Overview

An introduction to the programming and application of artificial intellgience, with a focus on deep learning. By the end of the course, students will be able to implement neural networks to perform classification on image, text, and other types of data. Students will also have a high-level understandings of neural network models used to generate images, such as autoencoders and GAN. We will focus on implementations using Python, Numpy, and PyTorch.

Meeting Time

Lecture: Monday 6pm-8pm MY330
Lecture: Thrusday 6pm-7pm MY330
Lab: Thursday 7pm-8pm SF1013

Course Staff

Instructor	Lisa Zhang
Office Hours	Thursday 4pm-5pm BA2197 and by appointment
Email	lczhang (at) cs.toronto.edu
	Please include APS360 in your email subject
	For non-personal, course related questions, please use Piazza
Teaching Assistants	Andrew Jung, Huan Ling, Farzaneh Mahdisoltani, Jake Snell

Website

The course website is required reading and is located here:

https://www.cs.toronto.edu/~lczhang/360/

The website contains important information and links: Quercus (for submitting work and receiving grades/feedback), Piazza (course discussion board), lecture materials, lab handouts, project information, and other links.

Textbook

None. Lecture notes and recommended readings will be posted each week.
If you prefer reading textbook, the following text might be helpful:
"Deep Learning with PyTorch" by Vishnu Subramanian
"Introduction to Deep Learning" by Eugene Charniak (uses tensorflow instead of PyTorch)

Tentative Schedule

Here is the rough week-by-week schedule, subject to change.

Weeks	Monday (lec)	Thursday (lec)	Thursday (lab)
Week 1	Introduction, Artificial Neurons	Pigeons to Neural Networks	Lab 1
Week 2	Neural Network Training	Neural Network Terminology	Lab 2
Week 3	(Victoria Day)	Multi-class Classification	Lab 3a
Week 4	Convolutional Neural Networks	CNN Architecture	Lab 3b
Week 5	Deconvolutions and Autoencoders	Word Embeddings	Lab 4
Week 6	Recurrent Neural Networks	Recurrent Neural Networks	Lab 5
Week 7	Midterm Review	Midterm Test	Midterm Test
Reading week			
Week 8	(Canada Day)	Text Generation	Text Generation (lec)
Week 9	Generative Adversarial Networks	Guest Lecture (TBD)	Project
Week 10	Reinforcement Learning	Guest Lecture (TBD)	Project
Week 11	AI Ethics	Guest Lecture (TBD)	Project
Week 12	Final Term Test Review	Final Term Test	Final Term Test
Week 13	(Civic Holiday)	Project	Project
Week 14	Presentations	Presentations	Presentations

Marking Scheme

The marking scheme for this course is as follows:

Work	Weight	Comments
Assignments	15%	
Midterm	20%	Thursday June 20, 6pm-8pm, Room TBD
Project	30%	
Final Term Test	35%	Thursday August 1, 6pm-8:30pm, Room TBD

Labs

A key part of the learning in this course is the hands-on programming labs. The scheduled lab time will provide time to work on and receive TA help on the lab exercises. There are 5 labs, all due in the first half of the course. All labs should be completed individually. The weighting of the labs are as following:

Lab	Weight	Deadline
Lab 1	2%	Due May 15, 9pm
Lab 2	3%	Due May 22, 9pm
Lab 3(a)	1%	Due May 24, 11:59pm (*note the irregularity)
Lab 3(b)	3%	Due June 5, 9pm
Lab 4	3%	Due June 12, 9pm
Lab 5	3%	Due June 19, 9pm

Project

The project in this course will require students to implement a major piece of software that makes use of the material of the course to do something of your own choosing. It is a substantial focus of the second half of this course. The project will be done in groups of three, and will account for 30% of your final grade. There are several phases and specific deadlines of the project, with several interim deliverables:

Deliverable	Weight	Comment
Team Formation and Uniqueness Approval		Due June 21, 9pm
Project Proposal	3%	Due June 27, 9pm
Progress Meeting with a TA Mentor	3%	Between July 8 and July 15, 9pm
Progress Report	4%	Due July 24, 9pm
Presentation Slides		Due August 12th, 3pm
Project Presentation	10%	August 12th / 15th, 6pm-8pm
Project Repository	10%	Due August 15, 9pm
Project Addendum		Due August 15, 9pm

Late Work Policy

There is a penalty-free grace period of **one hour** past the deadline. Any work that is submitted between 1 hour and 24 hours past the deadline will receive a **20%** grade deduction. No other late work is accepted. Quercus submission time will be used, not your local computer time. You can submit your labs as many times as you want before the deadline, so please submit often and early.

Midterm

The midterm test takes place during class, and covers all material from weeks 1 to 6. No aids will be permitted. The midterm room location will not be the regular lecture location, and is to be announced. Last term's midterm will be posted on the course website.

Final Term Test

The final term test is comprehensive, and will take place August 1, 6pm-8:30pm. No aids will be permitted. Last term's exam will be posted on the course website. This final term test replaces the final exam.

Use of TurnItIn

Turnitin.com will be used to assist in the evaluation of the originality of some of the term work. Turnitin.com is only a tool which will assist in detecting plagiarism. Normally, students will be required to submit their course essays to Turnitin.com 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 Turnitin.com reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of the Turnitin.com service are described on the Turnitin.com web site - http://turnitin.com/. **If you prefer not to submit your work to Turnitin.com, please let the instructor know by May 14.**

Accessibility

The University of Toronto and your instructors are committed to accessibility. If you require accommodations, or there is anything course-related we can do to help, please get in touch.

Academic Offenses

The University of Toronto expects you to be a full member of the academic community and to observe the rules and conventions of academic discourse. In particular, all of the work you submit must be your own and your work must not be submitted by someone else. Plagiarism is a form of academic fraud, and the department uses software that compares submissions for evidence of similarity. The full text of the policy that governs Academic Integrity at U of T (the "Code of Behaviour on Academic Matters") can be found at:

`www.governingcouncil.utoronto.ca/policies/behaveac.htm`

Please don't cheat. It is unpleasant for everyone involved, including us. Here are a couple of general guidelines to help you avoid plagiarism:

- Never look at another student's homework. Never show another student your 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*. Any code or solutions that you submit should be your alone.
- Do not post any of your assignment questions in a private or public online discussion forum or website in order to solicit solutions from others.

Note that, under the University of Toronto code of conduct, a person who supplies an assignment to be copied will be penalized in the same way as the one who makes the copy. We will use software to detect copying that is quite sophisticated and so is difficult to defeat.