COURSE OUTLINE

Ημερομηνία: 8 Νοε 2022

A. INFORMATION FOR THE COURSE

A1. School	School of Science and Technology of Information
A2. Department	Department of Statistics
A3. Master Programme	
A4. Course Code	6144
A5. Title of the Course	THEORETICAL STATISTICS

Lecturers

Name	Rank	Specialization
PAPAGEORGIOU IOULIA	Associate Professor	Statistics
PERDIKIS THEODOROS	PhD Candidate	
VAKEROUDIS STAVROS	Assistant Professor	Probability, Stochastic Processes, Stochastic Analysis and Applications.

B. TYPE OF COURSE

B1. Year of Study	3
B2. Semester	5th
B3. Level of Course (if applicable)	1st Cycle
B4. Type of course	Elective
B5. Field	Background
B6. ECTS credits allocated (ECTS)	8.00
B7. Is the Course in the Syllabus?	Yes
B8. If yes, which is the reference Page?	29-68
B9. Is there a site for the course?	Yes https://www.dept.aueb.gr/el/stat-courses

C. INSTRUCTION

C1. Lectures Include:	Classroom lectures: Yes Distance learning lectures: No Seminars: No Laboratory exercises: No Field training exercise: No Literary analysis: No Tutorial: Yes Interactive teaching: No Educational visits: No Project: No Essays/reports: Yes Independent study: Yes Lectures given by scientists: No Internship: No
C2. Scheduled Hours for Lectures per week	4.00
C3. Scheduled Hours for Tutorials per week	
C4. Scheduled Hours for Workshops per week	2.00
C5. Scheduled Hours for Case Studies per week	
C6. Scheduled Hours for Other Activities per week	
C7. Scheduled Hours for Lectures per semester	52
C8. Scheduled Hours for Tutorials per semester	
C9. Scheduled Hours for Workshops per semester	26
C10. Scheduled Hours for Case Studies per semester	
C11. Scheduled Hours for Other Activities per semester	2
C12. Mode of Delivery	Face to Face
C13. Student’s Evaluation	Written examination at the end of the semester: Yes Oral examination: No Midterm exam: No Homework: No Project: No Public Presentation: No Laboratory exercises: No Practical exercises: No Exempt work: No

C14. Language of Instruction	Greek

D. PREREQUISITE COURSES

Πιθανότητες Ι και Πιθανότητες ΙΙ

E. COURSE CONTENTS (Syllabus)

• Course contents
Point Estimation. Unbiasedness, Minimum Variance, Sufficiency, completeness, maximum Likelihood, efficiency. Fisher Information. Cramer-Rao inequality. Exponential family. Theorems of Rao-Blackwel and Lehmann-Scheffee. Best unbiased estimators. Maximum Likelihood Estimators. Methods of moments estimators. Confidence Interval. Pivotal Quantity. Construction of a confidence interval based on a Pivotal quantity. Best confidence interval. Other methods of constructing CI. Approximate CI. Statistical Tests. Neyman_Pearson most power statistical tests. Likelihood Ratio Tests. Asymptotic Likelihood Ratio Test.

F. LEARNING OUTCOMES

After completing the course the students ideally should be able to: Implement the standard methods from the classical mathematical statistics theory to derive estimates for unknown parameters of a population with known otherwise distribution. Assess and compare the derived estimates with respect to standard statistical criteria. Construct a confidence interval for the unknown parameters based on a sample. Construct a statistical test for a statistical hypothesis involving unknown parameters of the population under study.

G. LITERATURE

G1. Use of Multiple Literature	Yes
G2. Recommended or required reading	Yes