Module label: Wind Physics Student's Lab

Module code: phy646

Credit points: 6.0 KP

Workload: 180 h
(Attendance: 56 hrs, Self study: 124 hrs)

Used in course of study:
- Master's Programme Engineering Physics > Schwerpunkt: Renewable Energies

Contact person: Martin Kühn

Entry requirements:
Basic computer knowledge; mechanics; mathematical methods for physics and engineering; basic knowledge of wind energy utilization; previous knowledge of metrology, basic knowledge of aerodynamics.

Skills to be acquired in this module:
The "Wind Physics Student's Lab" aims to foster the learning process by own research activities of the students in wind physics and additionally to build up skills for scientific and experimental work and scientific writing. Therefore, this course is also intended as preparation for the master thesis.

The course is organized as seminar with integrated work in the laboratory. The students will investigate an individual, self-formulated research question and will be guided by the supervisors through the research-based learning process. The work in groups and discussion of solutions aims to improve skills in team working. In order to introduce the students to current wind energy research, the course is offered in three versions. These versions represent the work of the three research groups at ForWind - University Oldenburg.

Module contents:

1st phase: Class-room seminar
- building up basic competences
- identification of the technical tasks
- introduction to current research
- introduction to the learning platform
- investigating standard situations and functional interaction by means of the experimental system
- defining an own research question
- defining an experimental strategy
- planning the experiment

2nd phase: Laboratory work (1 week)
- set-up, execution, data acquisition and decommissioning of the experiment

3rd phase: Evaluation and documentation evaluating the experiment documentation with a short report (paper) presentation

The seminar "Wind turbine rotor in turbulent inflow" is connected to the scientific work of the research group Turbulence, Wind Energy and Stochastics (TWIST). In this seminar, turbulent wind fields and their effects on wind turbines will be investigated. Students learn how turbulence can be described, investigated and evaluated for different purposes. The students gain a deep understanding of the phenomenon of turbulence. They learn to work with measured data from the open field and perform own experiments with an active turbulence grid and a model of a wind turbine in a turbulent wind tunnel. They learn to establish their own research questions and are encouraged to develop own methods. The seminar consists of three main phases with different learning steps:

1st phase: Class-room seminar
- building up basic competences
- identification of the technical and/or scientific tasks
- introduction to current research
- introduction to the experiment related to the seminar
- investigating standard situations and functional interaction by means of the experimental system
- defining own research questions
- defining an experimental strategy
- planning the experiment

2nd phase: Laboratory work
- set-up, execution, data acquisition and decommissioning of the experiment
3rd phase: Evaluation and documentation

- evaluating the experiment
- documentation with a short report (paper)
- presentation

**Reader’s advisory**

German Language: CEwind eG / Alois Schaffarczyk, Einführung in die Windenergietechnik; 1st Ed. 2012, Carl Hanser Verlag, Munich

**Links**

- Language of instruction: English
- Duration (semesters): 1 Semester
- Module frequency: Sommer- und Wintersemester
- Module capacity: unlimited
- Modullevel: MM (Mastermodul / Master module)
- Modulart: Wahlpflicht / Elective

**Lern-/Lehrform / Type of program**

Vorkenntnisse / Previous knowledge

**Examination**

- Time of examination: Final exam of module
- Type of examination: Portfolio

**Course type**

- Seminar

**SWS**

- 4.00

**Frequency**

- SuSe or WiSe

**Workload attendance**

- 56 h