

CAAM 454/554: Numerical Analysis II (Spring 2010)

- **Instructor:** Yin Zhang, Room: DH 3090, Phone: X5744.
- **Office Hours:** Mon: 4:00–5:30pm 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* (free pdf file available)
 - 2) Kelley: *Iterative Methods for Optimization* (free pdf file available)
 - 3) Saad: *Iterative methods for sparse linear systems* (free pdf file available for 1st edition).
 - 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 with specific due dates (usually a week later in class). 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 or copying codes).
- **Grading:**

The course grades will be based on a weighted average of the homework assignments (60%) including computer projects, and 2 take-home, non-accumulative exams (20% each). A few more demanding home assignments will be weighted more than others. Class participation will be a factor in borderline cases.
- **CAAM 454 and 545 Differentiation:**

The exams will contain two different sets of problems with possible overlaps. Problems available to CAAM 454 students will be of less difficulty and some will be from homework assignments (with possible modifications).