COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF SCIENCES		
ACADEMIC UNIT	DEPARTMENT OF STATISTICS AND ACTUARIAL – FINANCIAL MATHEMATICS		
LEVEL OF STUDIES	UNDERGRADUATE PROGRAM		
COURSE CODE	331-3808	SEMESTER	G
COURSE TITLE	COMPUTATIONAL STATISTICS – SIMULATION TECHNIQUES		

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
	3	6
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*	Specialised general knowledge
PREREQUISITE COURSES:	NO
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES
COURSE WEBSITE (URL)	http://www.actuar.aegean.gr/index.php/en/academics/undergraduate-programs

(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*

After the successful completion of the course, students should be able to:

- Implement simulation methods and combine them for the estimation of the distributions
- Implement various simulation statistical techniques
- Obtain estimators, evaluate standard errors, construct confidence intervals and making statistical inference according to the computational statistics techniques

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, Project planning and management

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*	*Respect for difference and multiculturalism* *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…* *…….*

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Decision-making
- Team work
- Working in an international environment
- Working in an interdisciplinary environment

(3) SYLLABUS

Simulation techniques, random number generators, Box-Muller method, Markov chains, Gibbs sampler, Metropolis algorithm. Simulation software, statistical analysis of simulation results. Basic definitions, plug-in principle, correlation among bootstrap, jacknife and cross validation, nonparametric solutions, confidence intervals and hypotheses testing.

(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*	Communication with students via e-mail
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	39
Independent study	86
Course total (25 per ECTS)	*125*

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*	Student evaluation is done in Greek through a written examination which includes short-answers questions and problem solving. For students with disabilities, evaluatin takes place via oral exams.

students.	

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

1. Gentle, J.E. (2009). Στοιχεία Υπολογιστικής Στατιστικής. Επιστημονική Επιμέλεια: Μωυσιάδης Π., Μετάφραση: Μωυσιάδης Θ. και Λαφτσίδης Μ. Εκδόσεις Πανεπιστημίου Μακεδονίας, Θεσσαλονίκη.
2. Givens, G.H. and Hoeting, J.A. (2005). Computational Statistics. John Wiley & Sons, New Jersey.
3. Ripley, B.D. (1987). Stochastic Simulation. John Wiley & Sons, New Jersey.

- Related academic journals: