COURSE OUTLINE

1. GENERAL

SCHOOL	SCHOOL OF ENVIRONMENT AND AGRICULTURAL ENGINEERING		
ACADEMIC UNIT	DEPARTMENT OF NATURAL RESOURCES DEVELOPMENT AND AGRICULTURAL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	**191**	**SEMESTER**	**9o**
COURSE TITLE	MODERN TECHNIQUES AND SPATIAL ANALYSIS IN THE STUDY OF LAND RESOURCES		

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**
Theory: Lectures	3	
Laboratory: Use of Software Tools	2	
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*	General knowledge, Scientific Area, Skills development
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes (in Greek)
COURSE WEBSITE (URL)	http://openeclass.aua.gr

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*

It is the third course provided on the broader topic of Geographic Information Systems (GIS). The syllabus of the course aims at the management and evaluation of soil surveys data and soil maps with spatial statistical analysis methods, and by using the capabilities of GIS. Methodologies for the analysis and processing of spatial data are applied to investigate soil problems and assist soil mapping and the management of natural resources in general.
Concepts and problems of data analysis of data that have spatial reference, investigation of similarities and differences and especially investigation of the existence of spatial trends in the spatial distribution of values of soil properties are some of the problems encountered in the context of this course with the use of special statistical software and in a Geographic Information System environment.
Finally, the main objectives of the course are both the understanding by the students, through the presentation of theoretical units and laboratory practical exercises, of the important possibilities provided by the preliminary and exploratory non-spatial and spatial analysis of soil survey data, in a GIS environment, in dealing with problems of study of soil resources as well as in their practical utilization.

Upon successful completion of the course the student will be able to:
Understand the basic stages of exploratory spatial data analysis (ESDA), within a GIS environment, that describe an environmental issue, such as the soil survey data of an area.
Knowledge of ESDA's tools and techniques and how it is used for spatial data analysis.
Ability to implement basic and special procedures for processing non-spatial and spatial data.
Application of basic spatial interference models (e.g. weighted inverse distance weighted – IDW) method to solve environmental issues of soil resources.
Use of the rules of thematic cartography to render the results of his work.

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…*
	…….

1. Search, Analysis and Synthesis of Data and Information, using the Necessary Technologies
2. Adapting to New Situations
3. Decision-making

4. Autonomous Work
5. Teamwork
6. Project planning and management
7. Respect for the natural environment

3. SYLLABUS

i. Univariate analyses
ii. Spatial join processes
iii. Preliminary non-spatial analysis
iv. Statistical investigation of differences in mean values
v. Preliminary spatial analysis (posting of data, trend analysis)
vi. Determination of spatial outliers
vii. Spatial autocorrelation, general and local spatial autocorrelation indices (Moran's I, LISA), autocorrelations
viii. Spatial interpolation methods
ix. Geostatistical methods of spatial interpolation
x. Control and evaluation of spatial interpolation results (cross-validation, independent data set)

4. TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>In classroom and in laboratory (face-to-face)</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td>Exploitation of Information and Communication Technologies in teaching, in laboratory training and in communication with students.
Use of dedicated software.
Use of integrated e-learning system.
Communication with students via open eclass platform and e-mail.</td></tr>
<tr><td>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</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>26 hours</td></tr>
<tr><td>Laboratory work</td><td>39 hours</td></tr>
<tr><td>Individual study</td><td>60 hours</td></tr>
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<tr><td>Course total</td><td>125</td></tr>
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<tr><td>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.</td><td>Four written laboratory exercises (40%) of study cases (development of spatial data, their processing, modeling, calculations, cartography).
Oral examination (60%) on how to deal with and implement the study cases that each student (or group of students) faced.

Marking Scale: 0-10.
Minimum Passing Mark: 5.</td></tr>
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5. ATTACHED BIBLIOGRAPHY

Proposed literature:

1. Spatial Statistics, Daniel A. Griffith, Yongwan Chun, LAST MODIFIED: 26 NOVEMBER 2019, DOI: 10.1093/OBO/9780199363445-0125