Karlsruher Institut für Technologie

Module Handbook

Technology and Management in Construction (Master of Science (M.Sc.), ER/SPO 2022)

Summer term 2025

Date: 06/03/2025

KIT DEPARTMENT OF CIVIL ENGINEERING, GEO AND ENVIRONMENTAL SCIENCES

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This handbook version is for informational use only. For legally binding information, please refer to the German version of this handbook.

1 Preliminary remarks

The module handbook is the document in which important additional information about the studies is described. General examination regulation rules (see https://www.sle.kit.edu/english/vorstudium/master-technology-management-construction.php; *in German*) and the program structure are specified by the curriculum (Chapt. 2). The main function of the Module Handbook is the compilation of module descriptions (Chapt. 5) and learning controls (Chapt. 6).

In addition to the module handbook, information on the individual courses (type, content, language, etc.) is in the online course catalog. For links to the courses (online) see the learning controls (Chapt. 6). The course language is indicated in the module tables (Chapt. 2) and partly in the course catalog (online). Information on the examinations in the current semester is provided via the portal Campus Management for Students and via notices and on the institutes' web pages as well.

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2 Curriculum

This section describes the additional ’Curriculum’ rules to the examination and study regulation (ER/SPO), also available online:

https://www.sle.kit.edu/downloads/AmtlicheBekanntmachungen/2022_AB_044.pdf
(2022 KIT 044 Studien- und Prüfungsordnung des Karlsruher Instituts für Technologie (KIT) für den Masterstudiengang Technologie und Management im Baubetrieb; *in German*)

https://www.sle.kit.edu/downloads/AmtlicheBekanntmachungen/2023_AB_029.pdf
(2023 KIT 029 Satzung zur Änderung der Regelung über die mündliche Nachprüfung in den Studien- und Prüfungsordnungen des Karlsruher Institut für Technologie (KIT), Artikel 71; *in German*)

2.1 Objectives of the master degree program

The graduates of the master degree program 'Technology and Management in Construction' (TMB) at Karlsruhe Institute of Technology (KIT) supplemented and deepened their scientific qualifications obtained in the bachelor degree program. They independently learned to apply their scientifically founded and interdisciplinary knowledge and methods in the fields of system analysis, process development, life cycle and project management across disciplines and to assess the importance and scope for the solution of complex scientific and societal problems. Consequently, they can develop innovative problem solutions beyond the application of established constructional rules and enter new technological territory. Furthermore, they can develop macroeconomic as well as socially and environmentally compatible solutions for the increasing complexity of these tasks. The graduates have the ability to work interdisciplinary, to describe technically complex facts understandably and have a convincing manner, which also prepares them very well for managerial tasks, including interdisciplinary teams.

In particular, the graduates can purposefully apply their deepened knowledge of project and process management, of construction process engineering and construction economics as well as their methodological knowledge in project development, facility management and environmental protection to solve complex tasks. With their comprehensive understanding of the legal, economic and technical relationships they are able to realize, operate and dismantle buildings of all kinds in an optimal way - and under the newest requirements of the digitalization in the construction industry.

