Regulations for the degree programme *Bauingenieurwesen* – Civil Engineering Master of Science (M.Sc.)

Implementation regulations
with appendices
I: Study and examination plan
II: Competence descriptions
III: Module handbook (*only published electronically*)
dated 22/07/2020

Die englische Übersetzung dient nur zu Informationszwecken. Rechtlich verbindlich ist der deutsche Text.
The English translation is for information purposes only. The legally binding document is the German version.

TECHNISCHE UNIVERSITÄT DARMSTADT

Resolution of the Departmental Council on 22 July 2020

Coming into force on 01 October 2021

The Regulations for the degree programme M.Sc. *Bauingenieurwesen* – Civil Engineering of the Department of Civil and Environmental Engineering, dated 22 July 2020, supplementing the APB (*Allgemeine Prüfungsbestimmungen* – General Examination Regulations) of Technical University of Darmstadt, have been published, based on the approval of the Executive Board of Technical University of Darmstadt on 11 March 2021 (Ref. 652-2-2).

Darmstadt, 11 March 2021

The President of
Technical University of Darmstadt
Prof. Dr. Tanja Brühl

Table of contents of the Regulations for the Degree Programme

Table of contents of the Regulations for the Degree Programme 2

1. .....Implementation regulations 2

1.1. Appendix I: Study and examination plan 5

1.2. Annex II: Competence descriptions 14

1.2.1. Entrance competencies 14

1.2.2. Qualification objectives 16

1.3. Annex III: Module descriptions 18

1. Implementation regulations

For Section 2(1): Degrees

The degree programme M.Sc. *Bauingenieurwesen* – Civil Engineering is carried out by the Department of Civil and Environmental Engineering at Technical University of Darmstadt. Technical University of Darmstadt awards the degree Master of Science once the total of 120 credit points (CPs) required for the degree programme has been achieved.

For Section 5(2),(3): Modules, components and type of examination

Appendix I, the study and examination plan, to these implementation regulations specifies the type (technical examination, study examination), scope, number and form (oral, written or special form and specification) of the examination components as well as the weighting with which these are included in the overall grade for the module.

Examinations that are taken in other departments are governed by the regulations of the departments offering them.

For Section 11(4),(5): General admission requirements – language of instruction

The language of instruction for the degree programme is English and German.

For Section 17a(1): Entry requirements and entrance competencies for Master's degree programmes

The entry requirements for the Master's degree programme M.Sc. *Bauingenieurwesen* – Civil Engineering and, in particular, the prior knowledge and qualifications (entrance competencies) required from the applicants are defined below.

For Section 17a(2): Entrance competencies for a consecutive Master's degree programme

The entrance competencies for the consecutive Master's degree programme *Bauingenieurwesen* – Civil Engineering are based on the competence profile defined for the Bachelor's degree programme *Bauingenieurwesen und Geodäsie* (Civil Engineering and Geodesy) focussing on *Bauingenieurwesen* (Civil Engineering) that is used as a reference degree programme for admission to the Master's degree programme.

Details regarding the entrance competencies are specified in the competence description in Appendix II. The entry requirement for the Master's degree programme *Bauingenieurwesen* – Civil Engineering is a Bachelor's degree in the reference degree programme at Technical University of Darmstadt or a degree in a degree programme that teaches competencies that are not substantially different from those taught in the reference degree programme (comparable degree programme).

For Section 17a(4) lit. a) and b): Formal entrance examination

During the formal entrance examination, proof of the required entrance competencies is verified on the basis of the written documents to be submitted by the applicants. The following documents must be submitted: the transcript for the first degree and the Diploma Supplement or comparable documents for the degree programme leading to the first degree.
Applicants can also submit the following additional documents:
Applicant competence information

For Section 17a(4) lit. c): Substantive entrance examination

If the entrance competencies could not be clarified positively or negatively during the formal entrance examination, a substantive entrance examination will then be conducted.
The entrance examination cannot be retaken in this application procedure.

As part of the substantive entrance examination, an oral examination of 30 minutes is conducted either on the premises of Technical University of Darmstadt or alternatively via Internet-based video telephony that is unobjectionable under data protection law, with the identity of the applicant determined by a trustee on site (in particular, employees of cooperating universities or DAAD). The trustee also ensures that the examination procedure is carried out lawfully on site.

For Section 17a(8): Admission subject to conditions

If, after an entrance examination, it is found that the applicant lacks entrance competencies that can be compensated for by completing modules amounting to no more than 30 CPs, admission may be granted subject to conditions. The letter of admission lists the modules or technical examinations that are required. The conditions must be met by the end of the second regular semester.

The conditions are governed by the APB (*Allgemeine Prüfungsbestimmungen* – general examination regulations) of Technical University of Darmstadt with the exception of the second resit/retake examination in accordance with Section 31 APB and the oral supplementary examination (mEP) in accordance with Section 32 APB, i.e., only two attempts per condition are permitted.

For Section 18: Admission requirements

The admission requirements for examinations or modules, if any, are specified in Appendix I and III of these implementation regulations, containing the study and examination plan and the module descriptions respectively.

For Section 22(2): Conducting examinations – duration of the oral examination

The duration of the oral examination (at least 15 minutes per examinee and examination) is specified in Appendix I of these implementation regulations, containing the study and examination plan.

For Section 22(5): Conducting examinations – duration of supervised examinations

The duration of supervised examinations (at least 45 minutes) is specified in Appendix I of these implementation regulations, containing the study and examination plan.

For Section 23(2): Thesis – requirements

The topic of the thesis is only issued when possibly required conditions in accordance with Section 17a(8) APB have been completed successfully in the degree programme.

For Section 23(5): Thesis – preparation time

The thesis includes a workload of 24 CPs (720 hours) and must be completed and submitted within 26 weeks.

For Section 25(1),(3): Formation and weighting of grades

The assessment system for each examination component is specified in Appendix I of these implementation regulations, containing the study and examination plan. The study and examination plan also specifies how the grades for the technical examinations and study examinations are weighted for module grading. Unless otherwise specified, the grades of each examined component within a specific module are totalled and weighted according to the credit points assigned to each of these components to produce the final module grade.**For Section 28(3): Overall grade**

Appendix I, the study and examination plan, to these implementation regulations specifies how the module grades are weighted for overall grading. Unless otherwise specified in Appendix I, the module grades are included and weighted in the overall grade according to the credit points earned in the modules.

For Section 38a: Taking effect

These implementation regulations take effect on 01 October 2021. They will be published in the *Satzungsbeilage* (appendix to the statutes) of Technical University of Darmstadt.

Appendix I	Study and examination plan
Appendix II	Competence descriptions
Appendix III	Module descriptions

Darmstadt, 18 February 2021
The Departmental Chairperson of Civil and Environmental Engineering
Technical University of Darmstadt

1.1. Appendix I: Study and examination plan

Master's programme
Bauingenieurwesen - Civil Engineering (M.Sc.) 2021

TECHNISCHE UNIVERSITÄT DARMSTADT

Study and Examination Plan (Annex I)

