

Memorial University of Newfoundland
Math 6204: Iterative Methods in Numerical Linear Algebra
Winter 2018 Course Outline

Classrooms & Times: HH 3013 (TTh 10:30 - 11:45)

Instructor: Dr. Scott MacLachlan
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Office hours: Tuesdays, from 9:00-10:20 AM, and Wednesdays, 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/math6204_W18/ . 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.

Prerequisites: Undergraduate linear algebra at the level of MATH2051, experience with programming (Matlab or Python preferred), experience with computer simulation. Completion of Math 6210 and/or 6201 is certainly sufficient, but not strictly necessary.

Outline:

1. Sparse Direct Methods: Gaussian elimination, reordering schemes, nested dissection. (2 weeks)
2. Classical Iterative Methods: matrix splittings, incomplete factorizations. (2 weeks)
3. Polynomial and Krylov Methods: Krylov spaces, optimality and quasi-optimality properties (3 weeks)
4. Domain Decomposition Methods: classical and optimized Schwarz, overlapping and two-level methods (2 weeks)
5. Multigrid Methods: geometric multigrid, variational methods, algebraic multigrid (3 weeks)

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Evaluation: Course grades will be composed of

- Assignments: 45%. Weekly assignments, including analysis and programming components. 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.
- Final project: 20%. A final project, on a topic of your choosing that is relevant to the course, is to be completed by the last day of classes. This includes both a written component (properly typeset, of about 10 pages) and a 10 minute oral presentation to be given on the last day of classes.
- Final exam: 35%. 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. 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:

Thursday, January 18		Last day to add courses
Monday-Friday, February 19-23		Midterm Break, no classes
Thursday, March 1		Last day to drop courses without academic prejudice
Friday, April 6		Last day of lectures
TBD		Final Exam

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> .