



LUNDS UNIVERSITET
Lunds Tekniska Högskola

Course syllabus

Konsekvensanalys - med fokus på miljö- och humanpåverkan av större olyckor

Consequence Analysis - Focusing on the Environmental and Human Impact of Large Incidents

VBRA20, 9 credits, G1 (First Cycle)

Valid for: 2023/24

Faculty: Faculty of Engineering, LTH

Decided by: PLED BI/RH

Date of Decision: 2023-04-12

General Information

Main field: Technology.

Compulsory for: R2

Language of instruction: The course will be given in Swedish

Aim

The course will provide an introduction to the methods to calculate the consequences of different types of incidents, e.g. chemical accidents or fires. It will also provide an introduction to environmental toxicology and human toxicology, including relevant regulations. The course will begin with an introduction to fire chemistry and heat release from fires and explosions.

Learning outcomes

Knowledge and understanding

For a passing grade the student must

- Be able to understand and describe the consequences of undesirable emissions of gases and fluids, spread of gases vaporisation of fluids, and fires and explosions in gases and fluids.
- Be able to identify and apply relevant regulations.

- Have a basic understanding of sustainability terms and how these can be applied to large scale incidents.

Competences and skills

For a passing grade the student must

- Be able to estimate the environmental and human consequences of undesirable emissions of gases and fluids.
- Be able to apply relevant calculation methods to analyse the consequences of undesirable emissions of gases and fluids, including toxicity, eco-toxicity and risk for fire and explosion.
- Be able to, orally and in writing in dialogue with different groups, present and discuss the consequences of undesired emissions of flasks and fluids.
- Be able to use relevant computerised tools (e.g. ALOHA) to calculate the consequences of an incident and analyse the results.
- Be able to understand and apply methods to analyse the sustainability of risks and their mitigation, e.g. through life cycle thinking.

Judgement and approach

For a passing grade the student must

- Be able to demonstrate the ability to choose relevant calculation methods and show insights into their limitations.
- Be able to identify his/her need for further knowledge to solve problems and continually improve their competence.

Contents

The course consists of lectures, computational tutorials, a computer laboratory and an assignment. During the lectures, extracts from the course literature will be discussed using theoretical review, example calculations and presentation of previous cases. The course will begin with an introduction to fire chemistry and heat release from fires and explosions.

The computational exercises and tutorials provide an opportunity for the students to independently solve assigned material with the support of teaching assistants.

In addition to the manual computation, computer-based computation models are also used. The students get to familiarise themselves with these during the computer laboratory in which given assignments are solved. The assignments are solved individually with the help of tutors.

Hand-in assignments constitute one part of the course. Details of the assignment are presented during the course and vary from year to year. These could include, e.g.

- Presentation of analysis of historic cases
- Presentation of the environmental impact of incidents and their mitigation

- Calculation of safety distances for different types of incidents.
- Assessment of the United Nations Sustainable Development Goals in relation to the Fire and Rescue Services and their work on large scale incidents.

Examination details

Grading scale: TH - (U,3,4,5) - (Fail, Three, Four, Five)

Assessment: The examination is comprised of two parts (see description of course parts): - written exam - approved assignment submission/s, computer lab and seminar participation. The final grade is based on the results of written examinations. The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

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Parts

Code: 0123. **Name:** Consequence Analysis - Written Exam.

Credits: 6. **Grading scale:** TH. **Assessment:** The examination is given individually and consists of written exam consisting of both theory and problem solving questions. The final grade is based on the results of written examinations. **Contents:** The course consists of lectures, computational tutorials, a computer laboratory and an assignment.

Code: 0223. **Name:** Assignment Submission/s, Computer Lab and Seminars.

Credits: 3. **Grading scale:** UG. **Assessment:** The examination of the assignment submission/s is given groupwise. Examination of the computer lab and seminars is given individually. All parts of this course must be passed for the course points to be awarded. **Contents:** The course consists of lectures, computational tutorials, a computer laboratory and an assignment submission/s.

Admission

Assumed prior knowledge: KOOA06 General Chemistry FAFA30 Physics: Electricity - Fluids

The number of participants is limited to: 60

Selection: Completed University credits for the program. Priority is given to students whose program has the course listed in the curriculum and timetable.

The course overlaps following course/s: VBRA10, VBR230

Reading list

- Fischer, S. m fl: Vådautsläpp av brandfarliga och giftiga gaser och vätskor. FOA, 1998, ISBN: 1104-9154.
- Lag om skydd mot olyckor. ISBN: SFS 2003:778.
- Lag om åtgärder för att förebygga och begränsa följderna av allvarliga kemikalieolyckor. ISBN: SFS 1999:381.
- Lag om brandfarliga och explosiva varor. ISBN: SFS 2010:1011.
- Allmänna råd om skyldigheter vid farlig verksamhet. ISBN: MSBFS 2014:2.
- Föreskrifter om åtgärder för att förebygga och begränsa följderna av allvarliga kemikalieolyckor, inklusive Konsekvensutredningen. ISBN: MSBFS 2015:8.
- Andersson, B: Utdrag ur: Introduktion till konsekvensberäkningar, några förenklade typfall. Pasquill's stabilitetsklasser och andra tabeller, stencil. Brandteknik.

Contact and other information

Course coordinator: Margaret McNamee, margaret.mcnamee@brand.lth.se

Further information: Active participation in group work is mandatory. Each group member must be able to present and answer for the contents of the joint report. A student who does not meet the demands of active participation, or disregard their obligations, can be replaced to another group or failed by the examiner.