COURSE OUTLINE

(1) GENERAL

SCHOOL	ENGINEERING		
ACADEMIC UNIT	INFORMATICS AND COMPUTER ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE		**SEMESTER**	2nd
COURSE TITLE	Probability and 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	4	
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).	**4**	**6**

COURSE TYPE general background, special background, specialised general knowledge, skills development	General Foundation
PREREQUISITE COURSES:	Discrete Mathematics, Mathematical Analysis I
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	English (Instruction, Examination)
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	https://eclass.uniwa.gr/courses/ICE294/

(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

Upon successful completion of this course, students will have obtained comprehensive knowledge on the main concepts of Probability Theory and Statistics. Students will learn to quantize events, reason on how probable an event is, determine how to calculate conditional probability and how and if two events are independent. They will also understand, via the Bayes theorem, how a prior understanding of an event can be modified when new data emerges and how strong do the data need to be in this case. Students will learn to identify the different distributions that data follow and especially the Normal Distribution. They will also become familiar with two-dimensional variables and how we can measure their covariance and/or correlation. This course lays out the foundation needed for a wide range of applications of probability theory that students will come across during their studies.

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	Project planning and management Respect for difference and multiculturalism

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	Respect for the natural environment Showing social, professional and ethical responsibility and sensitivity to gender issues Criticism and self-criticism Production of free, creative and inductive thinking …… Others… …….
Research, analysis and synthesis of the data and information, using the appropriate equipment, Working into an interdisciplinary environment, Producing new research ideas, Promotion of free, creative and inductive thinking.	

(3) SYLLABUS

Revision of Set and Counting Theory, probability, conditional probabilities, event independence, Bayes theorem and Law of Total Probability, Random Variables, probability density functions, cumulative distribution functions, Properties of a Random Variable, discrete distributions (Binomial, Geometric, Negative Binomial, Poisson, etc), continuous distributions (Exponential, Uniform, Normal), Two dimensional random variables (discrete and continuous), jointly distributed random variables, properties of two dimensional random variables, covariance and correlation of two random variables.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY Face-to-face, Distance learning, etc.	Face to face, Distance learning
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY Use of ICT in teaching, laboratory education, communication with students	**Use of ICT in Course Teaching, Use of ICT in Communication with Students, Use of ICT in Student Assessment, e-class platform, Use of R program**
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 the ECTS	<table><tr><th>Activity</th><th>Semester workload</th></tr><tr><td>Lectures</td><td>48</td></tr><tr><td>Non-guided study</td><td>102</td></tr><tr><td>Course total</td><td>150</td></tr></table>
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.	Written examinations with Problem Solving questions (Summative), Written exam with Extended Answer Questions (summative). The evaluation process is disclosed to the students in class and online, via e-class.

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:
- Προτεινόμενη Βιβλιογραφία :

1. Douglas C. Montgomery, George C. Runger, “Applied Statistics and Probability for Engineers”, 6th edition, Wiley, 2013, ISBN: 9781118539712
2. Sheldon Ross, “A first course in Probability”, 8th edition, Pearson Prentice Hall, 2009, ISBN: 978-0136033134
3. Hossein Pishro-Nik, “Introduction to Probability, Statistics, and Random Processes”, 1st edition, Kappa Research, 2014, ISBN: 978-0990637202
4. William Mendenhall, Robert J. Beaver, Barbara M. Beaver, “Introduction to Probability and Statistics”, 15th edition, Cengage Learning, 2019, ISBN: 978-1337554428

5. Richard A. Johnson, “Miller & Freund's Probability and Statistics for Engineers”, 9th Edition, Pearson, ISBN: 978-0321986245

- Related academic journals: