COURSE OUTLINE

1. GENERAL

SCHOOL	NATURAL SCIENCES		
DEPARTMENT	MATHEMATICS		
LEVEL OF COURSE	UNDERGRADUATE		
COURSE CODE	MAT_ST333	**SEMESTER OF STUDIES**	6th
COURSE TITLE	STATISTICAL INFERENCE II		

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	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 developmen*	Compulsory course for the specialization *Statistics, Probability Theory and Operational Research* Elective course for each of the other specializations
PREREQUISITE COURSES:	Recommended prerequisite knowledge: STATISTICAL INFERENCE I
TEACHING AND ASSESSMENT LANGUAGE:	Greek
THE COURSE IS OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBPAGE (URL)	https://eclass.upatras.gr/courses/MATH1105/

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*

Upon successful completion of the course, the student will have gained understanding of the notion of a statistical hypothesis as well as of that of testing statistical hypotheses. He/she will be in posistion to formulate appropriate real life problems of decision making as testing statistical hypotheses problems. Furthermore, the student will be capable of choosing and applying the proper statistical test in order to make a decision, taking into account the possibility of an erroneous decision.

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	

- Decision making.
- Work in an interdisciplinary environment.
- Autonomous work.
- Team-work.
- Propotion of free, productive and inductive thinking.

3. COURSE CONTENT

The notions of statistical hypothesis and statistical test. Type I error, Type II error, power of a test. Relation between tests and confidence intervals. Fundamental Lemma of Neyman-Pearson. Uniformly most powerful (UMP) tests. Monotone likelihood ratio property and UMP test for one parameter exponential families. Applications to normal populations, z-test, t-test, chi-square test, $\mathcal{F}$-test; p value. Generalized likelihood ratio tests. Chi-square goodness of fit test, contingency tables. Kolmogorov-Smirnov test. Bayes tests, minimax tests.

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*	Post-class support of the course via the web page and the online platform.
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:** Final examination (100%) made up of theory questions and exercises. Minimum passing grade: 5 Maximum passing grade: 10

Activity	***Semester workload***
Lectures	26
Tutorials	26
Solving suggested exercises	45
Hours of personal study by the student	50
Final examination	3
Total number of hours for the Course (25 hours of work-load per ECTS credit)	***150***

5. RECOMMENDED LITERATURE

(*in Greek*)

- Ρούσσας Γεώργιος Γ. (μετάφραση: Σταμέλος Γεώργιος) *Στατιστική Συμπερασματολογία.Τόμος ΙΙ*. Εκδόσεις Ζήτη, 1992.
- Παπαϊωάννου Τάκης και Φερεντίνος Κοσμάς. *Μαθηματική Στατιστική.* 2η Εκδοση, Εκδόσεις Σταμούλη, 2000.

(*in English*)

- Hogg Robert V., McKean Joseph W. and Craig Allen T. *Introduction to Mathematical Statistics*. 8th ed., Pearson, 2018.
- Casella George and Berger Roger L. *Statistical Inference.* 2nd ed., Duxbury Press, 2002.