MJ2626 Environmental Technology and Environmental Impact Studies, Larger Course 12.0 credits

Miljöskyddsteknik med konsekvensstudier, större kurs

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

Establishment

Course syllabus for MJ2626 valid from Autumn 2007

Grading scale

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

Education cycle

Second cycle

Main field of study

Chemistry and Chemical Engineering

Specific prerequisites

Previous knowledge is assumed equivalent to KE1010 Introduction to Chemical Engineering (3C1451)

At least two years and 100 ECTS credits of academic studies in Chemistry and Chemical Engineering or Biotechnology.

Language of instruction

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

Intended learning outcomes

After a passed course the student should be able to:

- In detail describe and explain the climate change problem and also the global and national environmental threats on the ecosystems this climate change can give.
- Understand the problems according to modelling and predicting future changes in very complex systems.
- In detail describe and explain ecological impacts caused by toxic substances (metals and persistent organic pollutants).
- Propose and motivate strategies and actions for different environmental problems, based on a system analysis perspective.
- Describe and explain the function of different unit operations that can be used as kidney or recovery function in an industrial production process in order to minimize pollutions to air or water.
- State and describe other process internal solutions to minimize air pollution emissions (through flue gases and evaporation of VOC) and emissions through waste water discharges.
- Describe and explain the function of different process external methods that can be used in order to minimize pollutions to air or water.
- Discuss advantages and disadvantages for different environmental technical solutions.
- Describe different strategies and methods to minimize the waste production from industrial production processes.
- Describe and explain different treatment methods for industrial wastes (especially hazardous wastes).
- Propose and motivate the choice of different environmental technical solutions in order to solve or minimize pollutions to air or water from industrial production processes.
- Propose and motivate suitable methods to handle waste flows from industrial production processes.
- Collect information from scientific literature and other information sources, make a compilation of this information, and analyse it in a written report.
- Make an oral presentation of a project work, critically scrutinize another groups report and actively participate in the discussion of other groups reports.

Course contents

The environmental threats and their effects on man and ecosystems - expanded studies as compared to the basic course with focus on the climate change and toxic substances (metals and persistent organic pollutants).

Strategies for a better environment: Cleaner production strategies (process changes, raw materials changes etc.), process external solutions, product changes and other. Advantages and disadvantages using different strategies.

Air pollution control and gas cleaning technology. Process internal solutions and external solutions in order to minimize air pollutions (both gaseous compounds and particles). Two main applications will be discussed – emissions of VOC connected to handling of organic solvents and emissions of flue gases from energy production. Advantages and disadvantages with different methods.

Municipal and industrial waste water treatment. Process internal solutions and external solutions in order to minimize water pollutions. A number of common applications will be discussed. Advantages and disadvantages with different methods.

Industrial waste treatment. Process internal solutions to minimize waste production. Waste treatment methods especially handling of hazardous waste.

Applied environmental work: Knowledge from this and other courses are applied in a project carried out in close cooperation with an industrial company.

Course literature

Persson, P.O. “Miljöskyddsteknik – strategier och teknik för ett hållbart miljöskydd“, Industriell ekologi, KTH, 2005.

Bernes, Claes. “Persistent organic pollutants”, Monitor 16, Swedish Env. Protection Board 1998.

Bernes, Claes. “A warmer world”, Monitor 20, Swedish Env. Protection Board 2007.

Examination

- ÖVN1 - Exercise, 1.5 credits, grading scale: P, F
- PRO1 - Project, 4.5 credits, grading scale: P, F
- TEN1 - Examination, 4.5 credits, grading scale: A, B, C, D, E, FX, F
- ÖVN2 - Exercise, 1.5 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.

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

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.