

Module Nr.	Credits	Workload	Semester	Frequency	Duration
SE-CO-2	6 CP	180 h	2	Yearly (SS)	1 Semester
Courses			Contact time	Self-study	Group size
a) Design, engineering and technologies in Tunneling			a) 2 h/week	a) 60 h	25 Students
b) Design, engineering and technologies in Pipeline Construction			b) 2 h/week	b) 60 h	
Conventional and Mechanised Tunneling: Design – Engineering – Technologies					
Learning outcomes					
<p>The module is intended to familiarize students comprehensively with the whole field of tunneling. The participants will acquire in-depth knowledge for engineering tasks on the areas of planning, construction and operation of tunnels. The students will learn to independently work on tasks from these areas and to develop a specific understanding of the methods. They will be enabled to solve the common problems of tunnel design and construction and to work independently and purposefully. Relations of this area with other areas of civil engineering as an interdisciplinary task are recognized and integrated into the solutions. The students will acquire knowledge that is necessary for the preparation and execution of construction projects of tunnel construction. The methods commonly used in practice shall be applied.</p>					
Content:					
<p>The lecture deals with the extended basic knowledge of process engineering of Tunneling.</p> <p>a) Design, engineering and technologies in Tunneling</p> <ul style="list-style-type: none"> • Planning methods for tunnel constructions • Methods and components of for temporary and final tunnel lining • Conventional Tunneling • Excavation techniques for soil and rock • Conventional tunneling with mechanized excavation of the rock mass • Sprayed concrete method • Compressed air method • Mechanized tunneling, different Tunnel Boring Machines adapted to the boundary conditions on rock and soil formations • Single-shell and double-shell tunnel linings • Special construction methods • Monitoring and process management • Special features of tunneling logistics and ventilation • Safety aspects during construction and operation • Settlement prediction for green-field and buildings <p>b) Design, engineering and technologies in Pipeline Construction</p> <ul style="list-style-type: none"> • Technical principals of manned techniques – steerable • Micro-tunneling, • Pipe Jacking • Construction and structural analysis of Jacking Pipes 					

<ul style="list-style-type: none"> • Jacking Forces, Jacking Force Prediction
Teaching Methods/ Language a) Lectures (2 h/week), b) practical Exercises (2 h/week) / English
Modes of assessment Module examination: 120 min
Requirements for the award of credit points Passed module examination: 100% (6 CP)
Module applicability (in other study programs) -
Weight of the mark for the final score 5 %
Module coordinator and lecturer(s) Prof. Dr. M. Thewes (coordinator), Dr.-Ing. Britta Schoesser
Other information Recommended prior knowledge: Bachelor-level knowledge of construction operations and construction process engineering, foundation engineering and soil mechanics