



## DEPARTMENT OF BIOLOGICAL AND ENVIRONMENTAL SCIENCES

### **ES2413 Chemical Risk Assessment, 15 credits**

Kemiska risker, 15 högskolepoäng

*Second Cycle*

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#### **Confirmation**

This course syllabus was confirmed by Faculty of Science on 2010-11-01 and was last revised on 2024-03-12 by Department of Biological and Environmental Sciences to be valid from 2024-03-12, 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.

The course can be part of the following programme: 1) Ecotoxicology, Master's Programme (N2TOX)

#### *Main field of studies*

Environmental Science

#### *Specialization*

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

#### **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.

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 a sound understanding of the scientific principles behind chemical risk assessment
- Comprehend that risk assessment is a tiered approach that builds on an iterative refinement of two principal blocks, exposure and hazard assessment, and how the results from these evaluations are finally condensed into the actual risk assessment
- Understand the crucial role of uncertainty evaluations in this process, and how this is considered
- Know the differences and commonalities between environmental and human health oriented risk assessment
- Have an overview of major European regulatory frameworks, especially REACH, Water Framework Directive, Biocide Production D and the Plant Protection Products regulations
- Gain perspective on the sociopolitical dimension of the risk assessment process
- Appreciates the role of risk assessment in the risk management cycle

### *Competence and skills*

- Know how to source, compile and evaluate data on the ecotoxicity and toxicity of chemicals from publicly available databases
- Be able to apply exposure data and ecotoxicological data to derive a risk quotient
- Be competent in applying QSAR models to estimate ecotoxicity and exposure
- Knows how to identify the regulatory frameworks that concern a particular type of assessment and a particular type of chemical
- Can access and identify the important European Regulatory Frameworks and the corresponding guidelines for Risk Assessment

### *Judgement and approach*

- Assess the environmental hazard of chemicals, identify data demands and knowledge gaps
- Implement the basic blocks of chemical risk assessment
- Communicate the results of a chemical risk assessment, its conclusions and limitations

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 is divided into two parts:

1. Chemical hazard and exposure, and how to calculate the risk to environment from a chemical

- Background information, including environmental issues and recent developments in chemical risk assessment
- Environmental exposure of chemicals, including empirical and modelled data
- Environmental hazard of chemicals, including empirical and modelled data. How data is applied to derive environmental quality standards. How uncertainty is managed in chemical risk assessment
- Calculating a risk quotient, and evaluating results
- Statistical methods in chemical risk assessment

2. Major European regulatory frameworks for chemical risk assessment, major administrative bodies, and how their respective guidelines are applied in chemical risk assessment

- Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)
- Biocides
- Plant Protection Products

## Form of teaching

The forms of studies during the course include lectures, seminars and group exercises.

*Language of instruction:* English

## Assessment

There are three forms of examination in the course

1. The students have to research, prepare and present a student lecture, which is held in front of the whole course. This may be conducted in groups (max. 4 students). Topics relevant to chemical risk assessment will be chosen for the student lecture in consultation with the teacher. The lecture will be graded per individual: U, G (60%) or VG (80%).

2. The students have to research, prepare, carry out and present a student project in chemical risk assessment. This may be conducted in groups (max. 4 students). Topics relevant to chemical risk assessment will be chosen for the student project in consultation with the teacher. Students must source data and compile hazard and exposure data, and conduct a chemical risk assessment. The outcome of the project is:

- (a) a written report (around 5 000 words) and

(b) an oral presentation of the project

The project will be graded per individual: U, G (60%) or VG (80%)

3. A written exam at the end of the course. This is an open book exam, the students are allowed to bring all printed materials from the course. No laptops or other electronic devices are allowed, except calculator. The exam will be graded per individual: U, G (60%) or VG (80%).

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).

To get the grade Pass the student should have G for the exam, student lecture and student project

To get the grade Pass with distinction the student should have VG for at least 2 out of 3 for the exam, student lecture and student project.

### **Course evaluation**

An oral course evaluation will be held before the exam. An anonymous written course evaluation will be conducted electronically after the course. The evaluation is of great value in our quality work. 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.