Explanation of abbreviations		Examinations						Course					Semester			
Evaluation system (referring to technical examinations and study examinations)	St=graded (Standard); bnb=passed/not passed (bestanden/nicht bestanden)												The assignment of examinations to semesters is of a recommendatory nature.			
Examination type	A=Submission (Abgabe), B=Report (Bericht), H=Homework assignment (Hausarbeit), HÜ=Homework, worksheets (Hausübungen, Arbeitsblätter), K=Written exam (Klausur), Kq=Colloquium (Kolloquium), mP=Oral examination (mündliche Prüfungsleistung), P=Minutes (Protokoll), Pf=Portfolio, Pt=Presentation (Präsentation), R=Paper (Referat), SF=Special form (Sonderform), Th=Thesis															
Status	o=obligatory (obligatorisch); f=mandatory (fakultativ)															
Language of tuition	e=English; d=German; e+d=English and German parts; e/d=English or German (by arrangement)															
Teaching type	EX= Excursion (Exkursion); OV=Orientation course (Orientierungsveranstaltung); PJ=Project (Projekt); PR=Practical course (Praktikum); S=Seminar; Ü=Exercise (Übung); VL=Lecture (Vorlesung); VU=Lecture and Exercise (Vorlesung und Übung)															
CP	Credit Points															
TUCaN-No. and assignment of CPs to module components have informative character. The CP will be credited after completion of the module.		Technical examination (Fachprüfung)	Study examination (Studienleistung)	Examination type	Duration (min)	Weighting for module grade	Weigthing for overall grade	Contact hours per week (Semesterwochenstunden; SWS)	Status	Language of tuition	Teaching type	CP in total	Workload per semester (Credit Points; CP) 1.	2.	3.	4.
I. Mandatory Subject Area								**5**	**o**			**6**				
13-01-M003	Interdisziplinäres Projekt Bau und Umwelt (IPBU)	St		mP	15	1	1	5	o	d		6	6			
			bnb	Pt	20	0										
13-01-0005-se	Interdisziplinäres Projekt IPBU- Projekt-Kick-Off							2			S		x			
13-01-0006-ov	Interdisziplinäres Projekt IPBU - Auftaktveranstaltung							1			OV		x			
13-01-0014-se	Interdisziplinäres Projekt IPBU - Einführung in die Projektarbeit							2			S		x			
II. Subject-related elective area (range of research subjects)								**32**	**o**			**48**				
Choose 3 research subjects (basic research modules) and out of them 1 research subject (specialization research modules) with respect to the recommended job profiles (see study information)																
Research subject Construction, Maintenance and Rehabilitation of Transport Facilities								**f**				**12-24**				
Basic research modules (Construction, Maintenance and Rehabilitation of Transport Facilities) - range of subjects												**12**				
13-J2-M020	Konstruktive Gestaltung von Verkehrsanlagen	St		K	90	1	1	4	o	d		6		6		
			bnb	HÜ+Kq	20	0										
13-J2-0020-vl	Konstruktive Gestaltung von Verkehrsanlagen							2			VL			x		
13-J2-0020-ue	Konstruktive Gestaltung von Verkehrsanlagen - Übung							2			Ü			x		
13-J2-M019	Management of Traffic Infrastructure I	St		K	90	1	1	4	o	e		6		6		
			bnb	HÜ+Kq	20	0										
13-J2-0019-vl	Management of Traffic Infrastructure I							2			VL			x		
13-J2-0019-ue	Management of Traffic Infrastructure I - Exercise							2			Ü			x		
Specialization research modules (Construction, Maintenance and Rehabilitation of Transport Facilities) - range of subjects												**0-12**				
13-J2-M023	Management of Traffic Infrastructure II	St		mP	20	1	1	2	o	e		3			3	
13-J2-0023-vl	Management of Traffic Infrastructure II							2			VL				x	
13-J2-M024	Pavement and Track Maintenance Strategies	St		mP	20	1	1	2	o	e		3			3	
13-J2-0024-vl	Pavement and Track Maintenance Strategies							2			VL				x	
13-J2-M021	Specialization in Road Construction	St		mP	20	1	1	2	o	e		3		3		
13-J2-0021-vl	Specialization in Road Construction							2			VL			x		
13-J2-M022	Vertiefung in Eisenbahnbau	St		mP	20	1	1	2	o	d		3			3	
13-J2-0022-vl	Vertiefung in Eisenbahnbau							2			VL				x	
Research subject Construction Technologies and Management								**f**				**12-24**				
Basic research modules (Construction Technologies and Management) - range of subjects												**12**				
13-A0-M002	Baubetrieb IV	St		mP	15	1	1	4	o	d		6		6		
			bnb	Kq+HÜ		0										
13-A0-0006-vu	Baubetrieb IV							4			VU			x		
13-A0-M001	Construction Technologies and Management III	St		K	120	1	1	4	o	e		6	6			
			bnb	HÜ		0										
13-A0-0003-vu	Construction Technologies and Management III							4			VU		x			
Specialization research modules (Construction Technologies and Management) - range of subjects												**0-12**				
13-A0-M003	Baubetrieb V	St		mP	15	1	1	5	o	d		6			6	
			bnb	Pt+K	90	0										
13-A0-0008-vu	Baubetrieb V							5			VU				x	
13-A0-M004	Baubetrieb VI	St		mP	15	1	1	5	o	d		6				6
			bnb	Pt		0										
13-A0-0011-vu	Baubetrieb VI							5			VU					x
Research subject Building Construction and Building Physics								**f**				**12-24**				
Basic research modules (Building Construction and Building Physics) - range of subjects												**12**				
13-D3-M001	Advanced Building Physics	St		K	90	1	1	4	o	e		6	6			
			bnb	SF		0										
13-D3-0002-vl	Advanced Building Physics							2			VL		x			
13-D3-0002-ue	Advanced Building Physics - Exercise							2			Ü		x			
13-D1-M001	Konstruktives Gestalten	St		A+Pt		1	1	4	o	d		6	6			
			bnb	A+Pt		0										
13-D1-0008-vl	Konstruktives Gestalten							2			VL		x			
13-D1-0009-ue	Konstruktives Gestalten - Übung							2			Ü		x			
Specialization research subjects (Building Construction and Building Physics) - range of modules								**f**				**0-12**				
13-D3-M015	Bauen im Bestand und Energetische Sanierung	St		K	90	1	1	2	f	d		6			6	
			bnb	B+Pt		0										
13-D3-0010-vl	Bauen im Bestand und Energetische Sanierung							2			VL				x	
13-D1-M007	Green Building Design I	St		A+B		1	1	4	f	d		6			6	
			bnb	Pt		0										
13-D1-0015-vl	Green Building Design I							1			VL				x	
13-D1-0016-ue	Green Building Design I - Übung							3			Ü				x	
13-D1-M008	Green Building Design II	St		B+Pt	15	1	1	4	f	e		6				6
			bnb	HÜ		0										
13-D1-0017-vl	Green Building Design II							1			VL					x
13-D1-0018-ue	Green Building Design II - Exercise							3			Ü					x

Research subject Construction Mechanics								**f**				**12-24**						
Basic research modules (Construction Mechanics) - range of subjects												**12**						
13-E1-M001	Finite-Element-Methoden I	St		mP	30	1	1	4	o	d	☒	6		6		
			bnb	HÜ		0	☒											
13-E1-0003-vl	Finite-Element-Methoden I						☒	2			VL			x		
13-E1-0004-ue	Finite-Element-Methoden I - Übung						☒	2			Ü			x		
13-E2-M001	Theory of Plasticity (Mechanics)	St		mP	30	1	1	4	o	e	☒	6	6			
13-E2-0010-vl	Theory of Plasticity						☒	3			VL		x			
13-E2-0011-ue	Theory of Plasticity - Exercise						☒	1			Ü		x			
Specialization research modules (Construction Mechanics) - range of subjects												**0-12**						
13-M3-M002	Baudynamik I - Grundlagen	St		mP+K	15/90	1	1	4	f	d	☒	6				6
13-M3-0001-vu	Baudynamik I - Grundlagen						☒	4			VU					x
13-I2-M001	Betriebsfestigkeit	St		mP	30	1	1	4	f	d	☒	6				6
13-I2-0001-vl	Betriebsfestigkeit						☒	2			VL					x
13-I2-0002-ue	Betriebsfestigkeit - Übung						☒	2			Ü					x
13-I2-M002	Bruchmechanik	St		mP	30	1	1	4	f	d	☒	6			6	
13-I2-0007-vl	Bruchmechanik						☒	3			VL				x	
13-I2-0008-ue	Bruchmechanik - Übung						☒	1			Ü				x	
13-E1-M002	Finite-Element-Methoden II	St		mP	30	1	1	4	f	d	☒	6			6	
			bnb	HÜ		0	☒									
13-E1-0005-vl	Finite-Element-Methoden II						☒	2			VL				x	
13-E1-0006-ue	Finite-Element-Methoden II - Übung						☒	2			Ü				x	
13-E2-M002	Continuum Mechanics I	St		mP	30	1	1	4	f	e/d	☒	6			6	
13-E2-0004-vl	Continuum Mechanics I						☒	3			VL				x	
13-E2-0005-ue	Continuum Mechanics I - Exercise						☒	1			Ü				x	
13-E2-M003	Continuum Mechanics II (Material Theory)	St		mP	30	1	1	4	f	e	☒	6				6
13-E2-0006-vl	Continuum Mechanics II (Material Theory)						☒	3			VL					x
13-E2-0007-ue	Continuum Mechanics II (Material Theory) - Exercise						☒	1			Ü					x
13-E1-M004	Micromechanics	St		mP/K	30/90	1	1	4	f	e	☒	6			6	
			bnb	H		0	☒									
13-E1-0013-vl	Micromechanics						☒	3			VL				x	
13-E1-0014-ue	Micromechanics - Exercise						☒	1			Ü				x	
13-I2-M003	Schweißen und Schweißsimulation	St		R	30	1	1	4	f	d	☒	6				6
13-I2-0010-se	Schweißen und Schweißsimulation						☒	4			S					x
13-E1-M003	Stabilität der Tragewerke (FEM III)	St		mP	30	1	1	4	f	d	☒	6				6
			bnb	H		0	☒									
13-E1-0016-vl	Stabilität der Tragwerke (FEM III)						☒	2			VL					x
13-E1-0017-ue	Stabilität der Tragwerke (FEM III) - Übung						☒	2			Ü					x
13-E2-M004	Tensorrechnung für Ingenieure	St		mP/K	30/90	1	1	4	f	d	☒	6				6
13-E2-0008-vl	Tensorrechnung für Ingenieure						☒	3			VL					x
13-E2-0009-ue	Tensorrechnung für Ingenieure - Übung						☒	1			Ü					x
Research subjects Geotechnics								**f**				**12-24**						
Basic research modules (Geotechnics) - range of subjects												**12**						
13-C0-M001	Geotechnics III	St		K	90	1	1	4	o	e	☒	6	6			
			bnb	HÜ		0	☒									
13-C0-0011-vl	Geotechnics III						☒	2			VL		x			
13-C0-0012-ue	Geotechnics III - Exercise						☒	2			Ü		x			
13-C0-M002	Geotechnics IV	St		K	90	1	1	4	o	e	☒	6		6		
			bnb	HÜ		0	☒									
13-C0-0015-vl	Geotechnics IV						☒	2			VL			x		
13-C0-0016-ue	Geotechnics IV -Exercise						☒	2			Ü			x		
Specialization research modules (Geotechnics) - range of subjects												**0-12**						
13-C0-M003	Geotechnisches Praktikum und Projektseminar I	St		mP	20	1	1	4	o	e+d	☒	6		6		
		St		H+Pt	15	1										
			bnb	Pf		0										
13-C0-0017-se	Geotechnical Project Seminar I						☒	2		e	S			x		
13-C0-0040-pr	Geotechnisches Praktikum I						☒	2		d	PR			x		
13-C0-M004	Geotechnisches Praktikum und Projektseminar II	St		mP	20	1	1	4	o	e+d	☒	6			6	
		St		H+Pt	15	1										
			bnb	Pf		0	☒									
13-C0-0018-se	Geotechnical Project Seminar II						☒	2		e	S				x	
13-C0-0039-pr	Geotechnisches Praktikum II						☒	2		d	PR				x	
Research subject Water Management								**f**				**12-24**						
Basic research modules (Water Management) - range of subjects												**12**						
13-L1-M002	Ingenieurhydrologie II	St		K	90	1	1	4	o	d	☒	6	6			
			bnb	H		0	☒									
13-L1-0003-vl	Ingenieurhydrologie II						☒	2			VL		x			
13-L1-0004-ue	Ingenieurhydrologie II - Übung						☒	2			Ü		x			
13-K8-M001	Pollutants in the Water Cycle	St		K	90	1	1	4	o	e	☒	6		6		
			bnb	B+Pt		0	☒									
13-K8-0001-vu	Pollutants in the Water Cycle: Sources and Fate in the Aquatic Environment						☒	4			VU			x		
Specialization research modules (Water Management) - range of subjects												**0-12**						
13-K6-M001	Applied (Environmental) Microbiology for Engineers	St		mp/K	15/60	3	1	4	f	e	☒	6				6
			St	H/B+Pt		2										
13-K6-0001-se	Applied (Environmental) Microbiology for Engineers						☒	4			S					x
13-K4-M007	Infrastructure Planning	St		K	120	1	1	4	f	e	☒	6		6		
			bnb	HÜ		0	☒									
13-B2-J006-se	Economic Assessment Methods						☒	2			S			x		
13-B2-J007-se	System of Infrastructure						☒	2			S			x		
13-L1-M009	Ingenieurhydrologie III	St		mP	15	1	1	4	f	d	☒	6		6		
			bnb	H		0	☒									
13-L1-0005-vl	Ingenieurhydrologie III						☒	4			VU			x		
Research subject Glass Structures & Facade Technology								**f**				**12-24**						
Basic research modules (Glass Structures & Facade Technology) - range of subjects												**12**						
13-M4-M002	Facade Technology I	St		mP	15	1	1	4	o	e	☒	6	6			
			bnb	H		0	☒									
13-M4-0002-vu	Facade Technology I						☒	4			VU		x	x		
13-M4-M003	Facade Technology II	St		mP	15	1	1	4	o	e	☒	6		6		
			bnb	H		0	☒									
13-M4-0003-vl	Facade Technology II						☒	2			VL			x		
13-M4-0004-ue	Facade Technology II - Exercise						☒	2			Ü			x		
Specialisation research modules (Glass Structures & Facade Technology) - range of subjects												**0-12**						
13-M3-M003	Glass and Polymers I: Glass Structures	St		K	90	1	1	4	o	e	☒	6			6	
		St		mP	15	1										
13-M3-0002-vu	Glass and Polymers I: Glass Structures						☒	4			VU				x	
13-M0-M001	Glass und Facade Project	St		mP	15	1	1	4	o	e	☒	6				6
			bnb	H		0	☒									
13-M0-0002-vl	Glass und Facade Project						☒	2			VL					x
13-M0-0003-ue	Glass und Facade Project - Exercise						☒	2			Ü					x

