

## CAAM 454: Numerical Analysis II (Spring 2008)

- **Instructor:** Yin Zhang, Room: DH 3090, Phone: X5744.
- **Office Hours:** MW: 2:00–3:00pm or by appointment.
- **Webpage:** <http://www.caam.rice.edu/~yzhang/caam454/>
- **Textbook (TB):** *Numerical Linear Algebra* by Lloyd Trefethen and David Bau
- **Textbook (NW):** *Numerical Optimization* by Nocedal and Wright
- **Topics:**
  - 1) Iterative methods for numerical linear algebra (Notes, TB Part VI).
  - 2) Unconstrained optimization (NW Chaps. 1-9).
  - 3) Nonlinear least squares problems (NW Chap. 10).
  - 4) Nonlinear systems of Equations (NW Chap. 11).
  - 5) Primal-dual interior-point method for LP (Notes).(Not all the material within the above ranges will be covered.)
- **Prerequisites:** Matrix analysis, multi-variable calculus, Matlab programming.
- **Reference Books:**
  - 1) Kelley: *Iterative Methods for Linear and Nonlinear Equations* (QA297.8 .K45).
  - 2) Kelley: *Iterative Methods for Optimization* (QA402.5 .K44).
  - 3) Nash and Sofer: *Linear and Nonlinear Programming* (T57.74 .N37).
  - 4) Dennis and Schnabel: *Numerical Methods for Unconstrained Optimization and Nonlinear Equations* (QA402.5 .D44).
- **Homework Assignments:**
  - Homework problems will be assigned online roughly weekly, and will be due in class one week after the assignment unless otherwise specified. You may have late submissions up to one class period beyond their due date, with penalties of 10% or more at the discretion of the instructor. Homework submitted later than one class period beyond its due date will not be accepted without a valid written excuse.
  - Students can discuss homework problems with each others, but must eventually work out the solutions and Matlab programs on an individual basis (no sharing of identical solutions).
- **Grading:**

The course grades will be based on the average of the homework assignments (60%), two take-home, non-accumulative exams (Exam 1: 15%. Exam 2: 20%), and class participation (5%).
- **CAAM Ph.D students:**

CAAM Ph.D students are encouraged to form study groups and work on unassigned, more theoretical exercises in the textbooks and references to better prepare for the CAAM Qualifying Exam on Numerical Analysis.