

COMP 350 Numerical Computing (Fall 2020)

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 linear algebra 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 are expected to be covered:
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, 8.1 and 9.1.
2. Mike Overton, *Numerical Computing with IEEE Floating Point Arithmetic*, SIAM, 2004. Its e-copy is available from McGill Library.

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 30%.
- Midterm exam on **Thursday, Oct. 22** (to be confirmed) will account for 30%.
- Final exam during the exam period will account for 40%.

Both exams will be open book tests. 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:

Tuesday and Thursday 10:05am–11:25am.

Course Web Site:

<http://www.cs.mcgill.ca/~chang/teaching/cs350/cs350.html>

Contact Information:

• **Instructor:**

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Web: <http://www.cs.mcgill.ca/~chang>

Office Hours: Tuesday 3:00pm–4:00pm, 8:00pm–9:00pm

• **Teaching Assistants:**

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For any question about a specific assignment, please contact only the TAs who will mark it.

Office Hours: Thursday 4:00pm–5:00pm, 8:00pm–9:00pm (to be confirmed)