FMJ3384 Environomical Path-ways 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 Autumn 2016

Grading scale

Education cycle

Third cycle

Specific prerequisites

Doctoral student who is admitted to postgraduate education

- Basics of thermodynamics and heat transfer
- Basics of economy

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 a 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.

Course literature

The proposed reading materials are:

Notes of the course, provided by the Course Responsible.

Bejan A., Tsatsaronis G., Moran M., Thermal Design and Optimization, Wiley Interscience, 1996

Some papers from international journals, suggested by the Course Responsible

A series of video-recording of some lectures, recorded by the Course Responsible

The most recent edition of the course literature is posted on the course's homepage at least four weeks before the course starts.

Examination

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

The students will be examined with a pass or fail (P/F) criteria, based on the following:

- 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.