

CSC311H5 S

Winter 2026 Syllabus

Course Meetings

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Section	Day & Time	Delivery Mode & Location
LEC0105	Friday, 3:00 PM - 5:00 PM	In Person: MN 2190
	Friday, 7:00 PM - 9:00 PM	In Person: ZZ TBA
LEC0103	Friday, 1:00 PM - 3:00 PM	In Person: IB 235
	Friday, 7:00 PM - 9:00 PM	In Person: ZZ TBA
LEC0102	Monday, 3:00 PM - 5:00 PM	In Person: MN 2110
	Friday, 7:00 PM - 9:00 PM	In Person: ZZ TBA
LEC0101	Monday, 7:00 PM - 9:00 PM	In Person: MN 1190
	Friday, 7:00 PM - 9:00 PM	In Person: ZZ TBA
LEC0104	Tuesday, 1:00 PM - 3:00 PM	In Person: MN 1170
	Friday, 7:00 PM - 9:00 PM	In Person: ZZ TBA

Refer to ACORN for the most up-to-date information about the location of the course meetings.

Course Contacts

Course Website: <https://q.utoronto.ca/courses/416373>

Instructor and Coordinator: Joshua Jung

Email: josh.jung@utoronto.ca

Office Hours and Location: In-person (DH 3024): Thursdays 2-4 pm

Instructor: Marc De Benedetti

Email: marc.debenedetti@utoronto.ca

Office Hours and Location: In-person (DH 3019): Fridays 10-11 am

Instructor: Mai Ha Vu

Email: maiha.vu@utoronto.ca

Office Hours and Location: In-person (MN 4146): Fridays 2-3 pm

Course Overview

An introduction to methods for automated learning of relationships on the basis of empirical data. Classification and regression using nearest neighbour methods, decision trees, linear models, and neural networks. Clustering algorithms. Problems of overfitting and of assessing accuracy.

Detailed Course Description

Machine learning aims to build computer systems that learn from experience, instead of being directly programmed. It is an exciting interdisciplinary field, with historical roots in computer science, statistics, pattern recognition, and even neuroscience and physics. In the past ten years, many of these approaches have converged and led to rapid advances and real-world applications. This course is a broad introduction to machine learning. It will start with basic methods of regression and classification and problems of overfitting and the evaluation of learning algorithms, and then move on to more sophisticated methods such as neural networks. As part of the course, you will expand your Python skills to include numerical and scientific programming.

Students need a solid knowledge of calculus, linear algebra, probability, computer programming (including Python) and good geometric intuition. Machine learning is highly mathematical, and the ability to write and understand rigorous proofs is essential, as is the ability to use mathematics to solve real problems (as in Physics and Engineering). Consequently, mathematical maturity will be assumed.

Please note that reinforcement learning may not be covered this year.

Course Learning Outcomes

By the end of the course, students will be able to apply supervised and unsupervised learning models to solve machine learning problems. Models covered typically include linear regression, logistic regression, probabilistic models (Naive Bayes), decision trees, neural networks, k-means clustering, expectation maximization, principal component analysis. In particular, students will:

- Understand and apply the mathematical techniques used in machine learning model, particularly how to turn a learning problem into an optimization problem and solve that optimization problem (e.g., via gradient descent or other methods).
- Use numerical computing libraries (e.g., numpy) to build and analyze models; analyze and prepare data for modelling.
- Apply hyperparameter tuning, and choose models by evaluating model performance with consideration to the bias-variance tradeoff.
- Evaluate model results on real-world data; communicate the performance and limitations of a model.
- Understand and communicate ethical considerations in deploying a model, including the concerns related to algorithmic fairness.

Prerequisites: CSC207H5 and (MAT223H5 or MAT240H5) and MAT232H5 and (STA246H5 or STA256H5)

Corequisites: None

Exclusions: CSC411H5 or CSC311H1 or CSCC11H3

Recommended Preparation: CSC338H5

Credit Value: 0.5

Course Materials

There is no required text, but specific readings will be recommended from a variety of sources. If you prefer readings from a textbook, we recommend:

- "The Elements of Statistical Learning", Second Edition, by Hastie, Tibshirani and Friedman.
- "Pattern Recognition and Machine Learning", by Bishop.

