COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Science and Technology of Information		
ACADEMIC UNIT	Department of Statistics		
LEVEL OF STUDIES	Undergraduate – 1st cycle		
COURSE CODE	**6225**	**SEMESTER**	**5th**
COURSE TITLE	**DESIGN AND ANALYSIS OF EXPERIMENTS**		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	7

COURSE TYPE	Elective - Scientific Field
PREREQUISITE COURSES:	Linear Models
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://www.dept.aueb.gr/en/stat/content/design-and-analysis-experiments-8-ects

(2) LEARNING OUTCOMES

Learning outcomes

Upon completion of the course, students are expected to learn the fundamental principles of designing an experiment along with the analysis of variance (ANOVA) methodology. Specifically, they are expected to be able to propose both the appropriate statistical design of an experiment, which is called upon to answer a research question, as well as to perform the appropriate statistical analysis on the results of the experiment, allowing statistical inference and decision-making.

General Competences

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Decision-making
- Development of critical thinking.

(3) SYLLABUS

Introduction to Design and Analysis of Experiments. Single factor experiments. Multiple Comparisons. Random Effects Model. Non-parametric ANOVA. Randomized Complete Block Design: one controllable nuisance factor. Latin square design: blocking two controllable nuisance factors. Balanced Incomplete Block Design. Factorial Designs: two

factors with/without interaction. The general factorial Designs: more than two factors with interactions. 2^2, 2^3 and 2^k factorial designs. Fractional factorial designs. Nested and Split Plot Designs. Examples and case studies using R.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Face-to-face
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	Use of ICT in teaching
TEACHING METHODS	

Activity	*Semester workload*
Lectures	157,5
Exercises	17,5
Course total	***175***

STUDENT PERFORMANCE EVALUATION	The assessment consists of a written examination covering theory and applications, designed to evaluate the understanding of the methods taught in class. There is also the option to complete an additional project, which is optional but highly recommended. Furthermore, the instructor may request an oral examination to further assess the student's overall understanding of the course material.

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

- D. C. Montgomery (2020). “Design and analysis of experiments”, Wiley.
- V. Chasiotis and M. Chalikias (2023). “Experimental Designs and Statistical Analysis”, Kallipos (in Greek) https://repository.kallipos.gr/handle/11419/11674?&locale=en.
- D. D. Voss and D. Draguljic (2017). “Design and Analysis of Experiments”, Springer.
- F. J. Wu and M. S. Hamada (2021). “Experiments: Planning, Analysis, and Optimization”, Wiley.
- J. Lawson (2014). “Design and Analysis of Experiments with R”, Chapman & Hall.

- Related academic journals:

Journal “Significance” published from Royal Statistical Society
https://rss.org.uk/news-publication/publications/significance/