COURSE OUTLINE

(1) GENERAL

SCHOOL	SHOOL OF ENGINEERING		
ACADEMIC UNIT	FINANCIAL AND MANAGEMENT ENGINEERING		
LEVEL OF STUDIES	UNDERGRATUATE		
COURSE CODE	GEO110	SEMESTER	4
COURSE TITLE	STATISTICS		

INDEPENDENT TEACHING ACTIVITIES *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*	WEEKLY TEACHING HOURS	CREDITS
Lectures	3	4.5
Lab in R (or SPSS)	2	
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	General background/Special background/ Specialised general knowledge/Skills development
PREREQUISITE COURSES:	Prerequisite knowledge from Courses: Probabilities
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	http://www.fme.aegean.gr/el/c/statistiki

(2) 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*

The aim of the course consists in introducing the basic concepts of Statistical Inference. These concepts are prerequisites for future courses.

A successful student should be able to:

- understand and use basic statistical concepts underlying the characteristics of a population based on a random sample
- compute and interpret confidence intervals for estimations
- conduct hypothesis testing for the mean of a population, the binomial p, the difference between the means of two population, the variance of a population
- comprehend “non-parametric statistic” and conduct the appropriate tests
- use linear regression to examine the relation between an independent and a dependent variable, along with interpreting the results of regression

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	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
	Respect for the natural environment

Decision-making *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*

- 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
- Production of free, creative and inductive thinking

(3) SYLLABUS

- Introduction-Probability Theory: Random variables and Distributions
- Sample distributions
- Sampling, Central Limit Theorem
- Descriptive statistics
- Estimation, Unbiased Estimators (bias, consistency, adequacy, completeness)
- Maximum likelihood estimators, Method of moments
- Confidence intervals
- Hypothesis testing
- Non-parametric hypothesis testing
- Correlation, Simple linear regression

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face-to-face
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	**Use of ICT in teaching** — YES — Electronic Lecture Notes, Exercises **Use of ICT in laboratory education** — YES — Lab in R (or SPSS) **Use of ICT in communication with students** — YES — Announcements, Email

TEACHING METHODS

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

Activity	*Semester workload*
Lectures	39
Laboratory	26
Study and analysis of bibliography	10
Essay writing	12
Non-directed study	40
Final Exams	3
Course total	*130*

the ECTS	
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	(Final Exams in Greek = 80%) + (Assignment in R (or SPSS) in Greek = 20%)

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

In Greek:

[1]. Πιθανότητες Και Στατιστική Για Μηχανικούς, Μέθοδοι - Εφαρμογές, 5η έκδ./2022, Ζιούτας Γεώργιος, "σοφία" Ανώνυμη Εκδοτική & Εμπορική, Κωδικός Βιβλίου στον Εύδοξο: **112702629**,

[2]. Εφαρμοσμένη Στατιστική Και Πιθανότητες Για Μηχανικούς, 6η Έκδοση/2017, Montgomery Douglas- Runger C. George, ΕΚΔΟΣΕΙΣ Α. ΤΖΙΟΛΑ & ΥΙΟΙ Α.Ε., Κωδικός Βιβλίου στον Εύδοξο: **59397306**.

[3]. Πιθανότητες Και Στατιστική Για Μηχανικούς, Με εφαρμογές στο MATLAB και το SPSS, 2η έκδ/2023, Μυλωνάς Νίκος, Παπαδόπουλος Βασίλειος, ΕΚΔΟΣΕΙΣ Α. ΤΖΙΟΛΑ & ΥΙΟΙ Α.Ε., Κωδικός Βιβλίου στον Εύδοξο: **112691973**.

[4]. Στατιστική: Ανάλυση Δεδομένων με χρήση της R, WITTE ROBERT, 1η έκδ./2019, Witte Robert, Witte John, Ανδρουλάκης Γεώργιος, Κουνετάς Κωνσταντίνος, ΕΚΔΟΣΕΙΣ ΚΡΙΤΙΚΗ ΑΕ, Κωδικός Βιβλίου στον Εύδοξο: **86055461**.

[5]. Εισαγωγή στη Στατιστική, 2η έκδ./2002, Παπαϊωάννου Τάκης, Λουκάς Σωτήρης Β, ΕΚΔΟΣΕΙΣ ΣΤΑΜΟΥΛΗ ΑΕ Κωδικός Βιβλίου στον Εύδοξο: **22745.**

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[6]. Στατιστικές Μέθοδοι: Θεωρία και Εφαρμογές με Χρήση Excel και R, 1η έκδ./2019, Ιωαννίδης Δημήτριος, ΕΚΔΟΣΕΙΣ ΠΡΟΠΟΜΠΟΣ Ι.Κ.Ε., Κωδικός Βιβλίου στον Εύδοξο: **112701531**

[7]. Ανακαλύπτοντας την Στατιστική με τη Χρήση της R, 1η έκδ./2019, Andy Field, Jeremy Miles, Zoe Field, ΕΚΔΟΣΕΙΣ ΠΡΟΠΟΜΠΟΣ Ι.Κ.Ε., Κωδικός Βιβλίου στον Εύδοξο: **112701531.**

[8]. Στατιστικές Μέθοδοι: Θεωρία και Εφαρμογές με χρήση Excel και R, 1η έκδ./2018, Ιωαννίδης Δημήτριος, ΕΚΔΟΣΕΙΣ Α. ΤΖΙΟΛΑ & ΥΙΟΙ Α.Ε., Κωδικός Βιβλίου στον Εύδοξο: **77106795**.

[9]. Στατιστική Και Μηχανική Μάθηση με την R, Θεωρία και Εφαρμογές, 1η έκδ./2017, Ιωαννίδης Δημήτριος, Αθανασιάδης Ιωάννης, ΕΚΔΟΣΕΙΣ Α. ΤΖΙΟΛΑ & ΥΙΟΙ Α.Ε., Κωδικός Βιβλίου στον Εύδοξο: **59384938**.

[10]. Εισαγωγή στις πιθανότητες και τη στατιστική, Δαμιανού Χ., Χαραλαμπίδης Χ., Παπαδάκης Ν., Εκδόσεις Συμμετρία, 2010

[11]. Πιθανότητες και Στατιστική, (Schaum's Outline of PROBABILITY AND STATISTICS), Murray R. Spiegel, Μετάφραση: Σωτήριος Κ. Περσίδης

[12]. Στατιστική, Κολυβά-Μαχαίρα, Ε. Μπόρα-Σέντα, Ζήτη

In English:

[13]. Introductory Statistics, S M. Ross, Second Edition, Academic Press; 2nd edition, 2005

[14]. Theoretical statistics, D. R. Cox, D. V. Hinkley, London:Chapman and Hall, New York, 1979.

[15]. Statistics: An Introduction using R, M. J. Crawley, Wiley; 1 edition, 2005.

[16]. Introduction to probability and statistics: principles and applications for engineering and the

computing sciences, J. S. Milton, Jesse C. Arnold, 3rd ed. New York :McGraw-Hill, 1995.

[17]. Introduction to statistical theory, Paul G. Hoel, Sidney C. Port, Charles J. Stone, Boston: Houghton-Mifflin, 1971.

[18]. An Introduction to Statistics, G. Woodbury, Duxbury Press; 1 edition, 2001)