COURSE OUTLINE

(1) GENERAL

SCHOOL	ANIMAL BIOSCIENCES		
ACADEMIC UNIT	DEPARTMENT OF ANIMAL SCIENCE		
LEVEL OF STUDIES	Undergraduate [Free Elective]		
COURSE CODE	2525	**SEMESTER**	4th
COURSE TITLE	SOIL SCIENCE AND 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 (ECTS)**
Lectures	3	
Laboratory practice	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*	Scientific Area
PREREQUISITE COURSES:	-
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS:	Yes (in English)
COURSE WEBSITE (URL):	http://www.afp.aua.gr/?page_id=63&did=35 http://www.afp.aua.gr/?page_id=63&did=111 http://www.afp.aua.gr/?page_id=63&did=112 http://www.afp.aua.gr/?page_id=63&did=113 http://www.afp.aua.gr/?page_id=63&did=36 http://www.afp.aua.gr/?page_id=63&did=78 http://www.afp.aua.gr/?page_id=63&did=79 http://www.afp.aua.gr/?page_id=63&did=69 http://www.afp.aua.gr/?page_id=63&did=101 http://www.afp.aua.gr/?page_id=63&did=87 http://www.afp.aua.gr/?page_id=63&did=99 http://www.afp.aua.gr/?page_id=63&did=114 http://www.afp.aua.gr/?page_id=63&did=116

(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 introduction to the principles of soil science and aims to link related issues to the effective and sustainable soil resources management. Students develop abilities to critically analyze and evaluate factors and variables that determine soil properties. Moreover, students are introduced to the critical role of the soil in the terrestrial ecosystems and the importance of soils contribution to the natural equilibrium of the planet, to the effective management of soil resources for both food and fibres production and human actions support and for the improvement of the quality of the environment.
Passing successfully course exams, the student will be able to:
- understand the fundamental and dynamic role of soil as "life support system"
- critically assess the significance of soil properties on plant growth.
- compile data which will allow the classification of soils according to their potential for agricultural production
- Optimize nutrient balance by proposing the appropriate fertilizer dose combining soil data analysis and plant needs

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, with the use of the necessary technology
- Working independently
- Team work
- Working in an interdisciplinary environment
- Respect for the natural environment
- Production of free, creative and inductive thinking
- Soil and the Environment
- Soil and Agricultural Production

(3) SYLLABUS

1. Overview of soil systems (historical review, soil systems, soil genesis).
2. Soil particle-size analysis (classification of soil particles and their role in nature, soil textural classes).
3. Soil minerals (primary minerals: structure, physicochemical properties, weathering; secondary minerals: structure, physicochemical properties of clay-silicate minerals; Fe and Al oxides and hydroxides).
4. Chemical properties of soils (cation exchange and its role in plant nutrition, base saturation, Z-electric potential, clay flocculation-deflocculation, soil acidity and its role, management of acid soils, soil buffering capacities).
5. Soil organic matter (humic and organometalic complexes, clay-humic complexes, the role and properties of organic matter).
6. Soil physical properties (structure, porosity, structure improvement, soil solution and electrolytes, soil temperature and its role).
7. Introduction to soil fertility (fertility evaluation; macro- and micro- nutrients, bio-geochemical cycles of carbon, nitrogen and phosphorus and the participation of soil ecosystem).
8. Fertilizers: characteristics, production and use. Basic fertilizer categories. New technology fertilization products. Fertilizer labeling and exercises. Calculation of fertilizer quantity from the nutrient units needed and of nutrient units needed from the fertilizer quantity added. Calculation of the appropriate fertilizer quantity utilizing soil analysis data combined with plant needs

(4) TEACHING and LEARNING METHODS - EVALUATION

TEACHING METHOD *Face-to-face, Distance learning, etc.*	face-to-face
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	Power point. Communication with students via email and social media (close group). Support of the learning procedure by e-class platform and educational material platform of NRM&AE webpage

Use of ICT in teaching, laboratory education, communication with students	
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.*	Final written examination that may include: - multiple choice questionnaires - short – answer questions - problem solving - assessment of different scenarios - Comparative evaluation of theoretical aspects

Activity	***Semester workload***
Lectures	39
Laboratory practice	26
Team work on small personalized work	20
Independent study	50
Course total (25 h of workload per ECTS)	***125***

(5) ATTACHED BIBLIOGRAPHY

The nature and properties of soils / Nyle C. Brady, Ray R. Weil. Pentice Hall International Editions

-Related academic journals :
Geoderma (Elsevier), Catena (Elsevier), Soils and Sediments (Springer), Soil Systems (MDPI), Land Degradation and Development (Wiley)