

Memorial University of Newfoundland
MATHEMATICS 6210: Numerical Solution of Differential Equations (Fall 2017)
Course Outline

Classrooms & Times: HH3017 (TuTh 10:30 - 11:45)

Instructor: Dr. Scott MacLachlan, Tel: 864-8095, Email: smaclachlan@mun.ca

Office hours: Tuesdays, from 9:00-10:20 AM, and Thursdays, from 10:30 AM - Noon, in HH 2019
Other times are available by appointment

Website: Class information, assignments, and solutions will be available on my home page as PDF files. The URL is http://www.math.mun.ca/~smaclachlan/math6210_F17/ . This course will not use D2L.

Textbook: Relevant links to online content will be posted on the course webpage. There are no recommended/required textbooks to purchase.

Prerequisite: Permission of the instructor. Comfort and familiarity with undergraduate numerical analysis is expected. This course will include mathematical proofs and programming (in MATLAB).

Outline of the Course:

1. Finite Difference Discretizations (8 classes)
 - Collocation Schemes
 - Elliptic PDEs and boundary conditions
 - Accuracy, Stability, and Consistency
2. Finite Element Discretizations (7 classes)
 - Galerkin Methods
 - Approximation Properties
3. Finite Volume Discretizations (2 classes)
4. Spectral Methods (1 class)
5. Fast Poisson Solvers and the FFT (1 class)
6. Iterative Methods for Solution of Linear Systems (4 classes)
 - Matrix splittings for M-matrices and SPD systems
 - Krylov Methods

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Evaluation: 45% Assignments, 20% Midterm, 35% Final Exam

Assignments:

- Homework assignments will be announced in class and posted to the course webpage. Assignments are to be turned in during class on the day that they are due. You are allowed one freebie, in which you may turn in an assignment during the next class and still receive credit; otherwise, late assignments will not be marked. If you require a longer extension due to exceptional circumstances, please provide me with appropriate documentation and a suggested timeline for completing the work.

Examinations:

- One in-class midterm examination will be given, worth a total of 20% of your final mark.
- The final exam is a 2-hour comprehensive test during the formal examination period at the end of the semester. It will cover the entire course and determine 35% of your final mark.

Missed Exams:

- If you must miss an exam for an acceptable reason, you are responsible for providing me with appropriate documentation. For foreseeable circumstances, you must notify me in advance of the exam. In any circumstances, you must notify me no later than 48 hours after the exam.
- No makeup midterms will be allowed; in the event of an excused absence for the midterm exam, the grading scheme will be adjusted to 45% for the assignments and 55% for the final exam.
- If you miss the final exam for unacceptable reasons, you will receive a final exam mark of zero. Deferred final examinations will be administered by the department.

Academic Misconduct:

- All students are expected to be familiar with University Regulation 4.12 in the MUN SGS Calendar, and these regulations apply to all aspects of the evaluation in this course.
- No notes, textbooks, or other aids are permitted during any examination. 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.

Important Dates:

Wednesday, September 20	Last day to add courses
Monday-Tuesday, October 9-10	Midterm Break, no classes
Thursday, October 19	Midterm Exam
Wednesday, October 25	Last day to drop courses without academic prejudice
Friday, December 1	Last day of lectures

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

Accommodations: “Memorial University of Newfoundland is committed to ensuring an environment of understanding and respect for the dignity and worth of each student and also to supporting inclusive education based on the principles of equity, accessibility and collaboration.” For more information on Memorial University’s commitment to accommodation of students with disabilities, see <http://www.mun.ca/policy/site/policy.php?id=239> .