UNIVERSITY OF PIRAEUS

1) GENERAL

SCHOOL	ECONOMICS, BUSINESS AND INTERNATIONAL STUDIES		
ACADEMIC UNIT	ECONOMICS		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	**ΟΚΣΤΑ02**	**SEMESTER**	1
COURSE TITLE	**STATISTICS II**		
INTEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDITS**	
Lectures	4	6	
COURSE TYPE	MANDATORY		
PREREQUISITE COURSES			
LANGUAGE OF INSTRUCTION and EXAMINATIONS	ENGLISH		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES		
COURSE WEBSITE (URL)	**https://eclass.unipi.gr/courses/OEP236/**		

2) LEARNING OUTCOMES

Learning Outcomes

Upon completing the course, students will be able to:

- Understand the principles of sampling and design representative samples for statistical studies.
- Interpret sample distributions and the Central Limit Theorem and their roles in statistical inference.
- Calculate and interpret confidence intervals for various parameters.
- Perform hypothesis tests to evaluate statistical claims, including tests for population means and proportions.
- Apply the Chi-squared (X^2) test for discrete categorical variables and interpret its results.
- Analyze the relationship between two variables using correlation techniques.
- Develop and interpret simple linear regression models for predictive analysis.

General Competences

- Research, analysis, and synthesis of data using appropriate methodologies.
- Application of advanced statistical concepts to real-world problems.
- Decision-making based on statistical evidence.
- Development of critical and analytical thinking.
- Effective communication of statistical results through charts and reports.
- Promotion of free, creative, and inductive thinking.

3) SYLLABUS

1. Sampling
   - Definitions and sampling methods: random, systematic, stratified, and cluster sampling.
   - Sampling errors and biases.
2. Sample Distributions and Principles of Estimation
   - Introduction to sample distributions and their characteristics.
   - Central Limit Theorem: Concept and applications.
   - Principles of estimation: Point and interval estimation.
3. Confidence Intervals
   - Confidence intervals for means and proportions.
   - Interpretation and practical applications in business and economics.
4. Hypothesis Testing
   - Null and alternative hypotheses.

- Types of errors: Type I and Type II errors.
- Test statistics: Z-test, t-test, and their applications.

5. Hypothesis Testing for Discrete Categorical Variables
   - Chi-squared (X^2) test for goodness-of-fit and independence.
   - Applications in real-world datasets, including survey analysis.
6. Correlation and Simple Regression
   - Assumptions of simple linear regression.
   - Ordinary Least Squares Estimators.
   - Measuring and interpreting the strength and direction of relationships between variables.
   - Confidence intervals in regression analysis.

4) TEACHING and LEARNING METHODS

DELIVERY	In-class lecturing
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY	• Use of ICT in lectures • USE of ICT in Communication with students

TEACHING METHODS

Activity	**Semester workload**
Lectures	52
Weekly Study and Preparation	65
Exercises	20
Final Exam Preparation	30
Final Exam	2
TOTAL	162

STUDENT PERFORMANCE EVALUATION

Written examination in Greek with:
Multiple-choice and short-answer questions.
Exercises on real-world problems.
- For ERASMUS students: Evaluation based on a written project applying the course theory and methods to complex real-world problems.

ATTACHED BIBLIOGRAPHY

Recommended Bibliography
- Statistical Methods by George S. Donatos – Evdoxos Code: 133039736
- Introduction to Probability - Statistics and Applications by Markos Koutras, Ioannis Triantafyllou – Evdoxos Code: 122089451
- Basic Principles of Statistics for Business - Concepts and Applications by Mark L. Berenson, David M. Levine, Kathryn A. Szabat – Evdoxos Code: 77107287

Relevant Scientific Journals
- Journal of the American Statistical Association (JASA)
- Journal of Applied Econometrics
- Review of Economics and Statistics
- Journal of Business & Economic Statistics (JBES)
- Computational Statistics & Data Analysis
- International Journal of Data Science and Analytics