

COURSE OUTLINE: RESEARCH METHODS – SAMPLING

GENERAL

SCHOOL	ECONOMICS AND BUSINESS		
ACADEMIC UNIT	ECONOMICS		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	ΜΠ403	SEMESTER	4th
COURSE TITLE	RESEARCH METHODS - SAMPLING		
INDEPENDENT TEACHING ACTIVITIES <i>if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits</i>		WEEKLY TEACHING HOURS	CREDITS
		3	4
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
COURSE TYPE <i>general background, special background, specialized general knowledge, skills development</i>	Special background, skills development		
PREREQUISITE COURSES:	NO		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES		
COURSE WEBSITE (URL)	https://www.econ.uth.gr/		

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon successful completion of the course, students will be able to:

- 1. Understand and explain basic statistical concepts, allowing them to distinguish between:*
 - Censuses and sample surveys*
 - Representativeness and precision of a sample*
 - Random and non-random sampling*
 - Sampling and non-sampling errors*
 - Sampling with and without replacement.*
- 2. Clearly define the population or sampling unit for the survey and accurately identify the type of variable—whether quantitative or qualitative—and the statistical parameters necessary for generalizing results from the sample to the population.*
- 3. Execute the following tasks under different sampling plans:*
 - Select sampling units*
 - Calculate estimates from sample data*
 - Construct and analyze confidence intervals for*
 - ✓ Population means*
 - ✓ Population sums of observations*
 - ✓ Population percentages*
 - Determine the appropriate sample size based on the chosen sampling plan and evaluate how factors such as the desired degree of precision, the number and variance of research variables, budget constraints, and available time contribute to this decision.*
- 4. Understand and implement various strategies for addressing the issue of non-response. Specifically:*
 - In systematic sampling, calculate the sampling step, identify the random start, and understand the conditions under which different types of simple random sampling can be applied when estimating, constructing, and analyzing confidence intervals.*
 - In stratified sampling, comprehend the conditions for applying different methods of distributing the sample across individual strata, how to select the sample size for each method of distribution, and how to estimate, construct, and analyze confidence intervals accordingly.*
 - In cluster sampling, accurately differentiate between the "initial population unit" and the "group," depending on the grouping of the former, and understand how to estimate, construct, and analyze confidence intervals when the size of the initial population is unknown.*
- 5. Another goal is to utilize statistical computational tools for implementing sampling designs and calculating bibliographic formulas. Specifically, we will use either a combination of or exclusively the following:*
 - Specialized sampling packages in the R programming language.*
 - Computational techniques available in the MINITAB statistical software.*

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of

the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology

Adapting to new situations

Decision-making

Working independently

Team work

Working in an international environment

Working in an interdisciplinary environment

Production of new research ideas

Project planning and management

Respect for difference and multiculturalism

Respect for the natural environment

Showing social, professional and ethical responsibility and

sensitivity to gender issues

Criticism and self-criticism

Production of free, creative and inductive thinking

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Others...

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- *Search for, analysis and synthesis of data and information, with the use of the necessary technology*
- *Working independently*
- *Production of free, creative and inductive thinking*
- *Decision-making*

SYLLABUS

Course outline

1. BASIC IDEAS OF SAMPLING: Statistical unit, Population, Variable, Statistical parameters, Census versus sampling, Advantages and disadvantages of sample surveys, Sampling unit, Sampling frame, Random versus non-random sampling, Sampling and non-sampling errors, Causes of non-sampling errors.

2. SIMPLE RANDOM SAMPLING: Definitions and notation, Selection of a simple random sample, Method of random numbers, Estimating the population mean – the population total – the population proportion, Sample size determination, Estimating a Mean – Total – or Proportion of a subpopulation, Estimating a Ratio.

3. SYSTEMATIC SAMPLING AND UNEQUAL PROBABILITY SAMPLING: Selection of a systematic sample, Conditions of applying systematic sampling, sample selection with probability proportional to size, Sampling with replacement – The Hansen-Hurwitz estimator.

4. STRATIFIED RANDOM SAMPLING: Description and notation, Reasons for using stratification, Allocation in stratified random sampling – proportional allocation – Neyman allocation – optimum allocation, Estimating the stratified population mean – the stratified population total – the stratified population proportion, Sample size determination, Estimating a stratified Ratio.

5. CLUSTER SAMPLING: Examples and reasons for cluster sampling, Estimating in cluster sampling the population mean – the population total – the population proportion, Sample size determination, Cluster sampling with stratification.

6. TWO-STAGE SAMPLING: Description-examples-notation, Finding mean and variances in two-stage sampling, Variances of the estimated mean and the estimated population total, estimation of proportions, sample size determination, Stratified two-stage sampling.

7. NON-RESPONSE: Types of non-response, Replacement of non-respondents, Methods of non-response adjustments, population-level and sample-level weighting adjustment, imputation adjustment.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY <i>Face-to-face, Distance learning, etc.</i>	Face-to-face.																
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i>	• Use of the e-class platform for posting: (a) lecture materials, (b) announcements, (c) exercises, case studies, and pertinent articles. • Utilization of electronic media for presenting lectures (PowerPoint).																
TEACHING METHODS <i>The manner and methods of teaching are described in detail. Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc. The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</i>	<table border="1" data-bbox="647 1059 1311 1462"> <thead> <tr> <th><i>Activity</i></th><th><i>Semester workload</i></th></tr> </thead> <tbody> <tr> <td>Lectures</td><td>39</td></tr> <tr> <td>Study of bibliography</td><td>43</td></tr> <tr> <td>Course assignment preparation</td><td>30</td></tr> <tr> <td>Follow-up meetings for the assignments</td><td>6</td></tr> <tr> <td>Exams</td><td>2</td></tr> <tr> <td></td><td></td></tr> <tr> <td>Course total</td><td>120</td></tr> </tbody> </table>	<i>Activity</i>	<i>Semester workload</i>	Lectures	39	Study of bibliography	43	Course assignment preparation	30	Follow-up meetings for the assignments	6	Exams	2			Course total	120
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STUDENT PERFORMANCE EVALUATION <i>Description of the evaluation procedure</i> <i>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work,</i>	The final grade for the course is determined by the sum of the following components: - Final written exam: 100% of the final grade. (The exam will include multiple-choice questions, true/false questions, calculations, and open-ended questions). - Written work: 20% of the final grade. (An individual case study assignment that involves applying a sampling design to virtual population data).																

<i>essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other.</i> <i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i>	- Written work: 10% of the final grade. (An individual project to create a questionnaire in either printed or electronic format). These evaluation criteria are provided to students during the course's first lecture and are continually accessible through relevant announcements on the course's eclass platform. Erasmus students will follow the same examination methods but will be taught and examined in English.
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ATTACHED BIBLIOGRAPHY

- <i>Suggested bibliography</i> • <i>Kalton, G. (1983). "Introduction to survey sampling". SAGE Publications. https://doi.org/10.4135/9781412984685</i> • <i>Papageorgiou, I. (2015). "Sampling theory" [electronic resource]. Kallipos, Open Academic Editions. https://dx.doi.org/10.57713/kallipos-859 (Eudoxus code 320093).</i>
