BIOENG-448  
Fundamentals of neuroengineering
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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 he 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: 60% Exam, 40% Exercises.

Resources
Bibliography
Provided during the course.

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