

COURSE OUTLINE

1. GENERAL

SCHOOL	APPLIED ECONOMIC AND SOCIAL SCIENCES		
ACADEMIC UNIT	AGRIBUSINESS AND SUPPLY CHAIN MANAGEMENT		
LEVEL OF STUDIES	<i>Undergraduate</i>		
COURSE CODE	AGR806	SEMESTER	8th
COURSE TITLE	SOIL SCIENCE AND FERTILIZERS		
INDEPENDENT TEACHING ACTIVITIES		WEEKLY TEACHING HOURS	CREDITS
Lectures		5	5
COURSE TYPE	Special Background/Skills Development		
PREREQUISITE COURSES	NO		
LANGUAGE OF INSTRUCTION and EXAMINATIONS	Greek		
IS THE COURSE OFFERED for ERASMUS STUDENTS?	YES (in English)		
COURSE WEBSITE (URL)	https://oeclass.aua.gr/eclass/		

2. LEARNING OUTCOMES

Learning Outcomes
<p>The aim of the course is:</p> <p>The first part of this course focuses on soil chemical, physical and biological processes. The soil is characterized as a buffering system with water and reactive soil particles affecting mobility and bioavailability of nutrients. This affects soil organisms as well as plants. The second part of this course presents the main principles of nutrient management and fertiliser use.</p> <p>Upon successful completion of the course, the student will be able to:</p> <ul style="list-style-type: none"> • understand the function and processes of soil formation • understand the basic characteristics and properties of soils, and their importance for food production systems and food quality • have a knowledge of the tools and techniques required for sustainable soil management design a fertilization program based on efficiency - economy - sustainability
General Competences
<ul style="list-style-type: none"> • Adapting to new situations • Decision-making • Individual/Independent work • Group/Team work • Project planning and management • Development of free, creative and inductive thinking

3. SYLLABUS

<ol style="list-style-type: none"> 1. Introduction to basic concepts (soil functions, soil formation, soil classification) 2. Soil physical properties (texture, structure, porosity, humidity, ventilation, temperature, color, depth, consistence) 3. Soil chemical properties (pH, ion retention and exchange, cation exchange capacity, redox)

- status, salinity, sodicity)
4. Soil organic matter
 5. Soil biological properties
 6. Essential plant nutrients and their relationship to crop production (criteria of necessity, role of nutrients, availability of nutrients)
 7. Nitrogen, phosphorus and potassium (their role in plant nutrition, their cycle, availability estimation and practical management practices)
 8. Calcium, magnesium and secondary nutrients or micronutrients
 9. Soil analysis and interpretation of results
 10. Nutrition management practices
 11. Inorganic commercial fertilizers
 12. Use of organic sources of nutrients
 13. Basic principles regarding the methods and the time of fertilizers application

Laboratory exercises

1. Soil sampling and sample preparation for analysis (drying, determination of moisture content)
2. Symptomatology, diagnosis and treatment of nutritional disorders
3. Determination of soil texture
4. Determination of soil bulk density, particle density and porosity
5. pH determination
6. Determination of total and active calcium carbonate in soil
7. Soil electrical conductivity (EC)
8. Determination of exchangeable soil cations, cation exchange capacity (CEC) and percent base saturation
9. Determination of total soil N content
10. Determination of available P
11. Determination of exchangeable K
12. Determination of soil organic matter content
13. Determination of soil secondary nutrients or micronutrients

A combination of teaching and learning methods will be used, aiming at the active participation of the students and the practical application of the thematic units under examination; there will also be lectures using audiovisual media, discussions, and analyses of case studies on real business issues, experiential (group) activities, as well as projections of relevant videos. The students will also undertake an individual or group project. Furthermore, articles, audiovisual lecture materials, web links/addresses, useful information, case studies and exercises for further practice are posted in digital form on the AUA Open e-Class platform.

