Master's degree program "Civil Engineering"
Curriculum

Status 07.10.25

		Module code	Module title	SWS	CP	Semester	KIB - Design and Construction	KIB - Digital Design and Construction	Geotechnics and Tunneling	Water Managem. and Env. Technology	Road and Traffic Engineering
Compulsory modules of Specialization											
1. Semester	Compulsory modules 28 CP	BI-P01	Numerical Mathematics	4	5	WiSe	X	X	X	X	X
		BI-P02	Mathematical Statistics	4	5	WiSe				X	X
		BI-P03	Mechanics C	4	5	WiSe	X				
		BI-P04	Programming	4	5	WiSe		X			
		BI-P05	Geotechnics	4	5	WiSe			X		
		BI-P06	Construction Operation and Management	4	6	WiSe	X	X	X	X	X
		BI-P07	Actions on structures and safety concepts	4	6	WiSe	X	X			
		BI-P08	Finite Element Methods in Linear Structural Mechanics	4	6	WiSe	X	X	X		
		BI-P09	Physical Geology and Soil Mechanics	4	6	WiSe			X		
		BI-P10	Operations Research and Databases	4	6	WiSe				X	X
		BI-P11	Environmental Planning + GIS	4	6	WiSe				X	X
Compulsory optional modules											
2. / 3. Semester	Compulsory optional modules 24 CP from Category 1 + 12 CP from Category 1 oder 2	BI-WP01	Prestressing and non-linear calculations of concrete structures	4	6	SuSe	1	2	2		
		BI-WP02	Nonlinear Design Methods of Steel and Composite Structures	4	6	SuSe	1	2			
		BI-WP03	Bridges - Conceptual Design and Structural Detailing	6	9	WiSe	1	2			2
		BI-WP04	Buildings and industrial structures	6	9	WiSe	1	2	2		
		BI-WP05	Nonlinear Finite Element Method for Structures	4	6	SuSe	2	1	2		
		BI-WP06	Applied computational simulations of structures	4	6	SuSe	1	2			
		BI-WP08	Geometric Modeling and Visualization	4	6	WiSe	2	2			
		BI-WP09	Simulation Technology	4	6	WiSe	2	2	2	2	2
		BI-WP10	Foundation Engineering and Utility Pipe Construction: Design–Engineering–Technologies	4	6	WiSe	2		1	2	2
		BI-WP11	Conventional and Mechanised Tunneling: Design – Engineering – Technologies	4	6	SuSe	2		1		
		BI-WP12	Special Concrete Technology	4	6	WiSe	1		2		
		BI-WP13	Durability and Repair of Concrete Structures	4	6	SuSe	1		2		
		BI-WP16	Continuum Mechanics	4	6	SuSe	2	2			
		BI-WP17	Advanced Mechanics of Materials	4	6	SuSe	2	2			
		BI-WP18	Foundations of dynamics	4	6	WiSe		1			
		BI-WP19	Finite Element Technology	4	6	SuSe	2	1			
		BI-WP20	Fundamentals of System Dynamics	4	6	WiSe		2			
		BI-WP21	Plasticity and Damage	4	6	SuSe	2	2			
		BI-WP22	Load Bearing Behaviour and Design of Geotechnical Structures	4	6	SuSe			1		
		BI-WP23	Rock Mass Mechanics and Rock Engineering	5	6	SuSe			1		
		BI-WP24	Numerical Simulation in Geotechnics and Tunneling	4	6	SuSe			1		
		BI-WP25	Environmental Sustainability and Recycling of Building Materials	4	6	2 Sem	2		1	2	2
		BI-WP26	Operation and Maintenance of Tunnels and Utility Pipes	4	6	WiSe	2		2		
		BI-WP27	Practical Geotechnics: Laboratory and Computing	4	6	WiSe			1		
		BI-WP28	Design of roads, material models a. practical aspects in road construction technology	5	6	WiSe			2	2	1
		BI-WP29	Digitalization in road construction and the basics of railway engineering	5	6	SuSe			2	2	1
		BI-WP30	Traffic Engineering	4	6	SuSe				2	1
		BI-WP31	Transportation Systems	5	6	SuSe				2	2
		BI-WP32	Transportation Planning	4	6	WiSe				2	1
