CHALMERS | GÖTEBORGS UNIVERSITET

Matematiska Institutionen
Peter Kumlin

14th March 2007

TMA401 Functional Analysis
MAN670 Applied Functional Analysis
4th quarter 2006/2007

All document concerning the course can be found on the course home page:
http://www.math.chalmers.se/Math/Grundutb/CTH/tma401/0607/

Lecturs/Examination
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Literature
[1] Debnath/Mikusinski: Introduction to Hilbert Spaces with Applications, 3rd ed.
Academic Press
[2] Notes on Fixed point theory, L^p-spaces, BVP 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
Tuesdays 10-12 am in MVF31
Fridays 1-5 pm in MVF31

Examination
The examination is based on a written examination (that will be scheduled after a consul-
tation with the participants) and two homework assignments (not compulsary). 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 yaer.

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