Alternative Energy Sources and their Applications

Programme course

6 credits

Alternativa energikällor och deras tillämpningar

TFYA85

Valid from: 2017 Spring semester

Determined by
Board of Studies for Electrical Engineering, Physics and Mathematics

Date determined
2017-01-25

Main field of study
Applied Physics, Physics

Course level
First cycle

Advancement level
G2X

Course offered for
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- Applied Physics and Electrical Engineering, M Sc in Engineering
- Physics and Nanoscience, Master's programme
- Applied Physics and Electrical Engineering - International, M Sc in Engineering
- Engineering Biology, M Sc in Engineering
- Chemical Biology

Entry requirements
Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites
Basic knowledge in physics

Intended learning outcomes
After the course the student should be able to:

- describe the basic physical concepts of energy conversion and consumption.
- understand the importance of exploring renewable energy sources from technological, environmental and economical aspects.
- describe different methods of utilizing renewable energy sources.
- exhibit knowledge on achievement of energy efficient applications and energy-saving technologies.

Course content

Lectures cover general theory and technique of renewable energy sources to compare with unsustainable energy sources. Included areas:

- Basic aspects of physics of energy related applications.
- Renewable energy sources (solar, geothermal, hydro, wind, biofuel) and power plants.
- Energy transformation and transmission.
- Energy saving technologies for the electronics, transport, industry and buildings.
- Advanced materials, methods, and future prospects in the energy sector, influence on environment and human life, basic requirements for energy related applications.
- Introduction to computer simulation techniques for the energy sector.

Teaching and working methods

The scheduled parts of the course consist of lectures, seminars, laboratory work and visit companies working with renewable energy.

Examination

KTR1	Optional assignment	0 credits	U, G
UPG1	Site visiting and/or guest lectures	0.5 credits	U, G
LAB1	Laboratory work	0.5 credits	U, G
TEN1	Written examination	5 credits	U, 3, 4, 5

The optional assignments of the course can provide points that may be counted on the written exam.

Grades

Four-grade scale, LiU, U, 3, 4, 5

Department

Institutionen för fysik, kemi och biologi

Director of Studies or equivalent

Magnus Johansson

Examiner

Sergiy Valyukh

Course website and other links

http://www.ifm.liu.se/courses

Education components

Preliminary scheduled hours: 52 h
Recommended self-study hours: 108 h

Course literature

E. E. Michaelides, "Alternative Energy Sources", (Springer, 2012). A compendium of articles. R. Wengenmayr, T. Bührke “Renewable Energy: Sustainable Energy Concepts for the Future”, (Wiley, 2008). G. Boyle, ”Renewable Energy”, (Oxford University Press,2004).

Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.