Course Outline for Mathematics 406 (3 credits) Term 1, Sept.-Dec., 2013
Variational and Approximate Methods in Applied Mathematics

Prerequisites: MATH 400 and one of MATH 307, CPSC 302

Credit: 3 Credits. Math M406 is credit excluded with M401 and M405.

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Office Hours: Mon: 10-11 am, Wed: 3-3:55 pm, Fri: 10-11 am

Assessment: The final grades will be based on homework (45%) (including MATLAB projects), an in-class midterm exam (15%) and a final exam (40%). **Assignments are to be submitted in hard-copy from at the designated class – no late assignments can be accepted. There will be no make-up midterms.**

Test Date: Monday November 4$^{\text{th}}$.

Topics	Lectures
Introduction to numerical methods: Interpolation and Integration	6
Variational and Green's function methods for ordinary differential equations including an introduction to finite element methods	12
Initial value problems for ordinary differential equations: explicit and implicit one step methods, multi-step methods, convergence	6
Green's functions for elliptic equations: finite difference, finite element and boundary element formulations for Laplace's equation	6
Evolution equations: parabolic and hyperbolic equations, the method of lines, Lax's Convergence theory, von Neumann Stability analysis.	5
Test	1
Total	36