



# FMJ3384 Environomical Pathways 5.0 credits

Termodynamisk optimering av energisystem

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 FMJ3384 valid from Spring 2019

## Grading scale

P, F

## Education cycle

Third cycle

## Language of instruction

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

## Intended learning outcomes

The course has the aim of describing the tools and procedures useful to develop:

- exergy, thermo-economic, environomic analysis
- thermo-economic and environomic oprimization of complex energy systems.

During the course, each student has to develop the analysis and/or optimization of an energy system of relevance to the PhD research.

### Intended Learning Outcomes

After the end of this course, the participants should be able to:

- Develop an exergy analysis of a complex energy system
- Develop a thermo-economic analysis of a complex energy system (with cost accounting)
- Develop a thermo-economic optimization analysis of a complex energy system
- Develop an environomic optimization analysis of a complex energy system

## Course contents

The exergy, thermo-economic and environomic analysis are useful methodologies for understanding the potential for improvement of a complex energy system. With these methodologies, objectives of thermodynamic analysis can be considered while taking into account those constraints posed by economy and environmental sustainability.

These tools are complemented by procedures of mathematical optimization of the systems, with objective functions related to thermodynamic, economy and environmental preservation.

The aim of the course is to describe such methodologies, and to apply them to the energy systems developed by each student during his PhD study.

## Specific prerequisites

Admitted to PhD studies.

- Basics of thermodynamics and heat transfer
- Basics of economy

## Examination

- INL1 - Hand in exercise, 5.0 credits, grading scale: P, 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

For grades passed, the following is required:

- Attendance to 75% of the lectures

- Preparation of a Research Paper on the topic of the course ready to be submitted to an international scientific journal (ISI Journal), within a deadline discussed with the course responsible.

## **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.