

Technologies in Mechanised Tunneling					
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Module number BI-W51/SE-O-3	Credits 2 CP	Workload 60 h	Semester[s] 2. Sem.	Duration 1 Semester[s]	Group size 20
Courses a) Technologies in Mechanised Tunneling			Contact hours a) 2 WLH (30 h)	Self-study a) 30 h	Frequency a) each summer
Module coordinator and lecturer(s) Prof. Dr.-Ing. Markus Thewes a) Dr.-Ing. Gerhard Wehrmeyer					
Admission requirements Recommended previous knowledge: Bachelor-level knowledge of construction operations and construction process engineering, Bachelor-level knowledge of foundation engineering and soil mechanics					
Learning outcome, core skills 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. 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. 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.					
Contents a) The lecture deals with the extended basic knowledge of construction process engineering. <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) 					
Educational form / Language a) Lecture (2 WLH) / English					

Examination methods

- Written exam 'Technologies in Mechanised Tunneling' (60 min., Part of modul grade 100 %, optionally English or German)

Requirements for the award of credit points

- Passed Module examination

Module applicability

- MSc Civil Engineering
- MSc Subsurface Engineering
- MSc Geosciences
- MSc Mechanical Engineering

Weight of the mark for the final score

Percentage of total grade [%] = $2 * 100 * \text{FAK} / \text{DIV}$

FAK: The weighting factors can be taken from the table of contents.

DIV: The values can be taken from the table of contents.

Further Information