

University of Toronto
Department of Mathematics
Mat1062H
Computational Methods for PDEs
Winter 2008

Instructor: Mary Pugh mpugh@math.utoronto.ca

Web page: <http://www.math.utoronto.ca/mpugh/Teaching/Mat1062/mat1062.html>

Lecture: Tu, 11:10am–12pm, BA 1220, Th 10:10am–12pm, BA 6183

Office Hours: by appointment, ES 3141

Course description We will study numerical methods for solving partial differential equations that arise in physics and engineering applications. Special attention will be paid to how the design of effective numerical methods relates to the mathematical structure of the equation.

Work Final exam 40%. Term exam 25%, Feb. 26. HW 35% total, about every two weeks, with Matlab programming.

Approximate Outline

- Parabolic equations
 - Explicit and implicit discretizations
 - Consistency, stability, and convergence
 - Boundary conditions
 - Multi-dimensional problems
- Elliptic equations
 - Solution of sparse linear systems
 - Variational formulations and finite element methods
- Hyperbolic equations
 - CFL stability
 - Nonlinear conservation laws, shock capturing
- Special topics (as time permits)
 - Pseudo-spectral methods