COURSE OUTLINE

(1) General information

FACULTY/SCHOOL	TECHNOLOGY		
DEPARTMENT	ENVIRONMENTAL SCIENCES		
LEVEL OF STUDY	*Undergraduate*		
COURSE UNIT CODE	NEW **COURSE**	**SEMESTER**	8th
COURSE TITLE	HYDRAULIC WORKS - HYDROLOGICAL STUDIES		

INDEPENDENT TEACHING ACTIVITIES in case credits are awarded for separate components/parts of the course, e.g. in lectures, laboratory exercises, etc. If credits are awarded for the entire course, give the weekly teaching hours and the total credits	**WEEKLY TEACHNG HOURS**	**CREDITS**
THEORETICAL BACKGROUND	3	3
LABORATORY PRACTICE	-	-
TOTAL	3	3

COURSE TYPE Background knowledge, Scientific expertise, General Knowledge, Skills Development	Scientific area: environmental design
PREREQUISITE COURSES:	No
LANGUAGE OF INSTRUCTION &EXAMINATION/ASSESSMENT:	Greek
THE COURSE IS 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 (certain) level, which students will acquire upon successful completion of the course, are described in detail.
It is necessary to consult:

APPENDIX A

- *Description of the level of learning outcomes for each level of study, in accordance with the European Higher Education Qualifications' Framework.*
- *Descriptive indicators for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and*

APPENDIX B

- *Guidelines for writing Learning Outcomes*

Basic principles and computational methods of applied hydraulics (pressurized pipes, free surface conduits). Design of main hydraulic works and associated systems (aqueducts, pumps and their discharge pipes, water supply works, tanks, water distribution networks, channels, sewage networks, urban drainage works, flood protection works).

The aim of the course is:

1. Students should be able to understand the basic concepts that are developed in the lesson.
2. Students should be able to understand the basic concepts of hydraulic works.
3. Students should be able to apply the knowledge they will gain in the lesson, to solve environmental problems.

General Competences

Taking into consideration the general competences that students/graduates must acquire (as those are described in the Diploma Supplement and are mentioned below), at which of the following does the course attendance aim?

Search for, analysis and synthesis of data and information by the use of appropriate technologies,	*Project planning and management*
Adapting to new situations	*Respect for diversity and multiculturalism*
Decision-making	*Environmental awareness*
Individual/Independent work	*Social, professional and ethical responsibility and sensitivity to gender issues*
Group/Team work	*Critical thinking*
Working in an international environment	*Development of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Introduction of innovative research	*(Other…….citizenship, spiritual freedom, social awareness, altruism etc.)*
	…….

- *Search for, analysis and synthesis of data and information by the use of appropriate technologies,*
- *Decision-making*
- *Individual/Independent work*
- *Group/Team work*
- *Environmental awareness*
- *Critical thinking*
- *Development of free, creative and inductive thinking*

(3) COURSE CONTENT

1. Hydraulics and Hydraulic Works: definitions, historical evolution, importance.
2. Hydraulics of pressurized pipes
3. Special issues of pressured flow
4. Design principles for water transfer works
5. Pumping stations and discharge pipes
6. Design principles of water supply works
7. Design flows of water supply works
8. Tanks
9. Water distribution networks
10. Hydraulic analysis of water distribution networks
11. Basic principles of free surface flow
12. Uniform flow
13. Critical depth and non-uniform flow
14. Sewer hydraulics
15. Sewage works
16. Estimation of sewage flows
17. Design principles for sewer networks
18. Wastewater quality and technological issues of sewer networks

19. Urban floods and estimation of flood flows
20. Design principles for urban drainage networks

(4) TEACHING METHODS-ASSESSMENT

MODES OF DELIVERY **Face-to-face, in-class lecturing, distance teaching and distance learning etc.**	• Lectures • Semester projects - homework
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY **Use of ICT in teaching, Laboratory Education, Communication with students**	• Powerpoint presentation. • e-mail communication. • e-class theory and exercises
COURSE DESIGN **Description of teaching techniques, practices and methods:** **Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, Internship, Art Workshop, Interactive teaching, Educational visits, projects, Essay writing, Artistic creativity, etc.** **The study hours for each learning activity as well as the hours of self-directed study are given following the principles of the ECTS.**	

Activity/Method	***Semester workload***
Lectures	26
Workshop	13
Laboratory work	-
Theory study	23
Weekly individual evaluation reports for laboratory exercises	13
Course total (25 hours of workload per credit unit)	***75***

STUDENT PERFORMANCE EVALUATION/ASSESSMENT METHODS **Detailed description of the evaluation procedures:** **Language of evaluation, assessment methods, formative or summative (conclusive), multiple choice tests, short- answer questions, open-ended questions, problem solving, written work, essay/report, oral exam, presentation, laboratory work, other……etc.** **Specifically, defined evaluation criteria are stated, as well as if and where they are accessible by the students.**	• Final examinations • Students should watch at least half seminars • Work will be given during the semester to be assessed at a rate of 30% on the final grade. ***<u>Final Grade</u>*** ***70% in Final Exams + 30% in the semester projects***

(5) SUGGESTED BIBLIOGRAPHY:

-***<u>Suggested bibliography</u>***

- Stamou, A., Applied hydraulics - Pressured and open channel flow, 3rd edition, Papasotiriou, Athens, 2016 (in Greek).

-Koutsoyiannis, D., and A. Efstratiadis, Lecture Notes on Urban Hydraulic Works - Water Supply, 83 pages, doi:10.13140/RG.2.1.3559.7044, National Technical University of Athens, February 2015 (in Greek).

- Koutsoyiannis, D., Design of Urban Sewer Networks, Edition 4, 180 pages, doi:10.13140/RG.2.1.2169.1125, National Technical University of Athens, Athens, 2011 (in Greek).

-***Complementary bibliography***

Teacher's notes and the full lecture material, which are available through the asynchronous education platform