COURSE OUTLINE

(1) GENERAL

SCHOOL	Business		
ACADEMIC UNIT	Financial and Management Engineering		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΓΕΟ108	**SEMESTER**	**4**
COURSE TITLE	PROBABILITY MODELS		

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	5
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, special background, specialised general knowledge, skills development*
PREREQUISITE COURSES:	No
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	-

(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 main aim of the course is to familiarize student with stochastic phenomena and stochastic processes of the real world that can be described and explained by the language of mathematics. The course is actually a high-level extension of Probability Theory and it can be adapted to the needs of a Financial Engineer in order to be a useful tool for examining complex financial and engineering problems. After the successful completion of the course, the student will have:

to know and understand the basic concepts of probability theory.

to know and understand the basic concepts of probability modelling.

to be in position to classify problems with the use of Markov chains. into different categories, i.e., homogeneous Markov, non homogeneous, etc.

to perform real life problems modelling with the use of Markov chains.

to be able to solve efficiently Markov models.

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
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
Project planning and management
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
Adapting to new situations
Decision-making
Working independently
Working in an international environment
Working in an interdisciplinary environment
Critical thinking
Production of free, creative and inductive thinking

(3) SYLLABUS

Revision on Probability Theory, Basic properties, Conditional probabilities, Law of Total Probability, Bayes Theorem, Independent Events, Continuous and Discrete random variables, Probability density function, Probability distribution, Discrete probability distributions, Continuous probability distributions, Expectation, Variance, Poisson Process, Transient analysis of Discrete Time Markov Chains, Asymptotic analysis of Discrete Time Markov Chains, Transient analysis of Continuous Time Markov Chains, Asymptotic analysis of Continuous Time Markov Chains, Examples and Real life Applications.

(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*	*Use of ICT in teaching,*
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
study and analysis of bibliography	105
exams	6
Course total	***150***

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.*	- Midterm exam (optional: maximum 2 points on final grade), Final examination (problem solving)

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

Introduction to stochastic process, O. Chryssafinou, ed. ΣΟΦΙΑ, Athens, 2004 (in Greek)

Introduction to Stochastic Processes, E. Cinlar, Prentice-Hall, Engenwood Cliffs, 1975

Probability and Statistics with Reliability, Queuing, and Computer Science Applications K.S. Trivedi
Wiley-Interscience, 2002 ISBN 978-0471333418 830 Pages

Introduction to Probability Models, S.M. Ross, Academic Press, 2009, ISBN 978-0123756862, 800 Pages

- Related academic journals:

Journal of Applied Probabilities, European Journal of Operational Research, etc.....