

MATH 754: Functional Analysis (Fall 2010)
MWF 11:00-11:50 Morrill 101

Instructor: Maria Alfonseca

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Office Hours: MWF 10:00-10:50 am and by appointment. Please talk to me after class or send me an e-mail to set up appointments.

Text: *A Course in Functional Analysis (Second edition)* by John B. Conway, Springer.

Topics: Functional Analysis studies vector spaces that have a topological structure, usually arising from a norm (Banach space) or an inner product (Hilbert space). It also studies the linear operators on the space, i.e., continuous functions from the space to the underlying field. In many important examples, the vectors are functions (the space of all continuous functions $f : [a, b] \rightarrow \mathbb{R}$ is a Banach space; the space of functions f such that $|f|^2$ is integrable is a Hilbert space).

- Hilbert spaces: Orthogonality, Orthonormal basis, Fourier series, operators on Hilbert spaces.
- Banach spaces: Linear operators on Banach spaces, the dual of a Banach space, The Hahn-Banach Theorem, The Open Mapping and Closed Graph theorem, The Principle of Uniform Boundedness.
- Weak topologies
- Compact operators and spectral theorem

Attendance: Attendance is expected and required. 13% of the final grade will reflect your attendance. You are responsible for all the material covered in class and all the assignments and announcements made. If you need to miss class due to sickness or other reason, please email me.

Grading policy: There will be no final exam. The grade will be based on class attendance and on three sets of problems that will be collected on the following dates.

- Monday, September 20.
- Monday, October 25.
- Friday, December 3.

The overall grade will be calculated according to the following rule:

- Attendance: 13%
- Each Problem Set: 29%

Special Needs: Any students with disabilities or other needs, who need special accommodations in the course, are invited to share these concerns or requests with the instructor as soon as possible.

Academic Honesty: All work in this course must be completed in a manner consistent with NDSU University Senate Policy, Section 335: Code of Academic Responsibility and Conduct (<http://www.ndsu.nodak.edu/policy/335.htm>).