COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Sciences				
ACADEMIC UNIT	Department of Physics				
LEVEL OF STUDIES	Undergraduate				
COURSE CODE	**14**		**SEMESTER**	**1**	
COURSE TITLE	PROPABILITY, STATISTICS AND COMPUTERS				

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**	**ECTS**
	5	7
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
PREREQUISITE COURSES	
LANGUAGE OF INSTRUCTION and EXAMINATIONS	Hellenic-Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	https://ecourse.uoi.gr/course/view.php?id=3585

(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 course provides students with basic knowledge on the principles of statistical data acquisition, classification and representation, on mathematical techniques applied in the analysis of statistical data and on the use of personal computers for solving related problems and conducting ordinary academic work.

In particular, after successful completion of the course, students should be in position to:

- Collect, tabulate, plot and interpret statistical data.
- Use inferential statistics to make generalizations about a statistical population based on a statistical sample.
- Formulate and solve statistics and probability problems.
- Find the relationship between two variables from statistical data.
- Process and manage electronic files with the most widespread PC operating systems.
- Conduct calculations, process statistical data, and create graphical representations using modern spreadsheet software.
- Analyze data series and perform statistical calculations involving mean, standard deviation and error of the mean using modern spreadsheet software.

- Fit mathematical functions to data series derived from experimental measurements and determine their analytical expressions by least square minimization methods.
- Perform fitting with pre-defined functions using modern spreadsheet software.
- Create and format texts, essays and scientific reports using modern document editor 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	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*......*
Production of new research ideas	*Others...*
	....

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

Decision-making

Working independently

Working in an interdisciplinary environment

Production of free, creative and inductive thinking

(3) SYLLABUS

Probability and Physics. Descriptive statistics. Probability theory and probability rules. Conditional probability. Random variables and probability distributions. Parameters of probability distributions. Theoretical probability distributions (binomial, Poisson, Normal, Maxwell) and their application. Sampling distributions (t, χ^2). Parameter estimation, confidence intervals. Hypothesis testing for one or more populations mean. Goodness of fit. Introduction to computers. Basic and advanced text formatting using modern document editing software. Data tabulation, processing and graphical representation using spreadsheets. Mean and standard error of the mean. Least squares and weighted least squares fitting (application in linear, power, exponential, logarithmic functions). Preparing computer laboratory reports. Spreadsheet calculations of statistical distributions.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face-to-face learning. Compulsory attendance at the computer laboratory.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Delivery of face-to-face lectures, based on both traditional blackboard notes and projection of computer presentations. Compulsory attendance at the computer laboratory for hands-on practice. Asynchronous distance learning using the Moodle platform for accessing lecture notes, assigning homework activities, and communicating with students.

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.*	*Δραστηριότητα*	*Φόρτος Εργασίας Εξαμήνου*
	Lectures	39
	Laboratory practice	26
	Study and analysis of bibliography	35
	Non-directed study	35
	Essay writing	34

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	Exams	6
	Course total	*175*
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.*	• Homework assignments (problem solving, written work, essays/reports) on a regular basis (weekly). • Midterm exams including statistics and probability topics and problem-solving using computers. • Final exams.	

(5) ATTACHED BIBLIOGRAPHY

− *Suggested bibliography:*
• Στατιστική για Οικονομολόγους, 2η έκδ.   , Δ. Χατζηνικολάου (Λ. Κιόρογλου 2002).
• Στατιστική: Θεωρία, εφαρμογές και χρήση στατιστικών προγραμμάτων σε Η/Υ, Γεώργιος Ε. Χάλκος (Τυπωθήτω – Δαρδάνος 2011).
• Πιθανότητες και Στατιστική, M. R. Spiegel, (ΕΣΠΙ Εκδοτική ΕΠΕ 1977).
• Εισαγωγή στις Πιθανότητες και τη Στατιστική, Γεώργιος Κ. Παπαδόπουλος (Gutenberg 2015).
• Πιθανότητες και Στατιστική για Μηχανικούς, Νίκος Μυλωνάς, Βασίλειος Παπαδόπουλος (Εκδόσεις Τζιόλα 2016).
• Εφαρμοσμένη Στατιστική και Πιθανότητες για Μηχανικούς, Douglas C. Montgomery, George C. Runger, 6η εκδ. (Εκδόσεις Τζιόλα 2017).
• Στατιστική και Πιθανότητες, R. Walpole, R. Myers, S. Myers, K. Ye , 9η εκδ. (Εκδόσεις Τζιόλα 2019).
• Σημειώσεις για το μάθημα "Εισαγωγή στους Ηλεκτρονικούς Υπολογιστές", Α. Δούβαλης, Α. Πολύμερος (Τυπογραφείο Π.Ι. 2018).
• Εισαγωγή στην χρήση Η/Υ, Δαγδιλέλης Β., Ευαγγελίδης Γ., Σατρατζέμη Μ., Ν. Φαχαντίδης (Εκδόσεις Τζιόλα 2015).