

## COURSE OUTLINE

### 1. GENERAL

<b>SCHOOL</b>	ENVIRONMENT AND AGRICULTURAL ENGINEERING		
<b>ACADEMIC UNIT</b>	DEPARTMENT OF NATURAL RESOURCES DEVELOPMENT AND AGRICULTURAL ENGINEERING		
<b>LEVEL OF STUDIES</b>	Graduate		
<b>COURSE CODE</b>	<b>940</b>	<b>SEMESTER</b>	<b>9<sup>o</sup></b>
<b>COURSE TITLE</b>	Applied Soil Science		
<b>INDEPENDENT TEACHING ACTIVITIES</b> <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>	<b>WEEKLY TEACHING HOURS</b>	<b>CREDITS</b>	
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>			
<b>COURSE TYPE</b> <i>general background, special background, specialised general knowledge, skills development</i>	Scientific field		
<b>PREREQUISITE COURSES:</b>	Soil Science Soil Fertility Soil Genesis and Classification		
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	Yes (in English)		
<b>COURSE WEBSITE (URL)</b>	<a href="https://oeclass.aua.gr/eclass/courses/364/">https://oeclass.aua.gr/eclass/courses/364/</a>		

### 2. LEARNING OUTCOMES

<p><b>Learning outcomes</b> <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"> <li>• <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i></li> <li>• <i>Descriptors for Levels 6, 7 &amp; 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i></li> <li>• <i>Guidelines for writing Learning Outcomes</i></li> </ul>																			
<p>The course aims to establish principles, rules and methodologies for the sustainable use of soil resources. For this purpose, knowledge of the different types of soils, their geographical distribution, their properties, their interactions with other components of the ecosystem and their reaction to external interventions or impacts is essential.</p> <p>Upon successful completion of the course the student(s) will be able to: - Acquire knowledge towards the sustainable use and management of soil resources.</p>																			
<p><b>General Competences</b> <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%; border: none;"><i>information, with the use of the necessary technology</i></td> <td style="width: 50%; border: none;"><i>Project planning and management</i></td> </tr> <tr> <td style="border: none;"><i>Adapting to new situations</i></td> <td style="border: none;"><i>Respect for difference and multiculturalism</i></td> </tr> <tr> <td style="border: none;"><i>Decision-making</i></td> <td style="border: none;"><i>Respect for the natural environment</i></td> </tr> <tr> <td style="border: none;"><i>Working independently</i></td> <td style="border: none;"><i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i></td> </tr> <tr> <td style="border: none;"><i>Team work</i></td> <td style="border: none;"><i>Criticism and self-criticism</i></td> </tr> <tr> <td style="border: none;"><i>Working in an international environment</i></td> <td style="border: none;"><i>Production of free, creative and inductive thinking</i></td> </tr> <tr> <td style="border: none;"><i>Working in an interdisciplinary environment</i></td> <td style="border: none;"><i>.....</i></td> </tr> <tr> <td style="border: none;"><i>Production of new research ideas</i></td> <td style="border: none;"><i>Others...</i></td> </tr> <tr> <td style="border: none;"></td> <td style="border: none;"><i>.....</i></td> </tr> </table>		<i>information, with the use of the necessary technology</i>	<i>Project planning and management</i>	<i>Adapting to new situations</i>	<i>Respect for difference and multiculturalism</i>	<i>Decision-making</i>	<i>Respect for the natural environment</i>	<i>Working independently</i>	<i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i>	<i>Team work</i>	<i>Criticism and self-criticism</i>	<i>Working in an international environment</i>	<i>Production of free, creative and inductive thinking</i>	<i>Working in an interdisciplinary environment</i>	<i>.....</i>	<i>Production of new research ideas</i>	<i>Others...</i>		<i>.....</i>
<i>information, with the use of the necessary technology</i>	<i>Project planning and management</i>																		
<i>Adapting to new situations</i>	<i>Respect for difference and multiculturalism</i>																		
<i>Decision-making</i>	<i>Respect for the natural environment</i>																		
<i>Working independently</i>	<i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i>																		
<i>Team work</i>	<i>Criticism and self-criticism</i>																		
<i>Working in an international environment</i>	<i>Production of free, creative and inductive thinking</i>																		
<i>Working in an interdisciplinary environment</i>	<i>.....</i>																		
<i>Production of new research ideas</i>	<i>Others...</i>																		
	<i>.....</i>																		

*Search for, analysis and synthesis of data and information, with the use of the necessary technology*  
*Adapting to new situations*  
*Working independently*  
*Team work*  
*Respect for the natural environment*

### **3. SYLLABUS**

#### **Module 1: Introductory concepts**

Soil functions – The human impact on soil resources – Soil Degradation - Sustainable use of soil resources - Definition and objects of Applied Soil Science

#### **Module 2: Soil Maps – Alphanumeric Symbol**

Soil Mapping - Preliminary Survey and Field Mapping - Soil Maps – Soil Units and Usefulness - Alphanumeric Symbol - Parameters, Properties, and Interpretation

#### **Module 3: Soil and Land Evaluation**

Principles and purposes of evaluation, Qualitative evaluation, Storie Index, Land evaluation and Suitability (FAO) evaluation, Quantitative evaluation, Stages of quantitative evaluation, Pedotransfer functions, Agro-ecological land Resources Assessment (FAO).

#### **Module 4: Fertility and Nutrient Management of Soil Units**

Factors affecting soil fertility, Fertilization of soil units, the 4R Principle.

#### **Module 5: Nutrient Managements of Soil Units - Phosphorus**

Phosphorus management, the challenges of phosphorus, phosphorus transformations during pedogenesis, phosphorus site index, mobilization of residual phosphorus in Soil Units.

#### **Module 6: Nutrient Managements of Soil Units - Nitrogen**

Soil nitrogen balance, soil residual nitrogen and fertilization, application of nitrogen fertilizers to different soil units, nitrogen losses

#### **Module 7: Nutrient Managements of Soil Units – Potassium and micronutrients**

Available potassium forms in soil, potassium dynamics and mineralogical composition of soil units, application of potassium fertilizers to soil units, availability of micronutrients in soil units

#### 4. TEACHING and LEARNING METHODS - EVALUATION

<p style="text-align: center;"><b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i></p>	<p><i>Face-to-face and Distance learning</i></p>	
<p style="text-align: center;"><b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b> <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;"><b>TEACHING METHODS</b> <i>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.</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>	<b>Activity</b>	<b>Semester workload</b>
	Lectures	50
	Laboratory practice	40
	Field work study	20
	Essay writing	15
	Course total	125
<p style="text-align: center;"><b>STUDENT PERFORMANCE EVALUATION</b> <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

*- Suggested bibliography:*

Brady, N. C., & Weil, R. R. (2008). *The nature and properties of soils*. Prentice Hall.

*- Related academic journals:*

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