Selected Topics in Applied Mathematics

Mathematics 795

Section: G100

Term: 2010 Spring

Instructor: Manfred Trummer

Discussion Topics: Course Outline:

Algorithms that rock - Classics, Golden Oldies, Chartbusters we will be looking at some of
the most amazing, famous and widely used algorithms in scientific computing. The theme of
this course is inspired by Nick Trefethens talk on Who invented the great numerical
algorithms? and by Jack Dongarras list of Top Ten Algorithms of the 20th century. Our
playlist includes some of the Top Ten, as well as some hits further down in the charts:
Newtons method, Horner scheme, least-squares fitting, Gaussian elimination, QD scheme,
Euclidean algorithm, Gauss quadrature, conjugate gradients, matrix factorizations, QR
algorithm, SVD (the foundation of Google), iterative methods for solving linear systems, Fast
Fourier Transform, splines, multigrid methods, Krylov iterations, fast multipole methods,
Kalman filter and signal compression algorithms.

The course will be conducted in a mixed lecture/seminar style.

Grading: 50% Homework / project
20% Quiz
30% Participation

Required Texts: No textbook required
Readings will be assigned by the instructor.

Recommended Texts:

Materials/Supplies:

Prerequisite/Corequisite: Macm 316 or Math 310. Quantitative.
Ability to perform simple tasks in Matlab is essential, and enthusiasm for computation is
desirable.
Students may not take a 700 division course if it is being offered in conjunction with a 400
division course which they have taken previously.

Notes: THE INSTRUCTOR RESERVES THE RIGHT TO CHANGE ANY OF THE ABOVE INFORMATION.

Students should be aware that they have certain rights to confidentiality concerning the
return of course papers and the posting of marks. Please pay careful attention to the options
discussed in class at the beginning of the semester.

This outline is derived from a course outline repository database that was maintained by SFU
Student Services and the University's IT Services Department. The database was retired in
2014 and the data migrated to SFU Archives in 2015.