



# KE2350 Risk Analysis and Management for Chemical Engineers 6.0 credits

Riskanalys och riskhantering för kemiingenjörer

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

## Establishment

Course syllabus for KE2350 valid from Autumn 2014

## Grading scale

A, B, C, D, E, FX, F

## Education cycle

Second cycle

## Main field of study

Chemistry and Chemical Engineering

## Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

# Intended learning outcomes

After passing the exam, the student should

- have a basic understanding of chemical hazards and of other relevant hazardous situations;
- have a sound understanding of the principles behind chemical risk assessment and management;
- have a basic knowledge and understanding of methodology and tools for risk assessment and management and how these are used (e.g. what-if analysis, HAZOP analysis, fault tree analysis);

be able to describe how the risk assessment and mitigation process is adapted to specific situations (e.g. chemical laboratory, process industry, local and global environment );

- know the differences and commonalities between environmental and human health risk assessment;
- have an overview of major regulatory frameworks, especially GHS, REACH, AFS, and IEC 61511 in Sweden and Europe;
- appreciate, that risk assessment and management is not the end of the story but is followed and accompanied by risk mitigation and cost-benefit analyses.

## Course contents

The course deals with risk analysis and management in relation to handling chemicals as well as work situations in industrial processes. The following is included:

- Chemical hazards
  - \* Flammability
  - \* Stability/explosivity
  - \* Toxicity/corrosiveness
  - \* Environmental risks, persistence, bioaccumulation
  - \* Dangerous reactions
- Hazards in process industry
- Hazards in handling chemicals in laboratory environment
- Risk analysis and management theory
  - \* History
  - \* Case studies and practical examples
  - \* Methodologies (e.g. what-if analysis, HAZOP, Fault Tree Analysis, event analysis, etc)

- Legislation and standards in Sweden, EU and internationally

## Specific prerequisites

The students should have been accepted to the master programmes TMMMM, TMVTM or TKEMM program or have equivalent qualifications.

## Course literature

- Bernard Martel, "Chemical Risk Analysis: A Practical Handbook"
- handouts of major regulatory frameworks

## Examination

- INL1 - Individual Assignment, 0.5 credits, grading scale: P, F
- PRO1 - Project Assignment, 2.0 credits, grading scale: P, F
- SEM1 - Seminar, 0.5 credits, grading scale: P, F
- TEN1 - Examination, 3.0 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

## Other requirements for final grade

Approved examination (TEN1; 3 credits, grade scale A - E), approved project assignment (PRO1, 2 credits, grade Pass ), approved individual assignment (INL1, 0.5 credits grade Pass), and approved seminarium (SEM1 0.5 credits, grade Pass).

## Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.