

Module level Master	Credit points 6	Language English	Return annual
Module designation			
On- and Offshore Foundations			
Course(s)			
On- and offshore foundations			
Code	Subtitle		
Person responsible for the module	Prof. Dr.-Ing. Oliver Reul		
Lecturer	Prof. Dr.-Ing. Oliver Reul		
Workload	180 h (20 contact time/online presentation, 80 h private study, 80 h home work)		
Relation to curriculum	3 rd 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			
<p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p>			
Content			
<ul style="list-style-type: none"> • Material behaviour of soils <ul style="list-style-type: none"> - Soil as a multiphase media - Deformation - Strength - Soil response to cyclic loading - Laboratory testing to establish soil parameters • Site investigation <ul style="list-style-type: none"> - On shore - Off shore • Foundation types <ul style="list-style-type: none"> - Shallow foundations - Piled foundations 			

<ul style="list-style-type: none"> • Load estimates for foundations <ul style="list-style-type: none"> - On shore - Off shore • Analysis of foundations <ul style="list-style-type: none"> - Deformations (Serviceability Limit State) - Capacity (Ultimate Limit State) • Numerical modeling of foundation behaviour 	
Study and examination requirements and forms of examination	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.
Media employed	online script
Reading list Fleming, W.G.K., Weltman, A. J., Randolph, M.F., Elson, W.K. (2009) Piling Engineering. 3 rd ed.; Taylor & Francis Group; ISBN 978-0-203-93764-8 Randolph, M.F., Gourvenec, S. (2011) Offshore Geotechnical Engineering. Spon Press; ISBN 978-0-415-47744-4 Tomlinson, M.J. (2001) Foundation Design and Construction. 7 th ed.; Pearson Education Ltd; ISBN 978-0-13-031180-1 Whitlow, R. (2000) Basic Soil Mechanics. 4 th ed.; Pearson Education Ltd; ISBN 978-0582381094	