Marking Scheme

Assessment	Percent	Details	Due Date
Math Prepare	4%		Ongoing
Labs	12%		Ongoing
Machine Learning Challenge	14%		2026-03-30
Test 1 (Feb 13, 7:15-8:45pm in IB110/120)	15%		2026-02-13
Test 2 (Mar 20, 7:15-8:45pm in IB110/120)	15%		2026-03-20
Final Assessment	40%		Final Exam Period

More Details for Assessment and Deadlines

Math Prepare: Starting lecture 2, there will be a math prepare quiz to be submitted prior to the week's lectures, by Monday at 12pm. The math prepare quiz includes 2-4 multiple choice questions on key mathematical concepts that you need to be able to fully understand the lecture. Most of this content will be a review of pre-requisite concepts. Each multiple choice question will be accompanied by a video to help you review the concept. Your lowest 2 math prepare marks are dropped.

Labs: The labs are opportunities to implement machine learning models, aided by your TAs. You may work with a partner for the labs. Lab exercises are intended to be completed during the lab sessions, but to account for unforeseeable issues, their deadlines are set to 10pm on Fridays. The goal of these labs is to help you learn the material and connect with other classmate. Your lowest 2 lab marks are dropped.

Homework Exercises: Although these are not explicitly graded, there will be weekly homework exercises that include sample questions that could appear on the tests and exam. You may submit up to 3 pages*

of homework exercises for feedback each week, and choose to complete any question occurring in any previous homework. Thus, you can choose to complete and submit questions that you believe are most conducive to your learning. It is also completely okay if you fall behind a little bit and submit homework questions from a previous week. However, to ensure that homeworks are graded in a timely manner, please submit no more than 3 pages* of content per week. (*the amount of content submittable weekly may need to be adjusted during the course.)

Machine Learning Challenge: The machine learning challenge is intended to be a practical, cumulative project, to be completed in teams of 3-4. The goal is to build the best predictor you can using any of the materials from this course.

Research Surveys: We will be conducting pedagogical research to evaluate the math review resources and the role of prerequisites in this course. There will be a 1% bonus credit for completing an initial survey to better-understand your previous math/machine learning experience. We will be seeking your consent to use the survey responses and related data for research purposes; consent is not required for receiving the bonus.

Late Assessment Submissions Policy

Penalties for Lateness

Math Prepare: Late math prepares will not be accepted, but we will drop your lowest 2 math prepare marks.

Labs: We will be using a grace token system. Each student will begin with 8 tokens. Each token can be used to extend the lab deadline by 12 hours. Additionally, you can use a maximum of 2 tokens per lab.

The token limit is so that we can start grading and return your work promptly. MarkUs automatically deducts grace tokens when you submit an assessment late---you do not need to explicitly say you are using a grace token, just submit your work within the grace token period. If you work with a partner on a lab, grace tokens are deducted from both partners, not just one of you. For example, if Alice and Bob are working together, and wish to submit a lab 24 hours late, they must both have at least two grace tokens remaining.

The token system should cover most extenuous circumstances. If you have other special circumstances that may warrant additional accommodations, reach out to the course coordinator (Prof. Joshua Jung) at least 12 hours in advance of the deadline (not counting grace tokens.) Last-minute extension requests within 12 hours before the deadline will only be granted if there is an emergency that you could not have foreseen.

Procedures and Rules

Missed Term Work: Since the lowest labs are dropped from your grade, and grace tokens are available, short-term accommodations will not be granted for labs and homeworks. If you have highly extenuating circumstances (for example hospitalized for a long period of time), you may be given an alternative lab/homework to complete individually.

For missed term tests, contact the course coordinator (email above) within 2 days of the missed test. Students must provide valid documentation such as the UTM Verification of Illness or Injury. Once per semester, each student is allowed to miss work without any documentation. In that case, you must fill out the ACORN absence declaration form. The form can be used at most ONCE per semester (once in total for all of your courses, not once per course). The absence you declare can be for a maximum of 7 consecutive days. If you use the ACORN absence declaration form, please email the course coordinator stating that you have done so, but you do not need to submit any documentation for missed work during that absence.