Research subject Real Estate Valuation								**f**				**12-24**						
Basic research modules (Real Estate Valuation) - range of subjects												**12**						
13-B2-M033	Ausgewählte Kapitel der Bauleitplanung	St		mP	20	1	1	4	o	d	X	6		6		
			bnb	A		0	X											
13-B2-0033-vl	Ausgewählte Kapitel der Bauleitplanung						X	2			VL			x		
13-B2-0033-ue	Ausgewählte Kapitel der Bauleitplanung - Übung						X	2			Ü			x		
13-B2-M008	Bodenordnung und Bodenwirtschaft II	St		mP+K	15+120	1	1	4	o	d	X	6	6			
			bnb	HÜ		0	X											
13-B2-0005-vl	Bodenordnung und Bodenwirtschaft II						X	2			VL		x			
13-B2-0006-ue	Bodenordnung und Bodenwirtschaft II - Übung						X	2			Ü		x			
Specialization research modules (Real Estate Valuation) - range of subjects												**0-12**						
13-B2-M020	Ausgewählte Kapitel der Immobilienwertermittlung	St		mP	15	1	1	4	o	d	X	6		6		
			bnb	Pt+H		0	X											
13-B2-0021-vl	Ausgewählte Kapitel der Immobilienwertermittlung						X	4			VL			x		
13-B2-M022	Projekt Immobilienmarkt und Immobilienwertermittlung	St		mP	20	1	1	2	o	d	X	6			6	
			bnb	B		0	X											
13-B2-0025-pj	Projekt Immobilienmarkt und Immobilienwertermittlung						X	2			PJ				x	
Research subject Solid Construction								**f**				**12-24**						
Basic research modules (Solid Construction) - range of subjects												**12**						
13-D2-M015	Masonry Structures and Special Topics of Concrete Construction	St		K	90	1	1	4	o	e	X	6		6		
			bnb	HÜ		0	X											
13-D2-0012-vl	Masonry Structures and Special Topics of Concrete Construction						X	2			VL			x		
13-D2-0013-ue	Masonry Structures and Special Topics of Concrete Construction - Exercise						X	2			Ü			x		
13-D2-M005	Prestressed Concrete Structures	St		K	90	1	1	4	o	e	X	6	6			
			bnb	HÜ		0	X											
13-D2-0018-vl	Prestressed Concrete Structures						X	2			VL		x			
13-D2-0019-ue	Prestressed Concrete Structures - Exercise						X	2			Ü		x			
Specialization research modules (Solid Construction) - range of subjects												**0-12**						
13-D2-M010	Angewandte Baudynamik	St		mP/K	15/90	1	1	4	f	d	X	6			6	
13-D2-0001-vl	Angewandte Baudynamik						X	2			VL				x	
13-D2-0002-ue	Angewandte Baudynamik - Übung						X	2			Ü				x	
13-D2-M009	Massivbrückenbau und Traggerüste	St		mP/K	15/90	1	1	4	f	d	X	6				6
13-D2-0010-vl	Massivbrückenbau und Traggerüste						X	2			VL					x
13-D2-0011-ue	Massivbrückenbau und Traggerüste - Übung						X	2			Ü					x
13-D2-M011	Risiko und Sicherheit im Konstruktiven Ingenieurbau	St		mP/K	15/90	1	1	4	f	d	X	6				6
13-D2-0014-vu	Risiko und Sicherheit im Konstruktiven Ingenieurbau						X	4			VU					x
Research subject Numerical Methods and Informatics in Civil Engineering								**f**				**12-24**						
Basic research modules (Numerical Methods and Informatics in Civil Engineering) - range of subjects												**12**						
13-F0-M003	Engineering Informatics I	St		mP/K	45/90	1	1	4	o	e	X	6	6			
			bnb	HÜ+Kq		0	X											
13-F0-0009-vl	Engineering Informatics I						X	2			VL		x			
13-F0-0010-ue	Engineering Informatics I - Exercise						X	2			Ü		x			
13-F0-M004	Engineering Informatics II	St		mP/K	45/90	1	1	4	o	e	X	6		6		
			bnb	HÜ+Kq		0	X											
13-F0-0012-vl	Engineering Informatics II						X	2			VL			x		
13-F0-0011-ue	Engineering Informatics II - Exercise						X	2			Ü			x		
Specialization research modules (Numerical Methods and Informatics in Civil Engineering) - range of subjects								**f**				**0-12**						
13-F0-M006	Ingenieurgerechte Modellierung und Visualisierung	St		K	90	1	1	4	o	d	X	6			6	
			bnb	SF		0	X											
13-F0-0015-vl	Ingenieurgerechte Modellierung und Visualisierung						X	2			VL				x	
13-F0-0016-ue	Ingenieurgerechte Modellierung und Visualisierung - Übung						X	2			Ü				x	
13-F0-M005	Managementverfahren im Bau- und Umweltwesen	St		K	90	1	1	4	o	d	X	6		6		
			bnb	SF		0	X											
13-F0-0013-vl	Managementverfahren im Bau- und Umweltwesen						X	2			VL			x		
13-F0-0014-ue	Managementverfahren im Bau- und Umweltwesen - Übung						X	2			Ü			x		
Research subject Planning, Design and Operation of Transport Facilities								**f**				**12-24**						
Basic research modules (Planning, Design and Operation of Transport Facilities) - range of subjects												**12**						
13-J0-M003	Air Transport I	St		K	90	1	1	4	f	e	X	6		6		
			bnb	HÜ+Kq	20	0	X											
13-J0-0005-vl	Air Transport I						X	2			VL			x		
13-J0-0006-ue	Air Transport I - Exercise						X	2			Ü			x		
13-J1-M001	Bahnsysteme und Bahntechnik	St		K	90	1	1	4	f	d	X	6		6		
			bnb	HÜ+Kq	20	0	X											
13-J1-0001-vl	Bahnsysteme und Bahntechnik						X	2			VL			x		
13-J1-0002-ue	Bahnsysteme und Bahntechnik - Übung						X	2			Ü			x		
13-J3-M001	Transport Planning and Traffic Engineering I	St		K	90	1	1	4	f	e	X	6		6		
			bnb	HÜ+Kq	20	0	X											
13-J3-0005-vl	Transport Planning and Traffic Engineering I						X	2			VL			x		
13-J3-0006-ue	Transport Planning and Traffic Engineering I - Exercise						X	2			Ü			x		
Specializsation research modules (Planning, Design and Operation of Transport Facilities) - range of subjects												**0-12**						
13-J0-M009	Air Transport II	St		mP/K	20/60	1	1	2	f	e	X	3				3
13-J0-0004-vl	Air Transport II						X	2			VL					x
13-J1-M002	Bahnbetrieb: Modellierung, Planung, Disposition I	St		mP/K	20/60	1	1	2	f	d	X	3			3	
13-J1-0003-vl	Bahnbetrieb: Modellierung, Planung, Disposition I						X	2			VL				x	
13-J1-M004	Bahnbetrieb: Sichere Durchführung I	St		mP/K	20/60	1	1	2	f	d	X	3			3	
13-J1-0004-vu	Bahnbetrieb: Sichere Durchführung I						X	2			VU				x	
13-J3-M004	Modellierung der Verkehrsnachfrage und Intelligente Verkehrssysteme	St		mP/K	20/60	1	1	2	f	d	X	3			3	
13-J3-0002-vl	Modellierung der Verkehrsnachfrage						X	1			VL				x	
13-J3-0010-vl	Intelligente Verkehrssysteme						X	1			VL				x	
13-J3-M002	Transport Planning and Traffic Engineering II	St		mP/K	20/60	1	1	2	f	e	X	3			3	
			bnb	HÜ+Pt		0	X											
13-J3-0007-vl	Transport Planning and Traffic Engineering II						X	1			VL				x	
13-J3-0011-ue	Transport Planning and Traffic Engineering II - Exercise						X	1			Ü				x	
Research subject Sanitary Engineering								**f**				**12-24**						
Basic research modules (Sanitary Engineering) - range of subjects												**12**						
13-K6-M006	Drinking Water	St		mP/K	15/60	1	1	4	o	e	X	6	6			
			bnb	HÜ		0	X											
13-K6-0006-vl	Drinking Water						X	2			VL		x			
13-K6-0006-ue	Drinking Water - Exercise						X	2			Ü		x			
13-K2-M003	Industrieabwasserreinigung	St		mP	20	1	1	4	f	d	X	6		6		
			bnb	HÜ		0	X											
13-K2-0005-vu	Industrieabwasserreinigung						X	4			VU			x		
13-K2-M002	Kommunale Abwasserbehandlung	St		mP/K	15/90	1	1	4	f	d	X	6	6			
			bnb	HÜ		0	X											
13-K2-0001-vu	Kommunale Abwasserbehandlung						X	4			VL		x			
13-K0-M008	Water Treatment Processes	St		mP/K	15/90	1	1	4	f	e	X	6	6			
			bnb	HÜ		0	X											
13-K0-0008-vl	Water Treatment Processes						X	2			VL		x			
13-K0-0008-ue	Water Treatment Processes - Exercise						X	2			Ü		x			

