EG2050 System Planning 7.5 credits

Systemplanering

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 EG2050 valid from Autumn 2010

Grading scale

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

Education cycle

Second cycle

Main field of study

Electrical Engineering

Specific prerequisites

Courses in mathematics (including probabiliy theory) 30 HEC. Swedish B or equivalent alternatively English B or equivalent.

Language of instruction

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

Intended learning outcomes

To pass the course, the students should show that they are able to

- describe the principles of how an electricity market can be organised,
- perform rough estimations of electricity prices,
- explain how the balance between production and consumption is maintained in an electric power system, and calculate how the frequency is affected by various events in the power system,
- formulate short-term planning problems of hydro-thermal power systems,
- apply both probabilistic production cost simulation and Monte Carlo simulation to calculate expected operation cost and risk of power deficit in an electricity market.

To receive a higher grade the students should also show that they are able to

- identify factors that have a large importance for the electricity pricing, and to indicate how these factors affect for example producers and consumers,
- determine if the frequency control of an electric power system has sufficient margins, and if necessary be able to choose between various measures to increase the margins,
- create specialised models for short-term planning problems,
- create specialised models both for probabilistic production cost simulation and Monte Carlo simulation, and to use the results of an electricity market simulation to judge the consequences of various actions in the electricity market.

Course contents

Theory and examples are presented during the lectures and are then applied by the students in a a number of home assignments:

and three home assignments, which cover the central parts of the course contents. The computer assignments treats electricity pricing and demonstrates which factors affect the electricity price. The following home assignments are given:

- Electricity pricing. This assignment involves simplified models of the Nordic electricity market.
- Frequency control. In this assignment it is studied if a small system has sufficient reserves to maintain the frequency 50 Hz.
- Short-term planning of power generation. The objective of the assignment is to schedule the operation of a few power plants. An optimization problem is formulated and then solved in for example GAMS.
- Simulation of an electricity market. Here a small electricity market is analyzed using two different simulation methods (one analytical and one Monte Carlo method).

Course literature

“Efficient Operation and Planning of Power Systems”, Electric Power Systems Lab.

Examination

- LAB1 - Assignment, 0.5 credits, grading scale: P, F
- TEN1 - Examination, 7.0 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

Written exam, approved home assignments.

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.