

COURSE OUTLINE

(1) GENERAL

SCHOOL	Social Sciences		
ACADEMIC UNIT	Economics		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	OIK3502	SEMESTER	Autumn
COURSE TITLE	Statistical and machine learning with applications to economics I		
INDEPENDENT TEACHING ACTIVITIES <i>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</i>		WEEKLY TEACHING HOURS	CREDITS
		3	5
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i>	Specialised		
PREREQUISITE COURSES:	Statistics, mathematics, computers		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	English		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES		
COURSE WEBSITE (URL)	https://econservices.soc.uoc.gr/econ_classes/course/view.php?id=378		

(2) LEARNING OUTCOMES

Learning outcomes <i>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.</i> <i>Consult Appendix A</i> • 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 the course the student will be able to: • Understand the basic concepts of machine learning. • Choose the suitable method in real problems. • Select important variables using statistical and machine learning algorithms. • Apply nonlinear methods to real-world problems. • Assess the predictive performance of algorithms. • Assess and interpret empirical 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 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

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Others...

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- Use of machine learning tools in real data/problems.
- Working autonomous.
- Decision making.

(3) SYLLABUS

Indicatively, the following material will be covered:

- Association measures for continuous and discrete variables.
- Linear regression.
- Generalised linear regression.
- Non linear regression.
- Logistic regression.
- Poisson regression.
- Variable selection algorithms.
- k—NN algorithm.
- Random forest algorithm.
- Predictive performance evaluation.
- Dimensionality reduction algorithms.
- Illustration of the algorithms using *R*.

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(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY <i>Face-to-face, Distance learning, etc.</i>	Distance learning	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i>	Teaching material, announcements and communication via eclass.	
TEACHING METHODS <i>The manner and methods of teaching are described in detail.</i> <i>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.</i> <i>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</i>	Activity	Semester workload
	Lectures	39
	Personal study	86
STUDENT PERFORMANCE EVALUATION <i>Description of the evaluation procedure</i> <i>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</i> <i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i>	Course total	
	125	
	Written final exam.	

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography: Lecture notes. - Related academic journals:
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