COURSE OUTLINE

1. GENERAL

SCHOOL	SCHOOL OF ENVIRONMENT AND AGRICULTURAL ENGINEERING		
ACADEMIC UNIT	DEPARTMENT OF NATURAL RESOURCES DEVELOPMENT AND AGRICULTURAL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	**87**	**SEMESTER**	**6th**
COURSE TITLE	Irrigation		

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**
Theory: Lectures	3	
Laboratory:	2	
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*	General knowledge, Scientific Area, Skills development
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes (in English)
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*

The purpose of the course is to understand the basic principles that govern the application of water to the soil for the purpose of irrigating crops, as well as the general effects of the application of irrigation on the environment.
Upon successful completion of the course, the student will be able to:
●Understand the conditions for creating steady state moisture profiles in a homogeneous and in an inhomogeneous soil profile and be able to calculate them for the cases of a constant precipitation rate and a constant evaporation rate on the soil surface.
●Understand the properties of moisture profiles that develop over a moving water table, which moves at a constant speed, and calculate them.
●Understand the physics of the horizontal infiltration phenomenon and calculate the moisture profiles that develop when water is applied to the soil by horizontal infiltration.
● Understand the physics of the vertical infiltration phenomenon by applying a constant water head on the soil surface (flood irrigation), calculate the corresponding cumulative infiltration - time and infiltration rate - time relationships and apply the existing infiltration equations.
● Understand the physics of the vertical infiltration phenomenon by applying water at a constant rainfall rate on the soil surface (rainfall irrigation), calculate the corresponding

cumulative infiltration - time and infiltration rate - time relationships as well as the rainfall - runoff relationships.
● Trainning in the use of relevant software for the simulation of infiltration in porous media (Hydrus 1D).
●Understand the relationships that link the phenomena of infiltration by flooding and by precipitation and apply them to the design and facing the artificial rain irrigation practically.
● Understand the principles and physics of infiltration by applying water to the soil by furrows (two-dimensional infiltration) and by drip irrigation (three-dimensional infiltration) and be able to calculate the corresponding moisture profiles.
● Understand and calculate the redistribution of water after irrigation.
● Understand the moisture profiles that develop during water uptake by plants.
● Calculate the water balance of an irrigated soil profile.
● Applying irrigation with rational criteria and respect for the environment.
● Understand the effectiveness of irrigation and its role for the growth and performance of plants as well as to be able to use the existing relevant software.

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

1. Search, Analysis and Synthesis of Data and Information, using the Necessary Technologies
2. Decision-making
3. Autonomous Work
4. Project planning and management
5. Respect for the natural environment.

3. SYLLABUS

●Development of steady-state profiles in a homogeneous - inhomogeneous soil profile (precipitation - evaporation).
●Development of moisture profiles that develop above a moving water table.
● Development of moisture profiles during the application of water in the field with the various irrigation systems. Horizontal infiltration.
●Vertical infiltration with constant head on infiltration surface, Infiltration equations.
●Vertical infiltration with constant rainfall flux on the infiltration surface (artificial rain).
●Two-dimensional and three-dimensional infiltration (channels- drops, etc.).
●Redistribution of water after irrigation.
●Water balance of irrigated soil profile.
●Rational application of irrigation (efficiency, irrigation programs, modern irrigation scheduling methods, applications of existing software).
●The role of irrigation in improving plant growth and yield

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	In classroom and in laboratory (face-to-face)
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Exploitation of Information and Communication Technologies in teaching, in laboratory training and in communication with students. Use of dedicated software. Communication with students via open eclass platform and e-mail.
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*	***Activity*** — ***Semester workload*** Lectures — 65 hours Laboratory work and case studies — 47 hours Exercises and presentations — 13 hours Course total — ***125***
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.*	I. Final written exam (50%) which includes: Theory questions (multiple choice and short answer) and problem solving. II. Final written exam (50%) concerning the subjects of laboratory exercises and laboratory work. **Marking Scale:** 0-10. **Minimum Passing Mark:** 5.

5. ATTACHED BIBLIOGRAPHY

Proposed literature -Scientific journals

Soil Science
Soil Science Society of America Journal
Vadose Zone Journal
Water Resources Research
Agricultural Water Management
Hydrological Processes
Irrigation Science
Journal of irrigation and drainage engineering (ASCE)
Irrigation and Drainage (ICID)