Failure to take a test without an illness/valid reason will result in a grade of 0. If Test 1 or Test 2 is missed for a valid reason and appropriate documentation is provided, the weight of that test will be moved to the final exam.

Note: You should check all your course outlines carefully because different courses may have different policies.

Policies & Statements

Academic Integrity

The Code of Behaviour on Academic Matters states that:

The University and its members have a responsibility to ensure that a climate that might encourage, or conditions that might enable, cheating, misrepresentation, or unfairness is not tolerated. To this end, all must acknowledge that seeking credit or other advantages by fraud or misrepresentation, or seeking to disadvantage others by disruptive behaviour, is unacceptable, as is any dishonesty or unfairness in dealing with the work or record of a student.

It is your responsibility as a student at the University of Toronto to familiarize yourself with, and adhere to, both the Code of Student Conduct and the Code of Behaviour on Academic Matters.

This means, first and foremost, that you should read them carefully.

[Code of Student Conduct](#) and the [Code of Behaviour on Academic Matters](#) are available from the U of T website.

Religious Accommodations

Information about the University's Policy on Scheduling of Classes and Examinations and Other Accommodations for Religious Observances is at <https://www.vicereprovoststudents.utoronto.ca/student-resources/rights-responsibilities/accommodation-religious/>

Declaration of Temporary Absence

Students who miss an academic obligation during the term (i.e., in-class assessment, quiz, paper or lab report) may use the ACORN Absence Declaration Tool to record an absence in one or more courses. Students may utilize this option once per term for a single absence period of up to seven consecutive days. The declaration period must include the day of declaration and may include past and/or future dates, for a total of up to 7 calendar days.

Use of the ACORN Absence Declaration does not require supporting documentation and should be used in addition to the missed term work policy outlined in the course syllabus. It remains the student's responsibility to initiate the process for missed academic obligations by following the instructions in the course syllabus.

Re-grading Term Work

A student who believes that their written term work has been unfairly marked may ask the person who marked the work for re-evaluation. Students have up to one month from the date of return of an item of term work to inquire about the mark. If the student is not satisfied with this re-evaluation, they may appeal to the instructor in charge of the course if the work was not marked by the instructor (e.g., was marked by a TA). Such re-marking may involve the entire piece of work and may raise or lower the mark. For more information on policies regarding re-marking of term work, please refer to [Re-marking Pieces of Term Work in the Academic Calendar](#).

Plagiarism Detection Tool

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>).

Missed Final Examinations

Students who cannot complete their final examination due to illness or other serious causes must file an [online petition](#) with the Office of the Registrar within 72 hours of the missed examination. Late petitions will NOT be considered. Upon approval of a deferred exam request, a non-refundable fee is required for each examination approved. See the [Office of the Registrar Deferred Examinations](#) for more information.

Code of Student Conduct

All students are expected to adhere to the Code of Student Conduct ([Code of Student Conduct \[July 1, 2025\] | The Office of the Governing Council, Secretariat](#)).

Accommodations for Students with Disabilities

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach me and/or Accessibility Services as soon as possible. Accessibility staff (located in room 2240, Student Services Hub, Davis Building) are available by appointment to assess specific needs, provide referrals,

and arrange appropriate accommodations. Please call 905-569-4699 or email access.utm@utoronto.ca. The sooner you let us know your needs the quicker we can assist you in achieving your learning goals in this course.

Course Conflicts

Students are strongly discouraged from enrolling in courses where scheduled lectures, tutorials or practicals conflict with other courses in which they have already enrolled. Students who enrol in courses with conflicting lectures, tutorials or practicals may not receive accommodations for conflicting exams, assignments, lecture material, in-class participation, etc.

