Online M.Sc. Wind Energy Systems

DAAD USA: Online Info Session on April 10th, 2017
Online M.Sc. Wind Energy Systems

- Capacity building in the field of wind energy
- For natural scientist and engineers
- Combine study and work
  - Part time-work and study simultaneously and balance your studying and family time
  - International master’s degree program with 100% online learning program
- Student oriented teaching
- Become an expert in the field of wind energy:

Use this knowledge for a career in a company for wind park planning or in a public entity or become an expert for a single component at the development department of one of the worldwide leading producers.
**Why to study Wind Energy?**

**Job market wind industry**

- 2014 was a record year for the wind industry
- 3% of electricity consumption is covered by wind industry
- Qualified personnel is needed

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**GLOBAL CUMULATIVE INSTALLED WIND CAPACITY 1997-2014**

- Source: GWEC

![Wind capacity chart](chart.png)
# WES TEAM

<table>
<thead>
<tr>
<th><strong>Name</strong></th>
<th><strong>Title</strong></th>
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</thead>
<tbody>
<tr>
<td><strong>Prof. Dr.-Ing. habil. Detlef Kuhl</strong></td>
<td>Course Director, University of Kassel</td>
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<td><strong>Dr.-Ing. Kurt Rohrig</strong></td>
<td>Deputy Director of Fraunhofer IWES</td>
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<td><strong>Course Management</strong></td>
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<tr>
<td><strong>Dr. André Bisevic</strong></td>
<td>Fraunhofer IWES</td>
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<td><strong>Annika Schmitt</strong></td>
<td>University of Kassel</td>
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<tr>
<td><strong>Telsche Nielsen-Lange</strong></td>
<td>Scientific Coordination, Fraunhofer IWES</td>
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Environmental University

- Founded in 1971
- Current enrollment: ca. 23,696 students
- Practically orientated learning and research
- Environmental profile:
  - Responsibilities and challenges of balancing the needs of mankind with the preservation of the environment
  - Environmental study and research programs.

→ Online M.Sc. Wind Energy Systems

Environmental topics of science, e.g.:

- Sustainable materials flow systems
- Biomass as a material and an energy source
- Environmentally-conscious planning
- Integrated water management
- Regenerative energy systems and energy efficiency
- Wind energy systems
Annual budget: approx. 20 million Euros

Personal: approx. 260 (full-time: 170)

Directors: Prof. Dr. Clemens Hoffmann (Kassel), Prof. Dr. Andreas Reuter (Bremerhaven)

- Energy system technology for all renewables (Kassel)
- Wind energy from material development to grid optimization (Bremerhaven)
LECTURER OF THE MASTER PROGRAM

University
- University of Kassel
- University of Applied Sciences Bremerhaven
- Cologne University of Applied Sciences

Research Institutes
- Fraunhofer Institute for Wind Energy and Energy System Technology (IWES)

Industry
- SMA Technology
- Cube Engineering
- GLS Bank
- Dikei Abogados

Teaching alliance for your career

University
Fraunhofer
Industry

University of Kassel
University of Applied Sciences Bremerhaven
Cologne University of Applied Sciences
Fraunhofer Institute for Wind Energy and Energy System Technology (IWES)
SMA Technology
Cube Engineering
GLS Bank
Dikei Abogados
A study program of UNIAKSEL VERSITAT Fraunhofer IWES

CURRICULUM

Online M.Sc. Wind Energy Systems
120 ECTS-Credits

<table>
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<th>Course</th>
<th>Credits</th>
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<tr>
<td>Master-Thesis</td>
<td>30 ECTS-Credits</td>
</tr>
<tr>
<td>Specializations / Additive Key-Competences</td>
<td>60 ECTS-Credits</td>
</tr>
<tr>
<td>Fundamentals of Mathematics and Engineering for Wind Energy Systems</td>
<td>30 ECTS-Credits</td>
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Degree: Master of Science
Duration: 5 - 7 semester
Entitle to do a PHD

ASIIN Accredited Degree Programme
2015-2019
STUDY PLAN - CHOOSE YOUR SPECIALIZATION

- High flexibility in module selection
- Designed for students in employment

Fundamentals → Specialization in Energy System Technology → Specialization in Simulation and Structural Technology → Additive Key-Competences → Master Thesis

- Semester 1 - 2
- Semester 3 - 6
- Semester 7
WRITE YOUR MASTER THESIS

Choose your topic and your institution

University of Kassel  Fraunhofer Institute for Wind Energy and Energy System Technology  Research Institute  Industry
How do we teach our students online?

