COURSE OUTLINE

GENERAL

SCHOOL	School of Science		
ACADEMIC UNIT	Department of Mathematics		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	**MAE812**	**SEMESTER**	**8th**
COURSE TITLE	Measure theory		

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	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*	Specialized general knowledge and special backround.
PREREQUISITE COURSES:	None (from the typical point of view). In order to be able to follow this course, the knowledge from the following courses is required. Infinetisimal Calculus I Infinetisimal Calculus I Introduction to Topology
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes (exams in English are provided for foreign students)
COURSE WEBSITE (URL)	

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*

After completing this course the students will

a) Have knowledge of the basic properties of σ-algebras, of measures and especially of Lebesgue measure on and on ^{k}.
b) Know the basic properties of measurable functions, the definition of Lebesgue integral in a random measure space.
c) Be able to apply the basic theorems concerning Lebesgue intergral (Monotone Convergernce Theorem, Dominated Convergence Theorem).
d) Understand the difference between Riemann integral and Lebesgue integral on .

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

The course promotes inductive and creative thinking and aims to provide the student with the theoretical background and skills to use measure theory and integration.

SYLLABUS

Algebras, algebras, (positive) measures, outer measures, Caratheodory's Theorem (concerning the construction of a measure from an outer measure). Lebesgue measure. Lebesgue integral, Lebesgue's Monotone Convergernce Theorem, Lebesgue's Dominated Convergence Theorem. Product measures, Fubini's theorem. Signed measures. Hahn's, Jordan's and Lebesgue's analysis Theorems. Radon-Nikodym Theorem. L^p spaces.

TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Teaching on the blackboard by the teacher.</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td>Communication with the teacher by electronic means (i.e. e-mail).</td></tr>
<tr><td>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</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>39 hours</td></tr>
<tr><td>Studying theory and solving exercises</td><td>38 hours</td></tr>
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<tr><td>Course total</td><td>77 hours</td></tr>
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<tr><td>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.</td><td>Exams in the end of the semester (mandatory), intermediate exams (optional), assignments of exercises during the semester (optional).</td></tr>
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ATTACHED BIBLIOGRAPHY

- *Suggested bibliography:*

Θεωρία Μέτρου, Γ. Κουμουλλής, Σ. Νεγρεπόντης, Εκδόσεις Συμμετρία (κωδικός στο σύστημα Εύδοξος: 45284).

Measure Theory, Donald Cohn, Birkhauser.