Specialization research modules (Sanitary Engineering) - range of subjects												**0-12**					
13-K8-M002	Oxidative Processes in Water Treatment	St		K	15/90	3	1	4	f	e	☒	6			6		
			St	B+Pt		2											
13-K8-0002-vu	Oxidative Processes in Water Treatment						☒	4			VU				x		
13-K2-M004	Planung, Bau und Betrieb Abwassertechnischer Anlagen	St		K	60	1	1	4	f	d	☒	6		6			
		St		mP	15	1											
13-K2-0007-vl	Planung und Bau von Abwassertechnischen Anlagen						☒	2			VL			x			
13-K2-0008-vl	Betrieb von Abwasserbehandlungsanlagen						☒	2			VL			x			
13-K2-M005	Wasserchemisches Grundlagenpraktikum	St		mp/K	15/90	3	1	4	f	d	☒	6		6			
			St	H/B/Pt		1											
13-K2-0009-se	Wasserchemisches Grundlagenpraktikum						☒	4			S			x			
13-K6-M003	Weitergehende kommunale Abwasserbehandlung	St		mp/K	15/90	3	1	4	f	d	☒	6	6				
			St	H/B/Pt		1											
13-K6-0003-se	Weitergehende kommunale Abwasserbehandlung						☒	4			S		x				
Research subject Seel Construction									**f**			**12-24**					
Basic research modles (Steel Construction) - range of subjects												**12**					
13-I1-M002	Steel Construction III - Detailing and Design of Steel Structures	St		K	120	1	1	4	o	e	☒	6	6				
			bnb	HÜ		0	☒										
13-I1-0013-vl	Steel Construction III - Detailing and Design of Steel Structures						☒	3			VL		x				
13-I1-0014-ue	Steel Construction III - Detailing and Design of Steel Structures - Exercise						☒	1			Ü		x				
13-I1-M003	Steel Construction IV	St		K	120	1	1	4	o	e	☒	6	3	3			
			bnb	H		0	☒										
13-I1-0015-vl	Ultimate Load Design						☒	1			VL		x				
13-I1-0016-vl	Torsion / Lateral Torsional Buckling						☒	2			VL			x			
13-I1-0017-se	Ultimate Load Design - Seminar						☒	1			S		x				
Specialization research modles (Steel Construction) - range of subjects												**0-12**					
13-I1-M006	Ausgewählte Kapitel aus dem Verbund- und Leichtbau	St		mP/K	15/60	2	1	4	f	d	☒	6					6
			St	SF		1											
13-I1-0001-se	Ausgewählte Kapitel aus dem Verbund- und Leichtbau						☒	4			S						x
13-I2-M001	Betriebsfestigkeit	St		mP	30	1	1	4	f	d	☒	6					6
13-I2-0001-vl	Betriebsfestigkeit						☒	2			VL						x
13-I2-0002-ue	Betriebsfestigkeit - Übung						☒	2			Ü						x
13-I2-M002	Bruchmechanik	St		mP	30	1	1	4	f	d	☒	6			6		
13-I2-0007-vl	Bruchmechanik						☒	3			VL				x		
13-I2-0008-ue	Bruchmechanik - Übung						☒	1			Ü				x		
13-I1-M016	Entwurf von Knoten und Anschlüssen im Stahlbau	St		mP/K	15/90	1	1	4	f	d	☒	6			6		
			bnb	H		0	☒										
13-I1-0022-vl	Entwurf von Knoten und Anschlüssen im Stahlbau						☒	2			VL				x		
13-I1-0023-ue	Entwurf von Knoten und Anschlüssen im Stahlbau - Übung						☒	2			Ü				x		
13-I1-M009	Korrosions- und Brandschutz	St		mP	15	1	1	2	f	d	☒	3			3		
13-I1-0003-vl	Korrosions- und Brandschutz						☒	2			VL				x		
13-I1-M015	Plattenbeulen	St		mP/K	15/45	1	1	2	f	d	☒	3					3
			bnb	H		0	☒										
13-I1-0005-vl	Plattenbeulen						☒	2			VL						x
13-I2-M003	Schweißen und Schweißsimulation	St		R	30	1	1	4	f	d	☒	6					6
13-I2-0010-se	Schweißen und Schweißsimulation						☒	4			S						x
13-I1-M010	Stahlbrückenbau	St		mP/K	15/45	1	1	2	f	d	☒	3					3
			bnb	H		0	☒										
13-I1-0012-vl	Stahlbrückenbau						☒	2			VL						x
Research subject Structural Analysis									**f**			**12-24**					
Basic research modules (Structural Analysis) - range of subjects												**12**					
13-M2-M003	Structural Analysis III	St		K	90	1	1	4	o	e	☒	6	6				
			bnb	HÜ+SF		0	☒										
13-M2-0005-vl	Structural Analysis III						☒	2			VL		x				
13-M2-0006-ue	Structural Analysis III - Exercise						☒	2			Ü		x				
13-M2-M004	Structural Analysis IV	St		K	90	1	1	6	o	e	☒	6		6			
			bnb	HÜ+SF		0	☒										
13-M2-0007-vl	Structural Analysis IV						☒	4			VL			x			
13-M2-0016-ue	Structural Analysis IV - Exercise						☒	2			Ü			x			
Specialization research modules (Structural Analysis) - range of subjects												**0-12**					
13-M2-M022	Artificial Intelligence for Building Industry	St		mP	15	1	1	4	f	e	☒	6			6		
			St	H		1											
13-M2-0022-vl	Artificial Intelligence for Building Industry						☒	2			VL				x		
13-M2-0022-ue	Artificial Intelligence for Building Industry - Exercise						☒	2			Ü				x		
13-M3-M002	Baudynamik I - Grundlagen	St		mP+K	15/90	1	1	4	f	d	☒	6					6
13-M3-0001-vu	Baudynamik I - Grundlagen						☒	4			VU						x
13-M2-M007	Cable and Membrane Structures	St		mP+K	15+90	1	1	4	f	e	☒	6			6		
13-M2-0012-vl	Cable and Membrane Structures						☒	2			VL				x		
13-M2-0013-ue	Cable and Membrane Structures - Exercise						☒	2			Ü				x		
13-M2-M008	Einwirkungen auf Tragwerke und Tragwerkszuverlässigkeit	St		mP	15	1	1	4	f	d	☒	6					6
			bnb	H		0	☒										
13-M2-0014-vl	Einwirkungen auf Tragwerke und Tragwerkszuverlässigkeit						☒	2			VL						x
13-M2-0015-ue	Einwirkungen auf Tragwerke und Tragwerkszuverlässigkeit - Übung						☒	2			Ü						x
13-E1-M001	Finite-Element-Methoden I	St		mP	30	1	1	4	f	d	☒	6		6			
13-E1-0003-vl	Finite-Element-Methoden I						☒	2			VL			x			
13-E1-0004-ue	Finite-Element-Methoden I - Übung						☒	2			Ü			x			
13-E1-M002	Finite-Element-Methoden II	St		mP	30	1	1	4	f	d	☒	6			6		
13-E1-0005-vl	Finite-Element-Methoden II						☒	2			VL				x		
13-E1-0006-ue	Finite-Element-Methoden II - Übung						☒	2			Ü				x		
13-M2-M010	Spatial Structures	St		mP	30	1	1	4	f	e	☒	6					6
			bnb	HÜ		0	☒										
13-M2-0001-vl	Spatial Structures						☒	2			VL						x
13-M2-0017-ue	Spatial Structures - Exercise						☒	2			Ü						x
Research subject Structural (Health) Monitoring and dynamics									**f**			**12-24**					
Basic research modules (Structural (Health) Monitoring and dynamics) - range of subjects												**12**					
13-B1-M037	Sensortechnik und Analyse	St		mP	15	1	1	4	o	d	☒	6	6				
			bnb	SF		0	☒										
13-B1-0037-vl	Sensortechnik und Analyse						☒	1			VL		x				
13-B1-0037-ue	Sensortechnik und Analyse - Übung						☒	3			Ü		x				
13-B1-M055	Structural Monitoring I	St		mP/K	15/90	1	1	4	o	e	☒	6		6			
			bnb	SF		0	☒										
13-B1-0055-vl	Structural Monitoring I						☒	2			VL			x			
13-B1-0055-ue	Structural Monitoring I - Exercise						☒	2			Ü			x			
Specialization research modules (Structural (Health) Monitoring and dynamics) - range of subjects												**0-12**					
13-M3-M002	Baudynamik I - Grundlagen	St		mP+K	15/90	1	1	4	f	d	☒	6					6
13-M3-0001-vu	Baudynamik I - Grundlagen						☒	4			VU						x
13-02-M007	Project Geodetic Metrology	St		mP	15	1	1	4	f	e	☒	6		6			
			bnb	SF		0	☒										
13-02-0013-pj	Project Geodetic Metrology						☒	4			PJ			x			
13-B1-M015	Structural Monitoring II	St		mP/K	15/90	1	1	4	f	e	☒	6			6		
			bnb	SF		0	☒										
13-B1-0042-vl	Structural Monitoring II						☒	2			VL				x		
13-B1-0043-ue	Structural Monitoring II - Exercise						☒	2			Ü				x		

