COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF INFORMATION SCIENCES & TECHNOLOGY		
ACADEMIC UNIT	DEPARTMENT OF STATISTICS		
LEVEL OF STUDIES	1st Cycle (UNDERGRADUATE)		
COURSE CODE	**6001**	**SEMESTER**	**1st**
COURSE TITLE	**Probabilities I**		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures	4	7,5
Workshops		
Labs		

COURSE TYPE	Compulsory - Scientific Field
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK
IS THE COURSE OFFERED TO ERASMUS STUDENTS	
COURSE WEBSITE (URL)	https://www.dept.aueb.gr/en/stat/content/probability-i-75-ects

(2) LEARNING OUTCOMES

Learning outcomes
Upon successful completion of the course, the students should be able to: Understand the way probabilities correspond to events, to solve problems using probabilities laws, review probabilities using the Bayes rule, choose the correct probabilistic model for their problem.
General Competences
• Adapting to new situations • Decision-making • Working in an interdisciplinary environment • Respect for diversity and multiculturalism • Respect for the natural environment • Demonstrating social, professional and ethical responsibility and sensitivity to gender issues • Exercising critical and self-critical thinking • Promoting free, creative and inductive thinking

(3) SYLLABUS

Discrete probability spaces, elementary combinational analysis. Probabilities properties. Conditional Probabilities, Law of Total Probability. Bayes theorem. Discrete random variables, Joint distribution of random variables. Independence. Mean value, Variance, Covariance, correlation coefficient. Cauchy-Schwarz inequality, Markov and Chebyshev inequalities. Uniform, binomial, geometric and hypergeometric distributions, Poisson distribution. Uniform, binomial, geometric and hypergeometric distributions, Poisson distribution. Conditional mean value. The Weak Law of Large Numbers. Probability generating function. Multinomial and Multivariate hypergeometric distribution.
Continuous distributions. Distribution function and probability density function. Mean, variance. Uniform, exponential and normal distribution. Gamma and Beta distributions. Moment generating functions. Joint continuous variable distribution. independency. Random variables simulation using the method of inverse transformation.

(4) TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Face-to-face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</td><td>YES</td></tr>
<tr><td>TEACHING METHODS</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Class Lectures</td><td>52</td></tr>
<tr><td>Workshops</td><td>26</td></tr>
<tr><td>Assignments</td><td>40.5</td></tr>
<tr><td>Self Study</td><td>69</td></tr>
<tr><td>Total</td><td>187.5</td></tr>
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<tr><td>STUDENT PERFORMANCE EVALUATION
.</td><td>Written examination at the end of the semester

Information is available at the study guide.</td></tr>
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(5) ATTACHED BIBLIOGRAPHY

- Κούτρας Μ., Εισαγωγή στη Θεωρία Πιθανοτήτων και Εφαρμογές, Εκδόσεις ΤΣΟΤΡΑΣ ΑΝ ΑΘΑΝΑΣΙΟΣ, 2016.
- Feller, W. (1968). An Introduction to Probability Theory and its Applications. Wiley, N.Y.
- Hoel P., Port S., Stone C., Εισαγωγή στη Θεωρία Πιθανοτήτων, ΙΤΕ Παν/κές Εκδόσεις Κρήτης, 2009.
- Hogg, R. and Graig, A. (1970). Introduction to Mathematical Statistics, Third Ed., The Macmillan Co., New York.
- Hogg,R.V. and Tanis,E.A. (2000). Probability and Statistical Inference. Prentice Hall.
- Mendenhall, W., Beavec R.J. & Beaver, B.M. (1999): Introduction to Probability & Statistics (10th edition), Duxbury Press.
- Mood, A., Graybill, F. and Boes, D. (1974). Introduction of the Theory of Statistics. McGraw-Hill.