

Module Nr.	Credits	Workload	Semester	Frequency	Duration
SE-O-3	2 CP	60 h	3	Yearly (WS)	1 Semester
Courses			Contact time	Self-study	Group size
Technologies in Mechanized Tunneling			2 h/week	30 h	20 Students
Technologies in Mechanised Tunneling					
Learning outcomes					
<p>The performance-related design and the process engineering layout of a Tunnel Boring Machine (TBM) is an important interface on tunnel construction sites between the disciplines of civil engineering, geotechnics and mechanical engineering.</p> <p>The associated know-how enables the engineer to make a correct selection and dimensioning of individual components of the TBM and thus potentially determines the safety as well as the structural and economic success of a mechanised tunnel advance. It is therefore an indispensable tool for future Tunnel Engineers and Tunnel Project Managers in the field of mechanized tunneling. The students are introduced to the different machine types and details, which vary depending on the specific geotechnical boundary conditions.</p> <p>They will learn how to dimension them, to which details a special attention must be paid, which special solutions exist and in which direction research and development is in this area currently moving.</p>					
Content					
<p>The lecture deals with the extended basic knowledge of construction process engineering.</p> <ul style="list-style-type: none"> • Definition of different types of Tunnel Boring Machines and application ranges • Detailed consideration of assembly units • Shield (geometrical correlations, hydraulic forces of thrust jacks, load assumptions and evidence) • Cutting wheel / cutterhead (excavation process, soil excavation, application ranges, wear and change of cutting tools) • Cutterhead Drive (torque, sealing systems, lubrication and monitoring) • Handling of segmental linings and of alternative tunnel lining systems • Conveyor systems (hydraulic transport, screw conveyor, belt conveyor, monitoring of excavation volume) • Backup installations and TBM Logistics • Customized solutions (accessible Cutting Wheel, Variable Density Machines) • Emerging Technologies (Robotics, large Diameter, Diagnosis and Maintenance) 					
Teaching Methods / Language					
Lectures, practical Exercises / English or German					
Modes of assessment					
Module examination: 60 min					
Requirements for the award of credit points					
Passed module examination: (2 CP)					

<p>Module applicability</p> <p>Master Mechanical Engineering</p>
<p>Weight of the mark for the final score</p> <p>1.7 %</p>
<p>Module coordinator and lecturer(s)</p> <p>Prof. Dr. M. Thewes (coordinator), Dr.-Ing. Gerhard Wehrmeyer</p>
<p>Other information</p> <p>Recommended knowledge:</p> <p>Basic knowledge of foundation engineering and tunneling, fundamentals of geotechnics</p>