EG2020 Power Systems, Basic Course 7.5 credits

Elsystem, grundkurs

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

Establishment

Course syllabus for EG2020 valid from Autumn 2007

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Electrical Engineering

Specific prerequisites

General admission requirements

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

Upon completion of the course the

student will be able to

- Describe how a power system is designed and operated.
- Explain static and dynamic states in a power system.
- Explain the various causes of power system collapse.
- Create computational models for analysis of both symmetrical and unsymmetrical conditions in power systems.
- Perform load flow computations with the help of the Newton-Raphson method.
- Analyze the load flow results.
- Create computational models for analysis of power system dynamics and stability.
- Apply the theory to real-life problems.

Course contents

The course treats models and computation methods for power systems. The models and the methods are general and can be applied to industrial power system and local distribution networks as well as to national transmission networks. In the course assignments these models and methods are applied to solve realistic problems with computer programs written in MATLAB.

The following areas are treated in the course:

Symmetrical phasors: Three-phase systems, one-phase equivalents, the per-unit system, circuit theorems, admittance matrixes, impedance matrixes, load flow analysis, models of components in power systems such as lines, generators, cables, transformers, loads etc.

Unsymmetrical phasors: Symmetrical components, calculation methods, models of transmission lines, transformers, generators etc.

Load flow analysis: Problem formulation, models, solution methods.

Power system dynamics: Stability of dynamic systems, Lyapunov functions, modeling of power system components for transient stability analysis, stability of power systems, equal area criterion, rotor angle stability, voltage stability.

Course literature

Course compendia

Examination

- TEN1 - Examination, 7.5 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

Other requirements for final grade

One examination, 7,5 cr.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.