FMJ3383 Energy System Economics, Modelling and Indicators for Sustainable Energy Development 6.0 credits

Energisystemekonomi, modellering och indikatorer för hållbar energiutveckling

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 FMJ3383 valid from Autumn 2014

Grading scale

Education cycle

Third cycle

Specific prerequisites

Language of instruction

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

Intended learning outcomes

On completion of the course, the students should be able to:

1. Understand basic economic parameters and costs for energy infrastructure investments.
2. Develop economy screening curves to evaluate the results of energy investments and operations.
3. Understand the importance of long-term energy-environment-economy (3E) modelling in the planning process.
4. Identify key attributes for 3E modelling families.
5. Understand (the most important) relations that run bottom up 3E optimisation models.
6. Map the energy system for energy resources to the final needs in RES (Reference Energy System) diagrams
7. Understand basic linear programming techniques and how they can be used and are interpreted.
8. Understand important results from bottom up 3E optimisation models regarding their economic consequences (including system costs and shadow prices)
9. Use, apply and change bottom up 3E optimisation tools in a detailed case study, including representation of the important parts of the energy system.
10. Understand the field of use for indications for sustainable development (ISED) in modelling and evaluation of an energy system.
11. Identify key factors for social, economic and environmental sustainability dimensions.
12. Develop and model scenarios, policies, technical development and other actions and map these to relevant key indicators.

Course contents

The course will combine lectures, computer-based laboratory sessions, compulsory seminars and project work. Lectures and laboratory sessions will be held by both local and external experts from different research organisations. After all laboratory sessions are completed be expected the students participate in the seminars, followed of a detailed project report at the end of the course. The course responsible teacher will distributes lists with suitable projects during the first week of the course and each project is carried out by a group of 1-2 students. The project should be documented in a written report (in English). Each project group should also hand in a report critically reviewing the work of another project group, also this should be written in English. For the compulsory seminars, each group will prepare presentations of the progress of the project based on the contents of each computer-based laboratory session.

Course literature

Handouts and laboratory exercise material will be distributed by the course coordinator.

The students will also carry out an individual literature search formaterial relevant to their independent project.

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.

INL1, 1 credit P/F

INL2, 1 credit P/F

INL3, 1 credit P/F

INL4, 1 credit P/F

INL5, 1 credit P/F

INL6, 1 credit P/F

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.