Linear Analysis

Math 516 – Lecture A1

September – December 2007

Time and Place: TR 9:30 – 10:50, CAB 563.

Instructor: Alexander Litvak
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Office Hours: TBA

Recommended books (no textbook needed):

1. B. Bollobas, Linear Analysis. *An Introductory Course*, Second Edition. Cambridge University Press, 1999.
2. J.B. Conway, *A Course in Functional Analysis*, Springer Verlag, 1985.
3. N. Dunford and J.T. Schwartz, *Linear Operators*, I. Wiley-Interscience, 1988.
4. M. Fabian, P. Habala, P. Hajek, V. Montesinos, J. Pelant and V. Zizler, *Functional Analysis and Infinite dimensional Geometry*, Canad. Math. Soc. Books in Math. 8 (Springer-Verlag 2001).
5. L.V. Kantorovich, G.P. Akilov, *Functional analysis*, Translated from the Russian by Howard L. Silcock. Second edition. Pergamon Press, Oxford-Elmsford, N.Y., 1982.
6. W. Rudin, *Functional Analysis*, Second Edition. McGraw-Hill, 1991.
7. V. Runde, *Math 516 - Linear Analysis*, Lecture notes, http://www.math.ualberta.ca/~runde/math516.html.

Prerequisite: Math 418 or equivalent.

Topics to be covered:

1. Normed spaces and Banach spaces;
2. The principles of functional analysis: the Hahn-Banach theorem, the uniform boundedness principle (the Banach-Steinhaus theorem), the open mapping theorem, the closed graph theorem;
3. Hilbert spaces and orthonormal bases;
4. Spectral theory of compact normal operators;
5. Fixed point theorems with applications.

Grading Policy:

Your course grade will be based upon your marks in examinations and assignments weighted as follows:

50%	Final (09:00–12:00, CAB 563, Monday, December 17)
30%	Midterm (9:30–10:50, CAB 563, Thursday, November 1)
20%	Assignments

There is no deferred midterm. If you qualify for an excused absence on a midterm the weight will be transferred to the final exam. If you miss the final exam and obtain a formal (in writing) University accepted excuse for your absence you might write a **deferred exam**.

Assignments: Homework problems will be assigned in every lecture and all the problems assigned in the current week will be due at the **beginning** of the Thursday class of the next week in the lecture room CAB 563. **Please note**, late assignments will not be accepted. **The solutions** will be posted at my homepage. I **strongly recommend** that you do all the drill problems that will be recommended each week together with the assignment.

Dates: First Class: Sept. 6; Midterm exam: Nov. 1; Fall term class break: Nov. 13 (no classes are held); Last class: Dec. 4; Final exam: Dec. 17; Deferred exam: TBA.

Additional announcement:

As usual there will be Functional Analysis Seminar this year. If you are interested in participating, could you please provide me your schedule and e-mail address, so we could find time convenient to everybody.