

1 Curriculum

Objectives of the Bachelor Study

The graduates of the bachelor degree programme are prepared for an employment in the entire range of the typical occupational fields and acquired scientific qualifications for entering a master degree programme in Civil Engineering or a related subject at the same time. They possess knowledge and master methods from the entire range of Civil Engineering and are therefore well prepared for every shaping of the occupational profile.

A civil engineer designs, plans, calculates, constructs, manages and maintains all kinds of buildings required by our society. This includes buildings of all types (for housing, business, administration and industry), transport routes (roads, bridges, tunnels, airports, railway systems, waterways), hydraulic structures (locks, dikes, dams etc.), any kind of power plants, facilities for the protection of the environment (water supply and drainage systems, waste water treatment plants, waste incineration plant), buildings for civil protection and much more. This very wide range of their professional activities is embraced by the job title Civil Engineer.

The graduates of the bachelor degree Civil Engineering have learned how to extend and deepen quickly their basic knowledge gained by theoretical studies and practical exercises, their competences in methods as well as their additional skills in related natural and engineering sciences by focused and efficient investigations and to apply these adapted to the demands.

They are able to introduce themselves to technical problems almost independently and to develop a solution under consideration of economic and societal aspects. They are also able to think holistically as well as to harmonize social, ecological and economic aspects. Their strength is their technical know-how, but also their team and communication skills are trained during the study.

Structure of the Bachelor Study

Generally, the programme is organized into **subjects, modules** and **courses**. Every subject (e.g. mathematics or mechanics) is split into modules. Every module consists of one or more interrelated courses and is completed by one or more examinations. The extent of every module is indicated by credit points, which will be credited after the successful completion of the module.

The programme covers 180 credit points (CP) and is divided into **Basic Studies** (semester 1-3) and **Basic Subject Studies** (consolidation studies, semester 4-6), see overview next page. The Basic Studies as well as the Basic Subject Studies are subdivided into a **Compulsory Part** and a **Compulsory Elective Part** to which the modules of the programme are assigned. The descriptions of all modules are included within this module handbook.

Basic Studies

The **Basic Studies** comprise 92 CP, 82 CP thereof in the Compulsory Part and 10 CP in the Compulsory Elective Part. The **Compulsory Part** includes the subjects Mechanics (28 CP, 4 modules), Mathematics (25 CP, 4 modules), Building Materials (12 CP, 2 modules), Structural Design (9 CP, 2 modules) as well as the modules Planning Methodology, Project Management, Geology in Civil Engineering and Introduction to Computer Programming I (2 CP each). The **Orientation Examinations** have to be taken in the courses Statics of Rigid Bodies (subject Mechanics), Theory of Building Materials (subject Building Materials) and Building Physics (subject Structural Design) by the end of the 2nd subject-related semester and have to be passed by the end of the 3rd subject-related semester.

The **Compulsory Elective Part** includes the module **Key Competences** (6 CP, compulsory) as well as 5 additional technical modules (2 CP each, compulsory elective). For the module **Key Competences**, courses amounting to a total of 6 CP have to be chosen from the respective course catalogues on key competences offered by the House of Competence (HoC) or the Centre for Cultural and General Studies (ZAK). The selection of 2 of the 5 additional technical modules (4 CP in total) completes the Compulsory Elective Part.

Basic Subject Studies

The **Basic Subject Studies** comprise 88 CP, 80 CP thereof in the Compulsory Part and 8 CP in the Compulsory Elective Part. The **Compulsory Part** includes the subjects Structural Analysis (10 LP), Structural Engineering (15 LP), Water and Environment (12 LP), Mobility and Infrastructure (12 LP), Technology and Management in Construction (11 LP) as well as Geotechnical Engineering (9 LP) and the Bachelor Thesis (11 CP). These subjects consist of the modules with the same name respectively except the subject Structural Engineering, which consists of the two modules Basics of Reinforced Concrete and Basics in Steel and Timber Structures. The permission

to take the examinations for the subjects Structural Engineering, Water and Environment as well as Geotechnical Engineering requires the completion of all but two modules of the subjects Mechanics, Mathematics and Structural Design from the Basic Studies. The permission for the Bachelor Thesis requires a certificate about an internship in a construction company of at least eight weeks duration. It further requires the student to be in the 3rd regular year of study and to have completed all modules of the Basic Studies.

