

[Print to PDF](#) ▶

Important links

Contents

- Important links
- Course learning outcomes
- Deliverables
- Teaching team
- Lecture schedule
- Installation
- Course communication
- Reference Material
- Policies



WHEN YOU TRAIN PREDICTIVE MODELS ON INPUT FROM YOUR USERS, IT CAN LEAK INFORMATION IN UNEXPECTED WAYS.

DSCI 575 Advanced Machine Learning

- [Course Jupyter book](#)
- [Course GitHub page](#)
- [Slack Channel](#)
- [Canvas](#)
- [Gradescope](#)
- [Class + office hours calendar](#)

In this course, we will learn some advanced machine learning methods in the context of natural language processing (NLP) applications, including Markov chains, hidden Markov models, recurrent neural networks, and self-attention and transformers.

► Click to expand!



► Click to expand!


► Click to expand!

This course will be run in person. We will meet three times every week: twice for lectures and once for the lab. You can refer to the [Calendar](#) for lecture and lab times and locations.

Lectures of this course will be a combination traditional live lecturing, class activities, and pre-recorded videos. Drafts of the lecture notes for each week will be made available earlier in the week.

This course occurs during **Block 6** in the 2024/25 school year.

Lecture	Topic	Assigned videos/Readings	Resources and optional readings
0	Course Information	 <ul style="list-style-type: none"> Videos: 16.1 	
1	Markov Models		<ul style="list-style-type: none"> Markov chains in action
2	Language models, PageRank, text preprocessing	 <ul style="list-style-type: none"> Videos: 16.2 	<ul style="list-style-type: none"> OpenAI GPT3 demo Dan Jurafsky's videos on PageRank Dan Jurafsky's video on tokenization
3	Hidden Markov models		<ul style="list-style-type: none"> Nando de Freitas' lecture on HMMs A gentle intro to HMMs by Eric Fosler-Lussier
4	HMMs decoding and inference	(optional) HMM Baum-Welch (unlisted)	<ul style="list-style-type: none"> Nando de Freitas' lecture on HMMs A gentle intro to HMMs by Eric Fosler-Lussier
5	Introduction to Recurrent Neural Networks (RNNs)		<ul style="list-style-type: none"> The Unreasonable Effectiveness of Recurrent Neural Networks Highly recommended: Sequence Processing with Recurrent Networks

Lecture	Topic	Assigned videos/Readings	Resources and optional readings
6	Introduction to Transformers	 <ul style="list-style-type: none"> Videos: Introduction to Self-Attention 	
7	Applications of Transformers		
8	Large Language Models		

The labs are going to be in person. There will be a lot of opportunity for discussion and getting help during lab sessions. Please make good use of this time.

We are providing you with a `conda` environment file which is available [↓ here](#). You can download this file and create a conda environment for the course and activate it as follows.

```
conda env create -f env-dsci-575.yml
conda activate 575
```

We've only attempted to install this environment file on a few machines, and you may encounter issues with certain packages from the `yml` file when executing the commands above. This is not uncommon and may suggest that the specified package version is not yet available for your operating system via `conda`. When this occurs, you have a couple of options:

1. Modify the local version of the `yml` file to remove the line containing that package.
2. Create the environment without that package.
3. Activate the environment and install the package manually either with `conda install` or `pip install` in the environment.

Note that this is not a complete list of the packages we'll be using in the course and there might be a few packages you will be installing using `conda install` later in the course. But this is a good enough list to get you started.

► Click to expand!

► Click to expand!

Please see the general [MDS policies](#).