

SYLLABUS

Transport Processes 7.5 credits B0003K

Transportprocesser

Course syllabus admitted: Autumn 2023 Sp 1 - Present

**DECISION DATE
2023-02-13**

Transport Processes 7.5 credits B0003K

Transportprocesser

First cycle, B0003K

Education level	Grade scale	Subject	Subject group (SCB)
First cycle	G U 3 4 5	Kemisk apparatteknik	Chemical Engineering

Main field of study

Chemical Engineering

Entry requirements

In order to meet the general entry requirements for first cycle studies you must have successfully completed upper secondary education and documented skills in English language and Chemical Principles (K0016K, Physics 1 (F0004T, Physics 3 (F0006T), Linear Algebra and Differential Equations (M0031M) and good knowledge in English, equivalent to English 6

Selection

The selection is based on 1-165 credits.

Course Aim

After completing the course, students should be able to:

- describe the theoretical principles and concepts of transport processes.
- solve typical problems of transport processes using these theoretical principles and concepts.
- describe and compare the operation of different types of common equipment used for momentum, heat and mass transport (e.g. pumps, pipes, fittings, devices to measure fluid pressure and flowrate, agitators and mixers, packed/fluidized beds, heat exchangers and evaporators).
- conduct calculations to select the appropriate model among different types of these equipment.
- develop short programs using Matlab to predict the level of performance of different designs of evaporators.
- present in a written report experiments performed in the laboratory together with related results and corresponding analysis in a way that it can be reproduced by a technically qualified person.

Contents

This course gives the fundamental principles of momentum, heat and mass transfer, which are particularly relevant to unit operations in chemical engineering. The unit operation "Evaporation" is presented in this course as an example to illustrate the application of some of these principles. The other main unit operations found in the industry are introduced in the course "Unit operations", which has "Transport processes" as a prerequisite.

The fundamental principles of momentum, heat and mass transfer covered in this course are also used to select appropriate pumps, pipes, fittings, devices to measure fluid pressure and flowrate, agitators and mixers, packed/fluidized beds, heat exchangers and evaporators by evaluating their performance in specific situations.

In the case of evaporators, the performances of several evaporator designs are evaluated by Matlab to make the students familiar with computer-based methods of simulation.

Realization

Each course occasion's language and form is stated and appear on the course page on Luleå University of Technology's website.

The course consists of the following activities:

- one laboratory exercise
- self-reading
- lectures with the teacher
- home assignments
- one individual project to develop short Matlab programs
- one group project to identify and present the different technological solutions available for the type of equipment assigned, as well as a real example existing in the industry (study case).

Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided. The examination is criteria-based and carried out on the following five items:

- A written exam will evaluate the knowledge on the principles and concepts of transport processes as well as the ability to solve new problems.
- Students will work individually on problems (home assignment) and the feedback from the teacher until the assignment get approved by the teacher.
- The declarative and functioning knowledge on the common equipment used in the industry is assessed by evaluating the oral presentation of the group project.
- Students are evaluated individually by presenting orally the computer program to be developed in Matlab after having previously submitted a functioning code.
- The final lab report is assessed for each group (pass/fail). Individual assessment might be applied if necessary.

Students who missed one part of the course because of special circumstances will be given a chance to repeat it individually, except for the group project and laboratory. These activities will have to be carried out the next time the course is given.

The grades attributed to the written exam will be the grade obtain as the final grade.

Unauthorized aids during exams and assessments

If a student, by using unauthorized aids, tries to mislead during an exam or when a study performance is to be assessed, disciplinary measures may be taken. The term "unauthorized aids" refers to aids that the teacher has not previously specified as permissible aids and that may assist in solving the examination task. This means that all aids not specified as permissible are prohibited. The Swedish version has interpretative precedence in the event of a conflict.

Overlap

The course B0003K is equal to KGB006

Course offered by

Department of Civil, Environmental and Natural Resources Engineering

Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0010	Laboratory report	U G#	1.3	Mandatory	A14	
0011	Written exam	G U 3 4 5	2.3	Mandatory	A23	
0012	Group work	U G#	1.3	Mandatory	A23	
0013	Matlab simulation	U G#	1.3	Mandatory	A23	
0014	Home assignments	U G#	1.3	Mandatory	A23	

Study guidance

Study guidance for the course is to be found in our learning platform Canvas before the course starts. Students applying for single subject courses get more information in the Welcome letter. You will find the learning platform via My LTU.

Last revised

by Assistant Director of Undergraduate Studies Eva Gunneriusson, Department of Civil, Environmental and Natural Resources Engineering 2023-02-13

Syllabus established

Course plan approved by the Department of Chemical Engineering and Geosciences 2007-02-28.