COURSE OUTLINE

1. GENERAL

SCHOOL	School of Environment and Agricultural Engineering		
ACADEMIC UNIT	Natural Resources & Agricultural Engineering		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	**177**	**SEMESTER**	**6**
COURSE TITLE	**Soil Fertility - Fertilizers**		

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	NO
COURSE WEBSITE (URL)	https://oeclass.aua.gr/eclass/courses/AFPGM145/

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 an extensive introduction to the concepts and theory of the fertility of soil ecosystems with the addition of basic concepts related to Fertilizers, their production and their applications. It draws the main elements from two six-month courses "Soil Fertility" and "Fertilizer and their applications" (mainly from the first course, which is practically a prerequisite for understanding the second) but does not replace them in extent and depth of discussion.

The course material aims to introduce students to the basic concepts of soil fertility and to connect these concepts with the effective sustainable management of soil ecosystems. In addition, students gain a general overview of fertilizer categories and soil fertility management through fertilizers.

The student acquires the ability to critically understand the biotic and abiotic factors that determine the fertility of a terrestrial ecosystem and to plan improvement/management measures.

Finally, the student integrates the specific knowledge into a broader framework of management and protection of natural and agricultural ecosystems.

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

• Understands the main biotic and abiotic factors that determine/affect soil fertility

General Competences

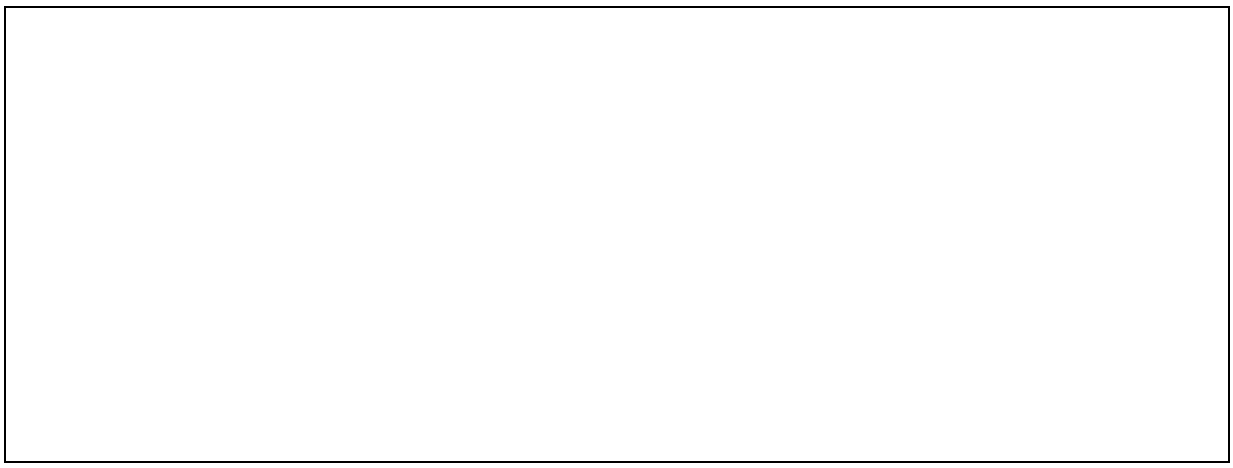
Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
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
Production of constructive and inductive thinking

3. SYLLABUS

Nutrients in soil (macro/trace elements, origin, transformations and cycles).
Availability of nutrients (biotic and abiotic factors that affect it, plant uptake mechanisms).
Key-soil microorganisms and fertility (nitrification, denitrification, nitrogen fixation, mycorrhizae, thiobacilli).
Degradation of organic materials and soil fertility
Agricultural and natural ecosystems and soil fertility.
Soil nutrient recycling and sustainability.
Recycling of agro- industrial, livestock and municipal waste and by-products in soil and sustainability.
Relationships between nutrient availability and plant growth/yield
Introductory concepts for fertilizers
Basic categories of fertilizers
Fertilizer uses and regulatory framework



4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	In the lecture room and labs – additional 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 electronic 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*	
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: - Multiple choice questions - Scenario analysis - Solving problems related to quantitative data - Benchmarking of theory elements

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

5. ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

N.C Brady and R.R. Weil, 2011. Εδαφολογία, η φύση και οι ιδιότητες των εδαφών. 14th edition, απόδοση στα ελληνικά, εκδ. Εμβρυο κεφάλαια 8 (υποδομής), 12, 13, 14, 15 και 16

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

- *Related academic journals:*