

## VMFP09, Advanced Neuroscience, 30 credits

*Avancerad neurovetenskap, 30 högskolepoäng*

Second Cycle / Avancerad nivå

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### Details of approval

The syllabus was approved by The Master's Programmes Board on 2024-05-21. The syllabus comes into effect 2024-05-21 and is valid from the spring semester 2025.

### General information

Freestanding course. The course is intended as preparation for third cycle studies in relevant fields at the faculties of medicine, science or engineering and for students with a first or second cycle degree in science, biomedicine or another relevant subject. The course is delivered full-time.

*Language of instruction:* English

*Main field of study*

*Specialisation*

Biomedicine

A1N, Second cycle, has only first-cycle course/s as entry requirements

### Learning outcomes

The aim of the course is to enable students to acquire specialised theoretical and practical knowledge of neuroscience, from basic concepts of neuroscience to pre-clinical and clinical applications. A further aim is to enable students to acquire practical experience of laboratory work or clinical methodology through project work in neuroscience. The course has a special focus on Parkinson's disease, cognitive diseases (dementia), Huntington's disease and acquired brain injuries.

### Knowledge and understanding

On completion of the course, the students shall be able to:

- define properties and functions of various cell types, brain areas, pathways and systems,
- define different forms of neurotransmission and intercellular communication,

- account for neuropathological changes that characterise neurodegenerative diseases and acquired brain injuries,
- account for experimental methods in current neuroscience research including cellular and animal based models,
- on a general level describe statistical concepts and calculation methods of relevance to the subject area.

### **Competence and skills**

On completion of the course, the students shall be able to:

- formulate a current, relevant scientific question in the area of neuroscience, define an aim and choose relevant methods to address these in the form of a written project plan,
- apply methods of relevance to the execution of a defined project in neuroscience,
- document, compile and present research results from a neuroscience project in the form of a written scientific report according to instructions provided,
- search, analyse and compile information from research publications in the subject area.

### **Judgement and approach**

On completion of the course, the students shall be able to:

- act in a professional manner in a neuroscience research environment,
- evaluate the suitability, strengths and weaknesses of choices regarding experimental and statistical methods for a neuroscience research project,
- critically analyse and evaluate research results of neuroscience research projects,
- critically analyse ethical problems arising in a neuroscience research project and determine which potential permissions are required to carry out the project,
- constructively give and use feedback in the course assignments.

### **Course content**

The course contains advanced theoretical and practical elements in the field of neuroscience. The course has a special focus on Parkinson's disease, cognitive diseases (dementia), Huntington's disease and acquired brain injuries.

### **Course design**

The course starts with 2 weeks of theory and preparation for the project work in the form of lectures and seminars led by experienced researchers and clinical practitioners.

Together with their supervisor, the student identifies a research project in the field of neuroscience and then writes a plan to be approved by the course management. Thereafter, the project is carried out as part of the supervisor's research environment. The research project is reported orally and in writing. Peer review is included in the assessment, in which constructive feedback is to be given, received and applied to the project. Throughout the course, students participate in seminars, group discussions and "journal clubs", which are included in the course portfolio. All activities in the

course portfolio require active preparation, for example in the form of reading and the review of handouts.

## **Assessment**

The course is assessed through three examination components:

- Individual written examination, 3 credits, Fail/Pass
- Course portfolio, 12 credits, Fail/Pass
- Project, 15 credits, Fail/Pass

Assessment of the course is based on a written examination of the initial theory weeks, a course portfolio that includes written assignments, peer review and participation in course activities such as seminars and journal clubs, and finally through a practical project that encompasses a written report, oral presentation and critical review.

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.

## **Grades**

Grading scale includes the grades: Fail, Pass

To achieve the grade of Pass for the whole course, the student must have passed all assessed components.

## **Entry requirements**

Bachelor's degree (180 credits) in science, biomedicine, medicine or other relevant field (engineering, physics, mathematics, bioinformatics).

International students are exempted from the general entry requirement of proficiency in Swedish but all students are required to have proficiency in English corresponding to English 6 from Swedish upper secondary school.