KE2180 Separation Processes for the Process Industry and the Environment 9.0 credits

Separationsprocesser för processindustri och miljö

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 KE2180 valid from Autumn 2011

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

Specific prerequisites

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.

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.

Language of instruction

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

Intended learning outcomes

The overall aim is to provide a deep understanding of the general fundamentals such as mass and energy balances, phase equilibria and transport kinetics, and of how these principles are applied in design of separation processes in the process industry and in clean technology. The students will get insight into the considerations that have to be balanced in finding a suitable solution to a specific separation problem. The aim is that the students will also reach understanding for how this knowledge can be applied to separations in other situations, in particular in environmental systems.

After the course the students shall be able to:

- collect and critically make use of information of relevans for design of separation processes

- describe and compare different separation processes, their characteristics and applications

- structure and analyse a separation problem and suggest solutions with particular consideration of energy aspects

- identify suitable separation methods for a particular separation problem

- explain how different variables, physical properties and momentum, heat and mass transport influence a specific separation process and what impact they have on the design of the equipment.

- understand and apply concepts like driving force and transfer coefficients

- design separation processes that are based on equilibrium steps

- design separation processes by making use of mass and energy balances and mass and energy transfer equations

Course contents

The course comprises fundamentals, basic requirements, and design principles for separation processes. Detailed descriptions and analyses of common unit operations are given. The fundamental mechanisms of phase equilibria and mass and/or heat transport and how the

mathematical description of these mechanisms can be used in the design are also treated, as well as matters concerning the practical design of apparatus.

The course also includes more empirical design methods, primarily for stage apparatus and continuous apparatus for common unit operations. The course includes design of separation processes for process industry and for clean technology, as well as the application of the methods to other systems - in particular environmental systems. The course has particulor emphasis on energy efficiency and the environment.

Course literature

Coulson J.M. and Richardson J.F., Chemical Engineering vol. 2, 5:te upplagan, Butterworth Heinemann, 2002.

Examination

- LAB1 - Computer Laborations, 1.5 credits, grading scale: P, F
- PRO2 - Project, 3.0 credits, grading scale: P, F
- TEN2 - Examination, 4.5 credits, grading scale: A, B, C, D, E, FX, 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

Computer Laborations (LAB1; 1,5 credits)
Project (PRO2; 3 credits)
Examination (TEN2; 4,5 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.