Math 555: Linear Analysis
(Winter 2009)

Lectures:	MWF 12:30–1:20, room C-036 Padelford
Professor:	Anne Greenbaum, C-434 Padelford, 543-1175
Office Hours:	M 2:30–3:30, W 2:30–3:30, Th 10-11, or by appointment.
e-mail:	greenbau@math.washington.edu
Web Address:	http://www.math.washington.edu/~greenbau
	Course materials: Click on "Math 555".

Text: We will use course notes that can be downloaded from the course web page.

Reserve list: The following books are on reserve in the Mathematics Research Library.

1. Coddington and Levinson *Theory of Ordinary Differential Equations.*
2. Birkhoff and Rota, *Ordinary Differential Equations.*
3. Jones, *Lebesgue Integration on Euclidean Space.*
4. Riesz and Sz.-Nagy, *Functional Analysis.*
5. Dym and McKean, *Fourier Series and Integrals.*
6. Epstein, *Partial Differential Equations: An Introduction.*
7. Kreiss and Oliger, *Methods for the Approximate Solution of Time-Dependent Problems.*
8. Iserles, *A First Course in the Numerical Analysis of Differential Equations.*
9. Strikwerda, *Finite Difference Schemes and Partial Differential Equations.*

Coddington & Levinson will be the main reference for the ODE portion of the course. Birkhoff and Rota is a good book to review ODE material that you may have studied previously. Jones and Riesz & Sz.-Nagy will be the main references for the functional analysis and Fourier analysis portions of the course. Epstein has a nice presentation of the Fredholm theory of compact operators with application to integral equations. The books by Kreiss & Oliger, Iserles, and Strikwerda discuss the numerical solution of ordinary and partial differential equations.

Material:

Autumn quarter:	Linear algebra
Winter quarter:	Ordinary differential equations, functional analysis, Fourier series
Spring quarter:	Partial differential equations, distribution theory

Winter quarter: ODE — existence and uniqueness, linear systems, numerical approximations; overview of Lebesgue integration in $\mathbf{R}^n$; Hilbert spaces; Fourier series with application to PDE's; Fourier transforms and convolutions.

Grading: There will be weekly homework assignments (50 %) and a final exam (50 %).

Homework: Students may collaborate on the homework, but each student must prepare his/her own homework paper for grading. Homework is due at the beginning of the class period on the due date. Homework turned in after the class on the due date but before the next class period will be accepted but docked 20%. Late homework will not be accepted after that time.

Final Exam: There is an in class final exam on Thurs., Mar. 19, 2009, from 8:30 until 10:20 a.m. The final exam will consist of questions similar to those that are on the preliminary exam for this course content.