

## COURSE OUTLINE

### (1) GENERAL

<b>SCHOOL</b>	Environment and Agricultural Engineering		
<b>ACADEMIC UNIT</b>	Natural Resources Management and Agricultural Engineering		
<b>LEVEL OF STUDIES</b>	Undergraduate		
<b>COURSE CODE</b>	<b>3110</b>	<b>SEMESTER</b>	<b>9o</b>
<b>COURSE TITLE</b>	Environmental Soil science and Soil Management		
<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	
<b>Laboratory practice</b>	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		
<b>PREREQUISITE COURSES:</b>			
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	Yes (English)		
<b>COURSE WEBSITE (URL)</b>	<a href="http://www.afp.aua.gr/?page_id=63&amp;did=119">http://www.afp.aua.gr/?page_id=63&amp;did=119</a>		

## (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 focuses on issues related to soil pollution and degradation, phytoremediation practices and nutrients management in soils

Passing successfully course exams, the student will be able to:

- evaluate soil pollution derived from anthropogenic sources (site specific and dispersed pollution)
- deploy descriptive statistics for raw data assessment
- get familiar with basic phytoremediation principles for the restoration of contaminated soils
- use Soil Quality Indicators for soil resources evaluation depending on managerial target
- accurately calculate the quantity of biologic origin inputs to soils (biosolids, manures) to cover nutritious plant needs and to minimize environmental threats from the utilization of such inputs
- appropriately manage nutrients in soils in order to protect soil and water resources and to improve the quantity and quality of the harvested products

### 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

Adapting to new situations

Decision-making

Working independently

Team work

Working in an international environment

Working in an interdisciplinary environment

Production of new research ideas

Project planning and management

Respect for difference and multiculturalism

Respect for the natural environment

Showing social, professional and ethical responsibility and sensitivity to gender issues

Criticism and self-criticism

Production of free, creative and inductive thinking

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Others...

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- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Team work
- Working in an interdisciplinary environment
- Respect for the natural environment

- Production of free, creative and inductive thinking

### (3) SYLLABUS

#### Lectures:

General aspects of natural environment. Soil pollution. Soil pollution sources (site specific and dispersed pollution). Nitrogen, phosphorus and heavy metals build up in soils. Statistical analysis and data evaluation. Application of livestock and plant residues and biosolids in agricultural soils – effects on soil/ plant system. Environmental and biological significance of soil pollution. Soil phytoremediation. Soil Quality Indicators. Sustainable soil nutrient management. Natural threats for soil resources, implementation of appropriate measures. Measures to protect soil quality.

#### Laboratory practice:

Extraction protocols for the determination of total and available metal forms in soils. Sequential extraction schemes to determine metals associations with different soil fractions.

### (4) TEACHING and LEARNING METHODS - EVALUATION

<b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i>	Face-to-face,	
<b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b> <i>Use of ICT in teaching, laboratory education, communication with students</i>	Power point. Communication with students via email and social media (close group)	
<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.  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>	<b>Activity</b>	<b>Semester workload</b>
	Lectures	36
	Laboratory practice	20
	Team work	20
	Power point presentations	10
	Study	40
	Course total	<b>126</b>
<b>STUDENT PERFORMANCE EVALUATION</b>	1. Final written examination that may include: - multiple choice questionnaires	

<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>	<ul style="list-style-type: none"> <li>- short – answer questions</li> <li>- Problem solving</li> </ul> <p>Or/and</p> <ol style="list-style-type: none"> <li>2. Evaluation of team work</li> </ol>
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#### (5) ATTACHED BIBLIOGRAPHY

<p>- <i>Suggested bibliography:</i></p> <p>- <i>Related academic journals:</i></p> <ol style="list-style-type: none"> <li>1. N.C Brady and R.R. Weil, 2011. Εδαφολογία, η φύση και οι ιδιότητες των εδαφών. 14<sup>th</sup> edition, απόδοση στα ελληνικά, <i>Εμβρυο</i>, Σελ. 973.</li> <li>2. Alloway, B.J. (1995). Heavy metals in soils. 2<sup>nd</sup> edition. (Blackie Academic &amp; Professional, London, UK).</li> <li>3. Kabata-Pendias, A. &amp; Pendias, H. (1992). Trace Elements in soils and plants. 2<sup>nd</sup> edition. (CRC press, Boca Raton, FL).</li> </ol>
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