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# Applied Deep Learning

## Lecture 0: *Course Information and Logistics*

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ECE Department, University of Toronto

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# Course Information



# Welcome to ECE1553!

Happy to see you in ECE 1553

*Applied Deep Learning*

**Instructor.** Ali Bereyhi

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*Where and When?*

- *Tuesdays at 1:00 – 4:00 PM at MC-252*

**Tutorials.** There are tutorial sessions

- *Fridays at 1:00 – 2:00 PM at MY-150*

## Instructional Team

- **Cassie Li** – *Project Coordination*
  - *PhD Candidate, ECE Department*
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- **Sara Azadegi Naeini** – *Exam Coordination*
  - *PhD Candidate, ECE Department*
  - *Email: sara.azadeginaeini@mail.utoronto.ca*
- **Navid Hassanzadeh** – *Course Coordination and Office Hours*
  - *PhD Candidate, ECE Department*
  - *Email: navid.hasanzadeh@mail.utoronto.ca*
- **Saleh Tabatabaei** – *Tutorials*
  - *PhD Candidate, ECE Department*
  - *Email: s.mirzatabatabaei@mail.utoronto.ca*

## Course Page

Pretty simple and sustainable!

- **GitHub Page.** You get all resources through the GitHub page
- **Quercus.** Used for announcement
- **Crowdmark.** Used for submissions
- **Piazza.** Used for asking questions and searching for team-mates

### Please use Piazza!

Please initiate a **Piazza post** whenever you got a question

↳ Use the right **topic label** to be safe

If you want to send an email . . .

1. Are you sure? 😊
2. It seems you are sure! Please add the **prefix [ECE1553:Ap1DL]** to subject



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# Course Content

# What Do We Learn?

*Simple: We learn **Deep Learning**!*

*How do we learn it?*

1. **Preliminaries**

↳ *Universality of computational models*

2. **Fundamentals of Neural Processing**

↳ *NNs, convolution, backpropagation, skip connection, etc*

3. **State of the Art Deep Architectures**

↳ *Seq2seq, transformer, autoencoder, etc*

## Attention

**Computational** Learning  $\longleftrightarrow$  **Statistical** Learning



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# Evaluation

## How Do We Get Trained?

1. **Assignments.** It comprises 40% of coursework
  - Five sets of assignments
  - Both written and programming questions
    - ↳ Each assignment has two weeks time
    - ↳ *No late submission is accepted!* Sorry!
  - You also get *Practice Questions*
    - ↳ Not submitted anywhere!
    - ↳ For further practice and exam preparation only

## Use of AI for Assignments

AI may be used in an extremely restricted fashion

↳ *clarifying concepts, debugging errors, performing sanity checks*

Copying AI responses or relying on AI code/solutions is **strictly prohibited**

↳ *Complete **AI Usage Attestation** for every submission*

We try to inspect submissions for potential AI usage

## How Do We Get Trained?

### 2. **Exams.** Two short exams comprising 30% of coursework

- First exam on **October 16**
- Second exam on **November 27**
- Hold on **tutorial hour, i.e., Friday 1:00-2:00 PM**
- Each exam contains two questions
  - ↳ *No detailed programming is asked*
  - ↳ *Similar to **practice questions and assignments***

## How Do We Get Trained?

### 3. Final Project. It comprises 30% of coursework

- Groups of 3. *Smaller or large groups are generally not accepted*
- Submit proposal by **October 23**
  - ↳ Topic must involve *deep learning*
  - ↳ Both *research* and *design* projects are accepted
  - ↳ *Git repository* must be initiated and shared with proposal
- Submission is due on the **third week of December, i.e., 14 – 18**
  - ↳ 5-minute presentation *during the week*
  - ↳ Final report and code submission by the *end of the week*

## Use of AI for Assignments

AI may be used in an *intelligent assistant* for tasks like

- ↳ *clarification, background knowledge, drafting code modules, implementations of benchmark, debug, sanity checks, polishing documentation*

Relying on AI-generated code/solutions without verification, delegating substantial portions to AI, or submitting an AI-written report is **strictly prohibited**