Research subject Environmental, Spatial and Infrastructure Planning								**f**				**12-24**						
Basic research modules (Environmental, Spatial and Infrastructure Planning) - range of subjects												**12**						
13-K4-M007	Infrastructure Planning	St		K	120	1	1	4	o	e	X	6		6				
			bnb	HÜ		0	X											
13-B2-J006-se	Economic Assessment Methods						X	2			S			x				
13-B2-J007-se	System of Infrastructure						X	2			S			x				
13-K4-M004	International Spatial Development and Planning	St		H		1	1	4	o	e	X	6		6				
			bnb	R		0	X											
13-K4-0011-se	International Spatial Development and Planning						X	4			S			x				
Specialization research modules (Environmental, Spatial and Infrastructure Planning) - range of subjects												**0-12**						
13-K4-M008	Umweltplanung	St		mP	20	1	1	4	f	d	X	6			6			
			bnb	R		0	X											
13-K4-0019-vl	Umweltplanung						X	2			VL				x			
13-K4-0020-ue	Umweltplanung - Übung						X	2			Ü				x			
13-K4-M010	Räumliche Entwicklung und Planungspraxis in Deutschland	St		H		1	1	2	f	d	X	6			6			
			bnb	R		0	X											
13-K4-0023-se	Räumliche Entwicklung und Planungspraxis in Deutschland						X	2			S				x			
Research subject Hydraulic Engineering								**f**				**12-24**						
Basic research modules (Hydraulic Engineering) - range of subjects												**12**						
13-G0-M012	Image Analysis	St		mP	15	1	1	2	f	e	X	3			3			
13-G0-0029-vl	Image Analysis						X	1			VL				x			
13-G0-0030-ue	Image Analysis - Exercise						X	1			Ü				x			
13-L2-M006	Numerische Modellierung im Wasserbau	St		mP	30	1	1	2	o	d	X	3		3				
13-L2-0007-vl	Numerische Modellierung im Wasserbau						X	2			VL			x				
13-G0-M006	Photogrammetric Computer Vision	St		mP/K	15/60	1	1	2	o	e	X	3	3					
			bnb	Pt+B		0	X											
13-G0-0025-vl	Photogrammetric Computer Vision						X	1			VL		x					
13-G0-0026-ue	Photogrammetric Computer Vision - Exercise						X	1			Ü		x					
13-L2-M001/3	Wasserbau II: Flussbau, Hochwasserschutz und Wasserkraftnutzung	St		K	45	1	1	2	o	d	X	3	3					
13-L2-0009-vl	Wasserbau II: Flussbau, Hochwasserschutz und Wasserkraftnutzung						X	2			VL		x					
Basic research modules (Hydraulic Engineering) - range of subjects												**0-12**						
13-02-J001	Urban Development and Architecture of Cities	St		mP	20	1	1	4	o	e	X	6	6					
			bnb	Pt		0	X											
13-B2-J005-se	Urban Structures						X	2			S		x					
13-M4-J001-se	Typology of Buildings						X	2			S		x					
13-L2-M018	Wasserbau III: Verkehrswasserbau, Gewässerentwicklung, Ökohydraulik	St		mP	30	1	1	2	o	d	X	3			3			
13-L2-0011-vl	Wasserbau III: Verkehrswasserbau, Gewässerentwicklung, Ökohydraulik						X	2			VL				x			
13-L2-M003/3	Wasserbau IV: Wasserbauliches Versuchwesen	St		mP	30	1	1	2	o	d	X	3				3		
13-L2-0005-vl	Wasserbau IV: Wasserbauliches Versuchwesen						X	2			VL					x		
Research subject Materials Technology and Restoration								**f**				**12-24**						
Basic research modules (Materials Technology and Restoration) - range of subjects												**12**						
13-D3-M005	Bauschäden und Bauwerksanalyse	St		K	90	1	1	4	o	d	X	6	6					
			bnb	B+Pt		0	X											
13-D3-0003-vl	Bauschäden und Bauwerksanalyse						X	2			VL		x					
13-D3-0003-ue	Bauschäden und Bauwerksanalyse -Übung						X	2			Ü		x					
13-D3-M004	Special Concretes	St		K	90	1	1	4	o	e	X	6		6				
			bnb	B+Pt		0	X											
13-D3-0008-vl	Special Concretes						X	2			VL			x				
13-D3-0007-ue	Special Concretes - Exercise						X	2			Ü			x				
Specialization research modules (Materials Technology and Restoration) - range of subjects												**0-12**						
13-D3-M016	Building Chemistry	St		K	90	1	1	4	o	e	X	6						
			bnb	B		0	X											
13-D3-0012-vl	Building Chemistry						X	2			VL				6			
13-D3-0013-ue	Building Chemistry - Exercise						X	2			Ü							
13-D3-M006	Concrete Durability	St		K	90	1	1	4	o	e	X	6			6			
			bnb	B+Pt		0	X											
13-D3-0009-vl	Concrete Durability						X	2			VL				x			
13-D3-0009-ue	Concrete Durability - Exercise						X	2			Ü				x			
III. Subject-related compulsory elective area (range of department 13 modules)								**22**			X	**36**	**6**	**12**	**18**			
13-K1-M003	Abfalltechnik	St		mP	30	1	1	4	f	d	X	6		6				
			bnb	B		0	X											
13-K1-0003-vl	Aggregate, Verfahrenskonzepte und Anlagen						X	2			VL			x				
13-K1-0004-ue	Abfalltechnik - Übung						X	2			Ü			x				
13-K2-M010	Alternative Sanitärkonzepte	St		mP	20	1	1	4	f	d	X	6		6				
			bnb	B+Pt		0	X											
13-K2-0010-se	Alternative Sanitärkonzepte						X	4			S			x				
13-C0-M011	Altlastenerhebung und -sanierung	St		mP/K	15/60	1	1	2	f	d	X	3	3					
			bnb	HÜ		0	X											
13-C0-0019-vl	Geotechnische Aspekte der Altlastenerhebung und -sanierung						X	1			VL		x					
13-C0-0020-ue	Geotechnische Aspekte der Altlastenerhebung und -sanierung - Übung						X	1			Ü		x					
13-J0-M010	Ausgewählte Themen der Flughafenplanung	St		mP/K	20/60	1	1	2	f	d	X	3		3				
13-J0-0001-vl	Ausgewählte Themen der Flughafenplanung						X	2			VL			x				
13-J1-M006	Bahnbetrieb: Modellierung, Planung, Disposition II	St		mP/K	20/60	1	1	2	f	d	X	3	3					
13-J1-0008-se	Bahnbetrieb: Modellierung, Planung, Disposition II						X	2			VU		x					
13-J1-M005	Bahnbetrieb: Sichere Durchführung II	St		mP	20	1	1	2	f	d	X	3			3			
13-J1-0007-vu	Bahnbetrieb: Sichere Durchführung II						X	2			VU				x			
13-A0-M009	Baubetriebliches Projekt - Schalungstechnik	St		mP	15	1	1	2	f	d	X	6		6				
			bnb	SF		0	X											
13-A0-0013-pj	Baubetriebliches Projekt - Schalungstechnik						X	2			VL		x	x	x	x		
13-A0-M006	Bauen im Bestand – Verfahrenstechnik und Ökonomie	St		K	60	1	1	4	f	d	X	6		6				
			bnb	HÜ		0	X											
13-A0-0014-vl	Bauen im Bestand - Verfahrenstechnik und Ökonomie						X	4			VL			x				
13-I1-M013/6	Baulicher Brandschutz	St		K	120	1	1	4	f	d	X	6			6			
			bnb	H		0	X											
13-I1-0002-vl	Baulicher Brandschutz						X	4			VL				x			
13-J2-M007	Bearing Behaviour of Traffic Superstructures	St		mP	20	1	1	2	f	e	X	3				3		
13-J2-0016-vl	Bearing Behaviour of Traffic Superstructures						X	2			VL					x		
13-K2-M007	Biologische Abwasserreinigung	St		mP	15	1	1	4	f	d	X	6			6			
			bnb	HÜ+H		0	X											
13-K2-0011-se	Biologische Abwasserreinigung						X	4			S				x			
13-K1-M015	Chemie III für Ingenieur*innen	St		K	90	5	1	4	f	d	X	6		6				
			St	H		3												
			St	A		2												
13-K1-0018-vl	Chemie III - Umweltchemie und Dateninterpretation						X	2			VL			x				
13-K1-0020-pr	Praktikum Chemie III						X	2			PR			x				
13-K1-M016	Chemie IV – Instrumentelle Analytik	St		mP	15	3	1	6	f	d	X	6			6			
			St	R		1												
			St	P		1												
13-K1-0025-se	Chemie IV						X	2			S				x			
13-K1-0026-pr	Praktikum Chemie IV						X	4			PR				x			

