

## COURSE OUTLINE

### (1) GENERAL

|                                                                                                                                                                                                                                                                       |                                        |                              |                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|------------------------------|----------------|
| <b>SCHOOL</b>                                                                                                                                                                                                                                                         | UNIVERSITY OF THESSALY                 |                              |                |
| <b>ACADEMIC UNIT</b>                                                                                                                                                                                                                                                  | DEPARTMENT OF CIVIL ENGINEERING        |                              |                |
| <b>LEVEL OF STUDIES</b>                                                                                                                                                                                                                                               | UNDERGRADUATE                          |                              |                |
| <b>COURSE CODE</b>                                                                                                                                                                                                                                                    |                                        | <b>SEMESTER</b>              | th             |
| <b>COURSE TITLE</b>                                                                                                                                                                                                                                                   | Water supply & sewerage systems        |                              |                |
| <b>INDEPENDENT TEACHING ACTIVITIES</b><br><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> |
|                                                                                                                                                                                                                                                                       |                                        | 4                            | 5              |
|                                                                                                                                                                                                                                                                       |                                        |                              |                |
|                                                                                                                                                                                                                                                                       |                                        |                              |                |
| <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><br><i>general background, special background, specialized general knowledge, skills development</i>                                                                                                                                                | <i>special background</i>              |                              |                |
|                                                                                                                                                                                                                                                                       |                                        |                              |                |
| <b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>                                                                                                                                                                                                                      | Greek and English for ERASMUS students |                              |                |
| <b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>                                                                                                                                                                                                                      | YES                                    |                              |                |
| <b>COURSE WEBSITE (URL)</b>                                                                                                                                                                                                                                           |                                        |                              |                |

### (2) LEARNING OUTCOMES

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
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| <b>Learning outcomes</b><br><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><br><i>Consult Appendix A</i> <ul style="list-style-type: none"> <li>• Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</li> <li>• Descriptors for Levels 6, 7 &amp; 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</li> <li>• Guidelines for writing Learning Outcomes</li> </ul> |
| <u>Knowledge</u><br>Upon completing the course, the student will have advanced knowledge that includes a critical understanding of theories and principles related to: <ul style="list-style-type: none"> <li>• Design and operation of water supply and sewerage systems</li> <li>• Cost-effective design of projects and networks</li> <li>• Meeting water supply demands</li> </ul>                                                                                                                                                                                                                                                                          |
| <u>Skills</u><br>Upon completing the course, the student will have advanced skills in solving complex problems related to: <ul style="list-style-type: none"> <li>• The design and operation of water Design and analysis of external networks and water supply pipes.</li> <li>• Design and hydraulics of wastewater networks.</li> <li>• Design of rainwater networks</li> </ul>                                                                                                                                                                                                                                                                              |
| <u>Competencies</u> <ul style="list-style-type: none"> <li>• Upon completing the course, the student will be able to design and study external water supply networks and water supply pipes. Also design and study wastewater and rainwater networks.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                |

- They will also be capable of working independently and collaboratively in the design of such projects. In particular, students will be able to:
  - Evaluate and assess technical, environmental, social, and economic factors during the design of water supply and sewerage systems
  - Develop and propose optimal or innovative solutions based on the above evaluations

### 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?*

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

- Search, analysis, and synthesis of data and information using the necessary technologies
- Adaptation to new situations
- Decision-making
- Independent work
- Teamwork
- Project planning
- Respect for the natural environment

### (3) SYLLABUS

1. The problem of water supply – the crisis of water resources.
2. Basic principles and parameters for municipal water supply systems.
3. Water reservoirs.
4. Design and analysis of external networks and water supply pipes.
5. Design and analysis of water distribution networks.
6. Special issues of water supply projects.
7. Basic principles and parameters for municipal sewerage systems.
8. Physicochemical properties and waste water microbiology – quality aspects.
9. Estimation of waste- and rainwater rate.
10. Design and hydraulics of wastewater networks.
11. Design of rainwater networks
12. Special projects. Siphons – weirs.
13. Wastewater pipes technology
14. Legislation

### (4) TEACHING and LEARNING METHODS - EVALUATION

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                  |                          |
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| <b>DELIVERY</b><br><i>Face-to-face, Distance learning, etc.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Face to face                                                                                                                                                                                                                                                                                     |                          |
| <b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b><br><i>Use of ICT in teaching, laboratory education, communication with students</i>                                                                                                                                                                                                                                                                                                                                                                                                          | Lectures with PowerPoint, Notes, Exercises, Announcements on e-class                                                                                                                                                                                                                             |                          |
| <b>TEACHING METHODS</b><br><i>The manner and methods of teaching are described in detail.</i><br><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><br><br><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>                                 | <i>Activity</i>                                                                                                                                                                                                                                                                                  | <i>Semester workload</i> |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Lecturew- Exercises                                                                                                                                                                                                                                                                              | 56 hours                 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Study                                                                                                                                                                                                                                                                                            | 26 hours                 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Project                                                                                                                                                                                                                                                                                          | 56 hours                 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Examination                                                                                                                                                                                                                                                                                      | 3 hours                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Study of Exams                                                                                                                                                                                                                                                                                   | 7 hours                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Education Visit                                                                                                                                                                                                                                                                                  | 2 hours                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                  |                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                  |                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Course total                                                                                                                                                                                                                                                                                     | 148 hours                |
| <b>STUDENT PERFORMANCE EVALUATION</b><br><br><b>Description of the evaluation procedure</b><br><br><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><br><br><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i> | Evaluation Language<br>Greek or English<br><br>Evaluation Methods<br>20% Project: Education from the students of a water supply & a sewerage design project. Oral examination<br>80% Written Examination: Open books and notes. No audiovisual means. Short answer questions and problem solving |                          |

##### (5) ATTACHED BIBLIOGRAPHY

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| <b>-Suggested bibliography:</b><br>1. N. Mylopoulos, "Water supply projects", University of Thessaly<br>2. A. Laggousis & N Fourniotis "Design of Water supply and Sewerage projects", GOTSIS<br><b>- Related academic journals:</b> |
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