GMU Department of Mathematical Sciences
Math 685: Numerical Analysis
Spring 2010
Syllabus

**Instructor:**
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Office: Room 226A, Science and Tech I
Office Hours: Mon 1-3pm and by appt

**Time and Room:**
Mondays 4:30-7:10pm, Room 206, Science and Tech I
Course materials, assignments and announcements will be available at the course website:
http://math.gmu.edu/~memelian/teaching/Spring10

**Prerequisite:** Graduate standing. Basic knowledge of calculus, linear algebra and some familiarity with programming are not required but will be beneficial.

**Textbook:** There is no required textbook, but the following reading sources are recommended in addition to lectures:
1) Michael Heath: Scientific Computing. An Introductory Survey
2) Diane O'Leary: Scientific Computing: with case studies
There are also several textbooks that are available for free online through SpringerLink (with GMU login), they will be useful at different times during the semester as we cover relevant topics.

**Course Description:**

We will learn how to formulate, analyze and solve real problems arising in the fields on science and engineering. In addition to computational techniques the course will includes theoretical development as well as implementation, efficiency, and accuracy issues in using algorithms and interpreting results. Specific topics include linear and nonlinear systems of equations, polynomial interpolation, numerical integration, and introduction to numerical solution of differential equations. Both analytical and computational assignments will be given and students will be expected to make 10-minute in-class presentations after completing each of the core assignments. Team work is allowed and encouraged while working on these projects. In-class demonstrations and examples will employ MATLAB tools and the use of MATLAB will be expected when doing computational assignments.

MATLAB is a computing environment with programming capability, good graphics, and powerful library functions. It is available on campus on the Mason cluster and several Unix computer labs. Alternatively, a PC version can be purchased at the bookstore at a reasonable price. MATLAB tutorials are available at our class home page if you are new to MATLAB. Alternatively, the manual which comes with the PC version is very complete.

**Grading policy:**
Final grade in the course will be determined as follows:
- Theoretical and computational assignments and projects: 35%
- Take-home midterm exam: 25%
- Take-home final exam: 30%
- Project presentations: 10%

Weekly practice problems will be given that will not count towards the final grade, unless specifically noted. I strongly encourage all participants to do these exercises in order to gain the necessary grasp of the material and perform well on exams and graded assingments. I will discuss solutions in class.

All GMU academic integrity policies http://www.gmu.edu/catalog/apolicies apply to this course. Feel free to ask me for help if you have any questions.