

**Syllabus**  
**MAE384 Numerical Methods for Engineers - Fall 2011**  
**Tu/Thu 12:00-1:15 PM SCOB 252**

Instructor: Huei-Ping Huang, ERC 359, Email: hp.huang@asu.edu  
Office Hours: Tuesday 3:00-5:00 PM, Wednesday 2:00-3:00 PM, or by appointment

Textbook: *Numerical Methods for Engineers and Scientists: An Introduction with Applications Using Matlab*, 2nd Edition, Gilat & Subramaniam, **Required**

Course website: <http://www.public.asu.edu/~hhuang38/MAE384.html>

Please review (1) Calculus and ordinary differential equation, (2) Linear algebra, (3) Matlab  
Self study: Ch.2, Ch.4 (Sec 4.1-4.6), and Matlab in Appendix of textbook

### Course Outline

#### Part I Basic Numerical Methods (Gilat & Subramaniam)

- Overview (Lecture note and Ch. 1 of G&S)
- Nonlinear equations (Ch. 3)
- System of linear equations (Ch. 4)
- Curve fitting and interpolation (Ch. 5)
- Numerical differentiation (Ch. 6)
- Numerical integration (Ch. 7)
- Ordinary differential equation - Initial value problem (Ch. 8)  
- Boundary value problem (Ch. 9)

#### Part II Introduction to Partial Differential Equation (PDE) (Lecture note)

- Overview and analytic solution
- Numerical solution

**Grade: 50% Homework (5-6 assignments expected) 20% Midterm (One exam) 30% Final**

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### Matters related to Matlab

● Many homework assignments will require computer programming. **Tutorials on Matlab will be given** at the beginning of the semester and on a learn-while-needed basis through the semester. Because free online resources abound, no additional textbook is required for Matlab. For example, the most accurate descriptions of Matlab commands and functions can be found at mathworks.com (the maker of Matlab). Instructor will provide additional lecture notes.

● The **use of Matlab is strongly recommended** whenever computer programming is needed to solve a homework problem. Programs written in C/C++ or Fortran will be accepted, but note that standard C and Fortran compilers do not support graphic applications/interface as Matlab does. Instructor will not provide help on C or Fortran. Solutions done by hand will also be accepted, but beware that some of the homework problems will take forever to solve by hand. Learning Matlab programming is essential for this course. **Those who choose to use alternative programming languages for homework are required to learn Matlab like the rest of the class.**