

MTH/CSI 4328: Numerical Linear Algebra

SYLLABUS

SECTION 01, SPRING 2007

↗ Meeting Time: MWF 10:00-10:50 AM

↗ Meeting Location: BSB A-107

Instructor: Professor Qin “Tim” Sheng

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Office Hours: MWF: 11:00-12:00 AM; TT: 3:00-5:00 PM

TEXTS:

- *Numerical Mathematics and Computing* (5th Ed.) by W. Cheney and D. Kincaid.
- *my lecture notes*.

COURSE DESCRIPTION: This is a general numerical linear algebra course emphasizing in computational applications. Materials to be studied in the course include vectors and matrices, their representation and operations, determinants, systems of linear equations, direct and indirect numerical methods, norms and error estimates. Topics in the latest results will be introduced to broad views of the students. Students are expected to build their interests, solid foundation and to govern the basic concepts, theory and methods in numerical linear algebra by the end of the course. They are expected to possess the ability in understanding practical algebraic problems in the correct way and developing new computational methods for solving various problems after this study. Computer programming skills are not required in this course.

OUTLINE OF THE TOPICS:

1. *Preliminaries:* matrix and vector definitions, addition and multiplications, basic properties, diagonal matrices and matrix inverse, symmetric and Hermitian matrices, special matrices.
2. *Determinants and beyond:* properties of determinants, computations, elementary matrices.
3. *Systems of linear equations and their numerical solutions:* basic Gaussian elimination, eliminations with scaled partial pivoting and beyond, tridiagonal and banded matrices and their importance, iterative techniques, recent trends and advances.
4. *Numerical solutions of algebraic equations:* bisection method, Newton’s method, secant method.
5. *Basic approximation skills and numerical differentiation:* polynomial interpolations, error and controls, estimating derivatives and Richardson extrapolation, recent trends and advances.
6. *Numerical integration:* definite integral, trapezoid rule, adaptive methods, Gaussian quadratures, recent trends and advances.

ATTENDANCE: Excellent attendance is expected. You should be aware of the attendance policy as stated in the Baylor catalog. Should you miss a class for whatever reason, you are still responsible for the materials discussed and any assignments made. Also, please get to class on time and turn off all cell phone during class.

EXAM AND GRADING POLICIES: Three in-semester (take home) assignments and one final exam will be given.

↔ **Final Exam:** Time: Saturday, May 5, at 9:00 AM; Location: BSB A-107.

The Method of Evaluation is:

3 assignments, 75%
1 final exam, 25%

Grading Scale: A 90-100%, B+ 85-89%, B 80-84%, C+ 75-79%, C 65-74%, D 60-64%, F below 60%

ACCESSING CLASS INFORMATION VIA INTERNET: This syllabus, in-semester assignments, and final project assignment, together with announcements and help links will be posed on the *BlackBoard* and my home page. Click MTH 4328 link there and get to the latest information you need.

SPECIAL NOTES: There will be no class on Friday, March 2, 2007.