MATH 6201 (Numerical Methods for Time Dependent Differential Equations) — Winter 2015

Instructor:	Scott MacLachlan	**Section**:	001
E-mail:	smaclachlan@mun.ca	**Slot**:	08
Office:	HH-2019	**Room:**	HH-3017
Phone:	864-8095		

Course description: Numerical methods for time-dependent ordinary and partial differential equations, including implicit methods for hyperbolic and parabolic equations. Stability, accuracy, and convergence theory.

To avoid overlap with the topics of Math 6210 (as taught in Fall 2014), we will focus on the following topics. Discretization and integration of nonlinear PDEs, including split-step methods. Finite-element methods, including convergence theory. Multigrid methods for elliptic and parabolic PDEs. Numerical treatment of conservation laws (if time permits).

Prerequisite: Permission of instructor. To be successful, you will need to be familiar with basic concepts in PDEs and linear algebra. While some of the course will build on topics in functional analysis, no background in this area is required, and this material will not be included on assignments or exams. Both homework assignments and the final project will require a computational component: you should be familiar with programming in a high-level programming language, such as Matlab or Python.

Web Site: Class information, assignments, and solutions will be available on my home page as PDF files. The URL is `http://www.math.mun.ca/~smaclachlan/math6201_W15` .

Textbooks: The course will make use of various textbooks and coursenotes, with pointers provided as we go. Many of these will be available as ebooks through the MUN library.

Office Hours: Monday 1-2pm, Wednesdays, 11am - noon, Friday 1-2pm, or by appointment

Evaluation: 40% Assignments, 20% Final Project, 15% Midterm, 25% Final Exam

Assignments:

- Homework assignments will be announced in class and posted to the course webpage. They must be submitted in class on the day that they are due.

- Homework assignments will be given every week or two, as we cover topics.

- In general, late assignments will <u>not</u> be marked. You are allowed two "freebies" in this system, where you can hand in an assignment 24 hours late and still receive credit. These cannot both be applied to the same assignment. To use a freebie, you must submit the late assignment to me in my office, or to the Math department office.

- If you require a longer extension, due to severe illness, bereavement, or other exceptional reason, please provide me with appropriate documentation (e.g. doctor's note, death notice) and a suggested timeline for completing the work.

Final Project

- A final project is a required component of the course. It is expected that you will identify your own topic for the project, at the intersection of the course topics and your own research interests. All proposed topics must be approved before you commence work.

- The final project will be worth 20% of your final grade, broken up as follows. A written, 2-page (plus references) project proposal will be worth 5% of your final grade, and due in-class on March 2. A presentation of your work on the final project will occur in the last days of class, and also be worth 5% of your final grade. The remaining 10% of your final grade will be given for a written, 10-page (plus references) project report. *Any cases of cheating or plagiarism will result in a grade of zero for the all components of the project grade, and may include further penalties, as outlined in the calendar.*

Midterm and Final Exams:

- No notes, textbooks, or other aids are permitted. No electronic devices (including calculators and cell phones) are allowed at your desk or on your person during any examination. Possession of such a device will be considered an academic offense and shall be reported as such (see University Regulation 6.11 in the MUN Calendar).

- If you must miss an exam for an acceptable reason, please provide me with appropriate documentation. For foreseeable circumstances, you must notify me in advance of the exam. No makeup midterms will be allowed; in the event of an excused absence for a midterm exam, the grading scheme will be adjusted to 40% for the final exam.

Important Dates:

Monday, January 19	Last day to add courses
Friday, February 13	Midterm Exam
February 16-18	Midterm Break, no classes
Monday, February 23	Last day to drop courses without academic prejudice
Monday, March 2	Project proposals due
Thursday, April 2	Last day of lectures, Project reports due

Midterm exam date is tentative, and will be confirmed in class. In the event of a class cancellation on the date the exam is to be written, check the course website for rescheduling information.