2.2 Structure of the master degree program

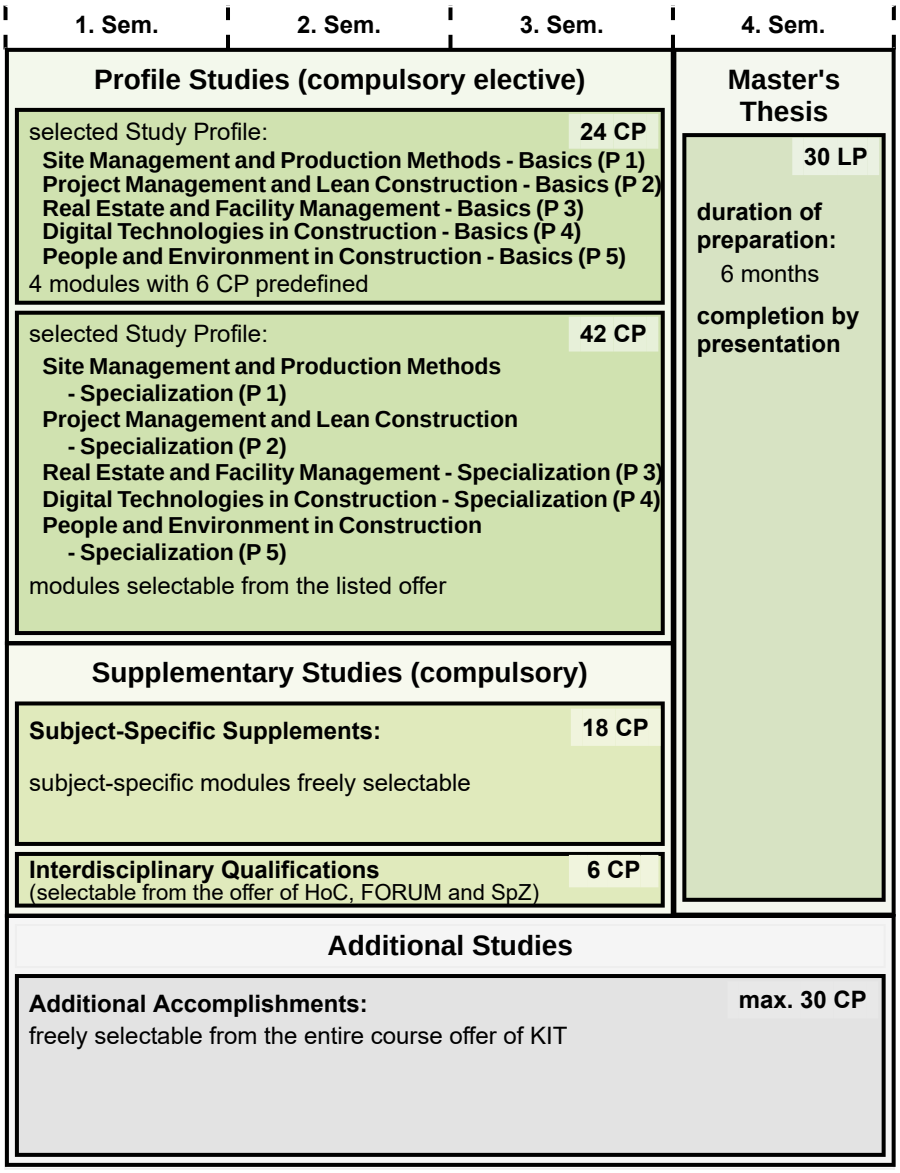
The master degree program ’Technology and Management in Construction’ comprises 120 credit points (CP). It is subdivided into a compulsory elective block, the **Profile Studies** (66 CP), a compulsory block, the **Supplementary Studies** (24 CP), and the **Master's Thesis** (30 CP). In the Profile Studies one of the following **Study Profiles** must be selected:

I. Site Management and Production Methods
II. Project Management and Lean Construction
III. Real Estate and Facility Management
IV. Digital Technologies in Construction
V. People and Environment in Construction

These study profiles focus on a specific field and are defined by the corresponding modules (s. Tab. 1 - 5) assigned according to the different characteristics of the professional profile. Each profile consists of two compulsory elective subjects. In the one compulsory elective subject (24 CP) four specific **basic modules** are predefined. The other compulsory elective subject (42 CP) is characterized by the corresponding module catalog with the **specialization modules**. All modules in the master degree program are integrated into these study profiles and normally comprise 6 CP. Modules imported from other study programs comprise between 3 and 9 CP. Most of the modules are assigned to several profiles.

