FEG3231 Vindkraftsystem, doktorandkurs 10,0 hp

Wind Power Systems, Graduate Course

När kurs inte längre ges har student möjlighet att examineras under ytterligare två läsår.

Fastställande

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Betygsskala

P, F

Utbildningsnivå

Forskarnivå

Särskild behörighet

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.

Undervisningsspråk

Undervisningsspråk anges i kurstillfällesinformationen i kurs- och programkatalogen.

Lärandemål

After the course, the student should be able to

- give some basic definitions (power curve, overall efficiency, Betz limit, stall and pitch regulation, etc.),
- understand basic concepts as power in the wind, vertical distribution of wind speeds, power production and efficiency of a wind turbine, energy yield of a wind turbine from a certain site,
- describe four main wind turbine design concepts, main differences, advantages, disadvantages,
- understands basic concepts from grid integration of wind turbines (voltage at the connection point, active, reactive power, strength of the grid, power quality of a wind turbine),
- describe some effects that wind power has on power system operation and grid investments,
- describe operation of hybrid systems (wind/diesel, wind/battery/diesel),
- describe effects that wind power has on environment,
- analyse and compare characteristics of different wind turbines,
- present some control possibilities of wind turbines,
- analyse wind conditions, and wind farm layout possibilities of the particular site,
- calculate energy yield of a wind turbine from a certain site using actual measurements or approximate data,
- perform basic calculations and analysis for grid connection of a wind turbine,
- describe main aspects treated in the Grid Codes for connection of wind turbines and explain why those aspects are important,
- work in a group,
- make presentations,
- reflect on the role of wind power in power systems.

Kursinnehåll

Wind energy technology covers many technological aspects, like aerodynamics, mechanics, physics and electrical engineering. Hence, the course intends to provide a wide overview of, for example, the physical power in the wind, the historical development, the wind energy industry, market regulations, wind turbine design concepts, environmental impact of wind turbines, economics, network integration, stand-alone systems and offshore wind power systems.
An important part of the course is a team assignment. In this assignment, the team will perform a feasibility study for a wind energy project.

Examination

- EXA1 - Examination, 10,0 hp, betygsskala: P, F

Examinator beslutar, baserat på rekommendation från KTH:s handläggare av stöd till studenter med funktionsnedsättning, om eventuell anpassad examination för studenter med dokumenterad, varaktig funktionsnedsättning.

Examinator får medge annan examinationsform vid omexamination av enstaka studenter.

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

Övriga krav för slutbetyg

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

Etiskt förhållningssätt

- Vid grupparbete har alla i gruppen ansvar för gruppens arbete.
- Vid examination ska varje student ärligt redovisa hjälp som erhållits och källor som använts.
- Vid muntlig examination ska varje student kunna redogöra för hela uppgiften och hela lösningen.