		BI-WP33	Sustainable Water Resources Management	4	6	WiSe				1	2
		BI-WP34	Hydrology	4	6	SuSe				1	2
		BI-WP35	Spatial data analysis and environmental modelling	4	6	WiSe			2	2	2
		BI-WP36	Transport and fate of substances in river basins	4	6	SuSe				2	
		BI-WP37	Intern. Wastewater Treatment, Industrial Wastewater Treatment a. River Water Quality	4	6	SuSe			2	1	2
		BI-WP38	Innovations in Urban Water Management and Mathematical Simulation	5	6	2 Sem				1	2
		BI-WP39	Water Chemistry and Laboratory Course	4	6	WiSe				2	
		BI-WP40	Sustainable operation a. resource conservation with urban water management facilities	4	6	WiSe				2	
		BI-WP41	Geotechnical calculations and foundation engineering	4	6	WiSe	2				2
		BI-WP42	Soil Dynamics and Geotechnical Earthquake Engineering	4	6	WiSe			1		
		BI-WP43	Environmental Geotechnics	4	6	SuSe			2	2	
		BI-WP44	Advanced Constitutive Models for Geomaterials	4	6	SuSe	2		1		
		BI-WP45	Wind effects – Engineering Structures and Wind Turbines	4	6	SuSe	2	2			
		BI-WP46	Introduction to Structural Health Monitoring	4	6	SuSe	2	2			
		BI-WP47	Sustainable Building	4	6	WiSe	2				
		BI-WP48	Automation in Design and Construction	4	6	WiSe	2	1			
		BI-WP49	Introduction to materials modeling	4	6	SuSe	2	2			
		BI-WP50	Advanced Building Information Modeling	4	6	SuSe		1			
		BI-WP51	Artificial Intelligence	4	6	SuSe		1			
		BI-WP53	Fundamentals of automation technology	4	6	WiSe		2			
		BI-WP54	Material Flow Management	4	6	SuSe		2			
		BI-WP55	High-Performance Computing on Clusters	4	6	WiSe		2			
		BI-WP56	High-Performance Computing on Multicore Processors	4	6	SuSe		2			
		BI-WP57	Computational Modeling of Membranes and Shells	4	6	WiSe	2	2	2		
		BI-WP58	Uncertainty Quantification in FE Analyses with Surrogate Modeling	4	6	WiSe	2	1	2		
		BI-WP59	Inelastic Finite Element Method for Structures	4	6	WiSe	2	1	2		
		BI-WP60	Transient Finite Element and Finite Difference Methods	4	6	SuSe	2	1			
		BI-WP61	Earthworks – Soil mechanical background and practice	4	6	WiSe			1		

Continuation of the Master's degree program "Civil Engineering" Curriculum

	Module code	Module title	CP		Specialization					
					KIB - Design and Construction	KIB - Digital Design and Construction	Geotechnics and Tunneling	Water Managem. and Env. Technology	Road and Traffic Engineering	
Project work of the specializations										
2. / 3. Sem.	Project 6 CP	BI-PA01	Project "KIB - Design and Construction"	6		X				
		BI-PA02	Project "KIB - Digital Design and Construction"	6			X			
		BI-PA03	Project "Geotechnics and Tunneling"	6				X		
		BI-PA04	Project " Water Management and Environmental Technology"	6					X	
		BI-PA05	Project "Road and Traffic Engineering"	6						X
BI										
4. Sem.	Master Thesis 30 CP	BI-MA	Master Thesis	30						
Optional modules										
	Optional modules 20 CP		Further modules from the above list and according to the module handbook	20						
			Foreign languages[1]							
			Modules from other Bachelor's or Master's degree programs[1]							
Total credit points				**120**						

[1] If similar or equivalent module content was not already part of the Bachelor's examination relevant for admission