



# UNIVERSITY OF GOTHENBURG

## FACULTY OF SCIENCE

### **ES2413, Chemical Risk Assessment, 15,0 higher education credits**

**Kemiska risker, 15.0 högskolepoäng**

*Second Cycle*

#### **1. Confirmation**

The course syllabus was confirmed by Faculty of Science on 2007-06-15 and was last revised by Faculty of Science on 2010-11-01 to be valid from 2010-11-01.

*Field of education:* Science 100 %

*Department:* Department of Biological and Environmental Sciences

#### **2. Position in the educational system**

The course is at advanced level and assigned to be included in masterexams. This course is also given as a single course subject.

*Main field of studies*  
Environmental Science

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

#### **3. Entry requirements**

The entrance requirements are a Bachelor of Science including, at least, 90 ECTS points within biology or chemistry, of which no less than 30 are within biology and 30 within chemistry.

#### **4. Course content**

The course will provide the scientific background to current approaches for the environmental risk assessment of chemicals. It will give an overview of how risk assessment is actually implemented in national and trans-national procedures and of the socio-political context in which this process takes place. The course will provide details on important regulatory frameworks, such as the IPPC directive (Integrated Pollution Prevention and Control), the Biocide directive, the European Water Framework Directive or the upcoming REACH regulation (Registration, Evaluation and Authorisation of Chemicals). Although the major focus will be on European approaches, comparisons with other methodologies such as those put forward by the US Environmental Protection Agency or the OECD will be made.

The course will follow the typical three steps during in risk assessment of chemicals and will provide an overview on approaches and methodologies for (a) hazard assessment (b) exposure assessment and (c) risk assessment of chemicals. Although the course focuses on risk assessment for the environment, references to human health risk assessment will be made from time to time, in order to analyse commonalities and differences between these two major risk assessment fields.

The forms of studies during the course include lectures, seminars and group exercises. The course is given at daytime, fulltime. Some seminars are at evening time.

## 5. Learning outcomes

### 1) *Knowledge and understanding*

After successfully finishing the course, the student

- has 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 ecotoxicological 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;
- knows the differences and commonalities between environmental and human health oriented risk assessment;
- has an overview of major European regulatory frameworks, especially REACH, the BPD and the PPP regulation;
- recognise the conflicts between scientific knowledge and demands on the one hand and the need for pragmatism in routine risk assessment on the other;
- realises the socio-political dimension of the process; '
- appreciates that risk assessment is not the end of the story but is followed and accompanied by risk management, risk mitigation and cost- benefit analyses;

### 2) *Skills and abilities*

After successfully finishing the course, the student

- knows where to find, compile and evaluate data on the ecotoxicity and toxicity of chemicals
- knows how to assess chemicals with EUSES, the European System for the Evaluation of Chemicals
- 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

### 3) *Judgement and approach*

After successfully finishing the course, the student can

- 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

## 6. Literature

A separate documentation of the course literature is available at the responsible department for the course

## 7. Assessment

There are 3 "exams" in the course

(i) the students have to prepare and implement a student lecture of roughly one hour. All reading materials for the lecture will be distributed by the teacher, the students then have to condense that into a lecture which is held in front of the whole course. This is a group work (max. 4 students), which will only be graded "pass" or "fail".

(ii) the students have to prepare, carry out and present a student project. Together with the course teachers, a subject for the project is agreed upon. The students (group work of max 5 students) will then collect the background materials for the project, work on it mainly autonomously, but with regular, mandatory meeting with the supervisor for the project. The outcome of the project are (a) a written report (around 5 000 words) and (b) an oral presentation of the project. This project work is a group exercise, a common grade (failed, G, VG) will be given to the whole group.

(iii) a written mandatory exam at the end of the course will be carried out. This is an open book exam, the students are allowed to bring all printed materials from the course. No laptops or other electronic gadgets are allowed, except calculator. The exam will be graded per individual (fail, G, VG).

To pass the evaluation it needs that the student fulfils the demands in the written exam, seminars and exercises. Participation in seminars and exercises are mandatory.

In agreement with the rules for studying at Göteborg University the student has the right to retake the examination four times. After failing in the examination two times the student has the right to get a new examiner, if it is practically possible.

## 8. Grading scale

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

The course has three grade levels according to the Swedish system. They are Fail (U), Pass (G) and Pass with honours (VG).

To get the grade Pass the student should have:

(i) G in the student lecture, (ii) G in the student project (iii) G in the exam

To get the grade Pass with honours the student should have:

(i) G in the student lecture, (ii) VG in the student project (iii) VG in the exam, or (i) G in the student lecture, (ii) VG in the student project (iii) G in the exam plus active participation (clearly more than average) in the seminarial discussions

## 9. Course evaluation

## 10. Additional information

Language of instruction: English and Swedish.

The course will be given in Swedish and if required in English.