



KE2050 Environmental Catalysis 6.0 credits

Miljökatalys

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 KE2050 valid from Spring 2019

Grading scale

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

Education cycle

Second cycle

Main field of study

Chemical Science and Engineering, Chemistry and Chemical Engineering, Environmental Engineering

Language of instruction

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

Intended learning outcomes

The overall aim of the course is to develop skills to creatively solve air pollution problems in industry or in the society by either abating the emissions of environmentally unacceptable compounds or employing processes which eliminate the formation of such substances.

After approved course you should be able to

- characterize the most important emissions of hazardous compounds and their health effects
- propose a suitable method to reduce emissions of hazardous substances from mobile or stationary sources from given data
- explain the function of spark-ignition engines and diesel engines and how emissions are formed in these engines both emanating from fuel and from combustion principle
- choose a suitable emission reduction technology for contemporary low-emission vehicles
- explain the role of the catalyst in environmental catalysis and identify its constraints
- explain how commercial catalysts are prepared
- describe the most important methods for abatement of volatile organic compounds and nitrogen oxides in stationary applications
- describe the production of low-sulfur fuels by ultra-deep hydrodesulfurization
- explain how to generate hydrogen from various fuels and how to utilize hydrogen in mobile applications including fuel cell systems
- explain the concept of green production
- write a consistent literature report in English on a subject related to environmental catalysis
- present your ideas and findings in oral form and discuss the results

Course contents

The course gives an overview of chemical processes that employ catalysts to control the emissions of environmentally unacceptable compounds and the course also covers processes which eliminate the formation of such substances. A special emphasis will be put on abatement of emissions from mobile sources. New and emerging catalytic technologies will be given special attention. The general concepts will be covered in lectures, while detailed studies will be performed in supervised seminar assignments. The assignments cover current problems in industry or in the society. These will be presented orally at seminars as well as in a technical paper. The entire course is given in English.

Specific prerequisites

Admission requirements for independent students:

75 university credits (hp) in chemistry or chemical engineering, 20 university credits (hp) in mathematics and 6 university credits (hp) in computer science or corresponding. Documented proficiency in English corresponding to English B.

Admission requirements for programme students at KTH:

At least 150 credits from grades 1, 2 and 3 of which at least 110 credits from years 1 and 2, and bachelor's work must be completed, within a programme that includes: 75 university credits (hp) in chemistry or chemical engineering, 20 university credits (hp) in mathematics and 6 university credits (hp) in computer science or corresponding.

Course literature

Heck, R. M. and Farrauto, R. J. **Catalytic Air Pollution Control**, 2nd ed., John Wiley, New York, 2002, kompletterat med utdelade aktuella vetenskapliga artiklar.

Examination

- TEN1 - Examination, 3.0 credits, grading scale: A, B, C, D, E, FX, F
- ÖVN1 - Seminars, 3.0 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.

Other requirements for final grade

Examination (TEN1; 3 credits)

Seminar (ÖVN1; 3 credits)

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.