UNIVERSITY OF TORONTO
SCHOOL OF CONTINUING STUDIES

COURSE OUTLINE

COURSE CODE: 3546

COURSE TITLE: Deep Learning

INSTRUCTORS:

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Please communicate with the instructors primarily through the online discussion boards. They will be checked once a day. For urgent requests, please email the instructor.

DAY/TIME:

May 22, 2024 - August 7, 2024

WEBINAR SCHEDULE: Wednesdays 6-8 PM, Eastern Time

REQUIRED TEXT(S): Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow (2nd Edition), by Aurelien Geron

RECOMMENDED TEXT(S) AND OTHER RESOURCES:

1. Deep Learning, by Goodfellow, Bengio & Courville
2. Deep Learning with Python, by Francois Chollet
3. Neural Networks and Deep Learning, by Charu C. Aggarwal
4. Information Theory, Inference and Learning Algorithms, by David MacKay

PREREQUISITE(S)/ RECOMMENDATIONS: 3253 Machine Learning

Recommended:

You should have a laptop with at least 8 GB of RAM to bring to class. You will need to have access to a laptop or desktop outside class with an i5 or preferably i7 processor, that can run recent Windows, Mac or Linux operating systems. Ideally the machine should also have an NVIDIA graphics card but this is not a requirement. Any software you'll need is free and mostly open source. You will receive further instructions in class.

CERTIFICATE(S): This course is applicable to the following SCS Certificates

COURSE DESCRIPTION:

Extend your knowledge and understanding of Machine Learning to Deep Neural Networks. In this course we will cover the theory and practice of modern neural nets through a series of exercises and examples in different domains. You will build your own algorithms to classify images, perform rudimentary language translation and generate synthetic images or music.

LEARNING OUTCOMES:

By the end of this course, learners will be able to:

- Know the theory and practice of modern neural networks.
- Use Tensorflow2 to create and train deep neural networks.
- Tune deep neural networks for different tasks.
- Understand the difference between various network architectures like CNN, RNN, transformer and generative algorithms.
- Apply deep-learning network architectures to solve a range of problems, e.g. classify images, predict trends and generate artwork.

ASSOCIATIONS: This course is not recognized by an Association.
https://learn.utoronto.ca/programs-and-courses/association-partnerships

COURSE FORMAT:

Course Format	Definition
Weekly webinars	Webinars Wednesday evenings 6-8 PM, ET. Webinars will be recorded.
Assignments	Four assignments to reinforce course concepts and build hands-on experience with deep nets.
Term Project	Group or individual.

QUERCUS and ONLINE RESOURCES

Quercus is a learning management engine, and is the University of Toronto's main online teaching and learning environment. It is web-based software which gives you and your instructor a shared learning space online to receive and exchange course content as well as to communicate using a range of tools. More information about online learning in Quercus can be

found here:
https://help.learn.utoronto.ca/hc/en-us/sections/115000462414-Online-learning-in-Quercus

COURSE PLAN:

MODULES	TOPIC/LESSONS/WEBINARS	READINGS, ASSIGNMENTS, ACTIVITIES, ETC.
1	Intro to Course & Review	• Module 1 notebook
2	Model Tuning	• Module 2 notebook • Assignment 1 assigned
3	Convolutional Networks	• Module 3 notebook
4	Deep Computer Vision	• Module 4 notebook • Assignment 1 due • Assignment 2 assigned
5	Recurrent Neural Nets	• Module 5 notebook
6	Natural Language Processing	• Module 6 notebook
7	Deep Models for Text	• Module 7 notebook • Assignment 2 due • Assignment 3 assigned
8	Representational Learning & Variational Methods	• Module 8 notebook
9	Deep Generative Models	• Module 9 notebook • Assignment 3 due • Assignment 4 assigned

10	Speech and Music Recognition & Synthesis	• Module 10 notebook
11	Term Project Presentations	• Term project due
12	Term Project Presentations	• Assignment 4 due

GRADING AND EVALUATION:

Project	30%
Assignments	60%
Participation	10%

A note about Participation Marks:

Participation marks are for attendance and, more importantly, constructive contributions to class discussion on a regular basis.

Learners can expect to receive feedback and marks, if applicable, before the course end date, for all their submitted assignment(s) and test(s) other than the final exam, project or course paper. However, it is the sole responsibility of learners to make sure that they do get these marks from their instructors and have all related questions answered before the course ends.

MISSED TEST/ASSIGNMENT GUIDELINES

If you miss a test or assignment please work directly with your instructors to make alternate arrangements. There may be penalties for missed or late assignments and tests.

SCS GRADING SCALE:

A: 80% to 100% Excellent

B: 70% to 79% Good

C: 60% to 69% Adequate

D: 50% to 59% Marginal

FX: Less than 50%

INC: Incomplete

DNW: Did not write

FINAL GRADE:

To view your final grade, please login to “My Access – Student Login” at: https://learn.utoronto.ca/login. Please note that your final grade will not be posted on Quercus.

More information regarding Academic Policies and Guidelines is located here: https://help.learn.utoronto.ca/hc/en-us/sections/207314307-Academic-Policies-and-Guidelines

CODE OF STUDENT CONDUCT AND CODE OF BEHAVIOUR ON ACADEMIC MATTERS:

All School of Continuing Studies learners are required to comply with the University of Toronto Academic Policies including, but not limited to the Code of Student Conduct and the Code of Behaviour on Academic Matters.

Information regarding University of Toronto Academic Policies can be reviewed here: https://help.learn.utoronto.ca/hc/en-us/articles/235279047-Academic-Policies-and-Student-Code-of-Conduct

ACADEMIC HONESTY:

Course work that is not appropriately cited may be in violation of the Code of Behaviour on Academic Matters (see above).

For guidelines about plagiarism and properly citing your sources, please visit:

https://help.learn.utoronto.ca/hc/en-us/articles/115006427548-Academic-Honesty

Your work is expected to be your own. Please do not submit code that has been copied from an online blog or public git repository. In exceptional cases, if you use code snippets you have found online (e.g. for advanced preprocessing pipelines, regex-based text cleaning, common plotting tasks, etcetera), please provide a citation. If unsure, please contact your instructors.

AUDIO/VIDEO RECORDINGS:

You are not permitted to record lectures without the written consent of your instructor(s).

ACADEMIC ACCOMMODATIONS:

If you require accommodation for a disability, please contact Enrolment and Learner Services at 416-978-2400, email scs.accessibility@utoronto.ca or fill out the form at the following link to arrange this service.
https://learn.utoronto.ca/help/forms-and-applications/accommodation-request-form