

## COURSE OUTLINE

### 1. GENERAL

<b>SCHOOL</b>	Environment and Agricultural Engineering		
<b>ACADEMIC UNIT</b>	Department of Natural Resources Development & Agricultural Engineering		
<b>LEVEL OF STUDIES</b>	Bachelor		
<b>COURSE CODE</b>	<b>187</b>	<b>SEMESTER</b>	9 <sup>th</sup>
<b>COURSE TITLE</b>	Land Reclamation Works and Water Resources Management		
<b>INDEPENDENT TEACHING ACTIVITIES</b> <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>	<b>WEEKLY TEACHING HOURS</b>	<b>CREDITS</b>	
Lectures and laboratory exercises	5	5	
Theory	3	3	
Exercises in the Classroom and the Laboratory	2	2	
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
<b>COURSE TYPE</b> <i>general background, special background, specialised general knowledge, skills development</i>	Specialised general knowledge		
<b>PREREQUISITE COURSES:</b>	FLUID MECHANICS ELEMENTS – APPLIED HYDRAULIC HYDRAULICS OF OPEN AND CLOSED PIPELINES, HYDROLOGY, UNDERGROUND HYDRAULICS		
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	Yes (English)		
<b>COURSE WEBSITE (URL)</b>	<a href="https://oeclass.aua.gr/eclass/courses/296/">https://oeclass.aua.gr/eclass/courses/296/</a> <a href="https://oeclass.aua.gr/eclass/courses/4796/">https://oeclass.aua.gr/eclass/courses/4796/</a>		

### 2. LEARNING OUTCOMES

<p><b>Learning outcomes</b></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.</i></p> <p><i>Consult Appendix A</i></p> <ul style="list-style-type: none"> <li>• <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i></li> <li>• <i>Descriptors for Levels 6, 7 &amp; 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i></li> <li>• <i>Guidelines for writing Learning Outcomes</i></li> </ul>
<p>The section on <b>Land Reclamation Works</b> is a basic course in the scientific field of Hydraulic Works. The course material aims to introduce students to the Design and Management of the main hydraulic projects of the rural area. Students will learn to assess the irrigation needs of the perimeter under study, to choose the characteristics of the collective project that are specific to each case and to design a project that will progressively adapt to the evolving needs of the irrigation perimeter</p> <p>The <b>Water Resources Management part</b> of course has the following objectives:</p> <ul style="list-style-type: none"> <li>• To present an integrated management framework for the water industry.</li> <li>• To combine technical issues such as systems analysis and design methodology with management issues such as the legislative framework, financing of technical projects, social environment, decision making, etc.</li> <li>• To emphasize the interdependence of technology and environment and the methodology of their</li> </ul>

approach, especially in water resources development issues.

The course approaches the relative crises in water resources through the analysis of systems and the synthesis of the interaction of their individual elements in space and time, and focuses mainly on strategic choices of water use. It also takes account of the fact that in many areas where water shortages are developing, there are excessive prices and the concept of water as a free good is contrasted to its concept as a product. In addition, the implementation of integrated management policies can contribute to achieving a higher quality environment (in agricultural and urban areas), to minimizing the accumulation of environmental impacts, and to working towards its sustainable use as a resource. In general, to be sustainable, such choices must interact smoothly with other subsystems of society, and adapt simultaneously to changes and uncertainties in supply and demand. Consequently, a framework of strategic options is outlined, which attempts to integrate advanced technologies for demand management, use of water-saving technologies, education and public participation, as well as changes in water pricing processes. The course trains students to understand that management in water resource systems follows this approach in order to achieve a decision-making process that includes multiple objectives, multiple decision-makers, multiple users, and multiple stakeholders and interest groups.

Upon successful completion of the course, the student will be able to:

- Understand the basic and critical characteristics of water resources development, their connection with general economic and operational objectives and decision-making principles, especially in conditions of water crises e.g. drought, desertification, floods. Environmental degradation, etc.
- Achieve knowledge of the tools and techniques of water resources management and how they are used to ensure the successful completion of projects on time and within budget.
- Collaborate with fellow students to create and present a plan in a project case study that includes the organization of a water resources development project, allocation of key tasks, and the basic project plans (Objectives, Environmental Analysis – Communications, Work Structure Analysis, Scheduling, and Budgeting, Synthesis of results).

