COURSE OUTLINE

1. GENERAL

SCHOOL	**SCHOOL OF ENVIRONMENT & AGRICULTURAL ENGINEERING**		
ACADEMIC UNIT	**NATURAL RESOURCES MANAGEMENT & AGRICULTURAL ENGINEERING**		
LEVEL OF STUDIES	**MASTER OF SCIENCE**		
COURSE CODE	**630043**	**SEMESTER**	**2st**
COURSE TITLE	**MULTIVARIATE STATISTICAL ANALYSIS**		
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 & *laboratory exercises*		(3+2)	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*	***special background/ skills development.***		
PREREQUISITE COURSES:	-		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	**Greek**		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	**Yes (in Greek)**		
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*
Upon successful completion of the course, the graduate student is expected to: • Know and apply the basic methods of multivariate statistical analysis. • Apply statistical inference to multivariate data. • Use multivariate techniques to create groups from either observations or variables with common characteristics. • Use methods of reducing the dimensions of a problem. • Create graphs and interpret relationships between variables and groupings of data with common characteristics. • Use appropriate software (statistical packages) to apply multivariate techniques for the statistical analysis and interpretation of experimental or sampled multivariate data.

- Comply to ethical issues related to the collection and use of data and the publication of conclusions drawn from them.

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
……
Others…
…….

1) Retrieve, analyze and synthesize data and information, with the use of necessary technologies.
2) Adapt to new situations.
3) Make decisions.
4) Work autonomously.
5) Work in teams.
6) Create new research ideas.
7) Advance free, creative and inductive thinking.

3. SYLLABUS

1) Multivariate data, multivariate descriptive measures, variance matrix, graphs for describing multivariate data.
2) Principal component analysis (selection and interpretation of principal components). Dimensionality reduction of multivariate data. Graphical representation of principal components and grouping of observations with common characteristics.
3) Factor analysis, the orthogonal factor model. Estimation methods, rotation of the model, interpretation of results, applications.
4) The concept of distance and its use for grouping. Discriminant analysis.
5) Cluster analysis.

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY ***Face-to-face, Distance learning, etc.***	In computer lab.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY ***Use of ICT in teaching, laboratory education, communication with students***	Statistical packages usage. Educational material, updates and announcements available on the web.

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 (direct)	39 hours
Laboratory work	26 hours
Autonomous study	60 hours
Total contact hours and training	***125 hours***

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.***	**I.** Laboratory autonomous exercises (30%). **II.** Final autonomous oral examination (70%).

5. ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

1. ***Manly, B. F. J., Navarro Alberto, J. A., Multivariate Statistical Methods A Primer, CRC Press, Fourth Edition, 2017.***
2. ***Johnson, R. A., Wichern Dean W., Applied Multivariate Statistical Analysis, Prentice Hall, Sixth Edition, 2007.***