13-K1-M012	Chemikaliensicherheit und Nachhaltige Chemie	St		mP/K	15/90	1	1	4	f	d	X	6	6			
			bnb	H+P		0	X										
13-K1-0023-vu	Chemikaliensicherheit und Nachhaltige Chemie						X	4			VU		x				
13-D3-M020	Computational Methods for Building Physics and Construction Materials	St		K	90	1	1	4	f	e	X	6		6			
			bnb	H		0	X										
13-D3-0022-vl	Computational Methods for Building Physics and Construction Materials						X	2			VL			x			
13-D3-0023-ue	Computational Methods for Building Physics and Construction Materials - Exercise						X	2			Ü			x			
13-C0-M010	Deiche, Dämme, Deponien	St		mP/K	15/60	1	1	2	f	d	X	3			3		
			bnb	HÜ		0	X										
13-C0-0003-vl	Deiche, Dämme, Deponien						X	1			VL				x		
13-C0-0004-ue	Deiche, Dämme, Deponien - Übung						X	1			Ü				x		
13-M4-M004	Design für Additive Herstellung	St		R		1	1		f	d	X	6		6			
			bnb	B+Pt		0	X										
13-M4-0005-vl	Design für Additive Herstellung						X	2			VL			x	x		
13-M4-0006-ue	Design für Additive Herstellung - Übung						X	2			Ü			x	x		
13-J1-M010	Design of Safety Critical Systems in Railway Engineering	St		mP/K	15/45	1	1	2	f	e	X	3			3		
13-J1-0010-vl	Design of Safety Critical Systems in Railway Engineering						X	2			VL				x		
13-K3-M008	Environmental Sciences	St		K	90	1	1	4	f	e	X	6		6			
			bnb	HÜ		0	X										
13-K3-0004-vl	Environmental Sciences						X	2			VL			x			
13-K3-0005-ue	Environmental Sciences - Exercise						X	2			Ü			x			
13-B2-M025	Exkursion "Entwicklung Ländlicher Räume"	St		mP	15	1	1	2	f	d	X	6				6	
			bnb	B		0	X										
13-B2-0028-ex	Exkursion "Entwicklung Ländlicher Räume"						X	2			EX					x	
13-G0-M013	Remote Sensing II	St		mP/K	15/60	1	1	4	f	e	X	6		6			
			bnb	B		0	X										
13-G0-0001-vl	Remote Sensing II						X	2			VL			x			
13-G0-0002-ue	Remote Sensing II - Exercise						X	2			Ü			x			
13-D1-M006	Freihandzeichnen	St		SF		1	1	4	f	d	X			6			
			bnb	A		0	X										
13-D1-0003-vl	Freihandzeichnen						X	1			VL			x			
13-D1-0004-ue	Freihandzeichnen - Übung						X	3			Ü			x			
13-B1-M054	Gebäudeinformationssysteme	St		mP/K	15/90	1	1	4	f	d	X	6		6			
			bnb	SF		0	X										
13-B1-0054-v	Gebäudeinformationssysteme						X	2			VL			x			
13-B1-0054-ue	Gebäudeinformationssysteme- Übung						X	2			Ü			x			
13-B1-M020	Geodatenbanken II	St		mP/K	15/90	1	1	4	f	d	X	6			6		
			bnb	SF		0	X										
13-B1-0046-vl	Geodatenbanken II						X	2			VL				x		
13-B1-0047-ue	Geodatenbanken II - Übung						X	2			Ü				x		
13-B2-J001	German Law of Property and Planning	St		K	90	1	1	4	f	e	X	6	6				
13-B2-J001-se	German Law of Property and Planning						X	4			S		x				
13-B2-M009	Geoinformationssysteme II	St		mP/K	15/90	1	1	4	f	d	X	6		6			
			bnb	SF		0	X										
13-B0-0003-vl	Geoinformationssysteme II						X	2						x			
13-B0-0004-ue	Geoinformationssysteme II - Übung						X	2						x			
13-C0-M014	Geotechnik im Hochhausbau	St		mP/K	20/90	1	1	4	f	d	X	6			6		
			bnb	HÜ		0	X										
13-C0-0013-vl	Geotechnik im Hochhausbau						X	2			VL				x		
13-C0-0014-ue	Geotechnik im Hochhausbau - Übung						X	2			Ü				x		
13-C0-M008	Geotechnische Messverfahren	St		mP/K	15/60	1	1	2	f	d	X	3		3			
			bnb	HÜ		0	X										
13-C0-0021-vl	Geotechnische Messverfahren						X	1			VL			x			
13-C0-0022-ue	Geotechnische Messverfahren - Übung						X	1			Ü			x			
13-L2-M009	Gewässerdynamik	St		mP	30	1	1	2	f	d	X	3		3			
13-L2-0003-vl	Gewässerdynamik						X	2			VL			x			
13-M2-M011	Glass and Polymers II: Polymer Mechanics	St		mP	20	1	1	4	f	e	X	6		6			
13-M2-0019-vl	Glass and Polymers II: Polymer Mechanics						X	2			VL			x			
13-M2-0021-ue	Glass and Polymers II: Polymer Mechanics - Exercise						X	2			Ü			x			
13-L2-M010	Grundwassermodellierung	St		mP	30	1	1	2	f	d	X	3			3		
13-L2-0013-vl	Grundwassermodellierung						X	2			VL				x		
13-K5-M003	Grundwasserschutz	St		mP	15	1	1	4	f	d	X	6		6			
			bnb	H+Pt		0	X										
13-K5-0008-vl	Grundwasserschutz						X	2			VL			x			
13-K5-0009-se	Grundwasserschutz - Seminar						X	2			S			x			
13-F0-M011	Hochleistungssimulationen im Ingenieurwesen	St		mP/K	45/90	1	1	4	f	d	X	6			6		
			bnb	HÜ		0	X										
13-F0-0007-vl	Hochleistungssimulationen im Ingenieurwesen						X	2			VL				x		
13-F0-0008-ue	Hochleistungssimulationen im Ingenieurwesen - Übung						X	2			Ü				x		
13-I1-M017	Holzbau I	St		K	90	1	1	2	f	d	X	3			3		
13-I1-0024-vu	Holzbau I						X	2			VU				x		
13-I1-M012	Holzbau II	St		mP	15	1	1	2	f	d	X	3		3			
			St	H+R	15	1											
13-I1-0019-vl	Holzbau II						X	2			VL			x			
13-L1-M005	Hydrometrie	St		mP	15	1	1	2	f	d	X	3			3		
			bnb	H		0	X										
13-L1-0012-vu	Hydrometrie						X	2			VU				x		
13-K1-M004	Immissionsschutz	St		K	90	1	1	4	f	d	X	6	6				
				B		0	X										
13-K1-0005-vl	Luftreinhaltung, Abgasreinigunstechnik, Emission von Treibhausgasen						X	2			VL		x				
13-K1-0006-ue	Auslegung von Abgasreinigungsanlagen, Immissionsprognosen, Berechnung von Schornsteinhöhe, Besichtigung von Abfallbehandlungsanlagen						X	2			Ü		x				
13-K6-M004	Ingenieurpraktikum Wassertechnologie	St		mP	15	3	1	4	f	d/e	X	6			6		
			St	B+Pt		2											
13-K6-0004-se	Ingenieurpraktikum Wassertechnologie						X	4			S				x	x	
13-J2-M010	Innovativer Straßenbau	St		mP	20	1	1	1	f	d	X	3				3	
13-J2-0014-vl	Innovativer Straßenbau						X	1			VL					x	
13-L1-M007	Integrated Water Management	St		mP	15	1	1	4	f	e	X	6			6		
			bnb	H		0	X										
13-L1-0006-vu	Integrated Water Management						X	4			VU				x		
13-D1-M010	Konstruktives Gestalten Projekt	St		A+B		1	1	4	f	d	X	6		6			
13-D1-0020-pj	Konstruktives Gestalten Projekt - Projekt						X	1			PJ			x			
13-D1-0021-ue	Konstruktives Gestalten Projekt - Übung						X	3			Ü			x			
13-L2-M016	Laborpraktikum im Wasserbaulichen Forschungslabor	St		mP	30	1	1	4	f	d	X	6			6		
			bnb	B		0	X										
13-L2-0018-se	Laborpraktikum im Wasserbaulichen Forschungslabor						X	1			S				x		
13-L2-0019-ue	Laborpraktikum im Wasserbaulichen Forschungslabor - Übung						X	3			Ü				x		
13-K7-M001	Laborseminar Industrieabwasserreinigung	St		mP	20	1	1	2	f	d	X	3			3		
			bnb	B+Pt		0	X										
13-K7-0001-se	Laborseminar Industrieabwasserreinigung						X	2			S				x		