The Supplementary Studies comprise the two compulsory subjects **Subject-Specific Supplements** (18 CP) and **Interdisciplinary Qualifications** (6 CP). Within the subject Subject-Specific Supplements, all modules not yet selected or predefined (depending on selected profile) can be chosen freely as **Supplementary Modules**. Interdisciplinary qualifications can be obtained in courses from the corresponding course catalog on key competences offered by the House of Competence (HoC) or from the 'General Studies. Forum Science and Society' (FORUM, formerly ZAK) or in language courses at the ’Sprachenzentrum’ (SpZ, center of language studies). These courses are freely selectable.

Beside field trips as part of several courses some one-day excursions take place annually, e.g. at the beginning of the winter term as 'Herbstexkursion'. In addition, the Institute of Technology and Management in Construction (TMB) annually offers a one big several-day excursion in the week after Whitsun, which all students should attend once. The single attendance of a TMB one- or several-day excursion is compulsory for each student in the master degree program ’Technology and Management in Construction’.



2.2.1 Profile 'Site Management and Production Methods' (P1)

The graduates can describe their scientific knowledge about technical, economic and organizational tasks of construction site management from the commission to the final acceptance. They are thereby able to analyze and evaluate the individual production steps. Furthermore, the students are able to describe and analyze the construction and function of construction machines and constructional procedures. They can select and assemble devices, equipment and production techniques adapted to the construction task. They can recognize optimization potentials as well as describe and dimension these by means of appropriate process technologies and methods.

Table 1: Modules in Profile Site Management and Production Methods

Module			Course				LC	
Code	Name	CP	Name (Language)	Type	HpW / SWS		Type	CP
(tmb)					W	S		
Modules Site Management and Production Methods - Basics (predefined)								
M101:	Machinery and Process Engineering	6	Construction Equipment (G)	L	2		ngA wE	1 5
			Process Engineering (G)	L	2			
M501:	Environmentally-friendly Recycling and Disassembly of Buildings	6	Project Studies (G)	L/E		2	oE	6
			Disassembly Process Engineering (G)	L/E		2		
M102:	Technology and Production Methods in Turnkey Construction and Civil Engineering Works	6	Turnkey Construction (G)	L/E		2	wE	6
			Civil Engineering Structures and Regenerative Energies (G)	L/E		2		
M103:	Production Planning and Control in Construction	6	Site Management (G)	L		1	ngA wE	1 5
			Site Planning and Handling (G)	L/E		3		
sum basic modules		**24**			**4**	**12**		
Modules Site Management and Production Methods - Specialization (selectable)								
M111:	Advanced Studies in Construction Engineering	6	Tunnel Construction and Blasting Engineering (G)	L	2		wE	6
			Operation Methods for Foundation and Marine Construction (G)	L	1			
			Operation Methods for Earthmoving (G)	L	1			
M112:	Equipment and Special Construction Techniques in Building Practice	6	Equipment and Special Construction Techniques in Building Practice I (G)	L		2	oE	6
			Equipment and Special Construction Techniques in Building Practice II (G)	L	2			
M503:	Upgrading of Existing Buildings and Energetic Refurbishment	6	Upgrading of Existing Buildings (G)	L/E	3		EoT wE	1,5 4,5
			Energetic Refurbishment (G)	L	1			
M113:	Decommissioning of Nuclear Facilities	6	Removal and Decontamination of Nuclear Facilities (G)	L/E	2		oE	6
			New Development and Optimization of Decommissioning Machine Technology (G)	L/E	2			
M114:	Seminar Construction Machinery	6	Seminar Construction Machinery (G)	S/E		4	EoT	6
M611:	Building Preservation of Concrete and Masonry Constructions	6	Protection, Rehabilitation and Reinforcement of Concrete and Masonry Constructions (G)	L/E		2/1	ngA oE	1 5
			Building Analysis (G)	L		1		
M613:	Building Physics II	6	Practical Noise Control (G)	L		2	oE	3
			Practical Fire Protection (G)	L		2	oE	3
M201:	Project Management in Construction and Real Estate Industry	6	Project Management in Construction and Real Estate Industry (G)	L/E	4		ngA EoT	1 5
M502:	Leadership and Communication	6	Leadership and Communication (G)	L/E		4	wE	6
M202:	Lean Construction	6	Lean Construction (G)	L/E	4		EoT wE	1,5 4,5

