SYLLABUS

Power distribution, EMC and power quality 7.5 credits W0001M

Elanläggningsteknik, EMC och elkvalitet

Course syllabus admitted: Autumn 2014 Sp 1 - Autumn 2019 Sp 2

DECISION DATE
2014-02-14

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Power distribution, EMC and power quality 7.5 credits W0001M

Elanläggningsteknik, EMC och elkvalitet

First cycle, W0001M

Education level	Grade scale	Subject	Subject group (SCB)
First cycle	G U 3 4 5	Elkraftteknik	Energy Technology

Entry requirements

In order to meet the general entry requirements for first cycle studies you must have successfully completed upper secondary education and documented skills in English language and Circuit Theory I (ET074G), Circuit Theory 2 (5EL180), Algebra for Engineer (MA117G) and Calculus for Engineers (MA118G) (These courses are given by MiUn and UmU) or equivalent knowledge through practical work within electrical power engineering.

Selection

The selection is based on 1-165 credits.

Examiner

Anders Larsson

Course Aim

The course consist of two different parts; Power distribution and power quality (EMC)

After finishing the course you as a student should have:

Knowledge and understanding:
-about different equipment used in low- and medium voltage network
-about basic principle of different protections units used in low- and medium voltage network
-about different fundamental concepts of power quality
-about how different disturbances spread in our networks
-about standards and regulations that apply to the area
-about current research in the field of power quality

Skills and ability:
-how to perform short circuit calculations in various electrical systems
-how to calculate the voltage drop in the electrical installations
-how we design electrical systems
-to identify the various sources that generate power quality related problems
-to deal with strategies to reduce power quality related problems

Ability of assessment and attitude:
-if an electrical installation meets the basic technical requirements we normally impose on these
-to make judgments regarding the protection and electrical safety

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Contents

The main focus of the course can be described as the low-voltage and medium-voltage part.

In the course we will go through:
-Components (transformer stations , substations, cables, overhead lines , circuit breakers, switchgear , breakers, capacitor, insulators, etc.).
-Protection (fuses, protective relays, Arc Monitors , RCDs , etc.)
-Earth and shielding systems (ground, earth- neutral reactors , zero resistance , potential equalization , capacitance , etc.).
-Short circuit calculations , principles of over-current protection in distribution networks
-Voltage regulation and voltage drop calculations in low and medium voltage networks
-The interleaving of loads, load capacity
-EMC and Power Quality
-Standards of EMC and power quality , EMC Directive
-Dips , voltage swells and interruptions
-Harmonics , unbalance and flicker
-Transients , lightning , power surges
-EMF

This course is aimed at those starting with a smaller grid company or industry.

Realization

Each course occasion´s language and form is stated and appear on the course page on Luleå University of Technology's website.
Teaching at a distance and labs done at campus Skellefteå. Some of the labs is in cooperation with energy companies and aims to provide insight into the link between theory and practice.

Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided.

Overlap

The course W0001M is equal to W0022T

Literature. Valid from Autumn 2014 Sp 1

Valid from autumn 2012 Sp 1 (May change until 10 weeks before course start)

Elkrafthandboken, Elkraftsystem 1 och 2 + Kompendium
Math Bollen and Irene Gu ”Signal Processing of Power Quality Disturbances” (Electronic version is also available through the LTU library)

Course offered by

Department of Engineering Sciences and Mathematics

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Items/credits

Number	Type	Credits	Grade
0001	Written exam	3.5	G U 3 4 5
0002	Laboratory Work	1	U G#
0003	Laboratory Work 2	1.5	U G#
0004	Project Work	1.5	U G#

Study guidance

Study guidance for the course is to be found in our learning platform Canvas before the course starts. Students applying for single subject courses get more information in the Welcome letter. You will find the learning platform via My LTU.

Last revised

by Mats Näsström 2014-02-14

Syllabus established

by Dept. TVM Mats Näsström 2012-03-14

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