DEPARTMENT OF MATHEMATICAL AND COMPUTATIONAL SCIENCES
UNIVERSITY OF TORONTO MISSISSAUGA

CSC411H5F LEC0101
Machine Learning and Data Mining
Course Outline - Fall 2019

Class Location & Time	Mon, 03:00 PM - 05:00 PM CC 2150
Instructor	Anthony Bonner
Office Location	DH 3090
Office Hours	MW 6-7pm
Telephone	905-828-3813
E-mail Address	bonner [at] cs [dot] toronto [dot] edu
Course Web Site	http://www.cs.toronto.edu/~bonner/courses/2019f/csc411
Teaching Assistant	Mustafa Ammous
Teaching Assistant	Hamed Heydari
Teaching Assistant	Mohan Zhang

Course Description

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. Problems with handling large databases. [24L, 12T]

Prerequisite: CSC207H5, CSC290H5, (MAT134H5/MAT136H5/MAT134Y5/MAT135Y5/MAT137Y5/MAT157Y5/MAT233H5), MAT223H5/MAT240H5; STA256H5
Exclusion: CSC411H1, CSCC11H3
Recommended: CSC338H5 (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.

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 over fitting 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. As a fringe benefit, you will also find out what all that math you learned is actually used for!

Textbooks and Other Materials

There is no required text, but we will recommend specific readings from Pattern Recognition and Machine Learning by Christopher Bishop (Springer).

Assessment and Deadlines

Type	Description	Due Date	Weight
Assignment	Assignment 1	2019-10-11	15%
Assignment	Assignment 2	2019-11-15	15%
Assignment	Assignment 3	2019-12-04	15%
Term Test	Midterm test	2019-10-21	15%

Final Exam	Final Exam	TBA	40%
		Total	100%

More Details for Assessment and Deadlines

No late assignments will be accepted.

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

The midterm test and final exam will follow the "I don't know" policy: if you leave a question (or part) blank and write "I don't know", you will receive 20% of the marks for that question (or part). Otherwise, if you get the answer wrong, you may receive 0 marks.

Penalties for Lateness

100%

Procedures and Rules

Missed Term Work

To request special consideration, bring supporting documentation to the instructor in person during office hours at least one week in advance.

In case of illness, bring a U of T medical certificate to the instructor within one week of the missed work. The certificate must specify the exact period during which you were unable to carry out your academic work.

In case of a missed midterm, the weight of the final exam will be increased by 15% (from 40% to 55%).

In case of a missed assignment, the weight of all other work (assignments, midterm and exam) will be increased equally to account for an additional 15% of the final grade.

Missed Final Exam

Students who cannot write a final examination due to illness or other serious causes must file anonline petition **within 72 hours of the missed examination**. Original supporting documentation must also be submitted to the Office of the Registrar **within 72 hours of the missed exam**. Late petitions will **NOT** be considered. If illness is cited as the reason for a deferred exam request, a U of T Verification of Student Illness or Injury Form must show that you were **examined and diagnosed at the time of illness and on the date of the exam, or by the day after at the latest**. 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

Honesty and fairness are fundamental to the University of Toronto's mission. Plagiarism is a form of academic fraud and is treated very seriously. The work that you submit must be your own and cannot contain anyone elses work or ideas without proper attribution. You are expected to read the handout How not to plagiarize (http://www.writing.utoronto.ca/advice/using-sources/how-not-to-plagiarize) and to be familiar with the Code of behaviour on academic matters, which is linked from the UTM calendar under the link Codes and policies.

Final Exam Information

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

Additional Information

The "cheat sheet" for the final exam must contain no more than 12,000 characters total. If typed, it should use 12-point font or larger.

The tutorials may introduce new material not covered in the lectures or the text. On all work, 20% of the grade will be for quality of

presentation, including the use of good English. Final grades may be adjusted up or down to conform with University of Toronto grading policies.

The midterm test will be held in class.

Last Date to drop course from Academic Record and GPA is November 7, 2019.