

COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF SCIENCES		
ACADEMIC UNIT	DEPARTMENT OF MATHEMATICS		
LEVEL OF STUDIES	POSTGRADUATE Studies in Mathematics		
COURSE CODE	A7	SEMESTER	A
COURSE TITLE	FUNCTIONAL ANALYSIS		
INDEPENDENT TEACHING ACTIVITIES	WEEKLY TEACHING HOURS	CREDITS	
	3	7,5	
COURSE TYPE	SPECIALISED GENERAL KNOWLEDGE		
PREREQUISITE COURSES:	NO		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES		
COURSE WEBSITE (URL)	http://www.math.aegean.gr/index.php/en/academics/undergraduate-programs		

(2) LEARNING OUTCOMES

Learning outcomes
Mastering the material described in the syllabus (see (3) below).
General Competences
Working independently

(3) SYLLABUS

Normed vector spaces, linear operators, linear functionals, Banach spaces (Theorems: Completion of a normed vector space, Hahn-Banach and some of its many consequences, Baire Category, Banach-Steinhaus, Open Mapping, Inverse Mapping, Closed Graph, Banach Contraction Mapping). Separable spaces. Duality. Weak topologies and Alaoglou's Theorem. Examples of classical Banach spaces. Hilbert spaces (inner product, orthogonal systems, Gram-Schmidt process, basic geometric properties, Bessel's inequality, Parseval's identity, Riesz Representation Theorem).

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Face-to-face	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	Communication with students via e-mail	
TEACHING METHODS	<i>Activity</i>	<i>Semester workload</i>
	Lectures	39
	Independent study	148.5
		62.5
	Course total (25 per ECTS)	250

STUDENT PERFORMANCE EVALUATION	<p>Student evaluation is done in Greek through a written examination which includes short-answer equations and problem solving.</p> <p>For students with disabilities, evaluation takes place via oral exams.</p>

(5) ATTACHED BIBLIOGRAPHY

1. H. Brezis, Functional Analysis, Sobolev Spaces and Partial Differential Equations, Springer, 2011
2. J.B. Conway, A Course in Functional Analysis, Springer, 1990
3. E. Hewitt & K. Stromberg, Real and Abstract Analysis, Springer, 1965
4. A.Kolmogorov & S. Fomin, Introductory Real Analysis, Prentice-Hall, 1970
5. P. Lax, Functional Analysis, Wiley, 2002
6. H.L. Royden, Real Analysis, Macmillan, 1963
7. W. Rudin, Functional Analysis, McGraw Hill, 1973
8. A. Taylor & D. Lay, Introduction to Functional Analysis, Wiley, 1980
9. K. Yosida, Functional Analysis, Springer, 1965