COURSE OUTLINE

(1) GENERAL

SCHOOL	Engineering
ACADEMIC UNIT	Industrial Design and Production Engineering
LEVEL OF STUDIES	Undergraduate
COURSE CODE	**4002** **SEMESTER** **4**
COURSE TITLE	Statistics and Probabilities for Engineers

INDEPENDENT TEACHING ACTIVITIES	WEEKLY TEACHING HOURS	CREDITS
Lectures	3	3
Laboratory	1	2
	4	**5**

COURSE TYPE	General background
PREREQUISITE COURSES:	No
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	https://eclass.uniwa.gr/courses/IDPE178/

(2) LEARNING OUTCOMES

Learning outcomes

The aim of the course is to introduce students to the basic principles of probability theory and statistics with emphasis on the use of new technologies (mainly with the use of appropriate software) in matters concerning and related to Management. Statistical tests and estimation are the predominant part of the material. Upon successful completion of the course the student must be able to:

- Apply basic principles of probability theory.
- Connect laws of probability with statistical inference.
- Recognize the basic types of random variables and be able to record data in order to be able to process them.
- Calculate and interpret descriptive measures.
- Investigate the relationship between economic variables using correlation and regression techniques.
- Apply descriptive statistics and regression methods using statistical packages.
- Have understood the basic concepts of valuation with emphasis on the calculation of confidence spaces.
- Perform statistical tests of average values and percentage for one and two samples and interpret the results.
- Carry out a statistical X^2 test and interpret the results.
- For the above there must be the corresponding familiarity with appropriate software through the laboratory part of the course.

General Competences

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

(3) SYLLABUS

Laplace probability definition with applications.
Random variables.
Probability and distribution functions.
Basic discrete variables (binomial, geometric Poisson).
Continuous random variables and probability distributions (normal and uniform).
Central Limit Theorem.
Correlation of two variables.
Simple linear regression.
Study of good adaptation of a statistical model through residual.
Sampling data, sampling methods.
Descriptive statistics of primary data.
Descriptive statistics of grouped data.
Internship using a statistical package in the laboratory.
Point estimators.
Confidence interval.
Hypothesis tests of average prices and percentages.
X^2 check.
Use of statistical packages.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Face-to-face
USE OF INFORMATION ANDCOMMUNICATIONS TECHNOLOGY	Specialized Software (SPSS, Envi). Learning process support through the electronic platform e -class.

TEACHING METHODS	*Activity*	*Semester workload*
	Lectures	39
	Practical applications	13
	Laboratory Exercises	26
	Individual study	72
	Course Total (30h/ECTS)	**150**

STUDENT PERFORMANCE EVALUATION	**Language of assessment:** Greek (English for ERASMUS students upon request). **Written final exam** (60%) (Concluding) which includes: - Multiple choice or right-wrong questions. - Short-Answer Questions. Purpose of assessment: The test of understanding the basic elements of the course. Evaluation criteria: The correctness, completeness, clarity and critical evaluation of the answers. **II. Multiple Choice Test** (10%) (Formative): It concerns the topics covered by the theoretical lectures. Purpose of evaluation: The control of the course of the students in relation to the educational objectives, feedback and possible modification of the teaching (fine tuning).

	Evaluation criteria: The correctness, completeness and clarity of the answers.
	III. Laboratory Exercises (30%) (Concluding):
	It concerns the topics covered by the laboratory courses.
	Purpose of evaluation: The control of the course of the students in relation to the educational objectives, feedback and possible modification of the teaching (fine tuning).
	Evaluation criteria: The correctness, completeness, clarity and critical evaluation of the answers.
	The evaluation criteria are explicitly mentioned on the course site and for each evaluation action.

(5) ATTACHED BIBLIOGRAPHY

- *Suggested bibliography*:
1. Παπαγεωργίου Ε., Χαλικιάς Μ. Πιθανότητες και Στατιστική για μηχανικούς με χρήση SPSS και MATLAB εκδόσεις BROKEN hill, Αθήνα. 2020.
2. Ζιούτας Γ. Πιθανότητες και Στοιχεία Στατιστικής για Μηχανικούς, Εκδόσεις Ζήτη, Θεσσαλονίκη 2003.
3. Καμαρινόπουλος Λ., Στοιχεία Πιθανοθεωρίας, Εκδόσεις Ζήτη, Θεσσαλονίκη 1996.
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8. Κολυβά-Μαχαίρα Φ., Μπορα-Σέντα Ε. Στατιστική Θεωρία, Εφαρμογές. Εκδόσεις Ζήτη, Θεσσαλονίκη 1998.
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13. DeGroot M. H., Schervish M. J., Probability and Statistics, 3rd ed., Addison Wesley, 2001.
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15. Montgomery D. C., Peck E. A., Vining G. G., Introduction to Linear Regression Analysis, 3rd ed., Wiley-Interscience, 2001.
16. Bickel P.J., Doksum K. A. Mathematical Statistics, Volume 1, Basic Ideas and Selected Topics, 2rd ed. Prentice Hall, 2001.
17. Casella G., Berger R. L., Statistical Inference, 2nd ed., Duxbury Press, 2001.
18. Hogg R. V., Craig A. T., McKean J. W., An Introduction to Mathematical Statistics, 6th ed., Prentice Hall, 2004.
19. Landow, S. and Everitt, B. A., Handbook of Statistical Analyses Using SPSS, Chapman and Hall/CRC Press Company, New York, Washington 2004.
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