13-K6-M002	Mathematical Simulation in Wastewater Treatment	St		mP/K	15/90	3	1	4	f	e	X	6		6		
			St	HÜ/B/Pt		2										
13-K6-0002-se	Mathematical Simulation in Wastewater Treatment						X	4			S			x		
13-B1-M053	Messungen zur Tragwerksanalyse	St		mP	15	1	1	2	f	d	X	3		3		
			bnb	SF		0	X									
13-B1-0053-vl	Messungen zur Tragwerksanalyse						X	1			VL			x		
13-B1-0053-ue	Messungen zur Tragwerksanalyse - Übung						X	1			Ü			x		
13-B2-J002	Methodology of Empirical Analysis	St		H		1	1	4	f	e	X	6	6			
			bnb	Pt		0	X									
13-B2-J002-se	Methodology of Empirical Analysis						X	4			S		x			
13-L1-M016	Methoden der Räumlichen Analyse in der Hydrologie	St		mP	15	1	1	2	f	d	X	3		3		
			bnb	H		0	X									
13-L1-0016-vu	Methoden der Räumlichen Analyse in der Hydrologie						X	2			VU			x		
13-K5-M007/6	Nachhaltige Wasserversorgungswirtschaft	St		mP/K	15/90	1	1	4	f	d	X	6		6		
			St	H		1										
13-K5-0016-vl	Nachhaltige Wasserversorgungswirtschaft						X	2			VL			x		
13-K5-0015-se	Nachhaltige Wasserversorgungswirtschaft - Seminar						X	2			S			x		
13-J1-M003	Nahverkehrsbahnen	St		mP	20	1	1	2	f	d	X	3			3	
13-J1-0005-vl	Nahverkehrsbahnen						X	2			VL				x	
13-K0-M004	Neues aus den Umweltingenieurwissenschaften	St		mP	15	3	1	2	f		X	3		3		
			St	B		1										
13-K0-0006-se	Neues aus den Umweltingenieurwissenschaften						X	2			S			x	x	
13-H0-M002	Parameterschätzung II	St		K	90	1	1	4	f	d	X	6	6			
			bnb	HÜ		0	X									
13-H0-0007-vl	Parameterschätzung II						X	3			VL		x			
13-H0-0008-ue	Parameterschätzung II - Übung						X	1			Ü		x			
13-H0-M010	Parameterschätzung III	St		mP	20	1	1	2	f	d	X	3			3	
			bnb	HÜ		0	X									
13-H0-0022-vl	Parameterschätzung III						X	1			VL				x	
13-H0-0023-ue	Parameterschätzung III - Übung						X	1			Ü				x	
13-K5-M004	Planung, Bau und Betrieb von Anlagen zur Wasserversorgung	St		mP	30	1	1	4	f	d	X	6				6
13-K5-0010-vl	Planung und Betrieb von Anlagen zur Wassergewinnung						X	2			VL					x
13-K5-0011-vl	Wasserversorgung in der Praxis						X	2			VL					x
13-J3-M003	Planung des ÖPNV / Wirtschaftspolitik und Verkehr	St		mP/K	20/60	1	1	2	f	d	X	3			3	
			bnb	HÜ+Pt		0	X									
13-J3-0003-se	Wirtschaftspolitik und Verkehr						X	1			S				x	
13-J3-0009-vl	Planung des Öffentlichen Personennahverkehrs						X	1			VL				x	
13-02-M015	Projekt Gebäudeinformationssystem und Building Information Modeling	St		Kq	15	1	1	2	f	d	X	3		3		
			bnb	H		0	X									
13-02-0012-pj	Projekt Gebäudeinformationssystem und Building Information Modeling						X	2			PJ			x		
13-B2-M035	Projekt Infrastruktur	St		mP	20	1	1	2	f	d	X	6				6
			bnb	B		0	X									
13-B2-0035-se	Projekt Infrastruktur						X	2			S					x
13-B2-M012	Projekt Landmanagement und Geoinformation	St		mP	20	1	1	2	f	d	X	6		6		
			bnb	B		0	X									
13-B2-0023-se	Projekt Landmanagement und Geoinformation						X	2			S			x		
13-K2-M009	Reststoffe aus Abwasseranlagen - Behandlung und Ressourcenrückgewinnu	St		mP	20	1	1	4	f	d	X	6			6	
			bnb	H+Pt		0	X									
13-K2-0015-se	Reststoffe aus Abwasseranlagen - Behandlung und Ressourcenrückgewinnung						X	4			S				x	
13-J2-M005	Road Infrastructure in Developing Countries	St		mP	20	1	1	2	f	e	X	3			3	
13-J2-0011-vl	Management and Financing of Road Infrastructure in Developing Countries						X	1			VL					
13-J2-0013-vl	Technology of Low Volume Roads						X	1			VL				x	
13-H0-M044	Satellitengeodäsie	St		K	60	1	1	2	f	d	X	3		3		
			bnb	HÜ		0	X									
13-H0-0044-vl	Satellitengeodäsie						X	1			VL			x		
13-H0-0044-ue	Satellitengeodäsie - Übung						X	1			Ü			x		
13-K5-M013	Siedlungswasserwirtschaft in der Internationalen Entwicklungszusammenarb	St		mP	15	1	1	4	f	d	X	6			6	
			bnb	H+Pt		0	X									
13-K5-0022-vl	Siedlungswasserwirtschaft in der Internationalen Entwicklungszusammenarbeit						X	2			VL				x	
13-K5-0023-se	Siedlungswasserwirtschaft in der Internationalen Entwicklungszusammenarbeit - Seminar						X	2			S				x	
13-D2-M019	Softwaregestützte Tragwerksmodellierung	St		mP/K	15/90	1	1	4	f	d	X	6			6	
			bnb	Kq/HÜ		0	X									
13-D2-0032-se	Softwaregestützte Tragwerksmodellierung						X	4			S				x	
13-J2-M025	Special Topics of Traffic Infrastructure Management	St		mP	20	X	1	2	f	e	X	3			3	
13-J2-0025-vl	Special Topics of Traffic Infrastructure Management						X	2			VL				x	
13-C0-M015	Spezialfragen des Grundbaus	St		mP/K	15/60	1	1	2	f	d	X	3		3		
			bnb	HÜ		0	X									
13-C0-0029-vl	Spezialfragen des Grundbaus						X	1			VL			x		
13-C0-0030-ue	Spezialfragen des Grundbaus - Übung						X	1			Ü			x		
13-D2-M001	Strategisches Facility Management and Sustainable Design	St		mP/K	15/90	1	1	4	f	d	X	6			6	
			bnb	Kq/HÜ		0	X									
13-D2-0026-vl	Strategisches Facility Management und Sustainable Design						X	4			VL				x	
13-K5-M008	Strömungsmodellierung - Arbeitsschritte in CFD	St		mP	30	1	1	4	f	d	X	6			6	
			bnb	H+Pt		0	X									
13-K5-0017-vl	Strömungsmodellierung - Arbeitsschritte in CFD						X	1			VL				x	
13-K5-0018-ue	Strömungsmodellierung - Arbeitsschritte in CFD - Übung						X	3			Ü				x	
13-K3-J021	Sustainable Waste Management and Life Cycle Assessment Application	St		K	90	1	1	4	f	e	X	6		6		
			bnb	Pt		0	X									
13-K3-0021-vl	Sustainable Waste Management and LCA Application						X	2			VL			x		
13-K3-0021-ue	Sustainable Waste Management and LCA Application - Exercise						X	2			Ü			x		
13-D2-M002	Technische Gebäudeausrüstung I	St		mP/K	15/90	1	1	4	f	d	X	6			6	
13-D2-0008-vu	Technische Gebäudeausrüstung I						X	4			VU				x	
13-D2-M003	Technische Gebäudeausrüstung II	St		mP/K	15/90	1	1	4	f	d	X	6				6
			bnb	Kq/Pt/HÜ		0	X									
13-D2-0006-vu	Technische Gebäudeausrüstung II						X	4			VU					x
13-K5-M002	Trinkwassergüte und Wasseraufbereitungstechnik	St		mP+K	15+60	1	1	4	f	d	X	6	6			
			bnb	H		0	X									
13-K5-0006-vl	Trinkwassergüte und Wasseraufbereitungstechnik I						X	2			VL		x			
13-K5-0007-vl	Trinkwassergüte und Wasseraufbereitungstechnik II						X	2			VL		x			
13-C0-M006	Umweltgeotechnik	St		mP/K	20/90	1	1	4	f	d	X	6			6	
			bnb	HÜ		0	X									
13-C0-0033-vl	Umweltgeotechnik						X	2			VL				x	
13-C0-0034-ue	Umweltgeotechnik - Übung						X	2			Ü				x	
13-F0-M012	Umweltinformationssysteme	St		K	90	1	1	4	f	d	X	6		6		
			bnb	HÜ		0	X									
13-F0-0018-vl	Umweltinformationssysteme						X	2			VL			x		
13-F0-0019-ue	Umweltinformationssysteme - Übung						X	2			Ü			x		
13-K3-M018	Umweltmanagement und Industrieller Umweltschutz	St		mP/K	15/90	1	1	4	f	d	X	6			6	
13-K3-0001-vl	Einführung in den Industriellen Umweltschutz						X	2			VL			x		
01-14-0010-vu	Qualitäts- und Umweltmanagement						X	2			VL				x	
13-C0-M007	Unterirdisches Bauen	St		mP/K	15/60	1	1	2	f	d	X	3		3		
			bnb	HÜ		0	X									
13-C0-0005-vl	Unterirdisches Bauen						X	1			VL			x		
13-C0-0006-ue	Unterirdisches Bauen - Übung						X	1			Ü			x		

