



# EG2220 Power Generation, Environment and Markets 7.5 credits

## Elproduktion, miljö och marknader

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

The official course syllabus is valid from the autumn semester 2022 in accordance with the decision from the head of school: J-2022-1234. Decision date: 08/06/2022

## Decision to discontinue this course

The course is discontinued at the expiration of spring term 2024 in accordance with Head of School decision:: J-2022-1234. Decision date: 08/06/2022 The course was given for the last time during the spring semester 22. The final opportunity for the course examination will be given in the spring term 2024. Two examination dates will be offered per academic year. Examination will have the same format as earlier.

Occasions to report the compulsory project task will be offered in connection with examinations.

The optional project tasks for higher grades will not possible to implement after course was given the last time in the spring semester 2022.

## Grading scale

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

## Education cycle

Second cycle

## Main field of study

Electrical Engineering

## Specific prerequisites

- EG2200/EG2205 Operation and Planning of Electricity Generation (or equivalent)
- English B/English 6 (or equivalent)

## Language of instruction

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

## Intended learning outcomes

The aim of the course is that the participants should learn how renewable electricity production affects operation and planning of electric power systems, and how the design of the electricity market can be adjusted then the amount of varying, renewable generation (for example wind power or solar energy) is increasing. The course is also considering additional markets that support renewable generation, for example markets for green certificates and emission trading. The course comprises theory, computation methods (in particular optimisation theory) as well as examples from reality.

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

- describe the principles of how an electricity market and other related markets can be organised, and analyse how the design of these markets affect renewable generation,
- formulate planning problems of hydro-thermal power systems in electricity markets with large volumes of varying renewable generation,
- analyse how the grid regulation affects the development of renewable generation,
- describe and explain the challenges in a power system with very large volumes of varying renewable generation,
- give a short oral presentation of the solution to a problem within power generation, environment and markets.

## Course contents

The course covers the following main topics: the relation between the environmental impact of the power system and the design of the electricity market, stochastic planning models for power generation, grid regulation and expansion planning, and future power systems. Theory and examples are presented in lectures. The students are then applying the theory to

a number of assignments. The course includes smaller assignments, which are mandatory and presented orally, as well as larger assignments, which are voluntary and presented in written reports.

## Examination

- PRO1 - Project Work 1, 4.0 credits, grading scale: A, B, C, D, E, FX, F
- TEN1 - Examination, 3.5 credits, grading scale: P, 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.

The final grade is equal to the grade of the project assignments.

## Other requirements for final grade

Each examination part should be approved.

## 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.