thinking

3. SYLLABUS

Soil and soil moisture: The hydraulic characteristics and the methods for determining them in different types of soils and substrates are examined.
Crop water requirements: The methods for determining irrigation requirements through the calculation of crop evapotranspiration are examined, with emphasis on the FAO-56 method.
Irrigation quantity/frequency: The correlation of the above with respect to the interval, dose and method of irrigation is examined.
Irrigation methods: The various irrigation systems (surface methods, sprinkler, micro-irrigation), the selection criteria and the installation methods are examined.
Hydraulic parameters: Methods for calculating the linear and local losses of irrigation networks are examined.
Components: A demonstration is carried out of components for quick-coupling portable and permanent irrigation networks from different materials. The use of special fittings, water intakes, filters, irrigation networks, fertilizer injectors, polyethylene components, drippers and sprinklers is also taught.
Assembly/connection: A walk is taken around the farm, where most of the above components are already connected and in full operation. Upon the students' return to the laboratory, they are asked to connect and disconnect sections of various irrigation networks.
Irrigation study: Solving exercises on irrigation studies.

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY Face-to-face, Distance learning, etc.	Face-to-face. The theory is taught in the form of lectures using audiovisual teaching aids, while the laboratory is taught through demonstration, practical exercises and the participation of students in the presentation of the course.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY Use of ICT in teaching, laboratory education, communication with students	Projection of electronic slides. Support of the learning process through the e-class electronic platform.
TEACHING METHODS The manner and methods of teaching are described in detail.	

Activity	Semester workload
Lectures	39
Practice Exercises	13
Laboratory Exercises	13
Study	60
Course total	**125**

STUDENT PERFORMANCE EVALUATION Description of the evaluation procedure	The assessment is conducted in Greek and English (for ERASMUS students). Theory: Assessment is carried out through (a) intermediate written examinations on multiple-choice questions from a question bank and problem-solving, and/or assignments (30% of the final grade), and (b) a final examination (70% of the final grade). Laboratory: Assessment is carried out through (a) 2 group laboratory assignments (50% of the final grade), and (b) written examinations (50% of the final grade). The assessment criteria are explicitly specified in the introductory lecture and in the corresponding slides on e-class.

5. ATTACHED BIBLIOGRAPHY

• Παπαμιχαήλ Δημήτρης, Μπαμπατζιμόπουλος Χρήστος, Εφαρμοσμένη Γεωργική Υδραυλική, Εκδόσεις Ζήτη Πελαγία & Σια Ι.Κ.Ε. (ΕΥΔΟΞΟΣ: 41960118)
• Αλέξανδρος Πουλοβασίλης, Εισαγωγή στις Αρδεύσεις, Εκδόσεις ΕΜΒΡΥΟ (ΕΥΔΟΞΟΣ: 86200480)
• Eisenhauer, D. E., Martin, D. L, Heeren, D. M. & Hoffman, G. J. (2021). Irrigation Systems Management, ASABE. doi:10.13031/ISM.2021, CC
• Theory and laboratory notes, laboratory list of the components