Summary

Neuroengineering is at the frontier between neuroscience and engineering: understanding how the brain works allows developing engineering applications and therapies of high impact, while design of new measurement and data analysis techniques contributes to advance our knowledge about the brain.

Content

1. How the Brain Works
2. Recording and Analysis of Brain Activity
3. Peripheral Neuroprostheses
4. Brain-Machine Interfaces
5. Sensory Neuroprostheses
6. Plasticity
7. Neurorehabilitation

Learning Prerequisites

Recommended courses

Background in neuroscience, signal processing, and machine learning (e.g., EE-516).

Learning Outcomes

By the end of the course, the student must be able to:

• Formalize basic building blocks of neuroengineering.
• Develop critical thinking
• Assess / Evaluate the potential and current limitations of neuroengineering

Teaching methods

Lectures, exercises.

Expected student activities

Students will have to carry out weekly exercises (mostly critical review of papers) and provide a written report.

Assessment methods
Written exam. Final grade: 2/3 Exam, 1/3 Exercises.

Resources

Bibliography
Provided during the course.

Moodle Link

• http://moodle.epfl.ch/enrol/index.php?id=12691