



Fraunhofer
ACADEMY

Online Certificate Programs

WIND ENERGY SYSTEMS



Offered by

U N I K A S S E L
V E R S I T Ä T



EXPAND YOUR KNOWLEDGE IN WIND ENERGY

Build your own career in the emerging wind energy industry with the online certificate program in Wind Energy Systems. Our lecturers are experts in wind power and are based at the University of Kassel, Germany's leading university in the field of sustainability, and at the Fraunhofer Institute for Energy Economics and Energy System Technology (IEE). Both partners have established seven certificate programs which are part of the study program Online M.Sc. Wind Energy Systems. In these certificates very specific aspects of wind power will be covered, which enables our students to extend their knowledge in very specific parts of the wind energy. These range from fundamentals of wind energy systems to integration of wind power in the electricity supply system.

We look forward to welcoming you on our certificate programs!

Prof. Dr.-Ing. habil. Detlef Kuhl
Course Director, Wind Energy Systems
University of Kassel

Prof. Dr. Kurt Rohrig
Deputy Director, Fraunhofer IEE

YOUR BENEFITS

- ››› International certificate program at a German university
- ››› 100% online teaching with close tutoring
- ››› Study any place, any time, with all courses in English
- ››› Work and study simultaneously and balance your studying and family time
- ››› Unique experience of both institutions, in education and research, in the field of renewable energies
- ››› Teaching by German experts and access to an international network in the field
- ››› Start with one certificate and use these modules as credits for the Master's program
- ››› New job opportunities through engineering education in a booming occupational field



OVERVIEW CERTIFICATE PROGRAMS

FLUID MECHANICS OF WIND ENERGY SYSTEMS

Each certificate includes different modules and has a total of 30 credits. All modules can be credited towards the Master's program (M.Sc.) in Wind Energy Systems and are ASIIN accredited.

The participants

Target groups are engineers and bachelor's degree holders who wish to extend their knowledge in the field of wind energy.

100% online teaching

The certificates are explicitly developed for those participants who would like to study beside their job. Therefore it is designed as a 100% online learning program.

Costs: €6000 each certificate

Duration: one year

Admission requirements

Bachelor Degree, Diploma or equivalent degree in a technical or scientific course, like electrical, mechanical, civil engineering or comparable degrees with basics in mathematics, natural sciences and engineering

Application deadline: April 1 and October 1 each year

Registration: www.uni-kassel.de/wes

Profile

This certificate provides a knowledge of mathematics and fluid mechanics as well as computational methods used for the fluid mechanical analysis of wind energy converters for stationary and transient applications. A knowledge about the aerodynamics of rotor blades will be facilitated. The goal is to enable engineers to apply existing commercial software packages for computational fluid mechanics in a sophisticated manner as a basis for reliable prognoses of the fluid flow around wind turbines, to improve the quality of numerical methods, and to develop realistic models of wind energy systems. These aspects are fundamental ingredients for optimizing current wind turbines and producing innovative new designs with a higher energy efficiency, lifetime, degree of capacity utilization and robustness with regard to extreme load cases.

Modules

- Mathematics
- Fluid Mechanics
- Theoretical Fluid Mechanics
- Computational Fluid Mechanics
- Rotor Aerodynamics





SCIENTIFICALLY ORIENTED FUNDAMENTALS OF WIND ENERGY SYSTEMS

Profile

The certificate in Scientifically Oriented Fundamentals of Wind Energy Systems provides the basic knowledge required to understand the principles behind the economically and ecologically efficient transformation of wind energy and also to design new wind turbines or components of wind turbines beyond the state of the art in wind engineering. In addition to improving basic engineering knowledge, this certificate also serves as a basis for studying more technically or methodologically oriented certificates or for studying the complete online M.Sc. program in Wind Energy Systems.

