MA 402

Computational Mathematics:
Models, Methods and Analysis

Time and Place: 10:15am-11:30am, TT, HA 274, Fall Semester of 2009

Instructor: Robert E. White, Professor of Mathematics, NCSU, SAS 3140, 515-7478, white@math.ncsu.edu

Prerequisites: Some programming language and MA 341 as a corequisite

One could view this course as a numerical modeling using discrete partial differential equations. This course will give the student an overall view of the computational modeling process. Numerical models will be carefully considered, and implementations will use MATLAB as well as some high performance computations.

1. Time dependent matrix models: heat transfer, pollutant transfer and convergence analysis.

2. Steady state matrix models: long run cooling and pollution, direct and iterative algorithms and convergence analysis.


4. Nonlinear and 3d models: nonlinear effects, three space variables, domain decomposition and multiprocessing computing.

5. Selection of numerical models from shallow water waves, fluid flow in a driven cavity, epidemics with diffusion, image restoration and value of option contracts.

This course will satisfy the university's "writing" requirement. And, when coupled with MA 401, MA 401,2 will satisfy the math department's "year course" requirement, in this case on partial differential equations. There will be two written modeling projects for 20% and 30% of the grade. The other 50% of the grade will come from weekly assignments.

NCSU Statement on Disability and Honesty
http://www4.ncsu.edu/eos/users/w/white/www/white/ma302/DandH.htm