COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Agricultural Sciences		
ACADEMIC UNIT	Biosystems & Agricultural Engineering		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	**BAE_550**	**SEMESTER**	**5th**
COURSE TITLE	**SOIL PHYSICS AND IRRIGATIONS**		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures	3	
Tutorials	0	
Laboratory	2	
TOTAL	**5**	**5**
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Background and Scientific Area
PREREQUISITE COURSES:	There are no prerequisite courses.
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek. For Erasmus students in English
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	

(2) LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

This course aims to gain an integrated knowledge on issues related to soil physics such as the basic properties of its solid, liquid and gaseous phase and the interactions between them. Emphasis is also put on the field of irrigation, focusing mainly on the irrigation, putting emphasis on basic concepts concerning the hydrological cycle, water resources and the principles which govern the movement of water into the soil-plant-atmosphere continuum and the laws of its movement in the unsaturated and saturated zone. In addition, the basic principles of water quality, the increase of Water Use Efficiency (WUE), the types of irrigation systems and their operating principles and the design of surface, sprinkler and drip irrigation are analysed.

After the completion and the successful examination of the course, students will be able to know:
• the basic properties of the solid, liquid and gaseous phase of the soil.
• the principles that determine the sustainable management of irrigation water.
• the problems related to the design and implementation of irrigation.
• the principles that determine the selection and installation of appropriate irrigation systems (irrigation by surface methods, sprinkler irrigation, drip irrigation)

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Team work
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas
Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Production of free, creative and inductive thinking
……
Others…
…….

At the end of this course the student will have further developed the following general skills:
Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Team work
Production of new research ideas
Respect for the natural environment
Criticism and self-criticism
Production of free, creative and inductive thinking

(3) SYLLABUS

1. Soil structure
2. The Solid phase of the soil
3. The Wet phase of the soil
4. Gaseous phase of the soil
5. Movement and distribution of the groundwater
6. Soil air and soil aeration
7. Crop water needs – Crop evapotranspiration
8. Crop water needs – Irrigation scheduling
9. Surface irrigation methods
10. Sprinkler Irrigation
11. Drip irrigation

Laboratory exercises

The purpose of the laboratory exercises is to familiarize students with the concepts and methodologies analyzed in the theoretical part. Particularly:

- Soil sampling.
- Measurement of the Specific Gravity of Soils.
- Direct and indirect methods of the soil moisture measurements.
- Characteristic humidity curve.
- Sprinkler irrigation system design.
- Drip irrigation system design.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Lectures in the amphitheatre and laboratory exercises both in the laboratory and in the field.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	• Use of ICT (power point) in Teaching • Use of ICT (power point) in Laboratory Training

<table>
<tr><td></td><td>• Use of ICT in Communication with students (Learning process support through the electronic platform e-class).</td></tr>
<tr><td>TEACHING METHODS
The manner and methods of teaching are described in detail.
Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.

The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>39</td></tr>
<tr><td>Laboratory</td><td>20</td></tr>
<tr><td>Writing short reports of laboratory exercises-Exams</td><td>21</td></tr>
<tr><td>Study hours and preparation for the laboratory exercises and the final examination</td><td>45</td></tr>
<tr><td>Course total</td><td>125</td></tr>
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<tr><td>STUDENT PERFORMANCE EVALUATION
Description of the evaluation procedure

Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other

Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>1. The examination in the theory of the course is done with a comprehensive questioner or a multiple-choice questioner that focus on the understanding of the course giving weight to the student's critical ability.
3. Oral exams may take place in cases of students who have been exempted from the writing exams and always the same time and day as the writing exams.
4. The above are done in the Greek language. For foreign language students (eg Erasmus students) conducted in English</td></tr>
</table>

(5) ATTACHED BIBLIOGRAPHY (In Greek)

- Suggested bibliography:

1. Χαρτζουλάκης Στ. Κων/νος, Η Άρδευση των καλλιεργειών: Μέθοδοι, Σχεδιασμός, Ανάγκες σε νερό, Ποιότητα νερού, Εφαρμογές, εκδόσεις ΑγροΤύπος 2019, ISBN: 978-960-7667-52-6

2. Γ.Α. Τερζίδη και Ζ.Γ. Παπαζαφειρίου, 1997, "Γεωργική Υδραυλική", Εκδόσεις Ζήτη Κωδικός Βιβλίου στον Εύδοξο: 11157

3. Δ.Μ. Παπαμιχαήλ και Χ.Σ. Μπαμπατζιμόπουλος, 2014, "Εφαρμοσμένη Γεωργική Υδραυλική", Εκδόσεις Ζήτη Κωδικός Βιβλίου στον Εύδοξο: 41960118

4. Α. Πουλοβασίλης, 2010, "Εισαγωγή στις αρδεύσεις", Εκδόσεις Έμβρυο Κωδικός Βιβλίου στον Εύδοξο: 7744

- Additional bibliography:

1. Σινάνης, Κ. 2015. Εργαστηριακές ασκήσεις διαχείρισης εδαφών. [ηλεκτρ. βιβλ.] Αθήνα:Σύνδεσμος Ελληνικών Ακαδημαϊκών Βιβλιοθηκών. Διαθέσιμο στο: http://hdl.handle.net/11419/4055

- Scientific journals:

1. https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/soil-physics
2. http://www.eolss.net/sample-chapters/c10/e5-24-01-01.pdf