KA1015 Chemistry for Sustainable Development 6.0 credits

Kemi för hållbar utveckling

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 KA1015 valid from Autumn 2018

Grading scale

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

Education cycle

First cycle

Main field of study

Technology

Specific prerequisites

Completion of upper-secondary school by 1 July 2011 and adult education at the upper-secondary level (gymnasium) by 1 July 2012

Specific entry requirements: Mathematics E, Physics B and Chemistry A. Passed or 3 in each of the subjects is required.

Completion of upper-secondary school from 1 July 2011 and adult education at upper-secondary level (gymnasium) from 1 July 2012 (Gy2011)

Specific entry requirements: Physics 2, Chemistry 1 and Mathematics 4. A pass in each of the subjects is the lowest acceptable grade.

Language of instruction

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

Intended learning outcomes

After the course the student should be able to

• demonstrate broad knowledge about the chemical background to sustainability problems,

• show understanding of both the problems and the possibilities of creating a sustainable technical culture,

• demonstrate knowledge and understanding of ethical issues in the area of sustainability,

• evaluate the sustainability work in the society holistically and demonstrate an understanding of how it is structured.

Course contents

Different stages in the history of technology from a sustainability and environmental perspective

Usage and availability of nonrenewable raw materials such as:

- Petroleum, natural gas and other fossil fuels and chemical raw materials

- Metals and particularly rare alloying metals

- Phosphorus, Sulphurs, Silica

- Fuels for nuclear reactors

Renewable alternatives to nonrenewable raw materials such as:

- Biomass from plants

- Chemicals from sea water or from air

The chemistry behind:

- Environmentally destructive polluters

- Climate changes based on greenhouse gases

- Decomposition of the ozone layer

- Ground-level ozone

- Acidification

- Over-fertilization

- Toxicity of hydrocarbons, halogenated organic species and heavy metals

Measures to combat various types of environmental threats from specific industries

Environmental impacts of process changes in the chemical industry

Waste hierarchy, biodegradability and combustion of waste

The use of catalysts to reduce energy and material use and waste generation

Environmental ethics, environment and sustainability questions from an ethical perspective

Environmental impact assessment (EIA) -terminology, the practical process, methods used in EIA

Biodiversity from a sustainability perspective

Disposition

Lectures

Seminars

Group work where an environmental impact assessment (EIA) document for public or industrial projects is reviewed

Course literature

Jon-Erik Dahlin, Hållbar utveckling – en introduktion for ingenjörer, 2014 ISBN: 9789144092669.

Distributed literature

Examination

- TEN1 - Written exam, 5.0 credits, grading scale: A, B, C, D, E, FX, F
- ÖVN1 - Assignment, 1.0 credits, grading scale: P, 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.

ÖVN1 Assignments: The workshops require necessary preparations, compulsory attendance and active participation. To pass, it is required that the written study of anenvironmental impact assessment and the abstract from the final seminar are submitted no later than the date given on the task.

Other requirements for final grade

Pass in all parts of the course

The final grade is based on TEN1 and thewritten presentations of the practical assignment ÖVN1.

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.