University of Toronto Scarborough - Dept. of Computer & Mathematical Sci

CSCC11H3 F

Introduction to Machine Learning and Data Mining

Fall 2023 Syllabus

Course Meetings

CSCC11H3 F

Section	Day & Time	Delivery Mode & Location
LEC01	Friday, 11:00 AM - 1:00 PM	In Person: HW 216
TUT0001	Tuesday, 2:00 PM - 3:00 PM	In Person: IC 320
TUT0002	Thursday, 1:00 PM - 2:00 PM	In Person: IC 230
TUT0003	Monday, 10:00 AM - 11:00 AM	In Person: HW 402

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

Course Contacts

Instructor: Rawad Abou Assi
Email: rawad.abouassi@utoronto.ca
Office Hours and Location: Mondays (18:00-20:00) and Fridays (14:00-18:00), IC478.

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 and non-linear models, class-conditional models, neural networks, and Bayesian methods. Clustering algorithms and dimensionality reduction. Model selection. Problems of over-fitting and assessing accuracy. Problems with handling large databases.

Course Learning Outcomes

By the end of the course, students will be able to:

1. Identify the problems that can be tackled using machine learning.
2. Formulate regression, clustering, and classification as optimization problems.
3. Understand the strengths and weaknesses of common machine learning approaches.
4. Implement and evaluate common machine learning algorithms using real datasets.
5. Differentiate between supervised and unsupervised learning techniques.
6. Analyze the factors that impact the generalization of a machine learning model.

Prerequisites: MATB24H3 and MATB41H3 and STAB52H3 and [CGPA of at least 3.5 or enrolment in a CSC Subject POSt or enrolment in a non-CSC Subject POSt for which this specific course is a program requirement].
Corequisites: None
Exclusions: CSC411H, (CSCD11H3)
Recommended Preparation: CSCC37H3
Credit Value: 0.5

Course Materials

There is no required textbook for the course. Instead, we will use a set of lecture notes that will be posted on Quercus. The students are encouraged to use the following Piazza forum for any relevant questions:

https://piazza.com/utoronto.ca/fall2023/cscc11

Marking Scheme

Assessment	Percent	Details	Due Date
Quizzes	5%		No Specific Date
Tutorial Exercises	5%		No Specific Date
Assignments	25%		No Specific Date
Term Test	30%		No Specific Date
Final Exam	35%		Final Exam Period

Students must score at least 35% on the final exam to pass the course.

Late Assessment Submissions Policy

Late submissions are accepted without penalty only if proper justification is provided. Otherwise, a 10% penalty per day of lateness is applied for a maximum of three days (i.e. after three days of the due date, the submission would not be accepted).

Missed submissions result in a grade of zero unless proper justification is provided along with any necessary documentation (e.g. UofT medical certificate). In such cases, the instructor would either conduct a similar assessment or distribute the weight of the missed assessment over the other graded ones.

Course Schedule

The following is a tentative schedule:

Weeks	Topic
1	Introduction
2	Linear Regression
3	Non-linear Regression
4	Generalization
5	Clustering
6, 7	Classification
8	Ensemble Techniques
9	Support Vector Machines
10	Principal Component Analysis
11, 12	Neural Networks

Policies & Statements

Academic Integrity

The University treats cases of cheating and plagiarism very seriously. The University of Toronto's Code of Behaviour on Academic Matters (http://www.governingcouncil.utoronto.ca/policies/behaveac.htm) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences.

Potential offences in papers and assignments include 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, making up sources or facts, obtaining or providing unauthorized assistance on any assignment.

On tests and exams, cheating includes using or possessing unauthorized aids, looking at someone else's answers during an exam or test, misrepresenting your identity, or falsifying or altering any documentation required by the University.

Equity, Diversity and Inclusion

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.

The University of Toronto is a richly diverse community and as such is committed to providing an environment free of any form of harassment, misconduct, or discrimination. In this course, I seek to foster a civil, respectful, and open-minded climate in which we can all work together to develop a better understanding of key questions and debates through meaningful dialogue. As such, I expect all involved with this course to refrain from actions or behaviours that intimidate, humiliate, or demean persons or groups or that undermine their security or self-esteem based on traits related to race, religion, ancestry, place of origin, colour, ethnic origin, citizenship, creed, sex, sexual orientation, gender identity, gender expression, age, marital status, family status, disability, receipt of public assistance or record of offences.

Accommodations

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 the AccessAbility Services Office as soon as possible.

AccessAbility Services staff (located in Rm AA142, Arts and Administration Building) are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations 416-287-7560 or email ability.utsc@utoronto.ca. The sooner you let us know your needs the quicker we can assist you in achieving your learning goals in this course.

Recording of Classroom Material by Students

Recording or photographing any aspect of a university course - lecture, tutorial, seminar, lab, studio, practice session, field trip etc. – without prior approval of all involved and with written approval from the instructor is not permitted.

Sharing Course Materials

Course 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 them 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.