- ↳ Complete **AI Usage Attestation** for final submission

# Course Calendar

| Week # | Date            | Notes                           | Posted       | Deadlines                               |
|--------|-----------------|---------------------------------|--------------|-----------------------------------------|
| 1      | Sep 07 - Sep 11 |                                 | Assignment 1 |                                         |
| 2      | Sep 14 - Sep 18 |                                 |              |                                         |
| 3      | Sep 21 - Sep 25 |                                 | Assignment 2 | Assignment 1                            |
| 4      | Sep 28 - Oct 02 |                                 |              |                                         |
| 5      | Oct 05 - Oct 09 |                                 |              |                                         |
| 6      | Oct 12 - Oct 16 | Exam I on Oct 16                | Assignment 3 | Assignment 2                            |
| 7      | Oct 19 - Oct 23 |                                 |              | Project Proposal                        |
| 8      | Oct 26 - Oct 30 | Reading Week-- No Lectures      |              |                                         |
| 9      | Nov 02 - Nov 06 |                                 | Assignment 4 | Assignment 3                            |
| 10     | Nov 09 - Nov 13 |                                 |              |                                         |
| 11     | Nov 16 - Nov 20 |                                 | Assignment 5 | Assignment 4                            |
| 12     | Nov 23 - Nov 27 | Exam II on Nov 27               |              |                                         |
| 13     | Nov 30 - Dec 04 |                                 |              | Assignment 5                            |
| 14     | Dec 07 - Dec 11 |                                 |              |                                         |
| 15     | Dec 14 - Dec 18 | Examination Time -- No Lectures |              | Project Presentation, Report, and Codes |

## In Person Lectures!

The course is **in-person** and . . .

*. . . by SGS rules the attendance is mandatory in in-person courses!*

attendance  
**MATTERS**

**Recording** is uploaded after each lecture

- They are mainly for **recap** and/or **following some missed lectures**
- I **strongly** advise to **attend** the lectures
  - You don't want to miss my **performance** 😊
  - **Board and I** are **not** captured in videos, it's **only** the **slides and my voice**
  - Let's do some exercise and **save the planet** 😊



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# Resources

## Programming in *Python*

*We do programming in Python*

- ↳ Basic knowledge in Python is needed
  - ↳ *Don't run away* if you *haven't*, you only need a bit of *more efforts*
- ↳ We just need *basics*, we will learn all packages that we need
  - ↳ *Matplotlib, NumPy, Scikit-Learn, Pandas*
  - ↳ But our main toolkit in Python will be *PyTorch* that we learn in detail

## No Major Prerequisites

The course is *self-containing* meaning that

*you will learn **all background** you need!*

We assume that we all have some *basic math* in mind

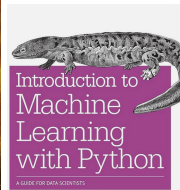
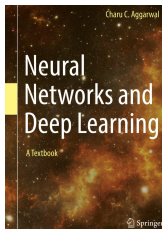
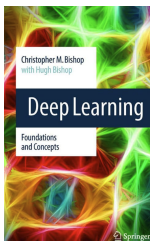
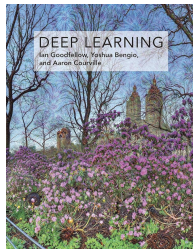
↳ *linear algebra, calculus, and probability theory*

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### ECE 1513. Introduction to Machine Learning

- Totally fine (actually *suggested*) if *you had it before or have it right now*
- It's focusing on *general Machine Learning* not *Deep Learning*
- We *study Deep Learning and Neural Networks*
  - ↳ *The courses can be seen as **complements***
  - ↳ *You **could** also have **only one of them***

## Textbooks



*All materials **are provided in the course**. It's however **good to know** some texts!*

- Goodfellow et al., can be accessed online [at this link](#)
- New textbook by Bishops is available online [here](#)
- Also, you may take a look at *NN and Deep Learning* [here](#)
- For *PyTorch* the best resource is its own [tutorials](#)

## Terms and Conditions!



*The instructor keeps the right reserved for himself to modify the slides*

- *last minute before the lecture 😊*
- *after the lecture has been given*
  - *Typically happens due to typos*

*The instructor keeps the right reserved for himself to deliver the lecture-notes*

- *in form of mini-batches 😊*

Date and Signature .....



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# Final Remarks

## Introducing Glum

*Glum does not buy my words! e.g.,*

- + Well! We know Python, you think you can teach us Deep Learning!*
- Sure! Let's try!*

*Please excuse me if sometimes I explain too much! I need to convince Glum!*



## *No such thing as a stupid question!*

*Did you know that we got [a Wikipedia page](#) on this?*

- Trust me! Your question will **never** sound stupid!
- **If you don't ask**; then, **I need to ask!**
  - ↳ *[Interaction](#) is the best tool to avoid getting bored!*

*Any Questions? 😊*