

Master of Civil Engineering (Building and Infrastructure Rehabilitation)

List of Course programme

Edited July 10, 2017

Several courses for “Digital Methods in Planning, Constructing and Operating Buildings / BIM (Building Information Modeling)” are under preparation and will be ready by 2018

Module	Course	Hours per week	ECTS-Credits
	Compulsory Courses		
1	Numerical Methods and Advanced Mathematics	4	5
1.1	Numerical Methods	(2)	(2,5)
1.2	Selected Chapters of Mathematics	(2)	(2,5)
2	Applied Structural and Soil Dynamic	4	5
2.1	Applied Dynamics	(2)	(2,5)
2.2	Soil Dynamics	(2)	(2,5)
3	Elective Module (2 out of 3.1 to 3.3) (Soft skills)	4	5
3.1	Intercultural Communication	(2)	(2,5)
3.2	Technical English for Building and Infrastructure Rehabilitation	(2)	(2,5)
3.3	Negotiating in Conflict Situations	(2)	(2,5)
4	Student Research Project	3	5
5	Master Thesis with presentation		20
	Compulsory Courses for Building and Infrastructure Rehabilitation		
6	Advanced Material Science	4	5
7	Safety of New and Existing Structures	4	5
8	Maintenance and Repair of Concrete Structures	4	5
	Compulsory Courses for Building Information Management		
9 to 11	<i>Still under construction</i>		
	Elective Courses for Building and Infrastructure Rehabilitation		
12	Earthquake-Resistant Design	4	5
12.1	Basic Seismic Design	(2)	(2,5)
12.2	Performance Based Design under Seismic Effects	(2)	(2,5)
13	Selected Works in Structural Design (2 out of 13.1 to 13.3)	4	5
13.1	Modelling with Finite Elements	(2)	(2,5)
13.2	Ultimate Load Analysis	(2)	(2,5)
13.3	Theory of Shells	(2)	(2,5)
14	Retrofitting for Existing Structures (2 out of 14.1 to 14.3)	4	5
14.1	Structural Use of Glass	(2)	(2,5)
14.2	Design of Cable Structures	(2)	(2,5)
14.3	Utilities and Piping Constructions	(2)	(2,5)
15	Bridges: Maintenance and Retrofit	4	5

15.1	Structural Analysis of Existing Bridges	(2)	(2,5)
15.2	Maintenance and Retrofit Works for Bridges	(2)	(2,5)
16	Steel Composite Structures	4	5
16.1	Basic Design for Steel Composite Structures	(2)	(2,5)
16.2	Steel Composite Bridges	(2)	(2,5)
17	Reinforced Concrete Structures	4	5
17.1	Strut-and-Tie Design in Reinforced Concrete Structures	(2)	(2,5)
17.2	Structural Design of Reinforced Concrete Structures	(2)	(2,5)
18	Building Physics: Measurements and Diagnosis	4	5
18.1	Noise Protection	(2)	(2,5)
18.2	Heat Insulation and Moisture Protection	(2)	(2,5)
19	Special Materials and Methods for Repair Work	4	5
20	Heritage Production and Engineering	4	5
21	Fire Safety	4	5
21.1	Fire Safety Officer	(2)	(2,5)
21.2	The Extraordinary Loadcase "Fire"	(2)	(2,5)
22	Advanced Concrete Technology (E-certificate)	4	5
23	Soil Mechanics	4	5
24	Dismantlement and Brownfield Restoration	4	5
24.1	Dismantlement: Sampling, Assessment, Planning / Contaminated Soil and Water	(2)	(2,5)
24.2	Dismantlement: Investigation, Recovery / Chemistry of Contaminants and Laboratory Analysis	(2)	(2,5)
25	Maintenance and Repair of Earthworks	4	5
26	Tunnelling <i>in planning</i>	4	5
27	Environmental Engineering - Maintenance and Retrofitting of Wastewater Treatment Plants	4	5
27.1	Technical and Economic Aspects of the Rehabilitation of Wastewater Treatment Plants	(2)	(2,5)
27.2	Energy Efficiency of Wastewater Treatment Plants and Sewage Sludge Treatment	(2)	(2,5)
28	Environmental Engineering - Maintenance and Retrofitting of Wastewater Collection Systems	4	5
28.1	Maintenance of Sewer Network/GIS and Sewer Simulation	(2)	(2,5)
28.2	Methods of Rehabilitation	(2)	(2,5)
29	Hydraulic Engineering - Development and Maintenance	4	5
29.1	Hydroelectric Power	(2)	(2,5)
29.2	River Engineering	(2)	(2,5)
30	Management in Road Maintenance	4	5
30.1	Road Maintenance	(2)	(2,5)
30.2	Improvement and Extension of Roadworks	(2)	(2,5)
31	Law for Existing Structures	4	5
31.1	Law for Existing Structures - Planning Phase	(2)	(2,5)
31.2	Law for Existing Structures - During Construction	(2)	(2,5)
32	Steel Construction for Hydraulic Engineering <i>in planning</i>		
33	Rail Engineering <i>in planning</i>		
	Elective Courses for Building Information Management <i>partly still under construction</i>		
35	Geodetical Survey and Monitoring	4	5
35.1	Geodetical Survey	(2)	(2,5)
35.2	Monitoring	(2)	(2,5)

36	Measurement Technologies for Assessment of Civil Engineer Structures	4	5
36.1	Basics - Requirements on Sensor and Monitoring Systems	(2)	(2,5)
36.2	Practical aspects of monitoring; modern monitoring technologies	(2)	(2,5)
37	Visualization & Virtual Reality: BIM Live - Models	4	5
38	Lifecycle Management - Digital Process Modeling	4	5
39	Parametric and Model Driven Design	4	5
40	Automatization und Integration of Planning and Building Processes	4	5
41	Automatization in Modeling Processes	4	5
42	BIM in Planning and Design for Geo Technical and Infrastructure Works in Construction	4	5
43	Workflows for Structural Mechanics; Associative Linking of Design and Mechanical Models	4	5
44	Construction Management for Repair Works	4	5
45	Facility-Management	4	5
45.1	Practical and Theoretical Basics of Facility Management	(2)	(2,5)
45.2	Facility-Management in the Industrial Sector	(2)	(2,5)

For further details see the German list