CK2130 Sustainable production of fuels and materials 7.5 credits

Hållbar produktion av material och bränslen

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

Establishment

Course syllabus for CK2130 valid from Autumn 2024

Grading scale

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

Education cycle

Second cycle

Main field of study

Chemical Science and Engineering

Specific prerequisites

Completed degree project 15 credits, 50 credits in chemistry, chemical engineering, energy technology, or energy and environment. English 6/B

Language of instruction

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

Intended learning outcomes

The general aim of the course is to develop the students' skill in analysing and in a creative way solving problems related to process chemistry. The starting point for the course is the raw materials, including renewables as well as fossil materials, and it then continues via the process system to products and side products, energy use and the placing of the process in the regional and global surroundings.

After completion of the course the student should be able to:

- Understand and be able to explain why the simultaneous production of several products may be advantageous in many situations but also when it is not relevant.
- Recognize the principle of process integration for the achievement of higher efficiency both concerning the use of raw material and for reaching a better energy utilization, and be able to perform simple calculations using the methods introduced in the course for process analysis.
- Analyse and criticise the interaction between technical and economic aspects in the development of process integrated systems.
- Describe a number of relevant existing processes, commercial or under development.
- Plan and gather the technical data required for the carrying out of mass and heat balances describing an actual process idea.

Course contents

The course describes a number of processes for the production of renewable fuels. Concept for simultaneous production of more than one product from the same raw material with the aim of reducing energy use and raw material consumption are discussed.

Important chemical, chemical engineering and biochemical process steps are discussed in detail in the course and relevant process schemes are suggested. Different types of reactors, optimisation of operating parameters etc., and different opportunities for process integration when producing renewable fuels are discussed.

- In lectures, and in a visit to an industrial process, more traditional processes as well as new types of processes in the technical front line will be treated.
- The course includes a project assignment in which the students in groups investigates different process systems and present their work orally and as a written report.

Examination

- TEN1 - Written exam, 4.0 credits, grading scale: A, B, C, D, E, FX, F
- PRO1 - Project, 3.5 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.