INTRODUCTION TO NEUROTECHNOLOGY
By NeurotechUofT

Room 2377 — Medical Sciences Building, University of Toronto
Mondays 6:00 — 8:00 PM　　　　　**January — March 2019**

Contact Information

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General Information

Description

This workshop series is designed as an introductory + intermediate course for undergraduate and junior graduate students to get an insight into the current state of business in Neurotechnology. The course does not assume any previous knowledge, neither in computer science & engineering nor in neuroscience and explains it all A-Z!

Expectations and Goals

The participants will take part in sessions with three general settings: **I.** Lectures **II.** Interactive sessions (based on Jupyter™ Notebooks) **III.** Brain Art Project

After the workshop series, the participants will be able to identify, acquire, and analyze brain signals through electroencephalography. At the end, they will make an art performance that is based on live brain signals.

Materials

Lecturecasts

The lectures will be uploaded to the NeurotechUofT [YouTube Channel](), please contact the workshops team if you have issues accessing them.

Jupyter™ Notebooks & Lecture Notes

The notes are posted on the workshops GitHub page ([click here]()).

Suggestion: Star it to get notified of the latest additions!

Required Text

Will be communicated every week.

Full Schedule

Week	Date	Topic
1	21/1/19	Introduction to Python *Absolute basics of programming*
2	28/1/19	**I.** Introduction to Git — **II.** Loading and graphing data *Git + GitHub, how to load data from CSVs (or FIFs), graphing data with Matplotlib, Fourier series*
3	04/2/19	Introduction to Neuroscience *History, how neurons work (brief intro), neuroanatomy review, Rall's cable theory, membrane potential (Nernst, GHK, HH equations)*
4	11/2/19	Noise Filtering *Filtering noise, and an introduction to the Fast Fourier Transform*
--	18/2/19	**Reading Week — No workshop**
5	25/2/19	Digital Signal Processing *Convolution, impulse responses, signal types, continuous vs discrete, aliasing, Nyquist's Theorem, FIR vs IIR, different types of filters, filter order*

Week	Date	Topic
6	04/3/19	Uncovering Oscillatory Processes in EEG *What exactly is EEG, physics of EEG, oscillatory processes vs ERPs, power spectral analysis for EEG power bands*
7	11/3/19	Brain Art Project! + Advanced Git + offline (dataset) work session *Intro to brain art project; how to get started; group Git; start working*
8	18/3/19	Neuromodulation *Literature review: therapeutic modulation of brain signals*
9	25/3/19	Intro to MuseJs + Brain Art architecture, brain artwork session (online) *A bit about how Brain Art was made, MuseJs, work session*
10	01/4/19	Present Brain Art!

CCR Recognition

Undergraduate students who take part in the 8 out of 9 of the workshops and *complete* the brain art project qualify for Co-Curricular Records (CCR). For more, visit clnx.utoronto.ca