<table>
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<th><strong>Module level</strong></th>
<th><strong>Creditpoints</strong></th>
<th><strong>Language</strong></th>
<th><strong>Return annual</strong></th>
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<tr>
<td>Master</td>
<td>6</td>
<td>English</td>
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**Module designation**

**Application of Software Tools**

**Course(s)**

**Application of Software Tools**

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<tr>
<th><strong>Code</strong></th>
<th><strong>Subtitle</strong></th>
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**Person responsible for the module**

Prof. Dr.–Ing. Sigrid Wenzel

**Lecturer**

1. Dipl.–Inf. Markus Schmitz  
2. Dr. Stefan Kopecz  
3. Dipl.–Ing. Tobias Gleim M.Sc.  
4. Prof. Dr.–Ing. Olaf Wünsch

**Workload**

Workload:

1. 45 h (5 h online presentation, 10 h private study, 30 h home work)  
2. 45 h (5 h online presentation, 10 h private study, 30 h home work)  
3. 45 h (5 h online presentation, 10 h private study, 30 h exercise)  
4. 45 h (5 h online presentation, 10 h private study, 30 h home work)

**Relation to curriculum**

Basic studies, compulsory optional subject

**Type of teaching, contact hours**

Skype, virtual classrooms, online presentation, online transmission.

**Requirements according to examination regulations**

None

**Recommended prerequisites**

None

**Module objective / intended learning outcomes**

The students should be able to design and implement structured programs using the object-oriented paradigm and know how to apply different simulation programs. The students have the ability to apply MATLAB to distinguish mathematical problems as well as the finite volume software OpenFoam in order to simulate fluid flows in technical apparatus. Additionally, the students have the ability to apply a semi-commercial finite element software to simulate structural components of wind power plants and to transfer their knowledge to classical commercial finite element packages as e.g. Abaqus, ANSYS, Nastran. In particular, geometrical modeling, meshing, static and dynamic analyses and the interpretation of the results are familiar to the students.

**Content**

1. Object-oriented Programming with Java  
   Introduction in the OO-paradigm, data structures and methods, recursive functions, programming example.

2. Application of MATLAB  
   Introduction in MATLAB, numerical solution of large linear systems, post processing

3. Application of MATLAB finite element software  
   Introduction to mesh generation, linear static and dynamic structural analyses, post-processing, simulation of wind power plants components

4. Application of OpenFoam  
   Introduction in OpenFoam, discretization of basic geometries and mesh generation, handling of OpenFoam, examples of fluid flow simulations

**Study and examination requirements and forms of examination**

Written homework (10–25 pages)
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<tr>
<th>Media employed</th>
<th>slides</th>
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**Reading list**
Reading list will be provided by lecturer via Moodle online platform.