

# Syllabus

for course at advanced level

**Neurochemistry with Molecular Neurobiology**  
**Neurokemi med molekylär neurobiologi**

**15.0 Higher Education  
Credits**  
**15.0 ECTS credits**

**Course code:** KN7001  
**Valid from:** Autumn 2007  
**Date of approval:** 2006-09-27  
**Department** Department of Biochemistry and Biophysics

**Subject**  
**Specialisation:** AXX - Second cycle, in-depth level of the course cannot be classified

## Decision

This syllabus has been approved by the Board of the Faculty of Science at Stockholm University.

## Prerequisites and special admittance requirements

Chemistry 60 ECTS, basic level, of which 7.5 ECTS in Biochemistry or 60 ECTS in Biology, basic level, of which 9 ECTS in Zoo Physiology, or corresponding courses. Also required is knowledge equivalent to the Swedish upper secondary school course English B, or equivalent to one of the following tests; Cambridge CPE and CAE: Pass, IELTS: 6.0 (with no part of the test below 5.0), TOEFL (paper based): 550 (with minimum grade 4 on the written test part), TOEFL (computer based): 213, TOEFL (internet based): 79.

## Course structure

Examination code	Name	Higher Education Credits
N701	Neurochemistry with Molecular Neurobiology	15
LABO	Laboratory exercises	6
LITT	Literature seminar	1.5
TEOR	Theory	7.5

## Course content

- The course covers the neurotransmitter synthesizing and metabolizing mechanisms of the nerve terminal (synapsome), uptake and release of classical neurotransmitters and peptide neurotransmitters. Neurotransmitter receptors and their ligands are treated in terms of chemical pharmacology; the relevance of these molecules and their interactions for the development of tolerance, hypersensitivity and long-term potentiation is elucidated. Neurochemistry as a basis for pharmacology is also treated. The course is useful i.e. for future work in pharmaceutical industry.
- The course includes the following elements:
  - Theory 7.5 higher education credits.
  - Laboratory exercises 6 higher education credits.
  - Literature seminar 1.5 higher education credits.

## Learning outcomes

It is expected that the student after taking the course will be able to:

- Demonstrate basic insights into the morphology of neurons and the organization of the central and peripheral nervous system.
- Give an account of the electrophysiological properties of nerve cells, and interpret selected examples in

terms of the kinetic properties of ion channel proteins.

- Understand molecular mechanisms underlying the release of neurotransmitters, the structure, kinetics and signal transduction paths of receptors, and intracellular processes affecting proteins and regulating the electrical properties of neurons.
- Demonstrate basic knowledge about the most common diseases affecting the nervous system, and a more detailed insight into the molecular mechanisms underlying these states.
- Give an account of the most important classes of pharmacological substances that affect the nervous system, focusing on the molecular mechanisms whereby these substances can provoke or ameliorate nervous system disorders.

### **Education**

The education consists of lectures, group work, seminars, reports and laboratory exercises. An individual literature task is also comprised.

Participation in the practical laboratory work, reporting literature assignment and group education associated with this is compulsory.

After consultation with the relevant teacher, an examiner may rule that a student is not obliged to participate in certain compulsory education, if there are special grounds for this

### **Forms of examination**

a. Measurement of knowledge takes place through:

- Written and/or oral examination

b. Grading is carried out according to a 7-point scale related to learning objectives:

A = Excellent, B = Very Good, C = Good, D = Satisfactory,

E = Sufficient Fx = Fail F = Fail.

c. Grading criteria for the course will be distributed at the start of the course.

d. A minimum grade of E is required to pass the course, together with:

- A "Sufficient" grade for laboratory exercise reports and literature task, and
- Participation in other compulsory education.

e. Students who fail to achieve a pass grade in an ordinary examination have the right to take at least further four examinations, as long as the course is given. The term "examination" here is used to denote also other compulsory elements of the course. Students who have achieved a pass grade on an examination may not retake this examination in order to attempt to achieve a higher grade. Students who have failed to reach a pass grade on two occasions have the right to request that a different teacher be appointed to set the grade of the course. A request for such appointment must be sent to the departmental board.

### **Interim**

Students may request that the examination is carried out in accordance with this syllabus even after it has ceased to apply. This right is limited, however, to a maximum of three occasions during a two-year-period after the end of giving the course. A request for such examination must be sent to the departmental board.

### **Limitations**

The course may not be included in a degree together with BI3240 (Neurochemistry) or KE3110 (Neurochemistry with Molecular Neurobiology).

### **Misc**

The course is a component of the Master's programme in Neurochemistry with Molecular Neurobiology, the Master's programme in Medicinal Chemistry and the Master's programme in Peptide and Protein chemistry, and it can also be taken as an individual course.

### **Required reading**

Course literature is decided by the departmental board and is described in an appendix to the syllabus.