Robert Gillespie Academic Skills Centre (RGASC)

The Robert Gillespie Academic Skills (RGASC) supports undergraduate and graduate students in their academic skill development (e.g., writing, note taking, time management, study planning, mathematics and numeracy, research). We offer a range of supports, including individual appointments, workshops, and programs (many CCR-accredited). Our programs are designed to help students identify and develop the academic skills they need for success in their studies. The RGASC is located in MN3251 (3rd floor, Maanjiwe nendamowinan building). Explore the RGASC's online resources, book an appointment, and register for one of our programs at <https://www.utm.utoronto.ca/rgasc/>.

Generative AI (GenAI) Policy

You will not be required or encouraged to use generative AI (ChatGPT, etc.) in this course. However, you are permitted to use it as an aid for learning, for labs, and for the machine learning challenge (but **not** homeworks or math prepares). If you choose to do so, you take on two responsibilities:

1. You are accountable for the work you submit, and any content produced by an artificial intelligence tool must be cited appropriately. Many organizations that publish standard citation formats are now providing information on citing generative AI (e.g., MLA: <https://style.mla.org/citing-generative-ai/>). Citations should appear as needed throughout your labs (e.g. in code comments).
2. You are responsible for your learning. Assigned work is meant to give you hands-on experience grappling with foundational topics in machine learning and it is important that you think through these problems on your own. Some uses of GenAI are more harmful to your learning than others. For example, using a tool like code prediction is less likely to be problematic than generating a large block of code from plain text or directly asking GenAI how to solve a problem. If you are struggling with a problem, please instead reach out to course staff through Piazza or office hours to get help from a person who cares about your learning.

Ultimately, tests and the final exam in this course will not allow the use of GenAI tools, so you must be prepared to solve exercises, including writing significant code, without assistance. As a result, it is highly recommended that if you choose to use GenAI, you view its use as a learning aid, and that you review any material built on its output so that you are confident that it reflects what you understand and can produce on your own. Understand that there is a difference between being able to follow a solution and being able to produce one from scratch. Exams test for the latter.

Equity and Academic Rights

The University of Toronto is committed to equity, meaningful inclusion, and respect for diversity. All members of the learning environment in this course should strive to create an atmosphere of mutual respect towards one another. As a course instructor, I will neither condone nor tolerate language or behaviour that undermines the dignity or self-esteem of any individual in this course and wish to be alerted to any attempt to create an intimidating or hostile environment. It is our collective responsibility to create a learning space that is inclusive and welcomes discussion. Discrimination and harassment will not be tolerated. If you have any questions, comments, or concerns I encourage you to bring them to me for us to discuss. You may also contact the UTM Equity, Diversity, and Inclusion Office at edio.utm@utoronto.ca for assistance.

Additional Content

Lecture Recordings

We may record lectures for occasional use (e.g., students who cannot attend the in-person classes due to sickness may watch the recording in that week). However, the course is designed for in-person learning, so students should not solely rely on the recordings. Recordings may not be consistently available depending on technical issues. This means that the course, including your participation, may be recorded on video and may be available to students in the course for viewing remotely and after each session. Course videos and materials belong to your instructor, the University, and/or other sources depending on the specific facts of each situation, and are protected by copyright. In this course, you are permitted to download session videos and materials for your own academic use, but you should not copy, share, or use them for any other purpose without the explicit permission of the instructor. For questions about recording and use of videos in which you appear please contact the course coordinator.

Re-Mark Requests

For timely feedback, please submit re-mark requests within one week of receiving your grade. All work will be re-evaluated; this can cause the grade to go up, go down, or stay the same. For assignments, please submit re-mark requests on markus. For tests, please email the course coordinator (Prof. Joshua Jung) with the subject "CSC311 TestX Re-mark Request", where X is the test number.

Piazza

We will make important announcements on Piazza. Therefore, we strongly suggest that you check Piazza daily. Course staff will check Piazza daily and aim to respond to questions within 48 hours.

Part of our teaching philosophy is to use Piazza as a teaching resource. We encourage discussion and participation on Piazza. For this reason, all posts that do not contain personal information or assignment code will be made public. Even if your question seems trivial or unimportant to you, it may help someone else or lead to good discussion.

Information for accessing Piazza may be found on [Quercus](#).