

COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Information Sciences & Technology		
ACADEMIC UNIT	Department of Statistics		
LEVEL OF STUDIES	1st Cycle (undergraduate)		
COURSE CODE	6128	SEMESTER	5 th
COURSE TITLE	Advanced Sampling Methods		
INDEPENDENT TEACHING ACTIVITIES		WEEKLY TEACHING HOURS	CREDITS
Lectures		4	7
Workshops			
Labs			
COURSE TYPE	Elective – Scientific Field		
PREREQUISITE COURSES:	Knowledge of topics related to Sampling will be useful		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	NO		
COURSE WEBSITE (URL)	https://www.dept.aueb.gr/en/stat-courses		

(2) LEARNING OUTCOMES

Learning outcomes
Upon successful completion of the course, students will be able to recognize the type of statistical problems in real-time sample surveys as well as to select and apply the appropriate by case methodology. They will also have the ability to evaluate the quality of the results of the selected method.
General Competences
• Decision-making • Independent work • Teamwork • Promoting free, creative and inductive thinking

(3) SYLLABUS

• Sampling with unequal probabilities of selection. • Sampling with probabilities proportional to size. • Sampling weights. • Parameter estimation methods for unequal probability sampling and calculation of estimator variance. • Cluster sampling with unequal probabilities. • Use of auxiliary information in estimation

- Ratio estimator.
- Regression estimator.
- Post-stratification estimator
- Variance estimation in complex sample designs.
- Estimation for subpopulations (Domain estimation).
- Estimation for rare populations.
- Treatment of non-sampling errors.
- Adjustment methods for non-response. Reweighting, Imputation.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY <i>Face-to-face, Distance learning, etc.</i>	Face-to-face	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	YES	
TEACHING METHODS	Activity	Semester workload
	Lectures	52
	Lab Exercises	35
	Studying and analyzing Bibliography	10
	Assignment	8
	Self Study	70
	Course Total	175
STUDENT PERFORMANCE EVALUATION	Written examination at the end of the semester	

(5) ATTACHED BIBLIOGRAPHY

- Academic Notes.
- Papageorgiou, I. (2016). Sampling Theory [Electronic Resource]. Hellenic Academic eBooks and Resources - "Kallipos" Repository. (in Greek). <https://repository.kallipos.gr/handle/11419/1296>
- Lumley, T. (2010). Complex surveys: A guide to analysis using R [Electronic resource]. Wiley. <https://onlinelibrary.wiley.com/doi/book/10.1002/9780470580066>
- Lehtonen, R., & Pahkinen, E. (2014). Practical methods for design and analysis of complex surveys [Electronic resource]. Wiley. <https://onlinelibrary.wiley.com/doi/book/10.1002/0470091649>
- Laaksonen, S. (2018). Survey methodology and missing data [Electronic resource]. Springer International Publishing. <https://link.springer.com/book/10.1007/978-3-319-79011-4>
- Longford, N. T. (2005). Missing data and small-area estimation [Electronic resource]. Springer London. <https://link.springer.com/book/10.1007/1-84628-195-4>
- Lu, Y., & Lohr, S. L. (2022). R companion for sampling: Design and analysis, third edition [Electronic resource]. Chapman & Hall. <https://math.unm.edu/~luyan/rbook/Rbook.pdf>