



## DEPARTMENT OF BIOLOGICAL AND ENVIRONMENTAL SCIENCES

### **BIO435 Ecological Toxicology: Physiology, 15 credits**

Ekotoxikologi med fysiologisk inriktning, 15 högskolepoäng

*Second Cycle*

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#### **Confirmation**

This course syllabus was confirmed by Faculty of Science on 2010-10-26 and was last revised on 2024-03-11 by Department of Biological and Environmental Sciences to be valid from 2024-03-11, spring semester of 2024.

*Field of education:* Science 100%

*Department:* Department of Biological and Environmental Sciences

#### **Position in the educational system**

This course is mandatory for the master program in ecotoxicology, N2TOX. It can also be taken as a freestanding course and be included as an elective course in other programs.

#### *Main field of studies*

Environmental Science

Molecular Biology

Environmental Science with  
Specialization in Ecotoxicology

Biology

Marine Sciences

#### *Specialization*

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

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#### **Entry requirements**

At least 90 credits in natural sciences (biology, chemistry, ecology, earth, environmental,

marine sciences), with a minimum of 30 credits in biology and 30 credits in chemistry, or 60 credits in biology. These prerequisites can be waived if an applicant has verifiable equivalent knowledge/skills. The course ES1305, 15 credits can be counted as biology or chemistry.

Applicants must prove their knowledge of English corresponding to English 6/English B from Swedish upper secondary school. For more information, see English language requirements on [Universityadmissions.se](http://Universityadmissions.se).

### **Learning outcomes**

After completed course, the student is expected to:

#### *Knowledge and understanding*

- Have gained a good insight into mechanisms of action of toxic substances on biochemical and physiological levels with emphasis on aquatic organisms
- Understand the cellular detoxification systems
- Have gained an increased knowledge of effect and risk assessment of toxic substances in the environment and the use of biological effect markers for monitoring purposes
- Understand basic ecotoxicological principles, problems and working methods

#### *Competence and skills*

- Be able to design strategies for environmental monitoring in the aquatic environment
- Be able to report on ecotoxicity results and understand and discuss laboratory results
- Have improved their ability to report on scientific studies

#### *Judgement and approach*

- Critically evaluate and discuss results from ecotoxicological studies
- Critically evaluate and discuss results from monitoring studies
- Critically evaluate the use of biological parameters as diagnostic tools in monitoring

The course is sustainability-focused, which means that at least one of the learning outcomes clearly shows that the course content meets at least one of the University of Gothenburg's confirmed sustainability criteria. The content also constitutes the course's main focus.

### **Course content**

The course deals with toxicological and ecotoxicological principles, chemical effects and mechanisms of action of contaminants with an emphasis on the individual and sub-organismal level. The course includes studies of changes in biochemistry/gene expression such as enzymes and metabolites and associated functions and regulations. The intention is to provide knowledge about the molecular mechanisms of toxic substances. Effects at the organism level include changes in phenotype and genotype, as well as physiological fitness of the individuals in a population. The course will also provide an orientation on the sources, transport, distribution, breakdown and fixation of environmental toxicants in the environment. One aim of the course is to show how biological parameter can be used for studies of environmental toxic effects in ecosystems and how it can be applied in environmental monitoring.

### *Sub-courses*

**1. Theoretical part** (*Teoretisk del*), 10 credits

Grading scale: Pass with Distinction (VG), Pass (G) and Fail (U)

This sub-course deals with theory and is assessed by a written exam.

**2. Practical part** (*Praktisk del*), 5 credits

Grading scale: Pass (G) and Fail (U)

This sub-course is laboratory-based and aims to provide insight into various ecotoxicological tests, among other methods for monitoring the environment. It also includes literature assignments and seminars.

### **Form of teaching**

The course consists of lectures and literature assignments, including presentations of these. The course also contains mandatory practical laboratory work.

*Language of instruction:* English

### **Assessment**

Sub-course 1 is assessed by a written exam. Sub-course 2 includes mandatory components such as laboratory work and other practical group activities as specified in the course schedule.

If a student who has twice received a failing grade for the same examination component wishes to change examiner ahead of the next examination session, such a request should be made to the department in writing and should be approved by the department unless there are special reasons to the contrary (Chapter 6 Section 22 of the Higher Education Ordinance).

If a student has received a recommendation from the University of Gothenburg for study support for students with disabilities, the examiner may, where it is compatible

with the learning outcomes of the course and provided that no unreasonable resources are required, decide to allow the student to sit an adjusted exam or alternative form of assessment.

In the event that a course has ceased or undergone major changes, students are to be guaranteed at least three examination sessions (including the ordinary examination session) over a period of at least one year, but no more than two years after the course has ceased/been changed. The same applies to internships and professional placements (VFU), although this is restricted to just one additional examination session

### **Grades**

The grading scale comprises: Pass with Distinction (VG), Pass (G) and Fail (U).

Both sub-courses must be passed to pass the entire course. In order to get a pass (G) on the course, the student needs a pass (G) on both sub-courses. In order to get a pass with distinction (VG), the student needs a pass with distinction on sub-course 1, in addition to a pass on sub-course 2. For pass grade (G) on the written exam 60% is usually required, for pass with distinction (VG) a total of 85% is required on the written exam.

### **Course evaluation**

An oral course evaluation will be held before the exam. An anonymous written course evaluation will be conducted electronically after the course. A summary of the course evaluation will be presented on the course Canvas page along with a summary of the course evaluation and information about any changes made for the next year.

### **Additional information**

The practical part of the course may contain studies on animals, primarily different species of fish.

The course literature is in English and the lectures will be held in English.