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Face -to-face, Distance learning
USE OF INFORMATION and COMMUNICATIONS TECHNOLOGY	<ul style="list-style-type: none"> • Support of the learning process through the University's AUA Open eClass platform (integrated e-Course Management System) • Support of lectures using presentation software • Use of audiovisual material

	<ul style="list-style-type: none"> • Use of web applications <p>Communication with students: face-to-face at office hours, email, eclass platform</p>																		
TEACHING METHODS	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;"><i>Activity</i></th> <th style="text-align: center;"><i>Workload</i></th> </tr> </thead> <tbody> <tr> <td>Lectures (direct)</td> <td style="text-align: center;">39</td> </tr> <tr> <td>Laboratory Practice</td> <td style="text-align: center;">26</td> </tr> <tr> <td>Essay Writing</td> <td style="text-align: center;">20</td> </tr> <tr> <td>Autonomous study</td> <td style="text-align: center;">36</td> </tr> <tr> <td>Advisory Support</td> <td style="text-align: center;">0,5</td> </tr> <tr> <td>Examination</td> <td style="text-align: center;">2</td> </tr> <tr> <td>Laboratory Examination</td> <td style="text-align: center;">2</td> </tr> <tr> <td><i>Total</i> <i>(About 25 hours of study per ECTS)</i></td> <td style="text-align: center;">125,5</td> </tr> </tbody> </table>	<i>Activity</i>	<i>Workload</i>	Lectures (direct)	39	Laboratory Practice	26	Essay Writing	20	Autonomous study	36	Advisory Support	0,5	Examination	2	Laboratory Examination	2	<i>Total</i> <i>(About 25 hours of study per ECTS)</i>	125,5
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STUDENT PERFORMANCE EVALUATION	<p>The evaluation process is in the language that the course is taught (Greek or English) and consists of:</p> <ol style="list-style-type: none"> i. Compulsory written final examination at the end of the semester (weighting factor 70% at least) which may includes: <ul style="list-style-type: none"> • Multiple choice questionnaires • Open-ended questions • Problem solving • Oral examination <p>Evaluation criteria: correctness, completeness, clarity</p> ii. Optional written exam or essay during the semester (weighting factor 30%) which may includes: <ul style="list-style-type: none"> • Multiple choice questionnaires • Open-ended questions • Problem solving • Essay/report • Oral examination <p>Evaluation criteria: correctness, completeness, clarity</p> <p>Special learning difficulties:</p> <p>Students with special learning difficulties in writing and reading (as they are certified and characterized by a competent body) are examined based on the procedure provided by the Department.</p> <p>Specifically-Defined Criteria:</p> <p>The evaluation criteria are made known during the first lesson and are clearly stated on the course website and the AUA Open e-class platform. The answers to the exam questions are posted on the AUA Open e-Class</p>																		

platform after the exam. The students are allowed to see their exam paper after its grading (during the announced office hours) and receive explanations about the grade they received.

5. ATTACHED BIBLIOGRAPHY

Suggested Bibliography in Greek Language:

- Brady, N.C., Weil R.R. (2015). *Εδαφολογία: Η φύση και οι ιδιότητες των εδαφών*. Εκδόσεις Έμβρυο, Αθήνα
- Παναγιωτόπουλος, Κ. (2016). *Εδαφολογία*. Εκδόσεις Γαρταγάνης Αγις-Σάββας, Αθήνα
- Γιάσογλου, Ν.Ι. (1995). *Μαθήματα Εφαρμοσμένης Εδαφολογίας*. Πανεπιστημιακές Εκδόσεις ΓΠΑ, Αθήνα

Suggested Bibliography in English Language:

- Rowell, D.L. (1994). *Soil Science: Methods and applications*. Longman, London
- Plaster, E. (2008). *Soil Science & Management, 4th ed.* Thomson Delmar Publ., NY
- White, R.B. (2005). *Principles & Practice of Soil Science*. Blackwell Publ., UK
- Sys, I., Van Rast, E., Debaveye, J. (1991). *Land evaluation*. GADC, Belgium.
- Ashman, M., Puri, G. (2002). *Essential Soil Science: A Clear and Concise Introduction to Soil Science*. Wiley-Blackwell Publ., New Jersey
- Carter, M. (1993). *Soil sampling and methods of analysis*. Canadian Society of Soil Science. Ontario, Canada
- Leeper G.W., Uren N.C. (1993). *Soil Science. An Introduction*. Melbourne University Press, Melbourne, Australia

Related academic Journals:

- *Journal of Soil Science*
- *Journal of Environmental Quality*
- *European Journal of Soil Science*
- *Journal of Agriculture and Food Production*
- *Soil Science*

- *Soil Science Society of America Journal*
- *Soil and Tillage Research*
- *Developments in Soil Science*
- *Soil Technology*

Instructor's Notes