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Table 1: Modules in Profile Site Management and Production Methods (continued)

Module			Course				LC	
Code	Name	CP	Name (Language)	Type	HpW / SWS		Type	CP
(tmb)					W	S		
M203:	Lean Integrated Project Delivery (Lean IPD)	6	Lean Integrated Project Delivery (G)	L/E		3	EoT wE	3 3
M402:	Building Information Modeling (BIM)	6	Building Information Modeling (BIM) (G)	L/E		4	EoT	6
M401:	Digital Engineering and Construction	6	Digital Engineering and Construction (E)	L/E	4		EoT	6
M211:	Research Seminar Construction Management	6	Research Seminar Construction Management I (G)	S		2	EoT	6
			Research Seminar Construction Management II (G)	S	2			
sum specialization modules		**84**			**28**	**28**		

explanations to Table 1:

in general:

LC	learning control
CP	credit point
HpW / SWS	hours per week
W / S	winter term / summer term
G / E	language German / English

type of course:

L	lecture
L/E	lecture and exercise, separate or integrated
S	seminar

type of learning control:

wE	written examination
oE	oral examination
EoT	examination of other type
ngA	not graded accomplishment

2.2.2 Profile 'Project Management and Lean Construction' (P2)

The graduates have deepened knowledge in the field of project management, particularly in planning and controlling projects in construction and real estate industries. The students can name stakeholders, project structures and contract types in the field of project management and can analyze projects. They can apply methods and tools of project management in construction projects of all kinds. They can also describe and explain the theoretical principles of the lean philosophy and are able to identify and analyze problems in construction projects from the process perspective.

Table 2: Modules in Profile Project Management and Lean Construction

Module			Course				LC	
Code	Name	CP	Name (Language)	Type	HpW / SWS		Type	CP
(tmb)					W	S		
Modules Project Management and Lean Construction - Basics (predefined)								
M201:	Project Management in Construction and Real Estate Industry	6	Project Management in Construction and Real Estate Industry (G)	L/E	4		ngA EoT	1 5
M202:	Lean Construction	6	Lean Construction (G)	L/E	4		EoT wE	1,5 4,5
M203:	Lean Integrated Project Delivery (Lean IPD)	6	Lean Integrated Project Delivery (G)	L/E		3	EoT wE	3 3
M502:	Leadership and Communication	6	Leadership and Communication (G)	L/E		4	wE	6
sum basic modules		**24**			**8**	**8**		
Modules Project Management and Lean Construction - Specialization (selectable)								
M102:	Technology and Production Methods in Turnkey Construction and Civil Engineering Works	6	Turnkey Construction (G)	L/E		2	wE	6
			Civil Engineering Structures and Regenerative Energies (G)	L/E		2		
M103:	Production Planning and Control in Construction	6	Site Management (G)	L		1	ngA wE	1 5
			Site Planning and Handling (G)	L/E		3		
M402:	Building Information Modeling (BIM)	6	Building Information Modeling (BIM) (G)	L/E		4	EoT	6
M303:	Sustainability in Real Estate Management	6	Sustainability in Real Estate Management (G)	L/E		3	wE	6
			Real Estate Life Cycle Management (G)	L		1		
M401:	Digital Engineering and Construction	6	Digital Engineering and Construction (E)	L/E	4		EoT	6
M811:	Entrepreneurship (EnTechnon)	6	Entrepreneurship [5] (E)	L	2	2	wE	3
			Design Thinking [5] (E)	S	2	2	EoT	3
M812:	Industrial Production I [2,3]	9	Fundamentals of Production Management (G)	L/E		2/2	wE	5,5
			Logistics and Supply Chain Management [4] (G)	L/E		2/1	wE	3,5
			Production Economics and Sustainability [4] (G)	L	2		wE	3,5
M916:	Logistics and Supply Chain Management	9	Logistics and Supply Chain Management (G)	L		4	wE	9
M911:	Quality Management	4	Quality Management (G)	L	2		wE	4
M915:	Human-oriented Production [1,3]	8	Human Factors Engineering I: Ergonomics (G)	L	2		wE	4
			Human-oriented Productivity Management: Personnel Management [4,5] (G)	B	2	2	oE	4
			Productivity Management in Production Systems [4] (G)	B		2	oE	4
M912:	Integrated Production Planning in the Age of Industry 4.0	8	Integrated Production Planning in the Age of Industry 4.0 (G)	L/E		6	oE	8

