Functional Analysis 1

Course Syllabus

Spring Term 2010 — SNU

Course Title Functional Analysis 1 (in English)

Course number 3341.603

Instructor Gerald Trutnau

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Course homepage http://www.math.snu.ac.kr/$\sim$ trutnau/teachingFA1.html

Course Objective We will study the main basic theorems and principles of functional analysis together with corresponding applications, in particular we cover: metric spaces, semi-norms, completeness, Banach and Hilbert spaces, function spaces, Sobolev spaces, separability, Stone-Weierstrass theorems, partition of unity, compactness, Arzela-Ascoli, Linear operators, Neumann series, Distributions, Linear functionals, Hahn-Banach theorems, Lax-Milgram theorem, dual space, weak convergence, reflexivity, Baire category theorem, Banach-Steinhaus, oppen mapping theorem, closed graph theorem, projections, orthogonality.

References Here are some recommended references:

- Alt, Hans Wilhelm: Lineare Funktionalanalysis, Springer; 5th edition (2006), available as ebook at the central library
- Brézis, Haïm: Analyse fonctionnelle, Dunod (2002)
- Lax, Peter D.: Functional Analysis, Wiley-Interscience (2002)
- Rudin, Walter: Functional Analysis, McGraw-Hill, 2 edition (1991)
- Yoshida, Kôsaku: Functional Analysis (Springer Classics in Mathematics) (6th edition, 1980)
- Zeidler, Eberhard: Applied Functional Analysis: Applications to Mathematical Physics (Applied Mathematical Sciences) (v. 108) , Springer (1995)
- Zeidler, Eberhard: Applied Functional Analysis: Main Principles and Their Applications (Applied Mathematical Sciences) (v. 109) , Springer (1999)

Evaluation - Attendance: (will not be checked). However, students are responsible for the material taught in class.

- Assignment sheets (50 % of final score);

Students must solve exercises regularily, and will be given assignment sheets mostly every week.

- Take Home Exam I (8th week, 20 % of final score);

- Take Hone Exam II (15th week, 25 % of final score);

- Miscellaneous 5 % of final score