UNIVERSITY OF WISCONSIN-MADISON
COMPUTER SCIENCE DEPARTMENT

SEMESTER I YEAR 2002-03

COURSE NO.	COURSE TITLE	INSTRUCTOR
Math/CS 717	Numerical functional analysis	Carl de Boor

COURSE DESCRIPTION

This is an introduction to Functional Analysis motivated by Numerical Analysis. It attempts to cover the basic Functional Analysis material that a Ph.D. student in Numerical Analysis needs for the understanding of the current Numerical Analysis literature.

Fundamentals of normed linear spaces and their duals and of linear and nonlinear operators. Applications to: approximate solution of operator equations (such as integral and differential equations) by discretization and iteration; perturbation and error; variational problems; optimization and approximation theory.

Chapter headings: 1. Linear algebra. 2. Advanced calculus. 3. Normed linear spaces. 4. The (continuous) dual. 5. Baire category and consequences. 6. Convexity. 7. Inner product spaces. 8. Compact perturbation of the identity. 9. The spectrum of a linear map. 10. Linearization and Newton's method.

LECTURES

1:20–2:10 MWF 1221 CS&Stat

PREREQUISITE

CS302 or equiv., CS513-514 or equiv., Math 521-522 or equiv., or cons.inst.

OFFICE HOURS

WF11-12 (also R14:25-15:25, but that's also UG advising) at 7379 CS&St, or, at other times, by appointment.

HOMEWORK

will be assigned once a week; it will be graded by the instructor.

TEXTBOOK

None. Complete TEXed lecture notes will be available in a timely fashion (in postscript and in pdf) from the web; see `http://www.cs.wisc.edu/~deboor/717.99/notes.html` for the 1999 version.

OTHER COMMUNICATION

The instructor welcomes communication by e-mail, at `deboor@cs.wisc.edu`.

Each student has an account (on the CS Department's Instructional Unix machines in 1370++ CS&Stat, but this is also reachable by `telnet`ing to `sol1@cs`), and the instructor intends to use the local listserver (address: `cs717-1list@cs`) to send messages (such as the homework assignment) to the students at these accounts. Place a `.forward` file into the `public` subdirectory of your class account if you want to receive these messages elsewhere. The file should contain just one line, containing the address at which you would like to receive these messages.

To activate your class account, telnet to `sol1.cs.wisc.edu`, give your login as `newuser`, hit Return for the password, and follow instructions.

See `http://www.cs.wisc.edu/csl/faq/` for details.