



LUNDS UNIVERSITET
Lunds Tekniska Högskola

Course syllabus

Vindkraftsteknik Wind Power Technology

MVKP15, 7,5 credits, A (Second Cycle)

Valid for: 2023/24

Faculty: Faculty of Engineering, LTH

Decided by: PLED M

Date of Decision: 2023-04-11

General Information

Elective Compulsory for: MHET1

Elective for: E4-em, F4, M4-en, W4-et

Language of instruction: The course will be given in English

Aim

Electricity consumption in the world is increasing, both in terms of quantity and as a proportion of total energy consumption. Wind power has the potential to make a major contribution to the electricity generation and this with very low CO₂ emissions. The course aims at providing insight in wind turbine design and operation as well as of atmospheric flows and the wind's interaction with the turbines and their surroundings. The course describes the operation of the wind power plants, aero- and structural dynamics and control. Furthermore, wind and wind measurements and, more comprehensively, electrical, political, economic and environmental aspects are dealt with.

Learning outcomes

Knowledge and understanding

For a passing grade the student must

- Describe wind power technology's pros and cons (merits and limitations)
- Understand relevant aerodynamics
- Understand the working principles of wind turbines
- Understand/describe the origin, characteristics and measurements of wind
- Understand the aerodynamical interaction between wind turbines and their surroundings.
- Understand the fundamental structural dynamics of wind turbines

- Understand/account for fundamental electrical aspects both for turbine design and wind turbines impact on the electricity grid
- Be aware of the most important political, economic and environmental aspects of wind

Competences and skills

For a passing grade the student must

- Make estimates of technical parameters relating to the turbines design, function and control
- Compute expected production based on measure wind data
- Use software for wind resource assessment and wind farm development

Judgement and approach

For a passing grade the student must

- be able to judge the merits and limitations of wind power from technical environmental and economic aspects
- be able to participate in technical discussions regarding wind power

Contents

Introduction and fundamental aerodynamics

Function and design of wind turbines:

Aeromechanics

Control

Structural mechanics

Wind, wind measurements and wind turbine parks

Electrical aspects

Economy, environment and politics

Compulsory assignments, Study visit

Examination details

Grading scale: TH - (U,3,4,5) - (Fail, Three, Four, Five)

Assessment: To pass the course, completion of the compulsory assignments and a written exam is required. The written exam contains both computations and theory.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Parts

Code: 0120. **Name:** Wind Power Technology, Written Examination.

Credits: 6. **Grading scale:** TH. **Assessment:** To pass the course, completion of the compulsory assignments and a written exam is required. The written exam contains both computations and theory.

Code: 0220. **Name:** Wind Power Technology, Compulsory Course Items.

Credits: 1,5. **Grading scale:** UG. **Assessment:** To pass the course, completion of the compulsory assignments and a written exam is required. The written exam contains both computations and theory. **Contents:** Compulsory assignments.

Admission

Assumed prior knowledge: Fundamental knowledge of classical mechanics

The number of participants is limited to: No

Reading list

- Colin Anderson: Wind Turbines - Theory and Practice. Cambridge University Press, 2020, ISBN: 9781108478328.

Contact and other information

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