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Table 2: Modules in Profile Project Management and Lean Construction (continued)

Module			Course				LC	
Code	Name	CP	Name (Language)	Type	HpW / SWS		Type	CP
(tmb)					W	S		
M913:	Constitutional and Administrative Law [1)]	6	Public Law I - Fundamentals (G)	L	2		wE	6
			Public Law II - Public Economic Law (G)	L		2		
M211:	Research Seminar Construction Management	6	Research Seminar Construction Management I (G)	S		2	EoT	6
			Research Seminar Construction Management II (G)	S	2			
sum specialization modules		**86**			**20**	**43**		

explanations to Table 2:

in general:

LC	learning control
CP	credit point
HpW / SWS	hours per week
W / S	winter term / summer term
G / E	language German / English
1)	Starting the module in winter term (W) is recommended.
2)	Starting the module in summer term (S) is recommended.
3)	In the module two learning controls have to be taken, one can be selected.
4)	Course with the related learning control can be selected.
5)	Course is offered every semester.

type of course:

L	lecture
L/E	lecture and exercise, separate or integrated
S	seminar
B	block course

type of learning control:

wE	written examination
oE	oral examination
EoT	examination of other type
ngA	not graded accomplishment

2.2.3 Profile 'Real Estate and Facility Management' (P3)

The graduates can distinguish between the prevailing alternatives of investment in property and apply financing models as well as established controlling tools in facility and real estate management. They are able to evaluate real estate by using different management procedures and can prepare expert opinions. In addition, the students have gained insight into project development of real estate by means of theoretical principles and case studies from the practice. They are enabled to solve problems in project development by themselves and conduct strategic planning.

