COMP 350 Numerical Computing (Fall 2018)

Course Description   **Instructor:** Xiao-Wen Chang

Purpose: To provide an introduction to numerical techniques for solving basic computational science problems. It emphasizes the design, analysis, and computer implementation of accurate and efficient algorithms.

Prerequisites: Facility with a high-level scientific programming language (such as C, C++, Java or Fortran), Calculus III, and an introductory knowledge of matrix theory and applications. These are provided by: COMP 202 (or COMP 250), MATH 222 and MATH 223.

Topics:

    Computer numbers and arithmetic.
    Use of MATLAB.
    Solving systems of linear equations.
    Solving a nonlinear equation.
    Polynomial and spline interpolation; least squares approximation.
    Numerical integration.
    Numerical ordinary differential equations.

Texts:

1. Ward Cheney & David Kincaid, *Numerical Mathematics and Computing*, 7th edition, 2013. The following sections will be covered (tentatively):
   1.1-1.4, 2.1-2.3, 3.1-3.3, 4.1-4.3, 5.1, 5.3, 5.4, 6.1-6.2, 7.1-7.2 and 9.1.

2. Mike Overton, *Numerical Computing with IEEE Floating Point Arithmetic*, SIAM, 2004. Part of the material appears in the document *Floating Point Representation and the IEEE Standard*, which can be downloaded from the course web site.

References:

1. Uri Ascher and Chen Greif, *A First Course in Numerical Methods*, SIAM 2011.

2. Walter Gander, Martin J. Gander, and Felix Kwok: *Scientific Computing - An Introduction using Maple and MATLAB*, Springer, 2014.

3. Cleve Moler, *Numerical Computing with MATLAB*, SIAM, 2004. Individual chapters can be downloaded from the author's web site: `http://www.mathworks.com/moler/chapters.html`.

Evaluation:

- 6 assignments, which can be downloaded from myCourses, will account for 20%.

- Midterm exam on **Tuesday, Oct. 9** (to be confirmed) will account for 20%.

- Final exam during the exam period will account for 60%.

Both exams will be closed book tests, and calculators will not be allowed. There will be a supplemental exam which counts for 100%. Students with marks of D, F or J have no option of doing additional work to upgrade their mark.

Policy on Grading:
No late homework will be accepted without an acceptable excuse which includes written supporting documentation. Any regrade requests must be requested within 10 working days of the day in which the item has been made available to you; after 10 working days have elapsed, regrade requests will not be accepted.

Right to submit in English or French written work that is to be graded:
In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded.

Academic Integrity:
McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures (see www.mcgill.ca/integrity for more information).

Time and Place:
Tuesday and Thursday 1:05pm–2:25pm, Leacock 219.

Course Web Site:
http://www.cs.mcgill.ca/∼chang/teaching/cs350/cs350.html

Contact Information:

- **Instructor:**

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  Phone: 398-8259
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  Web: http://www.cs.mcgill.ca/∼chang
  Office: McConnell Eng. Bldg 302
  Office Hours: Tuesday 2:35pm to 4:00pm.

- **Teaching Assistants:**

  Zhilong Chen (zhilong.chen@mail.mcgill.ca), Sitao Luan (sitao.luan@mail.mcgill.ca), Mathieu Nassif (mathieu.nassif@mail.mcgill.ca), Yuchen Wang (yuchen.wang@mail.mcgill.ca). (For any question about a specific assignment, please contact only the TAs who will mark it.)
  Office: Trottier Building 3090
  Office Hours: Thursday 4:00pm to 5:30pm (tentatively)