

Course Syllabus

Renewable Power Generation 7.5 Credits*, First Cycle Level 2

Learning Outcomes

Upon completion of the course, the student shall be able to:

- explain essential concepts and technologies for power generation based on commonly available renewable energy sources (1)
- demonstrate understanding of the relationship between properties of processes, media and technical systems (2)
- evaluate the resulting energetic and environmental characteristics and suitability for practical application (3)
- analyse, solve and evaluate the results of realistic quantitative problems concerning renewable power generation using scientifically-based mathematical models. (4)
- carry out a well-defined project task related to part of a system or micro-system for renewable power generation, draw reasonable conclusions from the results obtained and present these in writing with reference to the original problem formulation. (5)

Course Content

The course covers theoretical foundations and technology of plant and auxiliary systems for power generation based on commonly available renewable energy sources, primarily for Swedish conditions but also with an international perspective.

Essential theory of power generation from wind, wave, hydro and solar power.

Dynamic power generation technology for mainly hydro and wind and wave power applications is covered, as are project development and conditions for production.

Photovoltaic systems are covered, including their design based on different solar cell types, and operational characteristics as a consequence of the power electronics systems employed as well as generation potential when connected to grids and batterybased storage solutions.

Principles for designing subsystems or microsystems for the supply of electricity to single households, villages, industry or other utilities.

Assessment

- Three individual written partial examinations. Each test (1.5 credits) one each in the subjects wind, hydro and solar power (goals 1 – 4)

- Assignment in wave power (1 credits) (goals 1 – 4)
- Project (2 credits). In the form of computational/simulation study for dimensioning a microsystem based on one or more renewable energy technologies. (goal 5)

Forms of Study

Lectures, exercises, assignment and project work.

Grades

The Swedish grades U, 3, 4, 5.

Assignment and laboratory work pass or fail

The final grade is based on the student's achievements in the three written partial examinations.

Prerequisites

Introduction to Electrical Engineering and Programmable Controllers, 7.5 credits First Cycle

Level 1 or equivalent knowledge

Mechanics 7.5 credits, undergraduate level

Thermodynamics, 7,5 credits

Subject:

Energy Technology

Group of Subjects:

Energy Technology

Disciplinary Domain:

Technology, 100%

This course can be included in the following main field(s) of study:

1. No main field of study

Progression Indicator within (each) main field of study:

1. G2F

Approved:

Approved 29 June 2016

Valid from 29 August 2016