

## Course Syllabus

### Renewable Power Generation 7.5 Credits\*, First Cycle

#### Learning Outcomes

Upon completion of the course, students will be able to:

- explain essential concepts and technologies for power generation based on commonly available renewable energy sources
- demonstrate understanding of the relationship between and the properties of processes, media and technical systems
- evaluate the resulting energy and environmental characteristics and suitability for practical application
- analyse and evaluate the results of realistic quantitative problems concerning renewable power generation using scientifically-based mathematical models
- carry out a well-defined project related to a part of a system or micro-system for renewable power generation.

#### Course Content

The course covers the theoretical foundations and technology of plant and auxiliary systems for power generation based on commonly available renewable energy sources with focus on wind and solar power. The role of energy systems in energy sources, primarily for Swedish conditions but also with an international perspective, is covered. Also covered are the basic principles of physics for power generation from wind, hydro and solar power. Dynamic power generation technology for mainly hydro and wind power applications is covered, as are project development and conditions for production. The course will cover photovoltaic systems with regard both to the basic construction of different types of solar cells and to how the operational characteristics change as a consequence of the power electronics employed and the system layout (i.e., whether a system is grid-connected and/or has a battery-based storage solution). The course also covers the principles for designing subsystems or microsystems for the supply of electricity to different examples such as single households, villages and industry.

#### Assessment

- Oral presentation (1.5 credits)
- Project (solar PV) (3 credits)
- Project (wind power) (3 credits)

**Forms of Study**

Lectures, exercises and project work.

**Grades**

The Swedish grades U–VG.

Oral presentation, U-G

Project, U-G-VG

The final grade is based on the student's achievements in all assignments.

**Prerequisites**

Electrical Power Engineering 7.5 credits First Cycle Level, Fluid Dynamics, 7.5 credits First Cycle Level and Thermodynamics 7.5 credits First Cycle Level

**Other Information**

Replaces GEG29L.

**Subject:**

Energy Technology

**Group of Subjects:**

Energy Technology

**Disciplinary Domain:**

Technology, 100%

**Progression Indicator:**

G1F

**Approved:**

Approved 1 March 2022

Valid from 1 March 2022