# pre325 - Wind Potential, Aerodynamics & Loading of Wind Turbines

<table>
<thead>
<tr>
<th>Module label</th>
<th>Wind Potential, Aerodynamics &amp; Loading of Wind Turbines</th>
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<tr>
<td>Module code</td>
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<tr>
<td>Credit points</td>
<td>7.5 KP</td>
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<tr>
<td>Workload</td>
<td>225 h</td>
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<tr>
<td>Used in course of study</td>
<td>Master's Programme European Master in Renewable Energy (EUREC) &gt; Mastermodule</td>
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<td>Contact person</td>
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<td>Skills to be acquired in this module</td>
<td>At the completion of this module, the student will:</td>
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<td>• possess advanced knowledge on wind potential, aerodynamics and loading of wind turbines</td>
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<td>• be skilled in simulation programs for design and control of Wind Turbines (GH Bladed), practical experience</td>
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<td>• be skilled in wind potential evaluation, wind farm design and environmental impacts using simulation programs (GH WindFarmer),</td>
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<td>• have an understanding of economic parameters for a successful project realisation</td>
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At the completion of this module, the student will:
- possess advanced knowledge on wind potential, aerodynamics and loading of wind turbines
- be skilled in simulation programs for design and control of Wind Turbines (GH Bladed), practical experience
- be skilled in wind potential evaluation, wind farm design and environmental impacts using simulation programs (GH WindFarmer),
- have an understanding of economic parameters for a successful project realisation

### Module contents

1. Introduction
   - Status of Wind Energy
   - Status of European Wind Energy and R&D
2. Advanced Wind Structure and Statistics
   - Gusts and gust probability distributions
   - Effects of topography
3. Evaluation of Wind Energy Potential
   - Wind modelling in flat and complex terrain
   - Wind energy siting approaches
4. Wind Turbine Aerodynamics
   - Advanced methods
   - Aerodynamic stall
   - Unsteady aerodynamics
   - Vortex wake structure
   - Advanced wake models
   - Optimum design of wind turbine blades
5. Static and Dynamic Loading of Wind Turbines
   - Aerodynamic and gravity loading
   - Inertial and structural loads
   - Aeroelastic modelling
   - Fatigue of wind turbine blades

### Reader's advisory


### Links

- Language of instruction: English
- Duration (semesters): 1 Semester
- Module frequency: jährlich
- Module capacity: unlimited
- Modullevel: MM (Mastermodul / Master module)
- Modulart: je nach Studiengang Pflicht oder Wahlpflicht
- Lern-/Lehrform / Type of program: Lectures, Tutorials, Workshop, Laboratory
- Vorkenntnisse / Previous knowledge: 
- Examination: Final exam of module
  - Time of examination: Exam week (end of May)
  - Type of examination: Written exam (3 hours)
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