Table 3: Modules in Profile Real Estate and Facility Management

Module			Course				LC	
Code	Name	CP	Name (Language)	Type	HpW / SWS		Type	CP
(tmb)					W	S		
Modules Real Estate and Facility Management - Basics (predefined)								
M301:	Real Estate Management	6	Controlling in Real Estate Management (G)	L	1		wE	6
			Basics of Real Estate Valuation (G)	L	1			
			Corporate and Public Real Estate Management (G)	L	1			
			Project Development with Case Study (G)	L	1			
M302:	Facility Management	6	Facility and Service Management (G)	L/E	3		wE	6
			Facility and Real Estate Management II (G)	L/E	1			
M303:	Sustainability in Real Estate Management	6	Sustainability in Real Estate Management (G)	L/E		3	wE	6
			Real Estate Life Cycle Management (G)	L		1		
M503:	Upgrading of Existing Buildings and Energetic Refurbishment	6	Upgrading of Existing Buildings (G)	L/E	3		EoT	1,5
			Energetic Refurbishment (G)	L	1		wE	4,5
sum basic modules		**24**			**12**	**4**		
Modules Real Estate and Facility Management - Specialization (selectable)								
M404:	Digitalization in Facility and Real Estate Management	6	Digitalization in Facility and Real Estate Management (G)	L/E	4		EoT	6
M311:	Real Estate and Facility Management - on Site Lectures **#)**	6	Real Estate and Facility Management - on Site Lectures (G)	L/E		4	EoT	6
M313:	Agile Project Management in Facility and Real Estate Management	6	Agile Project Management in Facility and Real Estate Management (E)	L/E		4	EoT	6
M314:	Facility Management in Hospitals [2)]	6	Facility Management in Hospitals (G)	L/E	4		EoT	6
M612:	Building Physics I	6	Applied Building Physics (G)	L	2		oE	3
			Building Technology (G)	L	2		oE	3
M613:	Building Physics II	6	Practical Noise Control (G)	L		2	oE	3
			Practical Fire Protection (G)	L		2	oE	3
M914:	Technical Energy Systems for Buildings [1)]	8	Technical Energy Systems for Buildings 1: Processes, Components (G)	L	2		oE	4
			Technical Energy Systems for Buildings 2: System Concept (G)	L		2	oE	4
M711:	Energy and Indoor Climate Concepts	4	Energy and Indoor Climate Concepts (G)	L		2	EoT	4
M611:	Building Preservation of Concrete and Masonry Constructions	6	Protection, Rehabilitation and Reinforcement of Concrete and Masonry Constructions (G)	L/E		2/1	ngA oE	1 5
			Building Analysis (G)	L		1		
M501:	Environmentally-friendly Recycling and Disassembly of Buildings	6	Project Studies (G)	L/E		2	oE	6
			Disassembly Process Engineering (G)	L/E		2		

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#) for this module specific preconditions are defined (see module description)

Table 3: Modules in Profile Real Estate and Facility Management (continued)

Module			Course				LC	
Code	Name	CP	Name (Language)	Type	HpW / SWS		Type	CP
(tmb)					W	S		
M203:	Lean Integrated Project Delivery (Lean IPD)	6	Lean Integrated Project Delivery (G)	L/E		3	EoT wE	3 3
M201:	Project Management in Construction and Real Estate Industry	6	Project Management in Construction and Real Estate Industry (G)	L/E	4		ngA EoT	1 5
M402:	Building Information Modeling (BIM)	6	Building Information Modeling (BIM) (G)	L/E		4	EoT	6
M712:	Quarter Analysis	4	Quarter Analysis (G)	S	4		EoT	4
M713:	Urban Typologies	4	Urban Typologies (G)	S		2	EoT	4
sum specialization modules		**86**			**22**	**34**		

explanations to Table 3:

in general:

LC	learning control
CP	credit point
HpW / SWS	hours per week
W / S	winter term / summer term
G / E	language German / English
1)	Starting the module in winter term (W) is recommended.
2)	Module must not be selected together with the module M312 not offered anymore.

type of course:

L	lecture
L/E	lecture and exercise, separate or integrated
S	seminar

type of learning control:

wE	written examination
oE	oral examination
EoT	examination of other type
ngA	not graded accomplishment

2.2.4 Profile 'Digital Technologies in Construction' (P4)

The graduates can describe and apply digital methods and planning tools as well as theoretical principles of the different perspectives of the digitalization of buildings. They can also perform modeling steps as well as link the modeled structures with further information by themselves. The students can describe the different interests of the stakeholders in the context of digitalization in construction and are therefore able to collaborate in teams in the digital planning and construction processes with different stakeholders.

