Computational Complexity and Computability
CSC 463, Fall 2025
University of Toronto

Course Information

Instructor: Shubhangi Saraf

Email: shubhangi.saraf@utoronto.ca   PLEASE INCLUDE CSC463 in the subject line

Course web page: Quercus

Lecture: Mondays 1pm-3pm in ES B142 (in person)

TAs: Somnath Bhattacharjee, Ziyang Jin, Devansh Shringi

Tutorial: Fridays 2pm- 3pm in MP 137

Instructor Office hours: (See quercus)

TA Office hours: (see quercus)

Text Book: Introduction to the Theory of Computation, 3rd edition (Sipser).

Topics

Computability Theory (5 weeks): Turing machines, Church's Thesis, decidability and semi-decidability, diagonal arguments, the Halting Problem and other undecidable problems, reductions, complete problems. Computational Complexity (7 weeks): The classes P and NP, polynomial time re-ducibility, NP-completeness, Cook-Levin Theorem, various NP-complete problems, time and space complexity, intractable problems, other topics.

Grading Scheme:

There will 5 problem sets. The lowest problem set score will be dropped. The highest 4 problem sets will each count for 5% of the grade. There will be two midterm exams worth 20% of the grade each and one final exam worth 40% of the final grade (date: TBD).

The weights in calculating your final grade will be:

Homework	20%
Midterm 1	20%

Midterm 2   20%

Final   40%

Assessment	Percent	Details	Due Date
midterm 1	20%		2025-10-20
midterm 2	20%		2025-11-17
5 assignments	20%		2025-09-28, 2025-10-12, 2025-11-09, 2025-11-23, 2025-12-01
In-Person Final Exam	40%		Final Exam Period

Course Materials:

The recommended course textbook is Michael Sipser, ``Introduction to the Theory of Computation'', 3rd edition. The course contents will correspond to parts of Chapter 3-10 of this textbook.

A course Piazza will also be made available for discussions about course material. Please use Piazza rather than email for help related to understanding the course material and other questions.

https://piazza.com/utoronto.ca/fall2025/csc463h1flec0101/home

Course Tutorials:

The course tutorials will be led by the teaching assistants. The course tutorial may include practice with solving problems related to the course material and/or help with the course assignments. You are encouraged participate actively in course tutorials to support your learning in the course.

Policy on Missed Term Work

As flexibility for missed or late course assignments has been built into the marking scheme, late and missed assignments will not be accepted.

If you miss a term test or the final assessment, then you must inform your course Instructor within 72 hours of the test. No exceptions. If your request is approved, you may receive an accommodation in the form of an oral exam, written make-up test, or a re-weighting of your assessments.

Please note that Verification of Illness forms (also known as a "doctor's note") are temporarily not required. Students who are absent from class for any reason (e.g., COVID, cold, flu and other illness or injury, family situation) and who require consideration for missed academic work should report their absence through the online absence declaration. The declaration is available on ACORN under the Profile and Settings menu.

Email Policy
Should you have a question that is not answered on the course site (please check there first!), and if the question is not of a personal nature, please post the question on the course piazza site (linked to from quercus). please note that all communications with the Course Instructor or TA's must be sent from your official utoronto email address, with the course number included in the subject line. If these instructions are not followed, your email may not be responded to.

PLEASE INCLUDE "CSC463" in the subject of your email.

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 is a strong signal of each student's individual academic achievement. As a result, the University treats cases of cheating and plagiarism very seriously. The University of Toronto's Code of Behaviour on Academic Matters outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences. Potential offences include, but are not limited to:

In papers and assignments:

- Using someone else's ideas or words without appropriate acknowledgement.

- Submitting your own work in more than one course without the permission of the instructor in all relevant courses

- Making up sources or facts

- Obtaining or providing unauthorized assistance on any assignment

On tests and exams:

- Using or possessing unauthorized aids

- Looking at someone else's answers during an exam or test

- Misrepresenting your identity

In academic work:

- Falsifying institutional documents or grades

- Falsifying or altering any documentation required by the University, including (but not limited to) doctor's notes

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, please reach out to me. Note that you are expected to seek out additional information on academic integrity from me or from other institutional resources (for example, the University of Toronto website on Academic Integrity).

General policies

- The University of Toronto is committed to equity, human rights and respect for diversity. All members of the learning environment in this course should strive to create an atmosphere of mutual respect where all members of our community can express themselves, engage with each other, and respect one another's differences. U of T does not condone discrimination or harassment against any persons or communities.

- Students with diverse learning styles and needs are welcome in this course. If you have a disability that may require accommodations, please feel free to approach me and/or the Accessibility Services* office. Accessibility Services on the St. George campus

- The University provides reasonable accommodation of the needs of students who observe religious holy days other than those already accommodated by ordinary scheduling and statutory holidays. Students have a responsibility to alert members of the teaching staff in a timely fashion to upcoming religious observances and anticipated absences and instructors will make every reasonable effort to avoid scheduling tests, examinations or other compulsory activities at these times.