

## Neurobiology (C002728)

**Course size** *(nominal values; actual values may depend on programme)*

**Credits 3.0**

**Study time 80 h**

### Course offerings and teaching methods in academic year 2024-2025

A (semester 1)

English

Gent

seminar

excursion

lecture

### Lecturers in academic year 2024-2025

Vandenbroucke, Roosmarijn

WE14

lecturer-in-charge

van Loo, Geert

WE14

co-lecturer

### Offered in the following programmes in 2024-2025

[Master of Science in Biochemistry and Biotechnology](#)

**crdts**

3

**offering**

A

[Exchange programme in Biochemistry and Biotechnology \(master's level\)](#)

3

A

### Teaching languages

English

### Keywords

Brain, neuron, microglia, astrocyte, oligodendrocyte, synapse, ion channel, receptors, neurotransmitter, neuronal diseases, memory, imaging techniques

### Position of the course

The course Neurobiology will be given in the second year of the Master in Biochemistry and Biotechnology (Master 2) in which it is an obligatory course in the Major Biomedical Biotechnology (BIB). The first year of the Master in Biochemistry and Biotechnology and more specifically the Minor Biomedical Biotechnology (BIB) are a good preparation for the course Neurobiology.

The course will give a basic training in a number of important mechanisms involved in the functioning of the nervous system. This involves important knowledge concerning the development of the nervous system, the different neuronal cell types and the communication between nerve cells and the resulting physiological effects. Also mechanisms of neuronal diseases will be covered.

At the end of the course, students should be capable to apply their knowledge concerning the topics covered in the course, on research in the field of Neurobiology. They must be able to critically analyse the international literature and to communicate about these developments.

### Contents

1. Building of neuronal networks.

Overview neuroanatomy, CNS and PNS. Structure and function of neurons and glial cells (microglia, astrocytes, oligodendrocytes, Schwann cells) and their role in neuronal pathologies. Development and patterning of the nervous system. Axon guidance. Synapse formation.

2. Signal transduction in nerve cells.

Synapse: structure, regulation synaptic vesicles and neurotransmission, synaptic plasticity, Ion Channels.

3. Neuronal stem cells, neuroregeneration.

4. Information processing

Memory.

5. Techniques

Neuro-imaging

### **Initial competences**

Basic knowledge about Biochemistry and Biotechnology including technology (e.g. cloning, immunoprecipitation, knock-out, etc.) is required. Students must have successfully accomplished Bachelor in Biochemistry and Biotechnology (or studies at the same level with similar content). Students must be capable of critically analysing the international literature.

### **Final competences**

- 1 Students have acquired a specialised knowledge about the neurobiological subjects covered in the course.
- 2 They have to be able to extrapolate this knowledge to other research fields.
- 3 They have to be capable of analysing the international literature related to the field of neurobiology, and present these in a communicative and structured way.

### **Conditions for credit contract**

Access to this course unit via a credit contract is determined after successful competences assessment

### **Conditions for exam contract**

This course unit cannot be taken via an exam contract

### **Teaching methods**

Seminar, Excursion, Lecture

### **Extra information on the teaching methods**

Classroom sessions discussing articles from international literature. Individual literature study and written report.

### **Study material**

Type: Slides

Name: powerpoint slides

Indicative price: Free or paid by faculty

Optional: no

Language : English

Available on Ufora : Yes

### **References**

Principles of Neural Science (Kandel, Schwartz, Jesell, Siegelbaum and Hudspeth; McGraw-Hill, 2013)

This handbook is not obligatory and is available for consultation.

Publications from the recent international literature will be provided at no charge as pdf-files on Ufora.

### **Course content-related study coaching**

Apart from the classroom lectures, the possibility exists to raise questions to the teacher. The questions can also be raised through e-mail or in a personal contact after making a specific appointment.

### **Assessment moments**

end-of-term and continuous assessment

### **Examination methods in case of periodic assessment during the first examination period**

Written assessment with open-ended questions

### **Examination methods in case of periodic assessment during the second examination period**

Written assessment with open-ended questions

### **Examination methods in case of permanent assessment**

Assignment

### **Possibilities of retake in case of permanent assessment**

examination during the second examination period is possible

### **Extra information on the examination methods**

Non-periodical evaluation: Evaluation of individual literature study

Periodical evaluation: Evaluation will be based on the insights in the matters covered by the course. Written examination with open questions. If wanted, there is possibility for oral clarification.

### **Calculation of the examination mark**

Periodical evaluation (80%) + non-periodical evaluation (20%)