# 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 2015

## 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

The main gole of the course is that the student will learn how to design equipment for fluid flow and heat exchangers.

When you have passed the course part you will be able to:

- apply the continuity equation, momentum equation and energy balance (Bernoulli equation) for the calculation of flowing fluids
- describe characteristics of laminar and turbulent flow
- calculate the Reynolds number flow in pipes
- describe and characterize some common flowmeters
- calculate pressure drop for flow in circular and non-circular pipes and in porous bed
- calculate the energy used for flow in valves and pipe components
- calculate forces on particles through fluids
- use pump and system characteristics to calculate the power requirement for a pump transporting liquids
- describe the concept of cavitation and NPSH calculation for a flow system
- describe common types of pumps and their properties
- study operating conditions for a fan in the transport of gas
- describe characteristics of different types of fans
- calculate heat flow by conduction, convection and radiation
- calculate required area for heat transfer in a heat exchanger
- describe and characterize the properties of common heat exchangers
- 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

McCabe, W. L., Smith, J. C. and Harriott, P., Unit Operations of Chemical Engineering, 7th ed., McGraw-Hill, New York, 2005

## Examination

- LAB1 - Laboratory Work, 1.5 credits, grading scale: P, F
- TEN2 - Written exam, 6.0 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.