

MTH 4322 SYLLABUS

~ NUMERICAL ANALYSIS ~

Spring 2006

INSTRUCTOR: Professor Qin “Tim” Sheng

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OFFICE HOURS: WF: 10:00-11:30 AM; TT: 2:00-3:30 PM

TEXTS:

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

COURSE DESCRIPTION: This is a general numerical analysis course at the introduction level. Materials to be studied in the course include number representation and errors, numerical linear algebra, basic approximation theory and methods, linear and nonlinear systems, and numerical integration. Topics in the latest research 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 computations by the end of the course. They are expected to possess the ability in understanding practical 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:* error definitions and floating-point numbers, useful suggestions, review of advanced calculus.
2. *Detailed number representations and errors:* different bases, floating-point arithmetic, loss of accuracy.
3. *Numerical solution of nonlinear equations:* bisection method, Newton’s method, secant method.
4. *Basic approximation skills and numerical differentiation:* polynomial interpolations, error and controls, estimating derivatives and Richardson extrapolation, recent trends and advances.
5. *Numerical integration:* definite integral, trapezoid rule, adaptive methods, Gaussian quadratures, recent trends and advances.
6. *Systems of linear equations:* basic Gaussian elimination, eliminations with scaled partial pivoting and beyond, tridiagonal and banded matrices and their importance, iterative techniques, 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 assignments and one final exam will be given.

PROJECT ASSIGNMENTS AND FINAL REPORT: Three project assignments will be a given and one final exam is required.

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 4322 link there and get to the latest information you need.