Table 4: Modules in Profile Digital Technologies in Construction

Module			Course				LC	
Code	Name	CP	Name (Language)	Type	HpW / SWS		Type	CP
(tmb)					W	S		
Modules Digital Technologies in Construction - Basics (predefined)								
M401:	Digital Engineering and Construction	6	Digital Engineering and Construction (E)	L/E	4		EoT	6
M402:	Building Information Modeling (BIM)	6	Building Information Modeling (BIM) (G)	L/E		4	EoT	6
M403:	Digital Technologies in Field Information Modeling	6	Digital Technologies in Field Information Modeling (E)	L/E		4	EoT	6
M404:	Digitalization in Facility and Real Estate Management	6	Digitalization in Facility and Real Estate Management (G)	L/E	4		EoT	6
sum basic modules		**24**			**8**	**8**		
Modules Digital Technologies in Construction - Specialization (selectable)								
M201:	Project Management in Construction and Real Estate Industry	6	Project Management in Construction and Real Estate Industry (G)	L/E	4		ngA EoT	1 5
M202:	Lean Construction	6	Lean Construction (G)	L/E	4		EoT wE	1,5 4,5
M614:	Digital Planning and Building Information Modeling	6	Digital Planning and Building Information Modeling (G)	L/E	4		EoT	6
M615:	Models and Methods in Traffic Engineering and Transportation Planning	6	Methods and Models in Transportation Planning (G)	L/E	2		oE	6
			Traffic Engineering (G)	L/E	2			
M616:	Traffic Management and Simulation Methods	6	Traffic Management and Transport Telematics (G)	L/E		2	ngA [8)] oE	0 6
			Traffic Flow Simulation (G)	L/E		2		
M617:	2D/3D Image Analysis and Image based Tracking Methods	6	2D Computer Vision (G)	L	1		oE	3
			3D Computer Vision (G)	L	2			
			Image Sequence Analysis (G)	L	2		oE	3
CC933:	Introduction to GIS for Students of Natural, Engineering and Geo Sciences	6	Introduction to GIS for Students of Natural, Engineering and Geo Sciences (G)	L/E	4		ngA [8)] wE	3 3
M815:	Foundations of Informatics I	5	Foundations of Informatics I (G)	L/E		2/2	wE	5
M816:	Foundations of Informatics II	5	Foundations of Informatics II (G)	L	3		wE	5
M817:	Introduction to Programming	5	Introduction to Programming with Java (G)	L/E	3/2		wE	5

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Table 4: Modules in Profile Digital Technologies in Construction (continued)

Module			Course				LC	
Code	Name	CP	Name (Language)	Type	HpW / SWS		Type	CP
(tmb)					W	S		
M818:	Applied Informatics [1,5)]	9	Advanced Programming - Java Network Programming (G)	L/E		2/2	wE	4,5
			Applied Informatics – Applications of Artificial Intelligence [6)] (G)	L/E	2/1		wE	4,5
			Applied Informatics – Database Systems [6)] (G)	L/E		2/1	wE	4,5
			Applied Informatics – Information Security [6)] (G)	L/E		2/1	wE	4,5
			Applied Informatics – Principles of Internet Computing: Foundations for Emerging Technologies and Future Services [6)] (D)	V/Ü		2/1	wE	4,5
			Applied Informatics – Modelling [6)] (G)	L/E	2/1		wE	4,5
			Applied Informatics – Software Engineering [6)] (G)	L/E		2/1	wE	4,5
M813:	Digital Service Systems [5a)]	9	Service Innovation [6)] (E)	L		2	wE	4,5
			Operations Research in Supply Chain Management [6)] (E)	L/E	2/1		wE	4,5
			Operations Research in Health Care Management [6)] (E)	L/E	2/1		wE	4,5
M917:	Virtual Engineering Construction - A [3)]	8	Virtual Engineering I (E)	L/E	2/2		wE	4
			Business Administration for Engineers and IT professionals [6,7)] (G)	S	2	2	EoT	4
			Hot Research Topics in AI for Engineering Applications [6,7)] (E)	Pj	2	2	EoT	4
			IoT Platform for Engineering [6,7)] (G)	Pj	3	3	EoT	4
			PLM-CAD Workshop [6,7)] (G)	Pj	4	4	EoT	4
			PLM for Product Development in Mechatronics [6,7)] (G)	L	2	2	oE	4
			Virtual Engineering Lab [6,7)] (G/E)	Pj	3	3	EoT	4
M918:	Virtual Engineering Construction - B [2,4,5)]	8	Virtual Engineering II (E)	L/E		3	wE	4
			Business Administration for Engineers and IT professionals [6,7)] (G)	S	2	2	EoT	4
			Hot Research Topics in AI for Engineering Applications [6,7)] (E)	Pj	2	2	EoT	4
			IoT Platform for Engineering [6,7)] (G)	Pj	3	3	EoT	4
			PLM-CAD Workshop [6,7)] (G)	Pj	4	4	EoT	4
			PLM for Product Development in Mechatronics [6,7)] (G)	L	2	2	oE	4
			Virtual Engineering Lab [6,7)] (G/E)	Pj	3	3	EoT	4
sum specialization modules		**83**			**48**	**23**		

