Numerical Analysis (Honours)

MATH 3806 A, Winter 2022 [School of Mathematics and Statistics](), [Carleton University]()

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Course description: Elementary discussion of error, polynomial interpolation, quadrature, linear systems of equations and matrix inversion, non-linear equations, difference equations and ordinary differential equations. Implementation of numerical methods using a computer language.

Precludes additional credit for MATH 3800.

Prerequisite(s): i) MATH 2000 with a grade of C- or higher; and ii) MATH 1152 with a grade of C- or higher, or (MATH 1107 or MATH 1104 with a grade of B or higher and permission of the instructor).

No required textbook. Lecture slides and supplementary videos will be provided. Lecture contents are drawn from the following references:

- *Scientific Computing: An Introductory Survey (revised 2nd ed.)* by Michael T. Heath
- *Fundamentals of Numerical Computation* by Tobin A. Driscoll and Richard J. Braun.
- *Numerical Analysis in Modern Scientific Computing: An Introduction (2nd ed.)* by Peter Deuflhard and Andreas Hohmann.
- *Numerical Mathematics* by Alfio Quarteroni, Riccardo Sacco, and Fausto Saleri.
- *Numerische Mathematik (8th ed.)* by Hans R. Schwarz and Norbert Köckler.
- *Introduction to Interval Analysis* by Ramon E. Moore, R. Baker Kearfott and Michael J. Cloud.

Lectures: Online hybrid Mon/Wed 13:05-14:25   **Labs:** Thu 12:35-13:25 A1, 13:35 - 14:25 A2

Evaluation scheme: The final mark consists of 100 points distributed as follows:

Labs - 11 in total (10 points):
- At most 1 point can be earned on each lab. Only the best **ten** scores are counted.

Quizzes - 11 in total (20 points):
- At most 2 points can be earned on each quiz. Only the best **ten** scores are counted.

Problem sets - 6 in total (maximum 50 points):
- At most 10 points can be earned on each problem set. Only the best **five** scores are counted. **Due dates**: Jan 24, Feb 7, 28, Mar 14, 28, Apr 11

Final exam (20 points): Formally scheduled during the Winter 2022 final exam period.

Posting quiz, lab, or problem set questions outside Brightspace to sites such as chegg.com is strictly prohibited and is considered a violation of academic integrity.

Points to note for problem sets:
- **Up to two** problem sets no more than 24 hours late each are accepted.
- Solutions to each problem set **must be submitted in Brightspace** following all the submission requirements.

System requirements: Students are fully responsible for resolving their own computer and internet connection issues and having the proper tools to create PDF files and program files for problem set submissions. Students with login issues should contact the **ITS service desk.**

Communication: It is the students' responsibility to check for announcements in Brightspace and their Carleton email account every business day. Communication between students and the instructor is through electronic means only except for PMC students with a letter requesting accommodation for other available means of communication. All email to the instructor and TAs must be made from Carleton email accounts. **Messages originating from non-Carleton University email addresses are typically ignored.**

Regrade requests: Students may request to have any evaluated term work regraded if it has been incorrectly graded. Such a request must be submitted to the instructor in writing (briefly describing what has been incorrectly graded) no later than five (5) business days after the work is first returned. All regrades are final.

Students must conform to the University's Academic Integrity Policy. Failure to be informed of the expectations regarding academic integrity is not a valid excuse for violations of the policy. Minimum penalties for violations of the Carleton Policy on Academic Integrity are:

- First offence, first-year students (< 4.0 credits completed): No credit for assignment/activity in question, or a final grade reduction of one full letter grade (e.g., A- becomes B-, if reduction results in an F, so be it), whichever penalty is greater.
- First offence (everyone else): F in the course
- Second offence: One-year suspension from program
- Third offence: Expulsion from the University

Pregnancy/Religious Accommodation: Write to the instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity services website.

Students with disabilities requiring academic accommodations in this course must register with the Paul Menton Centre for Students with Disabilities (PMC) for a formal evaluation of disability-related needs. Documented disabilities could include but are not limited to mobility/ physical impairments, specific Learning Disabilities (LD), psychiatric/psychological disabilities, sensory disabilities, Attention Deficit Hyperactivity Disorder (ADHD), and chronic medical conditions. Registered PMC students are required to contact the PMC, 613-520-6608, every term to ensure that I receive your Letter of Accommodation, no later than two weeks before the first assignment is due or the first in-class test/midterm requiring accommodations. If you only require accommodations for your formally scheduled exam(s) in this course, please submit your request for accommodations to PMC by the deadlines published on the PMC website.