

**DEPARTMENT OF MATHEMATICAL AND COMPUTATIONAL SCIENCES
UNIVERSITY OF TORONTO MISSISSAUGA**

**CSC338H5S LEC0101
Numerical Methods
Course Outline - Winter 2023**

Class Location & Time	Wed, 11:00 AM - 01:00 PM MN 2110
Instructor	Ray Wu
Office Location	DH-3097D
Office Hours	Wed 13-14
E-mail Address	rwu [at] cs [dot] toronto [dot] edu
Course Web Site	http://www.cs.toronto.edu/~rwu/csc338/
Teaching Assistant	Harshit Gupta
Office Location	DH 4001
Office Hours	Thu 11-12
Teaching Assistant	Akira Takaki
Office Location	MN 2100
Office Hours	Wed 10-11
Teaching Assistant	Mohan Zhao

Course Description

Computational methods for solving numerical problems in science, engineering and business. Linear and non-linear equations, approximation, optimization, interpolation, integration and differentiation. The aim is to give students a basic understanding of floating-point arithmetic and the implementation of algorithms used to solve numerical problems, as well as a familiarity with current numerical computing environments. Course concepts are crucial to a wide range of practical applications such as computational finance and portfolio management, graphics and special effects, data mining and machine learning, as well as robotics, bioinformatics, medical imaging and others.

Prerequisite: CSC148H5 and (MAT134H5 or MAT136H5 or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5 or MAT233H5) and (MAT223H5 or MAT240H5) and (CSC263H5 or 1.0 MAT credit at the 200+ level).

Exclusion: CSC336H1 or CSC350H5 or CSC350H1 or CSC351H1 or CSC37H3 (SCI)

Distribution Requirement: SCI

Students who lack a pre/co-requisite can be removed at any time unless they have received an explicit waiver from the department. The waiver form can be downloaded from [here](#).

Textbooks and Other Materials

We will be following the textbook

- Ascher & Greif, "A First Course in Numerical Methods", SIAM, 2011.

You are not required to purchase it or any other materials for this course.

Assessment and Deadlines

Type	Description	Due Date	Weight
Assignment	Assignment 1	2023-01-26	10%
Assignment	Assignment 2	2023-02-09	10%
Term Test	Midterm	2023-02-15	10%
Assignment	Assignment 3	2023-03-02	10%
Assignment	Assignment 4	2023-03-16	10%

Assignment	Assignment 5	2023-03-30	10%
Final Exam	Final Exam	TBA	40%
Total			100%

More Details for Assessment and Deadlines

Students must receive at least 40% on the final exam to pass the course.

Students who receive a higher grade on the final exam than the midterm may have the grade on the final exam replace the grade on the midterm.

All course work is to be completed individually.

Penalties for Lateness

Assignments are to be submitted electronically using MarkUs by 22:00 on the due date, at Toronto time.

Every late day (24 hours) incurs a 10% penalty on the total possible number of points.

Assignments will no longer be accepted after five days late.

Procedures and Rules

Missed Term Work

In order to receive special consideration, you must email the course coordinator and declare your absence on ACORN. For more information, visit the Office of the Registrar website (<https://www.utm.utoronto.ca/registrar/utm-absence>).

Students who miss the midterm will have the weight transferred to the final exam.

Missed Final Exam

Students who cannot complete their final examination due to illness or other serious causes must file an [online petition](#) **within 72 hours of the missed examination**. Late petitions will **NOT** be considered. Students must also record their absence on ACORN on the day of the missed exam or by the day after at the latest. Upon approval of a deferred exam request, a non-refundable fee of \$70 is required for each examination approved.

Academic Integrity

Academic integrity is essential to the pursuit of learning and scholarship in a university, and to ensuring that a degree from the University of Toronto Mississauga is a strong signal of each student's individual academic achievement. As a result, UTM treats cases of cheating and plagiarism very seriously. The University of Toronto's [Code of Behaviour on Academic Matters](#) outlines behaviours that constitute academic dishonesty and the process for addressing academic offences. Potential offences include, but are not limited to:

In papers and assignments:

1. Using someone else's ideas or words without appropriate acknowledgement.
2. Submitting your own work in more than one course, or more than once in the same course, without the permission of the instructor.
3. Making up sources or facts.
4. Obtaining or providing unauthorized assistance on any assignment.

On tests and exams:

1. Using or possessing unauthorized aids.
2. Looking at someone else's answers during an exam or test.
3. Misrepresenting your identity.

In academic work:

1. Falsifying institutional documents or grades.

2. Falsifying or altering any documentation required, including (but not limited to) doctor's notes.

Keep in mind that the department uses software that compares programs for evidence of similar code. Below are some tips to help you avoid committing an academic offence, like plagiarism.

- Never look at another student's lab/assignment solution(s). Never show another student your lab/assignment solution. This applies to all drafts of a solution and to incomplete and even incorrect solutions.
- Keep discussions with other students focused on concepts and examples. Never discuss labs/assignments before the due date with anyone but your Instructors and your TAs.
Do not discuss your solution publicly on the discussion board or publicly in the lab rooms/office hours.

All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters. If you have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, you are expected to seek out additional information on academic integrity from your instructor or from other [institutional resources](#).

Plagiarism Detection

Normally, students will be required to submit their course essays to the University's plagiarism detection tool for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their essays to be included as source documents in the tool's reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of this tool are described on the Centre for Teaching Support & Innovation web site (<https://uoft.me/pdt-faq>).

Students may wish to opt out of using the plagiarism detection tool. In order to opt out, contact your instructor by email no later than two (2) weeks after the start of classes. If you have opted out, then specific information on an alternative method to submit your assignment can be found below.

Informed Consent – Email Lists

As a student enrolled in this course, you understand that you are providing your implicit consent to be included in an email list for the department to send you non-essential information from time to time. If you do not wish to be included in such an email list, please request to be removed by contacting one of the Academic Advisors & Undergraduate Program Administrators. Their information can be found on the MCS Website Contact Us [page](#).

Final Exam Information

Duration: 3 hours
Aids Permitted: Non-Programmable Calculators
1 page(s) of double-sided Letter (8-1/2 x 11) sheet

Additional Information

Here is the tentative list of topics for the course. Note that one lecture does not necessarily correspond to one week, as some topics are more substantial than others.

Lecture	Topic	Textbook Chapter
1	Intro to Numerical Methods and Floating-point systems	1-2
2	Solving one-dimensional nonlinear equations	3
3	Direct Methods for Linear Systems	5
4	Linear Least Squares	6
5	Eigenvalues	8
6	Optimization and solving nonlinear systems	9
7	Function Interpolation	10-11
8	Function Integration	15
9	Iterative Methods for Linear Systems	7

Last Date to drop course from Academic Record and GPA is March 19, 2023.