COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF INFORMATION SCIENCES & TECHNOLOGY		
ACADEMIC UNIT	DEPARTMENT OF STATISTICS		
LEVEL OF STUDIES	1st Cycle (UNDERGRADUATE)		
COURSE CODE	**6133**	**SEMESTER**	**3rd**
COURSE TITLE	**Introduction to Mathematical Analysis**		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures	4	7
Workshops	2	
Labs		

COURSE TYPE	Elective
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES
COURSE WEBSITE (URL)	https://www.dept.aueb.gr/en/stat/content/introduction-mathematical-analysis-7-ects

(2) LEARNING OUTCOMES

Learning outcomes
After successfully completing the course students will be familiar and able to use in concrete applications the basic concepts of mathematical analysis focusing on the future applications of these concepts in statistics, probability, and computer science as well as their applications in various fields of study related to economic sciences.
General Competences
• Search, analysis and synthesis of data and information, using the necessary technologies • Adaptation to new situations • Autonomous work • Teamwork • Work in an interdisciplinary environment • Generation of new research ideas • Respect for diversity and multiculturalism • Exercise of criticism and self-criticism • Promotion of free, creative and inductive thinking

(3) SYLLABUS

Introduction to Real Analysis. Fundamental concepts from set theory. The set of real numbers. Sequences and series of real numbers.
Real functions, continuous, uniformly continuous, monotone and convex functions. Stieltjes integral and functions of bounded variation. Metric spaces and continuous functions in metric spaces. Uniform convergence of sequences and series of functions. Linear spaces with norm and inner product spaces (Banach and Hilbert spaces). Short introduction to Lebesgue measure and integration. Applications of these concepts in probability, statistics and scientific computation.

(4) TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Face-to-face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</td><td>YES</td></tr>
<tr><td>TEACHING METHODS</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>52</td></tr>
<tr><td>Tutorial</td><td>26</td></tr>
<tr><td>Assignment</td><td>37</td></tr>
<tr><td>Self Study</td><td>60</td></tr>
<tr><td>Course total</td><td>175</td></tr>
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<tr><td>STUDENT PERFORMANCE EVALUATION
.</td><td>Written examination at the end of the semester: 70%
Assignment: 30%

Information is available at eclass</td></tr>
</table>

(5) ATTACHED BIBLIOGRAPHY

- K. Saxe, Beginning Functional Analysis, Springer Series on Undergraduate Mathematics, 2002
- A.N. Yannacopoulos, Introduction to Mathematical Analysis, Lecture Notes (2016)
- Johnsonbaugh, R. and W. Pfaffenberger (1981). Foundations of mathematical analysis. M. Dekker (New York, NY).
- Labarre, A. E. (2008). Intermediate mathematical analysis. Dover Publications
- Bobrowski, A. (2005). Functional analysis for probability and stochastic processes: an introduction. Cambridge University Press.
- Rudin, W. (1964). Principles of mathematical analysis, Volume 3. McGraw-Hill New York.
- Severini, T. A. (2005). Elements of distribution theory, Volume 17. Cambridge University Press.
- Jacod, J. and P. E. Protter (2003). Probability essentials. Springer.