A study program of UNI KASSEL VERSITAT

Fraunhofer IWES

ONLINE M.SC. WIND ENERGY SYSTEMS

DAAD China: Online Info Session on October 13th, 2016
ONLINE M.Sc. WIND ENERGY SYSTEMS

- Increasing capacity in the field of wind energy
- For natural scientists and engineers
- Combine study and work
  - Work and study part-time, balance your study 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 in the development department of one of the worldwide leading producers
WHY STUDY WIND ENERGY?

Wind industry job market

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

GLOBAL CUMULATIVE INSTALLED WIND CAPACITY 1997-2014

Source: GWEC
# WES TEAM

<table>
<thead>
<tr>
<th>Prof. Dr.-Ing. habil. Detlef Kuhl</th>
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<tbody>
<tr>
<td>Course Director, University of Kassel</td>
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<tr>
<th>Dr.-Ing. Kurt Rohrig</th>
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<td>Deputy Director of Fraunhofer IWES</td>
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## Course Management

<table>
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<tr>
<th>Dr. André Bisevic</th>
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<th>Telsche Nielsen-Lange</th>
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<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
Personnel: 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)
LECTURERS FOR 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
## CURRICULUM

### Online M.Sc. Wind Energy Systems

**120 ECTS-Credits**

<table>
<thead>
<tr>
<th>Category</th>
<th>Credits</th>
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<tr>
<td>Master’s Thesis</td>
<td>30 ECTS-Credits</td>
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<tr>
<td>Specializations / Additional Key Competencies</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 semesters  
**Entitled to do:** PHD
STUDY PLAN - CHOOSE YOUR SPECIALIZATION

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

**Fundamentals**

**Specialization**
- **Energy System Technology**
- **Simulation and Structural Technology**

**Additional Key Competencies**

**Master Thesis**

**Semester 1 - 2**

**Semester 3 - 6**

**Semester 7**

*Fundamentals*

*Specialization*
- **Energy System Technology**
- **Simulation and Structural Technology**

*Additional Key Competencies*

*Master Thesis*
**WRITE YOUR MASTER’S THESIS**

Choose your topic and your institution

| University of Kassel | Fraunhofer Institute for Wind Energy and Energy System Technology | Research Institute | Industry |
A study program of
UNIKASSEL VERSITAT

HOW DO WE TEACH OUR STUDENTS ONLINE?

Teaching Videos

Online M.Sc. Wind Energy Systems

Virtual Classroom

Online Teaching Scripts

Linear Computational Mechanics for Wind Energy Systems

Mobile Learning with Tablets

iAcademy

Online Learning Groups
A study program of

VIRTUAL CLASSROOM – ADOBE CONNECT

- principle of virtual work including approximations

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

- inclusion of approximations

\[ \int_0^L \frac{\delta u_1^2}{L} \frac{E}{L} u_1^2 \, dX_1 = \int_0^L \frac{\delta u_2^2}{L} X_1 \, \rho \, b_1 \, dX_1 \]

- integration - real and virtual nodal displacements \( u_1^2 \) and \( \delta u_2^2 \) are independent of \( X_1 \)

\[ \delta u_2^2 = \delta u_2^2 - \rho \frac{b}{2} L \]

- \( \delta u_2^2 \) is arbitrary → term in brackets is zero

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

- approximated solution is at node 2 identical to analytical solution

tension bar - approximated solution

32
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’S 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, at least 60 credits from the fields of
   - mathematics
   - natural sciences
   - engineering
   - of which at least 18 credits are in the field of mathematics (analysis, algebra).
ADMISSION REQUIREMENTS FOR THE MASTER’S PROGRAM II

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

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

5. Language skills of level B2 in English.
TUITION FEES

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

- Overall 14,000 Euro (2,000 Euro per semester)
  - Enrollment fees for the 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:**
30 ECTS credits each

**Costs:**
€ 6,000 each

**Admission criteria:** Bachelor’s degree in a technical or scientific course, e.g. Mechanical Engineering, Electrical Engineering
- Job experience and proof English language skills are not required!

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

Online Application for Master Program (until June, 1st)
www.uni-kassel.de/wes

For further questions after this Online Session contact:

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<td><a href="mailto:wes@iwes.fraunhofer.de">wes@iwes.fraunhofer.de</a></td>
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<td>0049-561-8043446</td>
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**WHICH DOCUMENTS DO I NEED TO SUBMIT IN 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 your 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 “APS” as well.

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

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!