Modules

- Design of Mechanical and Electrical Components
- Mathematics
- Application of Software Tools
- Solid Mechanics
- Fluid Mechanics
- Electrical Engineering



ELECTRICAL ENGINEERING OF WIND ENERGY SYSTEMS

Profile

The certificate in Electrical Engineering of Wind Energy Systems deals with the main components of the electrical system. Issues such as how to design, control and operate the electrical system in a wind energy converter will be covered. This will focus on the technical challenges and boundary conditions of the design process and how it interacts with the drive train and the whole wind energy converter system and the wind farm.

Modules

- Design of Mechanical and Electrical Components
- Electrical Engineering
- Control and Operational Management for Wind Turbines and Wind Farms
- Energy Storage
- Technical and Economic Aspects of Grid Integration



INTEGRATION OF WIND POWER IN THE ELECTRICITY SUPPLY SYSTEM

Profile

The decentralized generation of wind power and its fluctuation mean that complex solutions are required in order to ensure successful grid integration. The certificate in Integration of Wind Power in the Electricity Supply System provides participants with an opportunity to study this increasingly important issue. The certificate focuses on the technical, administrative and legal challenges that must be considered in order to ensure a successful integration of wind power and other renewable and conventional sources of energy.

Modules

- Energy Meteorology
- Micro Meteorology for Wind Engineers
- Energy Storage
- Control and Operational Management for Wind Turbines and Wind Farms
- Technical and Economic Aspects of Grid Integration
- Energy Law
- Business Administration and Management of Wind Turbines and Wind Farms



WIND ENERGY CONVERTER SYSTEMS

Profile

The certificate in Wind Energy Converter Systems focuses on engineering, planning and managing aspects of wind turbine technology, wind turbines and wind farms. It provides knowledge about classic and recently developed wind turbine components. Design and analysis methods for modern on- and offshore foundations, towers, rotor blades and nacelle systems will be taught. Modules about planning, management and the administration of wind turbines and wind parks will round off the course.

Modules

- Design of Mechanical and Electrical Components
- On- and Offshore Foundations
- Construction and Design of the Nacelle Systems
- Rotor Blades
- Business Administration and Management of Wind Turbines and Wind Farms
- Planning and Construction of Wind Farms



STRUCTURAL MECHANICS OF WIND ENERGY SYSTEMS

Profile

The certificate in Structural Mechanics of Wind Energy Systems will provide knowledge of classic, current and future numerical methods for the solution of advanced mechanical models of wind turbine structures and structural components. Engineers will be familiar with the interpretation of stress states in different materials and the consequences for the structural safety and lifetime of wind turbines. The goal of the certificate is to recognize which combinations of models and numerical methods can be efficiently and reliably applied for special kinds of structural analyses. Engineers will also be familiar with the limitations of the models and numerical methods. They will overcome these limitations by writing their own partial programs for special tasks in their professional fields.

Modules

- Mathematics
- Solid Mechanics
- Linear Computational Structural Mechanics
- Non-Linear Computational Structural Mechanics
- Strength Durability and Reliability



COMPUTATIONAL WIND ENERGY SYSTEMS

Profile

The certificate in Computational Wind Energy Systems provides a knowledge of computational methods used for the static and dynamic analysis of wind energy converters and the surrounding wind and water flows. The goal is to enable engineers to apply existing commercial software packages of structural and fluid mechanics in a sophisticated manner as a basis for reliable prognoses of the mechanical behavior of wind turbines, to improve the quality of numerical methods, and to develop more realistic models of wind energy systems. These aspects are fundamental ingredients for optimizing current wind turbines and producing innovative new designs with a higher energy efficiency, life time, degree of capacity utilization and robustness with regard to extreme load cases.

Modules

- Theoretical Fluid Mechanics
- Computational Fluid Dynamic
- Linear Computational Structural Mechanics
- Non-Linear Computational Structural Mechanics
- Rotor Aerodynamics
- Strength Durability and Reliability



DO YOU HAVE ANY QUESTIONS FOR US?

About content-related issues?

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About similar programs?

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