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	**630028**	**SEMESTER**	**2o**
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	5
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 English)
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*

The course material aims to manage and evaluate data using spatial statistical analysis methods and the capabilities of GIS.
The purpose of the course is initially to present non-spatial statistical analysis methods that are necessary to explore the nature and trend of the variables that describe a spatial problem (preliminary non-spatial analysis) but also their non-spatial correlations (multivariate analysis methods). However, the main purpose is, based on the characteristics of their spatial distribution, to estimate their behavior in locations where we do not have information.
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 significant possibilities offered by the preliminary and exploratory non-spatial and spatial analysis of data related to Agriculture and the Environment in GIS environment.
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 topic.
- Have knowledge of ESDA tools and techniques and how they are used for spatial data analysis.
- Be able to implement basic and specialized data processing procedures, both non-spatial and spatial.
- Apply basic spatial interpolation models (e.g., inverse distance weighted – IDW) to solve environmental soil resource issues.
- Use the rules of thematic cartography to display the results of his/her 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

- Advanced Modeling Techniques in GIS Environment
- Exploratory Non-Spatial Data Analysis (EDA)
- Exploratory Spatial Data Analysis (ESDA)
- Spatial Autocorrelation (General and Local Spatial Autocorrelation Indicators)
- Spatial Interpolation – Non-Geostatistical Spatial Interpolation Methods
- Geostatistics
- Geostatistical Spatial Interpolation Methods – Kriging
- Verification and Evaluation of Spatial Interpolation Results (Cross-Validation, Independent Data Set)

Exercise Material:

For each unit, exercise material is provided (a total of five exercises). To address these exercises, specialized software will be used (such as SPSS, Statgraphics, R, Geoda, Geostatistical Analyst - ESRI), and each student will submit a corresponding assignment.

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	In classroom and in laboratory (face-to-face)
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	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.
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*	

Activity	***Semester workload***
Lectures	35 hours
Laboratory work and case studies	75 hours
Exercises and presentations	15 hours
Course total	***125***

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.*	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.

5. ATTACHED BIBLIOGRAPHY

Proposed literature:

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