



**LUNDS UNIVERSITET**  
Lunds Tekniska Högskola

*Course syllabus*

# **Neuroteknik Neuroengineering**

**BMEF20, 7,5 credits, G2 (First Cycle)**

**Valid for:** 2021/22

**Faculty:** Faculty of Engineering, LTH

**Decided by:** PLED BME

**Date of Decision:** 2021-04-14

## **General Information**

**Main field:** Technology.

**Elective for:** BME4-br, F4, F4-mt, N4, Pi4

**Language of instruction:** The course will be given in English

## **Aim**

The aim of this course is to give a broad overview of neural engineering concepts and principles for recording outgoing and generating incoming neural signals. The course will give insights into existing and future neural interfaces, neural prostheses and neurorobotics.

## **Learning outcomes**

*Knowledge and understanding*

For a passing grade the student must

- be familiar with the basic anatomy and physiology of the human central and peripheral nervous system
- understand how motor commands translate into muscle actions
- understand how sensation translates into perceptions

*Competences and skills*

For a passing grade the student must

- be able to use techniques for neurophysiological/electrophysiological recordings
- be able to apply neural engineering in different contexts

### *Judgement and approach*

For a passing grade the student must

- be able to interpret and discuss information from scientific literature regarding neuroengineering advances
- be able to reflect over the ethical consequences of neuroengineering

## Contents

The course will introduce principles and technologies of neuroengineering applications including basic human neurophysiology and -anatomy, brain stimulator, spinal cord stimulation, functional electrical stimulation (FES), neural-machine interface for motor prosthesis control, artificial visual and auditory devices for augmented sensory perception.

## Examination details

**Grading scale:** TH - (U,3,4,5) - (Fail, Three, Four, Five)

**Assessment:** Compulsory parts to be passed: lab exercises including reports, assignments, written essay, active participation in ethics seminar and a written exam.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

### Parts

**Code:** 0118. **Name:** Written Exam.

**Credits:** 5. **Grading scale:** TH. **Assessment:** Approved exam **Contents:** Written exam

**Code:** 0218. **Name:** Written Assignments.

**Credits:** 2,5. **Grading scale:** UG. **Assessment:** Completed laboratory work with approved laboratory report and approved assignments. Approved essay and a reflection showing active participation in the seminar on ethics.

**Contents:** Laboratory works with report, assignments, essay and a short reflection from the seminar on ethics

## Admission

**Assumed prior knowledge:** Mathematics, Physics and Physiology.

**The number of participants is limited to:** 32

**Selection:** Credits taken within the programme. Priority is given to students enrolled on programmes that include the course in their curriculum.

## Reading list

## **Contact and other information**

**Course coordinator:** Christian Antfolk, [christian.antfolk@bme.lth.se](mailto:christian.antfolk@bme.lth.se)

**Course coordinator:** Nebojsa Malesevic, [nebojsa.malesevic@bme.lth.se](mailto:nebojsa.malesevic@bme.lth.se)

**Further information:** Expert guest lecturers from other faculties or other universities may appear.