

## Course Syllabus

### Active Electrical Networks 7.5 Credits, First Cycle

#### Learning Outcomes

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

- describe the differences between conventional and inverter-connected power production,
- explain and analyse how transmission and distribution grids are affected by large-scale integration of renewable power generation,
- describe the principle behind HVDC and FACTS, and explain their role in the power system,
- give examples of how battery storage and other forms of energy storage can be used to support the power system,
- describe the role that flexible consumers can have in supporting the power system.

#### Course Content

The course aims to provide an understanding of how current power systems work, and the challenges and opportunities that result from the transition to a more sustainable energy system. To achieve this understanding, the course deals with the differences between conventional power production (hydro power, nuclear power, etc.) and inverter-connected power production (solar and wind power), as well as how transmission and distribution grids are affected by an extensive integration of renewable power production.

The course also investigates the principles and use of High-Voltage Direct Current (HVDC) and Flexible AC Transmission Systems (FACTS) in the power system. Other important aspects covered in the course are how energy storage can support the power system and what role flexible consumers can have in countering variations in power production.

#### Assessment

- Examination
- Project assignment

#### Grades

The grading scale used for the final course grade is U, 3, 4, 5.

Grades are reported as follows:

- Examination - 5 Credits | U, 3, 4, 5
- Project assignment - 2.5 Credits | U–G

**Entry Requirements**

Electrical Power Engineering, 7.5 credits

**Other Information**

Overlaps ET2011.

This course cannot be counted towards the same degree along with courses that have equivalent content.

If the student has received a decision/recommendation granting study support from Dalarna University because of a disability, then the examiner has the right to offer an alternative examination arrangement. The examiner takes into account the objectives in the course syllabus when deciding whether the examination can be adapted in accordance with the decision/recommendation.

**Subject:**

Energy Technology

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

1. No main field of study

**Progression Indicator:**

1. GXX

**Approved:**

Approved 5 February 2024

Valid from 1 April 2024