



11th April 2005

TMA401 Functional Analysis

MAN670 Applied Functional Analysis

4th quarter 2004/2005

All document concerning the course can be found on the course home page:
<http://www.math.chalmers.se/Math/Grundutb/CTH/tma401/0405/>

Lecturs/Examination

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Literature

- [1] Debnath/Mikusinski: Introduction to Hilbert Spaces with Applications, 2nd ed. Academic Press
- [2] Notes on Fixed point theory, L^p -spaces, BWP for ODEs, spectral theory and additional exercises that will be handed out during the course.

Content

The course treats normed spaces, Banach and Hilbert spaces, contractions, compactness, Brouwer and Schauder fixed point theorems, operators on Hilbert spaces, spectral theory for compact self-adjoint operators, Fredholm's alternative, applications to differential and integral equations, optimization.

Hours and rooms

Wednesdays 8-10 am in MD1, 1-3 pm in MD1
Fridays 1-5 pm in MD6

Examination

The examination is based on a written examination (that will be scheduled after a consultation with the participants) and two homework assignments (not compulsory). These two assignments consists of some problems that can be solved by the techniques presented in the course. The problems will be handed out at least one week before the assignments are due. The handins can give some bonus points. Note that the bonus points expires after one year.

Weekly plan (tentative)

- week 1** [1] Chapter 1
- week 2** [2] Fixed point theory, [1] Chapter 5:1-2
- week 3** [2] L^p -spaces, [1] Chapter 3
- week 4** [1] Chapter 5:3-7, 4:1-3
- week 5** [2] Ordinary differential equations
- week 6** [1] Chapter 4
- week 7** [2] Spectral theory
- week 8** [1] Chapter 9:1-5