The **Compulsory Elective Part** includes 9 additional technical modules (2 CP each) from which 4 modules (8 CP in total) have to be taken.

Additional Studies

Furthermore, **Additional Accomplishments** can be taken voluntarily to an amount of maximum 30 CP. Modules from the total complete range of courses offered at KIT can be selected. In addition, up to 5 modules (30 CP max.) can be taken from a consecutive master degree programme as **master advance**, if the student has completed modules amounting to more than 120 CP. These can be credited in a master degree programme later on. This enables the student to customize content and time schedule of the interdisciplinary programme according to personal needs, interest and job perspective.

Curriculum of the Bachelor Degree Programme Civil Engineering - according to statutes for amendment from 14.01.2014 - state 20.02.2015

	Subject	Module	Course	Module code	type	1. SS	2. SS	3. SS	4. SS	5. SS	6. SS	Σ	LC	CP	
						HpW	HpW	HpW	HpW	HpW	HpW				
Basic Studies	Compulsory	Mechanics	Statics of Rigid Bodies	bauIBGP01-TM1	L/E	3/2						5	wE, 100 min., OE	7	
			Strength of Materials	bauIBGP02-TM2	L/E		4/2						6	wE, 100 min.	9
			Dynamics	bauIBGP03-TM3	L/E			2/2					4	wE, 100 min.	6
			Hydromechanics	bauIBGP04-HYDRO	L/E			2/2					4	wE, 100 min.	6
		Mathematics	Analysis and Linear Algebra	bauIBGP05-HM1	L/E	4/2							6	wE, 90 min.	9
			Integration and Multivariate Analysis	bauIBGP06-HM2	L/E		4/2						6	wE, 90 min.	9
			Applied Statistics	bauIBGP07-STATS	L/E		2						2	wE, 60 min.	3
			Differential Equations	bauIBGP08-HM3	L/E			2/1					3	wE, 60 min.	4
		Building Materials	Theory of Building Materials	Building Materials	bauIBGP09-BSTOF	L/E		1/1					2	wE, 60 min., OE	3
			L/E				4/2				6	wE, 120 min.	9		
	Structural Design	Building Physics	Structural Design	bauIBGP10-BKONS	L/E		1/1					2	wE, 60 min., OE	3	
		L/E				2/2				4	wE, 90 min.	6			
			Planning Methodology	bauIBGP11-PLANM	L/E	1/1						2	wA, 2x30 min.	2	
			Project Management	bauIBGP12-PMANG	L/E	2						2	wA, 45 min.	2	
			Geology in Civil Engineering	bauIBGP13-GEOL	L/E		2					2	wA, 20 min.	2	
			Introduction to Computer Programming I	bauIBGP14-BINF1	L/E	1/1						2	wA, 30 min. (prerequisite: cert. Progr.Exerc.)	2	
	SUM COMPULSORY						17	20	21				58		82
	Compulsory Elective		Key Competences		bauIBGW0-SQUAL			2	2				4		6
			Chemistry of Building Materials	bauIBGW1-BCHEM	L	2							2	wA, 30 min.	2
			Environmental Physics/ Energy	bauIBGW3-UPHYS	L	2							2	cert. exercises	2
Technical Illustrations			bauIBGW5-TECDS	L/E	2							2	3 at home exercises, team exercises with presentat.	2	
Laboratory Course			bauIBGW6-LABOR	P	2							2	4 experiments	2	
Introduction to Computer Programming II			bauIBGW7-BINF2	L/E		1/1						2	wA, 30 min. (prerequisite: cert. Progr.Exerc.)	2	
SUM COMPULSORY ELECTIVE (at least 4 CP to be elected + 6 CP Key Qualific.)						8	2					4+12		10	
SUM 1. - 3. SS						19-21	22-24	23				66		92	
