

COURSE OUTLINE

1. GENERAL

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| SCHOOL | Agricultural Sciences | | |
| ACADEMIC UNIT | BIOSYSTEMS& AGRICULTURAL ENGINEERING | | |
| LEVEL OF STUDIES | Undergraduate | | |
| COURSE CODE | BAE 904 | SEMESTER | 9 th |
| COURSE TITLE | Land improvement projects and irrigation systems | | |
| INDEPENDENT TEACHING ACTIVITIES <i>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</i> | WEEKLY TEACHING HOURS | CREDITS | |
| Lectures | 3 | | |
| Tutorials | 2 | | |
| Laboratory | 0 | | |
| TOTAL | 5 | 5 | |
| <i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i> | | | |
| COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i> | Specialised general knowledge, Skills Development | | |
| 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) | https://eclass.upatras.gr/courses/ | | |

2. LEARNING OUTCOMES

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| <p>Learning outcomes</p> <p><i>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</i></p> <ul style="list-style-type: none"> • <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i> • <i>Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i> • <i>Guidelines for writing Learning Outcomes</i> |
| <p>Upon successful completion of the course, the student will understand:</p> <ol style="list-style-type: none"> 1. The basic concepts of water movement and the mechanisms and laws that govern the entry of water and its distribution and retention in the soil 2. The procedures and methodologies for the study and determination of the soil parameters involved in the application of irrigation. 3. The basic principles of irrigation water quality and its proper management during the application of irrigation. 4. The main elements, the mode of operation, the advantages and disadvantages of irrigation systems. 5. The types of irrigation systems, operating principles, methodologies for the design and dimensioning of surface irrigation, sprinkler and micro-irrigation systems. |

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?

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| Search for, analysis and synthesis of data and information, with the use of the necessary technology | 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 |
| Adapting to new situations | Criticism and self-criticism |
| Decision-making | Production of free, creative and inductive thinking |
| Working independently | |
| Team work | Others... |
| Working in an international environment | |
| Working in an interdisciplinary environment | |
| Production of new research ideas | |

At the end of this course the student will have further developed the following general skills:

Search, analysis and synthesis of data and information, also using the necessary technologies
Adaptation to new situations
Decision making
Autonomous work
Teamwork
Generating new research ideas
Respect for the natural environment
Exercise criticism and self-criticism
Promotion of free, creative and inductive thinking

3. SYLLABUS

- Introduction
Water resources and agriculture, Historical review of the irrigation project, Irrigation networks in Greece and the world, Origin of irrigation water
- Soil characteristics - Soil moisture - Infiltration
Ways of expressing humidity, Horizontal percolation, Vertical percolation, Permeability, Determination of percolation equation.
- Evapotranspiration (Part I)
Concepts, Meteorological variables shaping evapotranspiration, Sequential sampling method, Water balance method, Lysimeter method, Evaporimeter method
- Evapotranspiration (Part II)
FAO-56 Penman-Montheith and ASCE-standardized Penman-Montheith methods
- Simplified evapotranspiration calculation methods
Hargreaves-Samani method, Blaney-Criddle method, Priestley-Taylor method, Parametric method
- Water needs of crops - Crop evapotranspiration
Stages of crop development, Plant factors according to FAO-56, Plant factors for Greek conditions, Crop evapotranspiration under normal conditions and under water stress conditions
- Irrigation water needs of crops - Irrigation planning
Useful rainfall, Irrigation efficiency, Irrigation parameters, Available and useful moisture, Irrigation water height, Irrigation duration and range
- Surface irrigation methods
Flood Irrigation, Furrow Irrigation, Applications
- Sprinkler irrigation
Irrigation with classic sprinkling, Uniformity of irrigation, Irrigation with self-propelled sprinkler systems, Applications
- Micro-irrigation (Part I)
Drip irrigation, Applications

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| <ul style="list-style-type: none"> • Micro-irrigation (Part II) Irrigation with micro sprinklers, Underground drip irrigation, Applications • Irrigation water quality Concepts, Origin of scale, Electrical conductivity of water, Classification of water according to Electrical Conductivity and SAR, Scale balance and leaching fraction, Applications • Precision irrigation Moisture and Salinity Sensors, Data Logging and Management, Irrigation Scheduling Using Mathematical Models, Irrigation Advisory Systems, Automation, Applications |
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4. TEACHING and LEARNING METHODS - EVALUATION

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| <p>DELIVERY <i>Face-to-face, Distance learning, etc.</i></p> | Face to face deliveries. | |
| <p>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i></p> | <ul style="list-style-type: none"> • Use of ICT (power point) in Teaching • Use of ICT (power point) in Laboratory Training • Video presentation • Use of ICT in Communication with students (Learning process support through the electronic platform e-class). | |
| <p>TEACHING METHODS <i>The manner and methods of teaching are described in detail.</i> <i>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.</i> <i>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</i></p> | <p style="text-align: center;">Activity</p> | <p style="text-align: center;">Semester workload</p> |
| | Lectures | 39 |
| | Tutorials | 26 |
| | Study and literature survey | 20 |
| | Exams | 10 |
| | Unguided study | 30 |
| | Course total | 125 |
| <p>STUDENT PERFORMANCE EVALUATION <i>Description of the evaluation procedure</i> <i>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</i></p> | <p>1. The main assessment criteria focus on understanding and correlating the knowledge that students gain from the course with knowledge from other courses. The evaluation is continuous and dynamic. It mainly includes short project work, solving problems or answering open questions. Exams are conducted orally or in writing or a combination of the two, with or without pre-examination of the key topics of the course, with or without progressions and by other inventive methods, depending on the dynamics and the needs of the audience</p> | |

examination of patient, art interpretation, other
Specifically-defined evaluation criteria are given, and if and where they are accessible to students.

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5. RECOMMENDED LITERATURE in Greek

1. Δ.Μ. Παπαμιχαήλ και Χ.Σ. Μπαμπατζιμόπουλος, 2014, “Εφαρμοσμένη Γεωργική Υδραυλική”, Εκδόσεις Ζήτη
Κωδικός Βιβλίου στον Εύδοξο: 41960118
2. Κ.Σ. Χατζουλάκης, 2019, “Η άρδευση των καλλιεργειών”, Εκδόσεις ΑγρόΤυπος
Κωδικός Βιβλίου στον Εύδοξο: 86053159
3. Ζ.Γ. Παπαζαφειρίου, 1998, “Αρχές και Πρακτική των Αρδεύσεων”, Εκδόσεις Ζήτη
Κωδικός Βιβλίου στον Εύδοξο: 10992
4. Ζ.Γ. Παπαζαφειρίου, 1999, “Οι ανάγκες σε νερό των καλλιεργειών”, Εκδόσεις Ζήτη
Κωδικός Βιβλίου στον Εύδοξο: 11312