Teaching Videos

Virtual Classroom

Online Teaching Script

Mobile Learning with Tablet

Online Learning Groups
VIRTUAL CLASSROOM – ADOBE CONNECT

- principle of virtual work including approximations

\[ \int_0^L \delta \varepsilon_{11} \; \sigma_{11} \: dX_1 = \int_0^L \delta u_1 \: \rho \: b_1 \: dX_1 \]

- inclusion of approximations

\[ \int_0^L \frac{\delta u_1^2}{\rho} \; E \frac{u_1^2}{L} \; dX_1 = \int_0^L \frac{\delta u_1^2}{\rho} \; X_1 \: \rho \: b_1 \; dX_1 \]

- integration - real and virtual nodal displacements \( u_1^2 \) and \( \delta u_1^2 \) are independent of \( X_1 \)

\[ \frac{\delta u_1^2}{\rho} \; E \frac{u_1^2}{L} \; \frac{\rho \: b \: L}{2} = 0 \]

\[ \delta u_1^2 \] is arbitrary \( \rightarrow \) term in brackets is zero

\[ \frac{E}{L} \frac{u_1^2}{\rho} \; \frac{\rho \: b \: L}{2} = 0 \]

\[ u_1^2 = \frac{\rho \: b}{E} \; L^2 \]

- approximated solution is at node 2 identical to analytical solution

- tension bar - approximated solution
SYNCHRONOUS AND ASYNCHRONOUS TEACHING CONCEPT

Synchronous Teaching
- Live Online Sessions
- Live Online Tutorials
- Live Consultation Time
- Online Learning Groups

Asynchronous Teaching
- Recorded Online Tutorials
- Recorded Online Sessions
- Videos
- Teaching Skript
ADMISSION REQUIREMENTS FOR THE MASTER PROGRAM I

1. Bachelor's degree, diploma or equivalent degree with at least 180 Credits in the subject fields
   • civil and environmental engineering
   • mechanical engineering
   • electrical engineering
   • physics
   • or a comparable technical study program

Or

2. in another program with basic subjects from the fields of
   • mathematics
   • natural sciences
   • engineering
   • and achieved at least 60 credits, of which at least 18 credits are in the field of mathematics (analysis, algebra).
ADMISSION REQUIREMENTS FOR THE MASTER PROGRAM II

3. Letter of motivation (max. two pages)
   • personal motivation
   • suitability for the master program through a record of previous academic performance
   • work experience and scientific work

4. One year of professional experience after finishing the first course of higher education

5. Language skills of level B 2 in English.
TUITION FEES

Study the complete Online M.Sc. Wind Energy Systems (120 Credits)

- Overall 14.000 Euro (each semester 2.000 Euro)
  + Enrollment fees of University of Kassel (currently 140,70 €, each semester)

Important: Costs are independent of study duration!
WES.ONLINE CERTIFICATES

Certificates of Advanced Studies

- Certificate **Scientifically Oriented Fundamentals of Wind Energy Systems**
- Certificate **Wind Energy Converter Systems**
- Certificate **Structural Mechanics of Wind Energy Systems**

**Credits:** each 30 ECTS-Credits

**Costs:** each € 6.000

**Admission criteria:** Bachelor Degree in a technical or scientific course, e.g. Mechanical Engineering, Electrical Engineering

- Job experience and English language proof is not required!

**Website:** [http://www.uni-kassel.de/uni/studium/wind-energy-system/wesonline-certificates.html](http://www.uni-kassel.de/uni/studium/wind-energy-system/wesonline-certificates.html)
THANK YOU FOR YOUR ATTENTION

Online Application for Master Program (until July, 15\textsuperscript{th})

www.uni-kassel.de/wes

For further questions after this Online Session contact:

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| **Dr. André Bisevic**  
Fraunhofer IWES  
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0049-561-7294451 |
| **Annika Schmitt**  
University of Kassel  
wes@uni-kassel.de  
0049-561-8043446 |
Which document do I need to submit my application for WES?

- School leaving certificate with which you fulfill the entrance requirement for higher education.
- Certificates and transcripts of records of your previous higher education.
- Proof of at least one year of professional work experience after finishing the first degree of higher education.
- Proof of English language knowledge equivalent to level B2 according to the Common European Framework of Reference for Languages.
- Letter of motivation.
- Applicants from China, Mongolia or Vietnam have to submit the so called APS as well.

uni-assist needs two versions of the above mentioned certificates:

1. One set of authenticated copies of the original documents and
2. one set of authenticated copies of translated versions (English or German language).

Please do not submit original documents to uni-assist!