

**SYLLABUS**

# **Processintegration and optimisation 7.5 credits F7038T**

**Processintegration och optimering**

**Course syllabus admitted: Autumn 2023 Sp 1 - Present**

**DECISION DATE  
2022-02-14**

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## Processintegration och optimering

### Second cycle, F7038T

**Education level**  
Second cycle

**Grade scale**  
G U 3 4 5

**Subject**  
Energiteknik

**Subject group (SCB)**  
Energy Technology

## Entry requirements

Knowledge of components and processes for energy conversion plants (e.g. F7011T, . Good knowledge in English, equivalent to English 6. Energy plant and system engineering), heat exchangers (e.g. F7012T, Advanced heat and mass transfer). Good knowledge in English, equivalent to English 6.

## Selection

The selection is based on 30-285 credits

## Course Aim

After completing the course, students should:

### 1. Knowledge and understanding

- be able to plan modeling, simulation and analysis of energy intensive industrial processes
- be able to use pinch analysis and optimization techniques for better integration of material and energy streams

### 2. Skills and abilities

- be able to perform calculations about the heat integration of a set of process streams and the related heat exchanger networks
- be able to create a simple model of an energy system
- be able to implement simple optimization algorithms

### 3. Evaluation and attitude

- be able to evaluate the opportunities of heat integration among thermal streams, the choices about the thermal utilities, the coupling with CHP systems
- be able to choose among different optimization techniques depending on the type of problem

## Contents

Theory and mathematical background for different process integration tools. Pinch analysis. Modelling of simple energy systems with Matlab and Simulink software. Modelling by mathematical optimization. Example of complex modelling of energy intensive industries. Project work.

## Realization

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

Teaching consists of lectures with theory review and problem solving. Computer exercises on modeling, simulation and optimization. Individual and group project work.

## 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. Oral and written project report with differentiated grades in the scale G U 3 4 5.

## 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.

## Course offered by

Department of Engineering Sciences and Mathematics

## Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0001	Written and Oral Presentation	G U 3 4 5	7.5	Mandatory	S13	

## 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 Niklas Lehto, Programme Director 2022-02-14

## Syllabus established

by Dept. TVM Mats Näsström 2012-03-14