# FEG3221 System Planning, Graduate Course 10.0 credits

**Systemplanering, doktorandkurs**

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

## Establishment

Course syllabus for FEG3221 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

After the course, the student should be able to

- describe the principles of how an electricity market can be organised,
- perform rough estimations of electricity prices,
- identify factors that have a large importance for the electricity pricing, and to indicate how these factors affect for example producers and consumers,
- 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,
- 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,
- formulate short-term planning problems of hydro-thermal power systems,
- create specialised models for short-term planning problems,
- apply both probabilistic production cost simulation and Monte Carlo simulation to calculate expected operation cost and risk of power deficit in an electricity market,
- 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,
- reflect on different methods and models for operation and planning of power systems and electricity markets.

## Course contents

Structure of electricity markets, electricity pricing, frequency control, linear programming, short-term planning of hydro-thermal systems, simulation of electricity markets, probabilistic production cost simulation, Monte Carlo-simulation.

## Disposition

Lectures, home assignments, 5 h exam, project assignments.

## Course literature

L. Söder & M. Amelin, “Efficient Operation and Planning of Power Systems”.

## 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 project assignments are chosen by students in agreement with their supervisors and the examiner of the course.

## Other requirements for final grade

- Approved home assignments.
- Passed the exam.
- Approved project 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.