<table>
<thead>
<tr>
<th>Module level</th>
<th>Credit points</th>
<th>Language</th>
<th>Return annual</th>
</tr>
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<tbody>
<tr>
<td>Master</td>
<td>6</td>
<td>English</td>
<td>annual</td>
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</table>

**Module designation**

**On- and Offshore Foundations**

**Course(s)**

**On- and offshore foundations**

<table>
<thead>
<tr>
<th>Code</th>
<th>Subtitle</th>
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<table>
<thead>
<tr>
<th>Person responsible for the module</th>
<th>Prof. Dr.-Ing. Oliver Reul</th>
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<tbody>
<tr>
<td>Lecturer</td>
<td>Prof. Dr.-Ing. Oliver Reul</td>
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**Workload**

180 h (20 contact time/online presentation, 80 h private study, 80 h home work)

**Relation to curriculum**

3rd semester, specialist studies Simulation and Structural Technology, elective

**Type of teaching, contact hours**

Online–unit, online presentation, digital communication

**Requirements according to examination regulations**

Module Solid Mechanics

**Recommended prerequisites**

Modules Mathematics, Fluid Mechanics, Practice of Different Software Tools

**Module objective / intended learning outcomes**

The objective of the module is to establish a framework for understanding the material behaviour of soils and to become familiar with foundation solutions for WES for a broad range of subsoil conditions and environmental boundary conditions.

The students know that soils are multiphase media. They are able to identify and estimate material parameters controlling the deformation and strength of different soil types with special focus on cyclic loading conditions. The students know laboratory tests and site-investigation methods to investigate the subsoil conditions at the WES foundation site.

The students know possible foundations type for WES, i.e. shallow foundations or piled foundations, and understand the options and limitations of these foundations depending on subsoil and loading conditions. They are able to calculate deformations and capacity of WES foundations based on classical geotechnical analysis methods. The students know numerical modeling techniques for the simulation of WES foundation behaviour.

For a given WES, the students have the competence to select an appropriate foundation type considering subsoil and loading conditions as well as environmental boundary conditions.

**Content**

- Material behaviour of soils
  - Soil as a multiphase media
  - Deformation
  - Strength
  - Soil response to cyclic loading
  - Laboratory testing to establish soil parameters
- Site investigation
  - On shore
  - Off shore
- Foundation types
  - Shallow foundations
  - Piled foundations
- Load estimates for foundations
  - On shore
  - Off shore
- Analysis of foundations
  - Deformations (Serviceability Limit State)
  - Capacity (Ultimate Limit State)
- Numerical modeling of foundation behaviour

<table>
<thead>
<tr>
<th>Study and examination requirements and forms of examination</th>
<th>Written exam (120 min) or online oral examination (30 min) or written homework (25 pages) with presentation of the homework (30 min). The examinations are going to 75% (written homework) of the shares and 25% (presentation) in the final grade of the module.</th>
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<tbody>
<tr>
<td>Media employed</td>
<td>online script</td>
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</table>
Randolph, M.F., Gourvenec, S. (2011)  
Tomlinson, M.J. (2001)  