MA5233 Computational Mathematics

Semester 1 2012/2013, Mondays 7:00-10:00 pm, S14-06SR

- **Instructor:** Weiqing Ren  
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- **Office hours:** Drop by any time for short questions; Send email to make an appointment for longer ones.

- **Course webpage:**  

- **Prerequisite:** {MA3228 or MA4255 or CZ4104 or CZ4105} and MA4230

- **Requirements:** ~ 6 homework assignments, including programming assignments, using Matlab, fortran or any alternatives. Homework will be posted on the course website and due at midnight on the given date. Please hand your completed homework to me or leave it under my office door.

The final exam will be a closed-book written exam.

**Your grade will be based on the assignments (60%) and the final exam (40%).**

- **Syllabus:** This course will cover fundamental methods that are essential for numerical solution of linear algebra and differential equations. It is intended for students familiar with linear algebra, ODE and PDE and interested in numerical computing; computer programming assignments form an essential part of the course. Topics to be covered include: (1) Numerical linear algebra (direct and iterative methods for solving linear systems; eigenvalue problems); (2) Time-stepping methods for ODEs (Euler’s method, multistep methods and Runge-Kutta methods, convergence, accuracy and stability issues); (3) Finite difference methods for elliptic, parabolic and hyperbolic partial differential equations.

**References:**

*Numerical linear algebra* by L. N. Trefethen and D. Bau, III, SIAM

*A first course in the numerical analysis of differential equations* by Arieh Iserles, Cambridge University Press.