

COURSE OUTLINE

1. GENERAL

SCHOOL	ENVIRONMENT AND AGRICULTURAL ENGINEERING		
ACADEMIC UNIT	DEPARTMENT OF NATURAL RESOURCES DEVELOPMENT AND AGRICULTURAL ENGINEERING		
LEVEL OF STUDIES	Graduate		
COURSE CODE	1345	SEMESTER	6^o
COURSE TITLE	PROBLEM SOILS AND THEIR RECLAMATION		
INDEPENDENT TEACHING ACTIVITIES <i>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</i>	WEEKLY TEACHING HOURS	CREDITS	
Lectures	3	3	
Lab Exercises	2	2	
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i>	Scientific field		
PREREQUISITE COURSES:	Soil Science Soil Chemistry		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes (in English)		
COURSE WEBSITE (URL)	https://oeclass.aua.gr/eclass/courses/3498/		

2. LEARNING OUTCOMES

<p>Learning outcomes <i>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.</i></p> <p><i>Consult Appendix A</i></p> <ul style="list-style-type: none"> • <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i> • <i>Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i> • <i>Guidelines for writing Learning Outcomes</i> 		
<p>The course aims at the acquisition of theoretical and practical knowledge on issues related to the categories of soils with the presence of physico-chemical characteristics that hinder the completion of the biological cycle of plants, requiring special cultivation practices for their management.</p> <p>Upon successful completion of the course the student(s) will be able to:</p> <ul style="list-style-type: none"> - Understand the nature of problem soils and the processes that lead to their formation. - Acquire knowledge of the identification of the different categories of problem soils. - Acquire knowledge of the management of problem soils and their reclamation - Gain knowledge of the cultural practices required to deal with problem soils and the crop yield responses to these soils. 		
<p>General Competences <i>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?</i></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i> <i>Adapting to new situations</i> <i>Decision-making</i> <i>Working independently</i> <i>Team work</i> <i>Working in an international environment</i> <i>Working in an interdisciplinary environment</i> <i>Production of new research ideas</i> </td> <td style="width: 50%; vertical-align: top;"> <i>Project planning and management</i> <i>Respect for difference and multiculturalism</i> <i>Respect for the natural environment</i> <i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i> <i>Criticism and self-criticism</i> <i>Production of free, creative and inductive thinking</i> <i>Others...</i> </td> </tr> </table>	<i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i> <i>Adapting to new situations</i> <i>Decision-making</i> <i>Working independently</i> <i>Team work</i> <i>Working in an international environment</i> <i>Working in an interdisciplinary environment</i> <i>Production of new research ideas</i>	<i>Project planning and management</i> <i>Respect for difference and multiculturalism</i> <i>Respect for the natural environment</i> <i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i> <i>Criticism and self-criticism</i> <i>Production of free, creative and inductive thinking</i> <i>Others...</i>
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<p><i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i> <i>Adapting to new situations</i> <i>Working independently</i> <i>Team work</i> <i>Respect for the natural environment</i></p>		

3. SYLLABUS

Module 1: Introductory concepts

Problem and degraded soils, Categories of problem soils, Problem soils due to salt accumulation, Classification criteria and categories of problem soils, Case study.

Module 2: Saline soils

Definition and criteria, Sources of salts, Sources of salt, transport and flux, Negative water balance and imperfect drainage conditions, Soil salinization due to location, Primary and secondary salinization, Role of parent material and geomorphology, Irrigation water and secondary salinization.

Module 3: Leaching of salts

Balance of salts in soil, calculation of leaching fraction and leaching requirement, examples, distribution of salts in relation to irrigation practices, supplementary measures for salinity management.

Module 4: Sodic soils

Classification criteria, soil degradation due to sodification, dispersion and flocculation of clay, sodic horizon, improvement of sodic soils.

Module 5: Soil acidity

Origin of H⁺ in soils. H⁺ supply - consumption balance.

Module 6: Changing pH of acid soils

Calculation of the required amounts of CaCO₃ based on the CEC of soils for pH change and acidity correction.

Module 7: Restoration of sodic soils

Calculation of the quantities of gypsum required for the correction of sodicity.

4. TEACHING and LEARNING METHODS - EVALUATION

<p style="text-align: center;">DELIVERY</p> <p style="text-align: center;"><i>Face-to-face, Distance learning, etc.</i></p>	<p><i>Face-to-face and Distance learning</i></p>	
<p style="text-align: center;">USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</p> <p style="text-align: center;"><i>Use of ICT in teaching, laboratory education, communication with students</i></p>	<p>Supporting the learning process by combining text, images, audio, video, animation and other interactive activities. Digital platform (open eclass).</p>	
<p style="text-align: center;">TEACHING METHODS</p> <p><i>The manner and methods of teaching are described in detail.</i></p> <p><i>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.</i></p> <p><i>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</i></p>	<p>Activity</p>	<p>Semester workload</p>
	<p>Lectures</p>	<p>50</p>
	<p>Laboratory practice and field work study</p>	<p>40</p>
	<p>Essay writing</p>	<p>35</p>
<p>Course total</p>	<p>125</p>	
<p style="text-align: center;">STUDENT PERFORMANCE EVALUATION</p> <p><i>Description of the evaluation procedure</i></p> <p><i>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</i></p> <p><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p>	<p>The evaluation will be conducted in Greek, except in the case of Erasmus postgraduate students, who will be assessed in English.</p> <p>I. Theory Multiple-choice test Written assignments Final written examination</p> <p>II. Laboratory part Written examination with problem-solving</p>	

5. ATTACHED BIBLIOGRAPHY

<p><i>- Suggested bibliography:</i></p> <p>Brady, N. C., & Weil, R. R. (2008). <i>The nature and properties of soils</i>. Prentice Hall.</p> <p><i>- Related academic journals:</i></p> <p>Geoderma, Catena, Journal of Plant Nutrition and Soil Science, Journal of Soil and Water Conservation, Journal of Soils and Sediments, European Journal of Soil Science, Land Degradation & Development, Journal of Soil Science and Plant Nutrition, Soil Systems, Geoderma Regional</p>
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