

COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Science and Technology of Information		
ACADEMIC UNIT	Department of Statistics		
LEVEL OF STUDIES	Undergraduate – 1 st cycle		
COURSE CODE	6225	SEMESTER	5 th
COURSE TITLE	DESIGN AND ANALYSIS OF EXPERIMENTS		
INDEPENDENT TEACHING ACTIVITIES		WEEKLY TEACHING HOURS	CREDITS
		4	8
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/experimental-design-and-analysis-8-ects		

(2) LEARNING OUTCOMES

Learning outcomes
<p>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.</p>
General Competences
<ul style="list-style-type: none"> • Search for, analysis and synthesis of data and information, with the use of the necessary technology • Decision-making • Development of critical thinking.

(3) SYLLABUS

<p>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</p>

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.

Knowledge of Linear Algebra and Linear Models will be useful

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Face-to-face	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	Use of ICT in teaching	
TEACHING METHODS	<i>Activity</i>	<i>Semester workload</i>
	Lectures	180
	Exercises	20
	Course total	200
STUDENT PERFORMANCE EVALUATION	<p>Examination in Greek in multiple choice questionnaires and use of negative marking. The negative score is calculated so that the expected value of the score of a person randomly selecting answers is zero.</p> <p>The method of examination is communicated to the students from the first lecture, and they are also informed electronically (and via email) through an announcement in the eclass page of the course.</p>	

(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/>