13-A0-J001	Urban Construction Technologies	St		K	120	1	1	4	f	e	X	6		6		
			bnb	SF		0	X									
13-A0-J001-se	Urban Construction Technologies						X	4			S			x		
13-M2-M005	Verallgemeinerte Technische Biegetheorie I	St		mP	15	1	1	4	f	d	X	6		6		
			bnb	H		0	X									
13-M2-0008-vl	Verallgemeinerte Technische Biegetheorie I						X	2			VL			x		
13-M2-0009-ue	Verallgemeinerte Technische Biegetheorie I - Übung						X	2			Ü			x		
13-M2-M006	Verallgemeinerte Technische Biegetheorie II	St		mP	15	1	1	6	f	d	X	6			6	
			bnb	H		0	X									
13-M2-0010-vl	Verallgemeinerte Technische Biegetheorie II						X	4			VL				x	
13-M2-0020-ue	Verallgemeinerte Technische Biegetheorie II - Übung						X	2			Ü				x	
13-A0-M011	Vergaberecht / Privates Baurecht	St		K	45	1	1	2	f	d	X			3		
13-A0-0019-vl	Vergaberecht / Privates Baurecht						X	2			VL			x		
13-J0-M008	Verkehr und Umwelt	St		mP/K	20/60	1	1	2	f	d	X	3			3	
13-J0-0010-vl	Verkehr und Umwelt						X	2			VL				x	
13-02-M014	Wasserbauliche und Geodätische Exkursion	St		H		1	1	2	f	d	X	3		3		
13-02-0010-ek	Wasserbauliche und Geodätische Exkursion						X	2			EX			x		
13-K5-M006/6	Wassertechnik und Wassermanagement für Aride Zonen	St		mP/K	15/90	1	1	4	f	d	X	6			6	
			St	H		1										
13-K5-0014-vl	Wassertechnik und Wassermanagement für Aride Zonen						X	2			VL				x	
13-K5-0021-se	Wassertechnik und Wassermanagement für Aride Zonen - Seminar						X	2			S				x	
13-K5-M005	Wasserversorgung: Optimierung, Modellierung und Fallstudien	St		mP	30	1	1	4	f	d	X	6			6	
			bnb	H+Pt		0	X									
13-K5-0012-se	Wasserversorgung: Optimierung, Modellierung und Fallstudien						X	4			S				x	x
13-K5-M009	Water Supply Systems	St		mP	15	1	1	2	f	e	X	3			3	
			bnb	H+Pt		0	X									
13-K5-0002-vl	Water Supply Systems						X	2			VL				x	
und weitere Module (Katalog)											X					
IV. Interdisciplinary Elective Area (Choice of modules according to § 30 (6) APB)									**o**		X	**6**				
Range of all TU Darmstadt modules (except Department 13 modules)									f		X	6			6	
MASTER THESIS (24 CP)									o			**24**				
13-00-MTBI	Master-Thesis Bauingenieurwesen - Civil Engineering	St		Th		1	1				X					24
			bnb	Pt		0	X									
							Total	59				120	30	30	30	30

1.2. Annex II: Competence descriptions

1.2.1. Entrance competencies

At Technical University of Darmstadt the following competencies among others are acquired within the degree programme B.Sc. *Bauingenieurwesen und Geodäsie* (Civil Engineering and Geodesy) focussing on *Bauingenieurwesen* (Civil Engineering) that are required for the consecutive degree programme M.Sc. *Bauingenieurwesen* – Civil Engineering.

A successful continuation of study in the Master's degree programme is ensured by having the graduates of the reference Bachelor's degree programme acquire the necessary general competencies which in turn enable them to work for and reflect on higher-level specialist competencies and field-specific competencies. These are in detail:

Once students have graduated successfully from their Bachelor's degree programme, they will have acquired the following general competencies:

- Ability to identify the complexities of technical problems and tasks;
- Ability to apply their specialist knowledge of core STEM fundamentals and work more or less independently on assignments in the context of all their compulsory courses of the degree programme;
- Ability to analyse and solve demanding engineering problems largely independently by using scientific methods;
- Ability to become familiar with new fields of expertise and key areas of civil engineering and geodesy;
- Ability to assess and consider in depth the field-specific and social consequences of their actions while respecting the technological, social, economic and ecological as well as regional and global implications;
- Ability and willingness to cooperate on interdisciplinary and international levels across technical, administrative and political borders;
- Ability to weigh different solutions, explain them objectively and comprehensibly, to make and justify decisions;
- Ability to describe and present their findings in a suitable way;
- Ability to work goal-oriented in a team to come up with a joint solution for an engineering assignment.

The following higher-level specialist competencies are acquired within the degree programme B.Sc. *Bauingenieurwesen und Geodäsie* (Civil Engineering and Geodesy):

- Ability to assess wide-ranging demands on structural installations and geodesic types of problems in a quantitative and qualitative context;
- Ability to assess the economic and ecological significance and implications of one's action;
- Ability to select best suitable methods and procedures to solve specific problems;
- Ability to work independently with field-specific problems using scientific principles within a given limited amount of time.

In addition, graduates have acquired field-specific and career-related higher level competencies for the following fields of work. This results in a broad and diverse competence profile particularly for the Bachelor's degree programme at TU Darmstadt by establishing a sound basis for many specialised Master's degree programmes.

- Systematic, holistic approach of developing space occupied by the society;
- Developing (planning, dimensioning and designing), building and operating infrastructure systems from start to finish for transportation, supply and waste disposal and hydraulic engineering;
- Developing, building and operating processes for infrastructure systems from start to finish (designing, dimensioning and constructing), particularly with regard to traffic, supply and waste disposal and hydraulic engineering;
- Developing (planning, dimensioning and designing), building and operating structural installations as part of infrastructure systems (buildings, bridges, tunnels, supporting walls) or superstructures and industrial structures from start to finish for transportation, supply and waste disposal and hydraulic engineering;
- Developing (planning, dimensioning and designing), building and monitoring load-bearing structures (including their foundations) and supply and waste disposal installations for complex buildings;
- Analysing, understanding, possibly designing and producing the materials or treated materials and resources needed for this as well as treating and testing them in an economic and safety-related way;
- Setting up and operating structures of organisation and processing;
- Preparing site-relevant information using information systems for interpretation, planning and engineering tasks;
- Within the geodesy profile: Presenting the geometric shape, orientation and characteristics of the Earth's surface and the Earth as a whole in geometric objects;
- Designing and applying modelling and method development (e.g. in geodesy, structural engineering) for a functional implementation of these fields of activity.

Within the taught specialisation, the scope of competencies encompasses various aspects in need of consideration, such as economic aspects, funding, approval procedures (including the necessary social and environmental trade-offs), drafting of contracts, organisational aspects and methods to be used for a systematic advancement of the findings.

Based on descriptions of reference professions, some of these areas are discussed in greater detail as matters of example.

Competencies to be demonstrated to meet entry criteria for the degree programme M.Sc. *Bauingenieurwesen* – Civil Engineering

To successfully complete the degree programme M.Sc. *Bauingenieurwesen* – Civil Engineering, the following requirements have been defined and deemed necessary:

1. To be admitted to this Master's degree programme, the following modules taken from the compulsory engineering and specialisation area and covering the core contents of the below stated modules must have been completed successfully:

    - *Mathematik (I-III) 15 CPs minimum (mathematics)*
    - *Technische Mechanik (I-III) 12 CPs minimum (engineering mechanics)*

    In addition, proof is required of having successfully completed contents covered in information technology (5 CPs minimum), measurement technologies – data capture and geographic information systems, physics and material science.

- As a rule, the competencies listed in position 1 always require proof. In addition, professional aptitude for the research disciplines will be checked based on the competencies acquired from the elective area of the

reference Bachelor's degree programme *Bauingenieurwesen und Geodäsie* (Civil Engineering and Geodesy) focussing on *Bauingenieurwesen* (Civil Engineering). Admission to a research discipline is recommended, provided technical competencies amounting to 9 CPs can be documented (refer to Section 18 APB). Admission to the degree programme will be granted if professional aptitude for at least three research disciplines can be demonstrated.

1.2.2. Qualification objectives

Graduates of the research-oriented degree programme **Master of Science *Bauingenieurwesen* (Civil Engineering)** of Technical University of Darmstadt extend their technical and interdisciplinary competencies acquired during their earlier Bachelor's degree programme. These competencies are key requirements for the Master's degree programme and are, therefore, important prerequisites for later post-graduate studies. Studying civil engineering paves the way for graduates to take positions in industry, administration and science.

The qualification objectives must be seen in the context of the entire degree programme and cannot be reduced to individual modules. Each objective is reflected in every module because these objectives correspond to the basic understanding of teaching that all lecturers and university teachers of the department share. All professors have this responsibility and bring it to life in their own courses. By integrating the contents of all modules, the foundations and methodological skills are acquired to meet the following qualification objectives:

Once students have completed their degree programme and graduated successfully, they will have acquired the following general competencies:

- Ability to solve problems from all contents of the degree programme on their own using scientific methods based on the technical and interdisciplinary knowledge acquired during the preceding Bachelor's degree programme and both reinforced and extended during the Master's degree programme;
- Ability to identify the complexities of technical problems and tasks and to work out and analyse possible solutions;
- Ability to independently become familiar with new areas and methods of the chosen field of expertise and adjoining fields;
- Ability to be creative by identifying new insights and developing new methods and solutions to problems;
- Ability to assess consequential effects of their action to their profession and society while considering their technological, social, economic, ecological, regional and global impacts;
- Ability and willingness to independently further their professional development;
- Ability to weigh different solutions, explain them objectively and comprehensibly, to make and justify decisions;
- Ability to make a career on the national and international job market based on their engineering language competence in German and English;
- Ability to communicate competently in a globally active work environment.

Graduates are also able to:

- Identify, understand and apply the correlations between the materials used in civil engineering, building physics and the movement of water;
- Plan, draft, design and build engineering structures including their foundations while considering their functionality, safe use and structural strength as well as profitability, aesthetics and environmental protection aspects. This also includes the analysis of support structures;
- Assess and design space-shaping measures based on social, cultural, economic, ecological, technological and legal circumstances;
- Plan, draft, design, build, operate and maintain infrastructure while considering technological, economic and environmental aspects, which also include traffic planning, management, supply and disposal of water and how to handle waste;
- Prepare and organise the building and operating of infrastructural and engineering structures while considering social, economic, technological and constructional aspects.

1.3. Annex III: Module descriptions

The module descriptions are published electronically as a module handbook in accordance with Section 1(1) of the *statute of Technical University of Darmstadt regulating the publication of the statutes of Technical University of Darmstadt*, dated 18 March 2010.