1.1.1 Open Channel and River Hydraulics

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΥΔΡ006	**SEMESTER**	7th
COURSE TITLE	Open Channel and River Hydraulics		

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**
	4	5
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*	Scientific Background
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

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 successful completion of the course will enable students to
- define the appropriate hydraulic method for solving complex problems related to open channel systems and river flows
- design open channels and culverts of various dimensions
- study of natural streams and determine water and solid discharge
- determine channel conveyance and evaluate the impact of bridges on the flow in streams and rivers
- propose and design river training and flood protection works
- assess and apply computer codes for flow computations in streams and rivers.

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*
	Showing social, professional and ethical responsibility and

Working independently	*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…*
	…….

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Adapting to new situations
- Decision-making
- Team work
- Project planning and management
- Criticism and self-criticism
- Production of free, creative and inductive thinking

SYLLABUS

- Introduction to open channel. Application of theory of critical depth, flow over a step and through, narrowing and widening of a cross-section.
- Steady state free surface flow: Flow characteristics. Uniform flow. Definitions and equations.
- Manning and Chezy equations. Uniform flow in compound channels.
- Cross-sections of composite shape. Best hydraulic cross-section.
- Specific force. Critical depth. Calculation of critical depth. Control cross-sections.
-Gradually varied flow in streams and rivers. Computations.
-Hydraulic jump and its features. Hydraulic jump on horizontal channel. Location of hydraulic jump
-The code HEC-RAS (River Analysis System). Application examples.
-Profile classification.
-Flow calculations from spillways and lake outlets
-Sediment Discharge in natural streams. Bed Load. Suspended Load

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, e-learning platform for educational material
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	40
Practice/exercises	12
Individual study	78
Course total (26 hours workload per ECTS credit)	***130***

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*	Formative evaluation consisted of: - Non-compulsory intermediate essays (5 to 6 in total) (30% of final mark) focused on solving problems : - Final written exams (70% of final mark) consisted of: a) multiple choice and short answer questions on the basic theory of the course (10% of the final mark) b) Solving of problems/questions (60% of the final mark)

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.*	

ATTACHED BIBLIOGRAPHY

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- [in Greek] Χρυσάνθου Βλάσιος, ΠΟΤΑΜΙΑ ΥΔΡΑΥΛΙΚΗ ΚΑΙ ΤΕΧΝΙΚΑ ΕΡΓΑ, Εκδόσεις Ελληνικά Ακαδημαϊκά Ηλεκτρονικά Συγγράμματα και Βοηθήματα - Αποθετήριο "Κάλλιπος", 2016, ISBN: 978-960-603-466-4. Κωδικός Βιβλίου στον Εύδοξο: 59303548
- [in Greek] Κατσιφαράκης Λ. Κωνσταντίνος, Μόνιμες ροές με ελεύθερη επιφάνεια, Εκδόσεις Αφοί Κυριακίδη ΕΚΔΟΣΕΙΣ ΑΕ, 2017 (2η έκδοση), ISBN: 978-960-602-176-3. Κωδικός Βιβλίου στον Εύδοξο: 68372423
- [in Greek] Σούλης Ιωάννης, ΥΔΡΑΥΛΙΚΗ ΑΝΟΙΚΤΩΝ ΑΓΩΓΩΝ, Εκδόσεις ΧΑΡΑΛΑΜΠΟΣ ΝΙΚ. ΑΪΒΑΖΗΣ, 2008, ISBN: 978-960-99293-0-1. Κωδικός Βιβλίου στον Εύδοξο: 995
- [in Greek] Πρίνος Παναγιώτης, Υδραυλική Κλειστών και Ανοικτών Αγωγών, Εκδόσεις Ζήτη, 2013, ISBN: 978-960-456-344-9. Κωδικός Βιβλίου στον Εύδοξο: 22767973