

# **SYDE 556/750**

## **Simulating Neurobiological Systems**

### **Lecture 0: Administrative Remarks**

Chris Eliasmith

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UNIVERSITY OF  
**WATERLOO**

FACULTY OF  
ENGINEERING

# Warning

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Tough ass course. Do not take this as an easy elective. Assignments will kill you, and lectures will go over your head. That said, super interesting. One of a kind (which makes searching online for answers impossible) and I'm still trying to fully understand how everything works but it blows my mind. 100% worth taking but be prepared for difficult assignments (on the plus side, late days deductions are pretty low!)

— Software Engineering student 4 years ago, taught by [Chris Eliasmith](#)

● ○ ○ ○ ○ Easy

● ● ● ● ● Useful

👍👎 Liked

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Awesome course that will make you use all of your previous mathematical knowledge (vectors, calculus, Fourier Transforms) and will kick your butt with assignments. If you want a quick overview of the neural approach to intelligent systems, this is the course for you.

— Electrical Engineering student 6 years ago, taught by [Chris Eliasmith](#)

● ○ ○ ○ ○ Easy

● ● ● ● ● Useful

👍👎 Liked

- ▶ The UWFlow reviews are accurate.
- ▶ This can be a challenging course.
- ▶ Be prepared to spend a lot of time on the assignments.
- ▶ We'll be making use of pretty much everything in undergrad engineering, and applying it to cognitive science and neuroscience.

# Organization (I)

Instructor

**Chris Eliasmith**

Email      `celiasmith@uwaterloo.ca`

Website    `compneuro.uwaterloo.ca`

Course website

- ▶ Syllabus, project description, due dates:  
`http://compneuro.uwaterloo.ca/courses/syde-750.html`
- ▶ Assignments, slides, lecture notes:  
`https://github.com/celiasmith/syde556-f24`

## Organization (II)

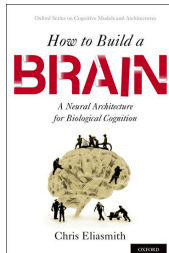
Course times and logistics - All meetings in E5-6008

- ▶ **Monday:**  
12:30-2:20 Lecture
- ▶ **Wednesday:**  
2:30-3:20 Lecture
- ▶ **Wednesday:**  
3:30-4:20 In person discussion (SYDE 750, optional for 556)

# Textbooks and Readings



**Main text:**  
Chris Eliasmith and  
Charles H. Anderson  
*Neural Engineering:  
Computation,  
Representation, and  
Dynamics in Neurobiological  
Systems*, MIT Press, 2003.



**Optional:**  
Chris Eliasmith  
*How to Build a Brain*,  
Oxford University Press,  
2013.

# Coursework (SYDE 556 & SYDE 750)

## Five Assignments

- ▶ 20%, 20%, 15%, 15%, 30%, respectively
- ▶ Roughly two weeks for each assignment
- ▶ Everyone must write their own code, generate their own graphs, and write their own answers.

## 750 Final Project (SYDE 556 optional, replaces assn 5)

- ▶ Build a model of some neural system.
- ▶ Replicable science: report everything needed to recreate your model and analysis
- ▶ 20% of grade (assignments are rescaled to 80%)
- ▶ Have your project proposal approved via email by Oct 23rd (see template)

## Coursework (SYDE 750 only)

### Class Participation in the Seminar (SYDE 750 only; optional for SYDE 556)

- ▶ General discussion about Neuroscience, cognitive science, AI, etc.
- ▶ Each student is asked to submit questions or interesting observations pertaining to this week's reading, lecture notes, or the material referenced in the lecture (this should be about 100 words).
- ▶ Questions must be submitted via email to the instructor ([celiasmith@uwaterloo.ca](mailto:celiasmith@uwaterloo.ca)) by midnight (23:59 EST) on the Tuesday before.
- ▶ This is to ensure a lively discussion in the seminar — there are no explicit marks for this part of the course, but participation will be incorporated into the final project mark.

# Schedule

- ▶ See here: <http://compneuro.uwaterloo.ca/courses/syde-750/syde-556-course-outline.html>
- ▶ Official syllabus: <https://outline.uwaterloo.ca/view/nwh9u7>



## To get started

- ▶ Get the textbook (“Neural Engineering”, Chris Eliasmith and Charles Anderson, 2003)
- ▶ Be able to run `jupyter lab` or `jupyter notebook` with a Python 3 kernel. Install `numpy`, `scipy`, and `matplotlib`. Anaconda is a Python distribution that ships with these packets preinstalled, so (depending on your platform) this might be the easiest to use.
- ▶ Start thinking about a project. . . already.