

CS623: Parallel Iterative Computing

Spring 2007 (MWF: 2:00pm – 2:50pm) C226-OHR

Instructor: Jun Zhang. E-mail: jzhang@cs.uky.edu. Tel: 257-3892.

Office: 763F FPAT.

Office Hours: WF: 1:00pm – 2:00pm, and by appointment.

Web Page: <http://www.cs.uky.edu/~jzhang/CS623/cs623main.html>.

Objectives: Introduce advanced computational science techniques and tools that support large scale engineering and scientific computations. Emphasis on robust and parallel iterative methods for solving large sparse linear systems.

Prerequisites: Two 500 level CS courses (and preferably CS621). Some background on computer architectures and scientific computing. Programming proficiency in Fortran (preferred) or C, and parallel programming in MPI.

Special Feature: Programming assignments on a parallel supercomputer. Reading assignments of research papers.

Text Book: *A Multigrid Tutorial* by William L. Briggs, and, *Iterative Methods for Sparse Linear Systems* by Yousef Saad.

Topical outline (tentative):

- discretization of partial differential equations
- basic iterative methods
- fast and parallel multigrid methods
- Krylov subspace methods and parallel implementations
- parallel preconditioning techniques
- Domain decomposition techniques (time permits)

HOMEWORK: Homeworks assigned in sheets will be collected within 1 week in class. **Late submissions will not be accepted. Homework assignments are to be worked out independently.**

CHEATING: Students have to do the work by themselves. They can help each other with general concepts; however, direct assistance with a particular solution will be considered as cheating. Please refer to *Student Rights and Responsibilities* for more details concerning cheating; let me only remind that the minimum penalty for cheating is an E-grade.

Grading: Homeworks and programming projects (40%); one midterm exams (temporarily set on March 17, Monday) (30% each); final exam (4/28 at 1:00PM 30%). In case of legitimate reasons (see *Student Rights and Responsibilities*), students must inform the instructor in advance to schedule an exam that will take place before the exam for the whole class. Make-up exams after that will only be given in cases of unforeseen (legitimate) reasons.

Letter Grade: A: 100 – 86, B: 85 – 76, C: 75 – 60, E: 59 – 0.