



Course syllabus

Energisystemanalys: Förnybara energikällor

Energy Systems Analysis: Renewable Sources of Energy

FMIN20, 7,5 credits, A (Second Cycle)

Valid for: 2023/24

Faculty: Faculty of Engineering, LTH

Decided by: PLED W

Date of Decision: 2023-03-27

General Information

Main field: Technology.

Elective Compulsory for: I3

Elective for: C4, D4, E4, F4, F4-es, MD4, Pi4, RH4, W4-p, W4-es

Language of instruction: The course will be given in Swedish

Aim

After passing the course, the student should have gained an understanding of the opportunities as well as the limitations for an increased use of renewable energy. Also, the student should be able to critically evaluate different systems for the use of renewable energy from different perspectives. The course departs from already acquired knowledge and relates it to the issue of sustainability.

Learning outcomes

Knowledge and understanding

For a passing grade the student must

- Be able to describe systems for the use of renewable energy for the production of heat, electricity and transport from technical and environmental perspectives, and the integration of these systems.
- Be able to describe certain new systems for the production of renewable energy carriers.

- Be able to describe and analyse systems for the use of renewable energy from environmental and sustainability perspectives.
- Be able to describe and discuss the societal framework for the use of renewable energy, in a critical perspective: legislation, policy instruments, etc.
- Be able to critically evaluate potentials for renewable energy, from a systems perspective.

Competences and skills

For a passing grade the student must

- Be able to present independent analyses in the scientific field of the course, in writing as well as orally
- Be able to utilize and evaluate a complex international source material within the field of the course

Contents

The course starts with an overview of Swedish, European and global energy supply, in particular with regard to renewable energy, and in a sustainability perspective.

Potentials for renewable energy in Sweden, Europe, and globally are presented and discussed in relation to different restrictions, e.g., alternative and/or conflicting land uses.

A large part of the course is devoted to the production and conversion of renewable energy. Apart from Nordic conditions, European and global issues are raised. The production of power, heat and transportation fuels is treated from technical, economic and environmental perspectives, focusing the complete chain from the extraction of energy resources to the final use of energy.

Integration of renewable energy is discussed in a Swedish and European perspective.

Towards the end of the course is discussed the political and institutional framework, and barriers to an increased use of renewable energy. Using the scenario technique, various possible future systems for renewable energy are discussed, relating to future energy use, and opportunities for a high energy and area efficiency.

Examination details

Grading scale: TH - (U,3,4,5) - (Fail, Three, Four, Five)

Assessment: A written exam. The final grade of the course follows from the result of the exam, but the quality of the assignments may add points to the exam. A bigger assignment is carried out in small groups, preferably with students from different LTH programmes. The assignment consists of an independent analysis of environmental and sustainability aspects on renewable energy and the assignment should involve calculations, which are accompanied by an independent critical evaluation. The assignment is divided into two steps that both need to be passed: first a feasibility study, which describes purpose and scope of the work, then a written final report, which is presented and discussed at a seminar together with other reports. Mandatory attendance at seminars and on study visits.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Admission

Assumed prior knowledge: Minimum 130 higher education credits within an engineering program.

The number of participants is limited to: No
The course overlaps following course/s: FMI040

Reading list

- Peake, S (ed.): Renewable Energy; Power for a Sustainable Future (fourth edition). Oxford University Press, 2018. Latest edition. Due to quick development in this field the literature may be changed; this will be communicated at least eight weeks before start of the course.
- Scientific papers, statistics, and reports, according to a list updated every year.

Contact and other information

Course coordinator: Lovisa Björnsson, lovisa.bjornsson@miljo.lth.se

Course administrator: Petra Malmquist, petra.malmquist@miljo.lth.se

Course homepage: <http://miljo.lth.se>

Further information: The written exam is in the form of a take-home exam.