MJ2500 Large Scale Solar Power 6.0 credits

Storskalig solkraft

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 MJ2500 valid from Spring 2017

Grading scale

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

Education cycle

Second cycle

Main field of study

Mechanical Engineering

Specific prerequisites

- Renewable Energy Technology, MJ2411, or equivalent
- Sustainable Power Generation, MJ2405, or equivalent
- Applied Energy Technology, MJ2409, or equivalent

Language of instruction

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

Intended learning outcomes

After completion of the course, students shall be able to:

- Describe in detail solar energy fundamentals and main characteristics of solar photovoltaic and concentrating solar power technologies for utility-scale electricity generation.
- Describe in detail the main components and their functionality in solar power plants.
- Compare advantages and disadvantages of solar photovoltaic and concentrating solar power plants.
- Design and dimension solar power plants that meet specific energy demands and are economically feasible in respond to electricity market prices or specific tenders
- Have basic knowledge of wide-spread tools used in industry and academia for design, dimensioning and operation of solar power plants
- Recognize and describe the role of key actors today in the value chain of solar power plants.

Course contents

- Provide an insight in solar energy utilization with utility-scale electricity solar power plants. According to the International Energy Agency, solar power is seen as one of the cornerstones of affordable renewable power production for a fossile free future. Without a significant share of solar power, the 1.5 degree global warming goal from the Paris climate convention will not be met. This means that the installation of large scale solar power plants will accellerate in coming years.
- Provide the students with all necessary background in solar power production starting from understanding the different technologies covering both photovoltaics (PV) and concentrating solar power (CSP)
- The students will learn about the main components of utility scale PV and CSP plants, their functionality and operating characteristics.
- Furthermore, the students will learn about the electricity market and solar power production for market specific demands. Lastly the students will learn about tools to design solar power plants for specific market conditions. The aquired knowledge will be used to design a utility scale PV and a CSP plant for specific electricity market conditions in two design projects.
- At the end of the course, the students should be able to analyze and design megawatt scale power plants to supply the electricity using solar energy. Students should be able to understand the value chain of a solar power plant project, the market perspectives and the main actors today.

Course literature

- Concentrating Solar Power Technology - Principles, Developments and Applications (2012). Lovegrove & Stein. Woodhead Publishing. ISBN :9781845697693
- Utility-Scale Solar Photovoltaic Power Plants - A Project Developer's Guide, IFC (2015)

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Examination

- PROA - Project 1, 3.0 credits, grading scale: A, B, C, D, E, FX, F
- TENA - Exam, 3.0 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.

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.