COURSE OUTLINE

1. GENERAL

SCHOOL	SCOOL OF ENVIRONMENT & AGRICULTURAL ENGINEERING		
ACADEMIC UNIT	Department of Natural Resources Management & Agricultural Engineering		
LEVEL OF STUDIES	Postgraduate		
COURSE CODE	**630005**	**SEMESTER**	**B**
COURSE TITLE	Biology Ecology and Soil Environment Fertility		

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 and practicals	3	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*	Special background, Scientific area
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	
COURSE WEBSITE (URL)	https://oeclass.aua.gr/eclass/courses/5401/

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 is a comprehensive introduction to the concepts and theory of soil ecosystem fertility, biology and ecology. The course material also aims to connect these concepts with the effective sustainable management and restoration of soil ecosystems.

The student acquires skills of critical analysis and evaluation of the biotic and abiotic factors that determine the functions of the soil ecosystem, and understands their interactions. He/she acquires decision-making skills, may implement actions and methodologies for the management and restoration of soil ecosystems and may design improvement/management measures. Finally, the student integrates the specific knowledge into a broader framework of management and protection of natural and agricultural ecosystems, and acquires the ability to handle complex related issues, and formulate thorough judgments.

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

• Understand the main biotic and abiotic factors that determine/influence soil ecosystems and their interactions.

• Propose measures of sustainable management, improvement, and restoration of soil ecosystems.

• Communicate with clarity his conclusions on the above issues as well as the knowledge, the reasoning, and the logical assumptions on which they are based, both to a specialized and a non-specialized audience.

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…*
	…….

- Working independently
- Team work
- Project planning and management
- Decision-making
- Respect for the natural environment
- Working in an Interdisciplinary environment

3. SYLLABUS

The soil ecosystem: functions and organisms.
Biodiversity of soil ecosystems.
Microbiomes in soil and the soil rhizosphere.
Plant-microorganism-soil interactions.
The process of biodegradation.
Biodegradation models of organic materials.
Recycling of organic materials in soils.
Soil Fertility – Introductory concepts.
Nutrient cycles.
Application of organic inputs and biostimulators to soils.
Indicators of quality, fertility, and sustainable management.
Bioremediation of soils and soil functions – General concepts and principles. Bioremediation technologies - Phytoremediation.

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face-to-face, Distance learning
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Learning process support through the e-class online platform

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
Non-directed study	45
Essay	40
Course total	***125***

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.*	Single or combined from: 1. Final written exam including multiple choice & text questions 2. Essay on relevant subject

5. ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

N.C Brady and R.R. Weil, 2011. The Nature and Properties of Soils. 14th edition, Prentice-Hall, Upper Saddle River, New Jersey.

(In Greek by Embryo Publishers) Chapters 8 (background), 12, 13, 14, 15 and 16.

https://www.embryopub.gr/index.php?target=products&product_id=4178

David L. Kirchman. Processes in Microbial Ecology (Second Edition) Oxford University Press

(In Greek by CUP Publishers) Μικροβιακή Οικολογία.

https://www.cup.gr/book/mikroviaki-oikologia/

- Related academic journals:

FEMS – Microbiology Ecology
Soil Biology and Biochemistry
Plant and Soil
Agriculture, Ecosystems & Environment
European Journal of Soil Science
European Journal of Soil Biology