Course No.: Math 536  
Course Title: Numerical Analysis of PDEs  
Core Course: yes  
Term: Winter 2017  
Instructor: Yau Shu Wong

Syllabus:

This graduate course will focus on computational methods for PDEs. In addition to develop numerical algorithms and implement for computer programming to solve model PDEs including elliptic, parabolic and hyperbolic equations, error analysis and theoretical studies for convergence, consistency and stability will be included.

Topics:

Discretization techniques (Finite Difference, Finite Element and Spectral methods)

Advanced iterative techniques for linear algebraic systems: preconditioning approach, conjugate gradients and multigrid techniques.

Finite difference methods for 1D & 2D elliptic, parabolic and hyperbolic PDE’s.

Prerequisites:

The required background includes undergraduate courses in Linear Algebra, PDE’s and Numerical Analysis. You must be capable in writing a computer code in at least one programming language, and also be familiar with standard visualization software (e.g. Matlab, Maple etc.) for presentation of your numerical results.

Grading:

Midterm examination 35%  
Final examination 65%

Remarks:

The time for the midterm and final exams will be decided in the course of the term so that it is suitable for both the students and the instructor.

The final exam consists of two parts: presentation on computing project and a written comprehensive exam covering the entire material.