Basic Subject / Consolidation Studies	Compulsory	Structural Analysis	Structural Analysis I	bauIBFP1-BSTAT	L/E			2/2				4	wE, 120 min.	5	
			Structural Analysis II		L/E				2/2			4	wE, 120 min.	5	
		Structural Engineering	Basics of Rein-forced Concrete	Basics of Reinforced Concrete I	bauIBFP2-KSTR.A	L/E				2/1			3	wE, 90 min.	4
			Basics in Steel and Timber Structures	Basics of Reinforced Concrete II		L/E					2		2	wE, 60 min.	2
				Basics in Steel Structures	bauIBFP3-KSTR.B	L/E				2/1			3	wE, 120 min.	9
		Water and Environment	Basics in Timber structures		L/E				2/1				3		
			Hydraulic Engineering and Water Management	bauIBFP4-WASSER	L/E				2/1				3	wE, 150 min.	12
		Mobility and Infrastructure	Hydrology		L/E					2/1			3		
			Sanitary Environmental Engineering		L/E						2/1		3		
			Spatial Planning and Planning Law		L/E				2/1				3	wE, 150 min. (prerequisite: 3 student research projects)	12
	Transportation		bauIBFP5-MOBIN	L/E				2/1				3			
	Technology and Management in Construction	Design Basics in Highway Engineering		L/E				2/1				3			
		Construction Technology		L/E				3/1				4			
		Economics in Construction Operation	bauIBFP6-TMB	L/E				2/1				3	wE, 150 min.	11	
	Geotechnical Engineering	Facility- and Real Estate Management		L				1				1			
		Basics in Soil Mechanics	bauIBFP7-GEOING	L/E				2/2				4	wE, 150 min.	9	
		Basics in Foundation Engineering		L/E					2/1			3			
	Bachelor Thesis		bauIBSC-THESIS							(7)	(7)	Thesis with presentation, 3 months	11		
SUM COMPULSORY								25	22	5		52		80	
Compulsory Elective		Partial Differential Equations	bauIBFW1-PDGL	L/E			1/1				2	wA, 60 min.	2		
		Introduction to Continuum Mechanics	bauIBFW2-EKM	L						2	2	wA, 60 min.	2		
		Physical Modelling in River Engineering	bauIBFW3-WASSVW	L							2	2	cert. experiment report	2	
		Geotechnical Design	bauIBFW4-GEOPL	L							2	2	cert. student research project with colloquium	2	
		Surveying	bauIBFW5-VERMK	L/E						1/1		2	cert. surveying exercise	2	
		Project "Plan, Design, Engineering"	bauIBFW6-PPEK	Pj							2	2	team exercise	2	
		Life Cycle Management	bauIBFW7-LZMAN	L/E							2	2	wA, 60 min.	2	
		Basics of Track Guided Transport Systems	bauIBFW8-GSTS	L						2		2	wA, 60 min.	2	
		Water Resources Management and Engineering Hydrology	bauIBFW9-WASSRM	L/E							2	2	wA	2	
SUM COMPULSORY ELECTIVE (at least 8 CP to be elected)								2	2	14		18		8	
SUM 4. - 6. SS									25-27	22-24	9-13	60		88	
MINIMUM SUM TOTAL 1. - 6. SS						19	22	23	25	22	9	126		180	
Additional Studies	Elective	modules from the total offer of KIT (max. 30 CP)										0-20		0-30	
		up to 5 modules from a consecutive Master Programme (max. 30 CP)										0-20		0-30	
MAXMUM SUM BACHELOR												166		240	

SS = subject-related semester
HpW = (contact) hours per week
LC = Learning Control
CP = credit point

wE = written exam
wA = written attestation,
not graded
OE = orientation exam

L = lecture
E = exercise
L/E = lecture and exercise,
separate or integrated
P = practical training
Pj = project