COURSE OUTLINE

1. GENERAL

SCHOOL	NATURAL SCIENCES		
DEPARTMENT	MATHEMATICS		
LEVEL OF COURSE	UNDERGRADUATE		
COURSE CODE	MAT_ST434	**SEMESTER OF STUDIES**	7th
COURSE TITLE	LINEAR 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*	**TEACHING HOURS PER WEEK**	**ECTS CREDITS**
Lectures and Tutorials – Laboratory Exercises	4	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*	Compulsory course for the specialization *Statistics, Probability Theory and Operational Research* Elective course for each of the other specializations
PREREQUISITE COURSES:	Recommended Prerequisite Knowledge: PROBABILITY I and II, STATISTICAL INFERENCE I and II, LINEAR ALGEBRA I.
TEACHING AND ASSESSMENT LANGUAGE:	Greek
THE COURSE IS OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBPAGE (URL)	https://thalis.math.upatras.gr/~vpiperig/LinearModels/index.html

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*

In the "Linear Models" course, regression analysis techniques are introduced and studied which are one of the most useful and widespread tools of applied statistics. Regression analysis is a statistical methodology used in almost all cases where there is a need for simultaneous study of two or more variables to study and predict one of these against the values of another or some other variables associated with it.

After successful completion of the course, the student will be able to apply and study stochastic linear regression models.

General Abilities

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	*Others…*
Production of new research ideas	

- Search, analyze and synthesize data and information using the necessary technologies.
- Decision making.
- Working in an interdisciplinary environment.
- Autonomous work.
- Teamwork.

3. COURSE CONTENT

Simple linear regression and relations between variables. Estimation of regression function. Least squares estimators. Normal error regression model. Maximum likelihood estimators. Inferences in regression analysis. Diagnostics for residuals. Matrix approach to simple linear regression analysis. Multiple linear regression. Polynomial regression models. Qualitative predictor variables. Building the regression model: Selection of predictor variables.

4. TEACHING AND LEARNING METHODS - ASSESSMENT

TEACHING METHOD *Face-to-face, Distance learning, etc.*	Lectures (face to face).
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES *Use of ICT in teaching, laboratory education, communication with students*	✓ In-class slides. ✓ In-computer lab use of statistical programs. ✓ Post-class support of the course and communication via the web page of the Department of Mathematics.
TEACHING ORGANIZATION *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*	
STUDENT ASSESSEMNT *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*	**Assessment Language:** Greek **Assessment Language for Erasmus students:** English **Assessment methods:** Written Final Course Examination (100%) including: ✓ Theory ✓ Exercises Minimum passing grade: 5 Maximum passing grade: 10

Activity	***Semester workload***
Lectures	39
Tutorials and Laboratory Exercises	26
Solving suggested exercises	35
Hours of personal study by the student	47
Final examination	3
Total number of hours for the Course (25 hours of work-load per ECTS credit)	***150***

5. RECOMMENDED LITERATURE

(*in Greek*)

- Κούτρας Μάρκος και Ευαγγελάρας Χαράλαμπος. *Ανάλυση Παλινδρόμησης. Θεωρία και Εφαρμογές.* 3η Έκδοση, Εκδόσεις Τσότρας, 2018.
- Χρήστου Γεώργιος Κ. *Εισαγωγή στην Οικονομετρία*. 3η Έκδοση, Εκδόσεις Gutenberg, 2007.
- Draper Norman R. and Smith Harry. *Εφαρμοσμένη Ανάλυση Παλινδρόμησης*. Εκδόσεις Παπαζήση, 1997.
- Ντζούφρας Ιωάννης και Καρλής Δημήτρης. *Εισαγωγή στον Προγραμματιστό και στη Στατιστική Ανάλυση με R.* (e-book). Σύνδεσμος Ελληνικών Ακαδημαϊκών Βιβλιοθηκών. Αποθετήριο "Κάλλιπος", 2016