Math 554: Linear Analysis
(Autumn 2008)

Lectures:	MWF 12:30–1:20, room C-36 Padelford
Professor:	Anne Greenbaum, C-434 Padelford, 543-1175
Office Hours:	M,W 2:30–3:30, Th 10–11, or by appointment or drop by.
e-mail:	greenbau@math.washington.edu
Web Address:	http://www.math.washington.edu/~greenbau
	Course materials: Click on "Math 554".

T.A.:	Anusha Sekar, C-404 Padelford
Office Hours:	Th 3-5.
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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. *Matrix Analysis* by Horn and Johnson.
2. *A Short Introduction to Perturbation Theory for Linear Operators* by Kato.
3. *Finite-Dimensional Vector Spaces* by Halmos.
4. *Linear Algebra and Matrix Theory* by Nering.
5. *Matrix Computations* by Golub and Van Loan.
6. *Numerical Analysis: A Second Course* by Ortega.
7. *Theory of Ordinary Differential Equations* by Coddington and Levinson.
8. *Ordinary Differential Equations* by Birkhoff and Rota.

Horn & Johnson is an excellent reference for the linear algebra portion of this course. There is a more advanced book by Horn and Johnson called *Topics in Matrix Analysis* that is full of interesting material on more specialized subjects. Kato is an excellent reference for some of the material on infinite dimensional spaces and linear operators. Halmos and Nering are advanced undergraduate texts that are good for reviewing material on linear algebra that you may have studied previously. Golub and Van Loan is a modern classic on numerical linear algebra, and Ortega is another excellent book dealing with the numerical aspects of linear algebra.
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.

Material:

Autumn quarter:	Linear algebra, start on ordinary differential equations
Winter quarter:	More on ordinary differential equations, functional analysis, Fourier series
Spring quarter:	Partial differential equations, distribution theory

Autumn quarter: Linear algebra (8-9 weeks): Review of undergraduate material from an abstract perspective; infinite dimensional vector spaces; norms; completeness; linear transformations and matrices; bilinear forms; finite dimensional spectral theory; normal forms; factorization theorems; resolvents; applications to optimization and least squares problems; numerical issues. ODE (1-2 weeks): Existence and uniqueness results.

Grading: There will be weekly homework assignments (40 %), a midterm (20 %), and a final exam (40 %). The final exam (in class, closed book) will be on Thurs., Dec. 11, 8:30–10:20.
Homework Policy: 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.