

Math 400 Outline

Section 101, Fall, 2012

Instructor: Brian Wetton, wetton@math.ubc.ca, www.math.ubc.ca/~wetton

Focus: This class concentrates on analytic methods to solve partial differential equations (PDE's) coming from physical applications.

Topics:

1. Review: linearity; ordinary differential equations; wave, heat and Laplace equations; separation of variables. Introduction to: maximum principle; D'Alembert's solution; scaling and non-dimensionalization; well-posedness; weak solutions; asymptotic methods; numerical methods.
2. Classification of equations
3. Linear and quasi-linear first order equations, shock waves
4. Eigenfunction expansions and Sturm-Liouville theory
5. Parabolic (heat), elliptic (Laplace) and hyperbolic (wave) equations
6. Solution by integral transforms

Text: No required text. Optional text: "Elementary Applied Partial Differential Equations," by Richard Haberman. Handwritten notes for the course will be posted online.

Marks: 50% final, 20% midterm (Friday, October 19), 30% assignments.

Assignments: Challenging weekly assignments. Assigned Fridays, due Mondays (after ten days). Late homework will not be accepted after solutions are posted.