COURSE OUTLINE

1. GENERAL

SCHOOL	SCHOOL OF ENVIRONMENT & AGRICULTURAL ENGINEERING		
ACADEMIC UNIT	NATURAL RESOURCES MANAGEMENT &AGRICULTURAL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	**197**	**SEMESTER**	**9th**
COURSE TITLE	WATER QUALITY ASSESSMENT AND ENVIRONMENTAL PROTECTION		

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**
Lectures/ Laboratory exercises	2+2	4
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*	Special background, Skills development
PREREQUISITE COURSES:	-
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	
COURSE WEBSITE (URL)	

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 aim of the course is to provide knowledge to students on:

- the quality parameters of water systems and the pollutants that affect the water environment, the techniques for determining the quality parameters of surface and ground water systems, sediments and liquid waste, their quality monitoring methodologies, statistical data processing methods and quality assessment methodologies.

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

- know the components and parameters involved in the assessment of the quality of water systems,
- understand the principles and practices applied to water pollution control,
- know the techniques and methodologies for the analysis and determination of pollutant of surface water, ground water, sediments and liquid waste,
- can assess, in a holistic way, the effects of pollution on the natural environment
- knows the methodologies for detecting and monitoring water quality trends,
- knows the environmental legislation, criteria and standards to assess the quality status of water systems

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*
Working independently	*Showing social, professional and ethical responsibility and 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,
Decision-making
Working independently
Team work
Working in an interdisciplinary environment
Project planning and management
Respect for the natural environment

3. SYLLABUS

- Water quality. Parameters and quality characteristics of rivers, lakes and groundwater. Sources of water pollutants. Elements of aqueous chemistry.
- Quality parameters and criteria. Water Quality Indicators and Environmental Standards.
- Basic instrument. Visible, UV Spectroscopy, Gas Chromatography - Mass Spectrometry (GC, GC-MS). High Performance Liquid Chromatography (HPLC). Ion chromatography. Atomic Absorption Spectrometry. Electrochemical methods (potentiometry-voltammetry-polarography).
- Planning principles and sampling techniques of surface, groundwater and sediments. --Methods for determining parameters of organoleptic, physico-chemical control of water and organic pollution. Solid sample analysis techniques and liquid waste control techniques.
- Methodology for recording and monitoring water quality trends.
- Statistical analysis of quality data.
- Assessment of the quality of water systems and measures to deal with water pollution.
- Legislation on water quality and protection of water bodies. Directive 2000/60.

Laboratory work aims to provide student with the ability and the experience to apply the methodologies and techniques to measure water quality
Development of measurement methods and determinations of water and waste samples, aqueous extracts of soils in the laboratory. Individual tasks.
Exercises and application of the methodologies analyzed in the theoretical part.

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 ICT in teaching
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*	
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.*	Evaluation of theory (50%) - Final written examination Evaluation of Laboratory work (50%) - Grade of assigned projects

Activity	***Semester workload***
Lectures	26
Laboratory Work (Experiments in the Lab Exercises – Applications)	26
Project work	40
Autonomous study	33
Course total	***125***

5. ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

Baird, R.B., Eaton, A.D. and Rice, E.W., Eds. (2017) Standard Methods for the Examination of Water and Wastewater. 23rd Edition, American Public Health Association, American Water Works Association, Water Environment Federation, Washington D.C.
Water Quality, An Introduction, Claude E. Boyd, 2015, 2nd . Edition, Springer
Helsel DR, Hirsch RM. Statistical Methods in Water Resources. Amsterdam, Netherlands: Elsevier Science Publisher B.V; 1992.
Yuncong L. and K. Migliaccio "Water Quality Concepts, Sampling, and Analyses" CRC Press, 2010UNEP/ WHO. Water quality monitoring: A practical guide to the design and implementation of freshwater quality studies and monitoring programs. 1996

- Related academic journals:

Water, Air and Soil Pollution
Environmental Pollution