Elkraftteori

Electrical Power Theory

7,5 ECTS credit points (7,5 högskolepoäng)

1 Course title and credit points
The course is titled Electrical Power Theory/Elkraftteori and awards 7,5 ECTS credits. One credit point (högskolepoäng) corresponds to one credit point in the European Credit Transfer System (ECTS).

2 Decision and approval
This course is established by Department for Electrical Engineering 2013-05-29. The course syllabus was revised by School of Engineering and applies from 2014-09-25.
Replaces ET1442.

3 Objectives
The purpose of this course is that the student must develop knowledge of electrical theory with the intention of understanding the characteristics of power grids, electrical machinery and power electronics. Knowledge may be useful for analysis, measurement and troubleshooting in power grids and the system of electric machines and power electronics.

4 Content
Central parts of the course
• Three-phase power grids.
• General information about voltages, currents and the effects of symmetric systems and systems with unbalanced loads.
• Voltage drop.
• Phase compensation.
• If electricity menstrual risks to humans.
• The transformer.
• Magnetic flux, induction and transformer theory.
• The ratings for transformers
• Transformer Connections and voltage drop in the transformers.
• Electric power network in Scandinavia and other parts of the world.
• Energy losses and voltage drops in power grids.
• Calculation of short circuit currents.
• Design of electrical systems for maximum power.
• Safety of electrical installations.
• Electrical machinery.
• Electro-mechanical energy conversion.
• Three-phase asynchronous motor and three-phase synchronous generator.
• Power Electronics.
• The diode, thyristor and transistor in the power circuits.
• The rectifier, controllable rectifiers, frequency converters.
• DC / DC converter.
• Harmonics in power networks.

5 Aims and learning outcomes
After completion of the course the student will be able to:
• use analytical methods in electrical power theory to explain the characteristics and behavior of power grids, electrical machines and power electronics.
• be able to perform line selection for load current.
• independently carry out measurements on power circuits and interpret the results of such measurements.
• describe the risks of electrical hazards and to act so that these risks are prevented.

6 Learning and teaching
The course consists of lectures, exercises and assignments. An area of the course reported in the form of a project with a project report.
The teaching language is English.

7 Assessment and grading
Examination of the course

<table>
<thead>
<tr>
<th>Code</th>
<th>Module</th>
<th>Credit</th>
<th>Grade</th>
</tr>
</thead>
</table>

---

page 1
The course will be graded A Excellent, B Very good, C Good, D Satisfactory, E Sufficient, FX Insufficient, supplementation required, F Fail. If grade FX or UX are given, the student may after consultation with the course coordinator / examiner get an opportunity to within six weeks complement to grade E or G for the specific course element.

8 Course evaluation
The course coordinator is responsible for systematically gathering feedback from the students in course evaluations and making sure that the results of these feed back into the development of the course.

9 Prerequisites
Admission to the course requires knowledge equivalent to the following courses through the past:
• Electric Circuit Theory ET1124
• Electronics ET1401
• Project Electrical ET1320

10 Field of education and subject area
The course is part of the field of education and is included in the subject area Electrical Engineering.

11 Restrictions regarding degree
The course cannot form part of a degree with another course, the content of which completely or partly corresponds with the contents of this course.

12 Course literature and other teaching material
Introduction to electrical power systems; Mohamed E El-Hawary

page 2