KE1170 Transport Phenomena 7.0 credits

Transportprocesser

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 KE1170 valid from Autumn 2018

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. In each of the subjects the grade required is Passed or 3.

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. In each of the subjects the minimum grade required is Pass.

Language of instruction

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

Intended learning outcomes

After passing this course you should be able to:

· explain qualitatively the basic principles of transport of mass, heat, and momentum both on a macroscopic and microscopic scale, and describe quantitatively the fundamental laws underlying these phenomena, namely Newton's law of viscosity, Fourier's law of heat conductivity, and Fick's law of mass diffusion.

· describe the role of transport phenomena in industrial and environmental processes on a macroscopic scale, including the role of fluid viscosity, heat conductivity and mass diffusion.

· solve steady state problems of mass, heat, and momentum transport in 1 dimension using the fundamental laws of transport phenomena.

· explain and apply the concept of transport coefficients for describing heat and mass transfer across fluid-fluid and fluid-solid interfaces in the presence of convection, and solve problems of mass and heat transfer using transport coefficients.

· formulate and solve simple problems of fluid flow and qualitatively describe more complex flow phenomena, including turbulence.

Course contents

The course treats the fundamental phenomena of momentum, energy, and mass transport. In particular, the course discusses the molecular origin of transport phenomena and establishes the mathematical framework how these processes can be described quantitatively. Furthermore, it elaborates the role and the use of transport phenomena in various chemical engineering applications and in natural systems.

Course literature

I. Tosun: Modeling in Transport Phenomena - A Conceptual Approach, Elsevier (2007)
J. M. Coulson and J. F. Richardson, "Chemical Engineering Vol. 1, 6th Ed." Butterworth Heinemann 2000.
R. B. Bird, W. E. Stewart, E. N. Lightfoot, "Transport Phenomena, 2nd Ed." Wiley 2007.

Examination

- LAB1 - Laboratory Assignment, 1.5 credits, grading scale: P, F
- PRO1 - Project, 2.5 credits, grading scale: P, F
- TEN1 - Written exam, 3.0 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.

Other requirements for final grade

Passed examination, passed laboratory course and passed project.

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.