COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF INFORMATION SCIENCES & TECHNOLOGY		
ACADEMIC UNIT	DEPARTMENT OF STATISTICS		
LEVEL OF STUDIES	1st Cycle (UNDERGRADUATE)		
COURSE CODE	**6113**	**SEMESTER**	**8th**
COURSE TITLE	**Non-Parametric Statistics**		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures	4	8
Workshops		
Labs	2	

COURSE TYPE	Elective – Scientific Field
PREREQUISITE COURSES:	
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/non-parametric-statistics-8-ects

(2) LEARNING OUTCOMES

Learning outcomes
At the end of the course the student will be able to: Understand the non-parametric methods described and their properties. Apply these methods in real data analysis and correctly interpret the results.
General Competences
• Search, analysis and synthesis of data and information, using the necessary technologies • Autonomous work • Promotion of free, creative and inductive thinking

(3) SYLLABUS

Nonparametric density estimation, histograms, Nadaraya-Watson estimator: bias, variance, tradeoff between them and bandwidth choice: plug in and cross-validation methods. Nonparametric regression: smoothing techniques. Estimator based on kernels (Nadaraya-Watson), asymptotic development of bias and

variance, bandwidth choice, local polynomial regression and splines, variance estimation and confidence intervals. Generalized additive models (and regression trees). Empirical distribution function, empirical process, Kolmogorov –Smirnoff and similar tests. Statistics based on functional of the empirical distribution. Jacknife and Bootstrap: general principles, examples, parametric bootstrap, estimating parameter variance and bootstrap confidence intervals. Nonparametric tests based on ranks and concepts of robustness and asymptotic relative efficiency.

Knowledge of Linear Algebra, Estimation – Hypothesis Testing, Linear Models, Generalized Linear Models are useful.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face-to-face
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	In Teaching: Yes — Teaching with slides In labs: Yes — Application Lab using R In communicating with the students: Yes — eclass
TEACHING METHODS	*Activity* / *Semester workload* Lectures: 52 Tutorial: 26 Assignment: 40 Self Study: 82 **Course Total: 200**
STUDENT PERFORMANCE EVALUATION	Written examination at the end of the semester: 80% Written Assignment (Project): 20% Information is available at eclass

(5) ATTACHED BIBLIOGRAPHY

- Efron and Tibshirani (1998), An Introduction to the Bootstrap. Chapman & Hall.
- Fan, J. and Gijbels, I. (1996). Local polynomial modelling and its applications. Chapman & Hall.
- Fox, J. (2000). Nonparametric Simple Regression: Smoothing Scatterplots. Sage Publications.
- Hajek, J. (1969). A Course in Nonparametric Statistics. Holden Day.
- Hastie, T. J. and Tibshirani, R. J. (1990). Generalized Additive Models. Chapman and Hall.
- Hettmansperger, T. and McKean, J. (2011). Robust nonparametric Statistical Methods. Boca Ration : CRC/Taylor & Francis.
- Higgins, J. J. (2004). Introduction to Modern Nonparametric Statistics. Thomson/Brooks/Cole, New York.
- Hollander, M. and Wolfe, D. A., (1999). Nonparametric Statistical Method. Wiley.
- Shao and Tu (1995), The Jackknife an the Bootstrap, Springer.
- Sidak, Z., Sen, P. K. and Hajek, J. (1999). Theory of Rank Tests. Academic Press.
- Silverman, B.W. (1986). Density Estimation for Statistics and Data Analysis. Chapman and Hall.
- Wand, M. P. and Jones, M. C. (1994). Kernel Smoothing. Chapman and Hall.
- Wasserman, L. (2006). All of Nonparametric Statistics. Springer.
- Wood, Generalized Additive Models. Chapman and Hall.
- Ξεκαλάκη , Ε. (2001). Μη παραμετρική στατιστική.
- Α. Μπατσίδης, Π. Παπασταμούλης, Κ. Πετρόπουλος, Α. Ρακιτζής (2022). Μη Παραμετρική Στατιστική, Θεωρία και εφαρμογές με χρήση R και S.P.S.S., Κάλλιπος

ανοιχτές ακαδημαικές εκδόσεις που είναι διαθέσιμο και σαν electronic ressource στην http://dx.doi.org/10.57713/kallipos-102

- Κούτρας, Μ. και Τριανταφύλλου, Ι. (2022). Μη Παραμετρική Στατιστική, Θεωρία και Εφαρμογές, Εκδόσεις Τσότρας
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