COURSE OUTLINE

1.GENERAL

SCHOOL	AGRICULTURAL SCIENCES		
DEPARTMENT	FOOD SCIENCE AND TECHNOLOGY		
LEVEL OF COURSE	UNDERGRADUATE		
COURSE CODE	**FST_X09**	**SEMESTER OF STUDIES**	Winter
COURSE TITLE	TECHNOLOGY & QUALITY CONTROL OF WATER		

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**	**ECTS CREDITS**
Lectures	3	
Exercises	2	
Total	**5**	**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*	*specialised general knowledge*
PREREQUISITE COURSES:	No.
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek.
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No.
COURSE WEBPAGE (URL)	https://eclass.upatras.gr/

2.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 course aims to achieve the following learning outcomes for the students:

- Acquire theoretical and applied knowledge for the design, management, operation, monitoring and optimization of water treatment plants.
- Recognize and understand the principles governing the processes applied in water treatment.
- Familiarize themselves with the techniques used to control water quality.
- Gain experience in operating and evaluating the performance of water treatment facilities.

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	*Search for, analysis and synthesis of data and information, with the use of the necessary technology*
Adapting to new situations	*Adapting to new situations*
Decision-making	*Decision-making*
Working independently	*Working independently*
Team work	*Team work*
Working in an international environment	*Working in an international environment*
Working in an interdisciplinary environment	*Working in an interdisciplinary environment*
Production of new research ideas	*Production of new research ideas*

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Decision-making
Working independently
Team work
Working in an interdisciplinary environment
Production of new research ideas

3.SYLLABUS

Water resources and water reserves. Hydrological cycle and water resources management. Physical and chemical characteristics of water. Hardness and alkalinity.
Design of water treatment facilities. Separation principles. Removal of solid particles. Sedimentation, filtration. Design of settling tanks. Dimensioning of sand beds. Removal of organic compounds. Adsorption on activated carbon.
Adsorption isotherms. Dynamic study of adsorption. Activated carbon beds and filters. Flocculation agglomeration. Water dispersion systems. Mechanisms of action of flocculants. Inorganic and organic anticoagulants. Hardness removal. Application of membranes for the treatment of drinking water. Cleaning provisions. Ion exchange. Ion exchange resins. Design of beds with resins. Water disinfection. Disinfection mechanisms. Chlorination. Ozonation. Planning of disinfection arrangements.

4.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*	Use of Information and Communication Technologies (ICTs) (e.g. powerpoint) in teaching. Communication with students: through e-mail, department's website and platform e-class. The lectures content of the course for each chapter are uploaded on the internet, in the form of a series of .pdf files, where students can freely download them from the platform e-class.upatras.gr
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*	

Activities	***Work Load per semester***
Lectures (3 hours per week x 13 weeks)	39
Exercises (2 hour per week x 13 weeks)	26
Literature study and analysis	41
Writing reports of laboratory exercises	16
Final examination (3 hours)	3
Total number of hours for the Course (25 hours of work-load per	**125**

learning activity are given as well as the hours of non-directed study according to the principles of the ECTS	***ECTS credit)***	
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 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.*	It is carried out based on the following criteria (combined or not) depending on the number of students who will participate in the course. • Written exam at the end of the semester with development questions, short answer questions and/or multiple choice questions, or a combination of the above • Evaluation of laboratory work Grading scale: 1 to 10. Minimum passing grade: 5. Examination time: 3 hours. Grading scale: 1 to 10. Minimum passing grade: 5. Examination time: 3 hours.	

5.**ATTACHED BIBLIOGRAPHY**

1. Rump H.H. and Krist H., Lab Manual for the Examination of Water, WasteWater, Soil, VCH, Germany.
2. American Public Health Association, Standard Methods for the Examination of Water and WasteWater, APHA, USA.
3. World Health Organization, Guidelines for Drinking Water Quality, WHO, Geneva.
4. Μ. Μήτρακας, Ποιοτικά χαρακτηριστικά και επεξεργασία νερού, Εκδόσεις Τζιόλα, Θεσσαλονίκη, 2001 (in Greek).
5. Α. Σ. Αυλωνίτης, Εισαγωγή στην τεχνολογία νερού και αφαλάτωσης, Εκδόσεις Ίων, Θεσσαλονίκη, 2006 (in Greek).
6. Desalination and Water treatment Journal