■ CE67 - Measure Theory

GENERAL

SCHOOL	EXACT SCIENCES
DEPARTMENT	MATHEMATICS
LEVEL OF STUDIES	UNDERGRADUATE

COURSE CODE	CE67	**SEMESTER**	F

COURSE TITLE	MEASURE THEORY

INDEPENDENT TEACHING ACTIVITIES	WEEKLY TEACHING HOURS	ECTS
Lectures	4	5

COURSE TYPE	Scientific Field
PREREQUISITE COURSES	Infinite Calculus I-II-III-IV Real Analysis
LANGUAGE OF TEACHING AND EXAMINATIONS	Greek/English
THE COURSE IS OFFERED TO ERASMUS STUDENTS	YES
COURSE WEBSITE (URL)	http://eclass.uowm.gr/

LEARNING OUTCOMES

Learning Outcomes
With the successful attendance of the course the students: • will be familiar with the notion of measure and its basic properties, • will be able to characterize basic sets as measurable or non measurable, • will be familiar with the notion of measurable function, • will understand the Lebesgue integral and will be able to compute it through a direct integration or the Riemann integral, • will learn the basic properties of the spaces L_p.

General Competencies
- Search for, analysis and synthesis of data and information, with the use of the necessary technology.   - Working independently for the enhancement of their self-esteem.   - Production of free, creative and inductive thinking, which is based on mathematical processes.

CONTENT OF THE COURSE

- Algebra and σ-Algebra, measure (definition, properties, completion).   - Outer measures, Lebesgue measure, measurable and non measurable sets, Lebesgue measure and transformations, the Cantor set.   - Measurable functions and operations between them.   - Integral functions, Luzin Theorem, criteria of integration, comparison with Riemann integral.   - Spaces with measures. Tonelli and Fubini Theorems.   - Riesz Representation Theorem.   - Spaces L_p, (definition and properties).

TEACHING AND LEARNING METHODS - EVALUATION

TEACHING METHOD	In the classroom.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	Use of e-class. Communication through e-mails.
TEACHING ORGANIZATION	<table><tr><th>Activity</th><th>Semester Workload</th></tr><tr><td>Lectures</td><td>52 hours</td></tr><tr><td>Individual Study</td><td>73 hours</td></tr><tr><td>Course Total (25 hours per ECTS)</td><td>125 hours</td></tr></table>
STUDENT EVALUATION	Written final examination 100%.

RECOMMENDED BIBLIOGRAPHY

1. Measure Theory, Koumoullis G. Negrepontis S., Publications Symmetria, 2005 (Greek).

2. Real Analysis, Xenikakis P., Publications Ziti, 1996 (Greek).
3. Introduction to Real Analysis, Betsakos D., Kyriakidi Press 2016 (Greek).