COURSE OUTLINE

1. GENERAL

SCHOOL	SCHOOL OF ENVIRONMENT AND AGRICULTURAL ENGINEERING		
ACADEMIC UNIT	DEPARTMENT OF NATURAL RESOURCES DEVELOPMENT AND AGRICULTURAL ENGINEERING		
LEVEL OF STUDIES	Postgraduate		
COURSE CODE	**630301**	**SEMESTER**	**2o**
COURSE TITLE	Processing Vector and Raster Data – Spatial Modeling		

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**
Lectures and Practice		5
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)	

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 is a continuation of the first semester postgraduate course "Geographic Information Systems" in the sense that it will develop theories whose application in GIS environments includes quite advanced processing of vector and raster data. Specifically, the following will be developed: multicriteria methods for processing spatial data, neural networks, fuzzy logic, logistic regression models, landscape metrics. For each theoretical unit, there will be corresponding material for performing practical exercises in ArcGIS, usually with the use of other specialized software (MATLAB, R, FragStats, ...).

For each theoretical unit, one published scientific paper from the international bibliography is given, which will have as its main analysis method the specific unit. A total of five papers are given and five groups of students are created, each of which takes on the presentation of one of these 5 papers in PowerPoint.

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…*
	…….

• Search, analysis, and synthesis of spatial data and information, using the necessary technologies.

• Solving problems with a spatial dimension.

• Adaptation to new situations.

• Independent work.

3. SYLLABUS

• Processing and analysis of vector data

• Processing and analysis of raster data

• Spatial modeling

• Landscape metrics • Logistic regression • Fuzzy logic • Multicriteria methods for processing spatial data (AHP, OWA, FLOWA) • Neural networks

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 — 20 hours Laboratory work — 40 hours interactive teaching — 25 hours Projects and presentations — 40 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*	**I. Theory** Final Exam, written or oral, of increasing difficulty, which may include Multiple choice test, Questions of brief answer, Questions to develop a topic, Judgment questions and Exercise solving. Assuming feasibility, Progress exams will take place during the semester whose marking will contribute to the determination of the final Theory mark. **Marking Scale:** 0-10. **Minimum Passing Mark:** 5. **II. Laboratory**

Specifically-defined evaluation criteria are given, and if and where they are accessible to students.	Final Exam, hands on computer, of the software tools taught. **Marking Scale:** 0-10. **Minimum Passing Mark:** 5. **The final Course mark is the average of the marks on Theory and Lab.**

5. ATTACHED BIBLIOGRAPHY

Proposed literature:

1. KEITH C. CLARK, *GETTING STARTED WITH GEOGRAPHIC INFORMATION SYSTEMS, 5TH EDITION*, PEARSON, 2011.
2. KOLLIA V., KALIVAS D, TRIAKONSTANTIS D, GEOGRAPHIC INFORMATION SYSTEMS, EMVRIO PUB., ATHENS.
3. http://www.esri.com/what-is-gis
4. http://www.qgis.org/
5. http://grass.osgeo.org/

-Related scientific journals

1. Journal of Geographic Information System (JGIS)
2. Cartography and Geographic Information Science.

GIS and Remote Sensing Journal