### 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...*

*.....*

- Search, analyze and synthesize data and information, using the necessary technologies .
- Adapting to new situations
- Decision making
- Autonomous Work
- Teamwork
- Design and Management of Water Resources Projects
- Respect for diversity and multiculturalism
- Respect for the natural environment

### 3. SYLLABUS

The part of the course concerning **Land Reclamation Works** will cover the following contents: Introduction. Head works (dams, pumping stations, boreholes). Transmission works (pipelines and supply canals). Distribution projects (Collective networks under pressure, Collective surface irrigation networks). Principles of design, design and construction. Regulation of irrigation networks of canals. Management of irrigation networks (operation, maintenance, administration, modernization). Rural road network. Environmental impact of irrigation projects. General principles for the assessment of irrigation networks

The section of the course concerning **Water Resources Management** has the following content:  
Water resource systems.

- i. Water resources development and use planning.
- ii. Water resources management methodology
- iii. Water resources and environmental sustainability
- iv. Social parameters. Public participation in decision-making
- v. Project Schedule Techniques.
- vi. Costing and Budgeting of Water Resources Projects. Circular Economy. Economic Evaluation
- vii. Institutional Framework for Water Resources Management
- viii. Systems Analysis, Modeling, Decision Support Systems (DSS)
- ix. Integrated water resources management
- x. Decision making and holistic management of water resource systems
- xi. Design and Management Applications

#### 4. TEACHING and LEARNING METHODS - EVALUATION

<p style="text-align: center;"><b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i></p>	<p>Face-to-face &amp; distance learning Lecture-Based Learning</p> <ul style="list-style-type: none"> <li>● e-Learning</li> <li>● Internships and Work-Study Programs</li> <li>● Field Trips</li> <li>● Guest Lectures</li> </ul>																		
<p style="text-align: center;"><b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b> <i>Use of ICT in teaching, laboratory education, communication with students</i></p>	<ul style="list-style-type: none"> <li>● Basic software (windows, word, excel, power point, web, etc)</li> <li>● AUA webmail</li> <li>● AI material</li> </ul>																		
<p style="text-align: center;"><b>TEACHING METHODS</b> <i>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.</i></p> <p><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>	<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>Semester workload</i></th> </tr> </thead> <tbody> <tr> <td><i>Lectures</i></td> <td style="text-align: center;">39</td> </tr> <tr> <td><i>Individual exercises, essay writing</i></td> <td style="text-align: center;">26</td> </tr> <tr> <td><i>Group work in a case study. Elaboration of project management plans</i></td> <td style="text-align: center;">20</td> </tr> <tr> <td><i>Field trip / Small individual practice assignments</i></td> <td style="text-align: center;">10</td> </tr> <tr> <td><i>Independent Study</i></td> <td style="text-align: center;">30</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td><b>Course total</b></td> <td style="text-align: center;"><b>125</b></td> </tr> </tbody> </table>	<i>Activity</i>	<i>Semester workload</i>	<i>Lectures</i>	39	<i>Individual exercises, essay writing</i>	26	<i>Group work in a case study. Elaboration of project management plans</i>	20	<i>Field trip / Small individual practice assignments</i>	10	<i>Independent Study</i>	30					<b>Course total</b>	<b>125</b>
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<p style="text-align: center;"><b>STUDENT PERFORMANCE EVALUATION</b> <i>Description of the evaluation procedure</i></p> <p><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 examination of patient, art interpretation, other</i> <i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p>	<ul style="list-style-type: none"> <li>● <b>Midterm Examination:</b> Comprehensive test covering material from the WRM Part of the course.</li> <li>● <b>Exercises on land Reclamations and on Water Resources Management</b> Individual exercises correspondingly.</li> <li>● <b>Final Examination:</b> Cumulative test covering material from the entire course.</li> </ul>																		

## 5. ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*

- ***Hydraulic Works, Planning and Management, Volume II: Land Reclamation Works, G. Tsakiris Editor***
- ***Handbook of Applied Hydraulics, C.V Davis Editor in Chief, K. E. Sorensen, Co-Editor, Mc Graw-Hill Book Company.***
- ***Grigg, N.S., 1996. Water Resources Management. McGraw-Hill, N.Y., N.Y.***
- ***Gleick, P.H., 2003. The World's Water. Island Press, Washington, D.C.***
- ***Theis, Tom and Jonathan Tomkin (2012) Sustainability: A Comprehensive Foundation***
- ***Crites, Ron and George Tchobanoglous (1998) Small and Decentralized Wastewater Management Systems***

*- Related academic journals:*

**LAND RECKAMATTION WORKS**

- *Irrigation and Drainage (ICID)*
- *Journal of Irrigation and Drainage Engineering, ASCE*
- *Journal of Hydraulic Engineering, ASCE*

**WATER RESOURCES MANAGEMENT**

- *Journal of Water Resources Management, Springer*
- *Water Policy, Elsevier Science*
- *Water, MDPI.*