KE1150 Engineering Chemistry 10.0 credits

Teknisk kemi

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

Establishment

Course syllabus for KE1150 valid from Autumn 2019

Grading scale

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

Education cycle

First cycle

Main field of study

Technology

Specific prerequisites

The upper-secondary school before 1 July 2011 and adult education at upper-secondary level before 1 July 2012

Specific entry requirements: mathematics E, physics B and chemistry A. The grade Passed or 3 inn each of the subjects is required .

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

Specific entry requirements: Physics 2, Chemistry 1 and Mathematics 4. Minimum requirement is a pass grade.

Language of instruction

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

Intended learning outcomes

After completed and passed course, the student should be able to:

• write balanced formulas for chemical reactions.

• carry out stoichiometric and thermochemical calculations.

• Define the reaction rate based on reactions of chemical elements.

• carry out simple calculations of chemical equilibrium and reaction kinetics.

• use the important tools - material and energy balances and adapt the base case for these to a given process and solve the resulting equation system.

• set up models for material and energy balance for different design alternatives, combine and apply these models in problem-solving and use enthalpy tables, specific heat and other material properties to make the calculations.

• describe and give example of processes such as continuous/satsvis process, stationary/non-stationary processes, open/closed systems, and explain the concepts of air surplus, recirculation, total yield, exchange and selectivity.

• apply a system approach to problems of a chemico-technical nature and identify the system boundaries for the problem, and choose system boundaries so that the problem becomes solvable based on the given data.

• review the different instrumental analytical methods within modern chemistry: chromatographic separation methods, spectroscopic methods, diffraction methods.

Laboratory course:
• carry out simple chemical laboratory work with consideration for the working environment and safety precautions.

Course contents

Disposition

To achieve the expected learning outcomes, the course is divided into two subparts.

Part 1: Stoichiometry, thermochemistry, material balance, energy balance, kinetics (8 credits) and period 1-2
Part 2: Laboratory course(2 credits), period 1

Course literature

• For stoichiometry and thermochemistry, part 1:
Chemistry³: Introducing inorganic, organic and physical chemistry, Burrows et al., Oxford University Press, 3rd edition 2017, ISBN 978-0198733805

• For material balance and energy balance, part 1:
Elementary Principles of Chemical Processes, R.M. Felder & R.W. Rosseau, John Wiley & Sons, Inc., Global edition 2016, ISBN 978-1-118-09239-2

• Distributed material.

• Lecture notes.

Examination

- TENA - Examination, 8.0 credits, grading scale: A, B, C, D, E, FX, F
- LAB1 - Laboration, 2.0 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.

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

Other requirements for final grade

To pass the course the student must pass the examinations (TEN1, TEN2 and period 2) and pass the laboratory course (LAB1, period 1).

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.