COURSE OUTLINE

1. GENERAL

SCHOOL	School of Environment and Agricultural Engineering		
ACADEMIC UNIT	Natural Resources & Agricultural Engineering		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	**2435**	**SEMESTER**	**6**
COURSE TITLE	**Soil 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+2	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, Specialised general knowledge
PREREQUISITE COURSES:	Soil Science -157 Soil Chemistry 1565
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES (theory only)
COURSE WEBSITE (URL)	https://oeclass.aua.gr/eclass/courses/AFPGM118/

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 fertility of soil ecosystems
The course material aims to introduce students to the basic concepts of soil fertility and to link these concepts with the effective sustainable management of soil ecosystems.
The student acquires skills of critical analysis and evaluation of biotic and abiotic factors that determine the fertility of a soil ecosystem, understanding their interactions and designing improvement/management actions/measures.
Finally, the student integrates this knowledge into a broader framework of management and protection of natural and agricultural ecosystems.
Upon successful completion of the course the students will be able to:
• Understand the basic biotic and abiotic factors that determine/affect soil fertility.
• Analyze in combination the factors that determine the fertility of a particular soil ecosystem.
• Elaborate and select cultivation scenarios.
• Propose measures for sustainable management, improvement and restoration of soil fertility

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

Respect for difference and multiculturalism

Adapting to new situations *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *……*

Working independently
Team-work
Project planning and management
Decision making
Production of constructive and inductive thinking

3. SYLLABUS

Nutrients in soil (macroelements/trace elements, origin, transformations and cycles).

Mechanisms of nutrient uptake by the plants

Nutrient cycles and nutrient availability in soils (biotic and abiotic factors affecting it, nutrient balances).

Soil microorganisms and fertility (nitrification, denitrification, nitrogen fixation, phosphorus solubilization, mycorrhizae, thiobacilli).

Soil analyses and soil fertility

Degrading of organic materials and fertility – carbon sequestration.

Agricultural and natural ecosystems and fertility.

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	In the lecture room and labs – complementary remote support
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	**Specialized teaching/presentation software** **Support Learning process through** **e-class 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*
Standard Lectures	36
Practical Exercises that focus on implementation of methodologies	26
Teamwork study or Small individual tasks for each student	20
Independent Study	43
Total Course (25 hours of workload per credit unit)	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.*	Written final exam that includes Combinations of: - Multiple choice questions - Scenario analysis - Solving problems related to quantitative data - Benchmarking, comparative evaluation of theory elements

5. ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

- Weil, R.R. and Brady, N.C. (2017), The Nature and Properties of Soils. 15th Edition, Pearson, New York. (Background reading)

JL Halvin, SL Tisdale, JD Beaton & WL Nelson Soil Fertility and Fertilizers 8th Edition, Pearson 2014

- Related academic journals:
Soil Biology and Biochemistry – Elsevier
Applied Soil Ecology - Elsevier
Biology and Fertility of Soils – Elsevier
European Journal of Soil Science – Wiley
Journal of Plant Nutrition – Taylor & Francis