KE1090 Transport Processes in Chemical Systems 7.5 credits

Transportprocesser i kemiska system

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 KE1090 valid from Spring 2013

Grading scale

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

Education cycle

First cycle

Main field of study

Technology

Specific prerequisites

Completed upper secondary education including documented proficiency in English corresponding to English A. For students who received/will receive their final school grades after 31 December 2009, there is an additional entry requirement for mathematics as follows: documented proficiency in mathematics corresponding to Mathematics A.

And the specific requirements of mathematics, physics and chemistry corresponding to Mathematics E, Physics B and Chemistry A.

Language of instruction

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

Intended learning outcomes

After passing the course the students should be able to:

- describe, explain and apply the fundamental relations that describe molecular momentum, heat and mass transport; i.e. Newtons law of viscosity, Fouriers law and Ficks law.
- explain boundary layer theory and momentum transfer mechanisms for flow around solid bodies and how these mechanisms effects heat and mass transport.
- relate the molecular mechanisms to macroscopic transport processes and apply fundamental theories to industrial processes.
- identify and solve flow problems in complex systems including pipes, porous media, fluidized beds, pumps and other equipment with the help of Bernoullis equation, Newtons law of viscosity, the continuity equation and other laws of transport phenomena
- identify and solve problems related to heat tranport mechanisms, conduction, convection and radiation and design simple heat exchangers with and without phase change where these mechanisms are included.
- describe and give exapmles of different mass transfer problems, and specify the exact condition between mass flows that is needed for the problem to be solvable.
- identify and solve mass transfer problems where mass flow occurs both through diffusion and convection and solve simple problems with simultaneous heat and mass transfer

Course contents

The aim is to provide an understanding of the underlying physics of transport phenomena and to teach methods that can be used to predict the effects of heat, mass and momentum transport in various situations.

Course literature

Coulson J.M. and Richardson J.F.,
Chemical Engineering vol. 1, 6:te upplagan/edition, Butterworth Heinemann, 2000, och/and
Chemical Engineering vol. 2, 5:te upplagan/edition, Butterworth Heinemann, 2002.

Examination

- PRO1 - Project, 3.0 credits, grading scale: P, F
- TEN1 - 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.

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.