COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Engineering		
ACADEMIC UNIT	Department of Computer Engineering & Informatics		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	**CEID_NY204**	**SEMESTER**	**3**
COURSE TITLE	Probability and Principles of 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 and Tutorials	3(L), 2(T)	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).	TOTAL	5

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	*General background*
PREREQUISITE COURSES:	No
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes (English)
COURSE WEBSITE (URL)	https://eclass.upatras.gr/courses/CEID1081/

(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*

By attending the course, students acquire basic knowledge on Probability and Statistics, which are useful tools for their academic studies and their professional career. In the tutorials they apply the knowledge they have acquired by solving related problems. After completing the course, they will have the appropriate skills and the ability to solve combinational problems related to the topics of:

- Random experiments and Sample spaces
- Counting and Probability
- Basic concepts (Conditional Probability and Independence)
- Random Variables and Distributions (continuous and discrete)
- Basic systematic tools (Generating functions, Inequalities and bounds, Central Limit Theorem)
- Principles of Statistics (Point Estimation, Confidence Intervals, Linear Regression, Statistical Tests)

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…*
	…….

The course aims that the degree-holder to be acquired the below competences:

- *Search for, analysis and synthesis of data and information, with the use of the necessary technology*
- *Working independently*

- *Working in an interdisciplinary environment*
- *Production of free, creative and inductive thinking*

(3) SYLLABUS

- Random Experiments – Sample space - Events – Axioms of Probability.
- The basic principle of counting and combinatorial analysis
- Conditional Probability and Independence
- Random variables – Cumulative distribution function and probability density function - Jointly Distributed Random Variables.
- Expected value, Variance and Standard deviation.
- Probabilistic inequalities (Markov, Chebyshev, Jensen).
- Moment Generating Functions – Probability Generating functions
- Distributions of Discrete Variables (Bernoulli, Binomial, Geometric, Poisson).
- Distributions of Continuous Variables (Uniform, Normal, Exponential) - Poisson Process
- Central Limit Theorems.
- Descriptive statistics - Correlation of statistical data – Data transformations.
- Inferential statistics - Point Estimation – Estimator Functions
- Special random distributions (χ^2, t, F) – Confidence Intervals for the Normal Mean, the Variance and the difference in Means of Two Normal Populations - generalization in Non-Normal Populations.
- Linear Regression
- Statistical Tests (p-value, Z-test for the mean of normal population with known variance, t-test for the mean of normal population with unknown variance, test for proportions).

(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*	Lecture slides, Course website, e-class, forum , e-mail, progress.upatras.gr
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*	**Activity** / **Semester workload** Lectures: 3*13 = 39 Tutorials: 2*13 = 26 Study in each week: 3*13 = 39 Study for Progress exam: 6 Study for Final exam: 12 Course total: ***122***
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.*	The evaluation of the student is performed through: • a progress exam on the first half of the syllabus, at the middle of the semester • a final exam on all of the syllabus, at the end of the semester The evaluation criteria are accessible to students through the course website and presented in the first lecture

(5) ATTACHED BIBLIOGRAPHY

Suggested bibliography:

- *S. Ross: "Introduction to probability and statistics for engineers and scientists", Academic Press, 2009.*