FEG3211 Power System Analysis, part 1 10.0 credits

Analys av elkraftsystem, del 1

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

Establishment

Course syllabus for FEG3211 valid from Autumn 2011

Grading scale

G

Education cycle

Third cycle

Specific prerequisites

The course is intended for Ph.D. students in electric power systems, but can also be interesting for students from other fields of electrical engineering.

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 should be able to

- explain static state in a power system,
- create computational models for analysis of both symmetrical and unsymmetrical conditions in power systems,
- perform load flow computations and analyze the load flow results,
- perform an optimal power flow for reactive power dispatching to decrease power losses.
- analyze the system performance where there is an unbalanced fault, and also calculate the corresponding fault current.

Course contents

The course is given in English, and 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:

- Balanced system: three-phase systems, single-line equivalent, the per-unit system, circuit theorems, admittance matrixes, impedance matrixes, models of components in power systems such as lines, generators, cables, transformers, loads etc.
- Load flow analysis: problem formulation, models, solution methods.
- Optimal load flow and sensitivity analysis: reactive power dispatching to decrease power losses.
- Unbalanced system: symmetrical components, calculation methods, models of transmission lines, transformers, generators etc.
- Fault analysis: system models, and calculation of fault currents where there is an unbalanced fault.

Disposition

Lectures, assignments, exam and project.

Course literature

L. Söder & M. Ghandhari, ”Power System Analys, Part I”

Examination

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.

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

The result of the project is reported in a technical report.

Other requirements for final grade

- Approved exam.
- Approved technical report.

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.