explanations to Table 4:

in general:

LC	learning control
CP	credit point
HpW / SWS	hours per week
W / S	winter term / summer term
G / E	language German / English
1)	Starting the module in winter term (W) is recommended.
2)	Starting the module in summer term (S) is recommended.
3)	Module will not be offered anymore as from summer term 2025.
4)	Module will not be offered anymore as from winter term 2025/26.
5)	In the module two learning controls have to be taken, one can be selected.
5a)	In the module two learning controls have to be taken, both can be selected.
6)	Course with the related learning control can be selected.
7)	Course is offered every semester.

type of course:

L	lecture
L/E	lecture and exercise, separate or integrated
S	seminar
S/P	seminar/practical course integrated
Pj	project

type of learning control:

wE	written examination
oE	oral examination
EoT	examination of other type
ngA	not graded accomplishment
ngA 8)	not graded accomplishment as examination prerequisite

2.2.5 Profile 'People and Environment in Construction' (P5)

The graduates can independently name and identify interventions and the impact of the construction industry on climate and environment. They are able to analyze environmental issues related to building, operation and removal of buildings of all kinds and to apply appropriate methods and tools for reducing and avoiding harmful impact on humans, animals, soil, resources, energy, immissions, climate and ecosystems. Furthermore, the students are able to recognize and explain the influence of social aspects on the realization of construction projects as well as on the later use of the building. In addition, they can describe their knowledge of the principles of communication as well as analyze and apply methods of personal management and conflict resolution.

Table 5: Modules in Profile People and Environment in Construction

Module			Course				LC	
Code	Name	CP	Name (Language)	Type	HpW / SWS		Type	CP
(tmb)					W	S		
Modules People and Environment in Construction - Basics (predefined)								
M303:	Sustainability in Real Estate Management	6	Sustainability in Real Estate Management (G)	L/E		3	wE	6
			Real Estate Life Cycle Management (G)	L		1		
M501:	Environmentally-friendly Recycling and Disassembly of Buildings	6	Project Studies (G)	L/E		2	oE	6
			Disassembly Process Engineering (G)	L/E		2		
M502:	Leadership and Communication	6	Leadership and Communication (G)	L/E		4	wE	6
M503:	Upgrading of Existing Buildings and Energetic Refurbishment	6	Upgrading of Existing Buildings (G)	L/E	3		EoT wE	1,5 4,5
			Energetic Refurbishment (G)	L	1			
sum basic modules		**24**			**4**	**12**		
Modules People and Environment in Construction - Specialization (selectable)								
M620:	Environmental Communication	6	Environmental Communication [4] (G)	S	2	2	ngA [5] EoT	0 6
M202:	Lean Construction	6	Lean Construction (G)	L/E	4		EoT wE	1,5 4,5
M621:	Urban Renewal	6	Urban Management (G)	L/E		2	ngA [5] oE	1 2
			History of Urban Planning (G)	L		2	wE	3
M622:	Environmental Geotechnics	6	Landfills (G)	L/E	2		oE	3
			Brownfield Sites - Investigation, Evaluation, Rehabilitation (G)	L	2		oE	3
M613:	Building Physics II	6	Practical Noise Control (G)	L		2	oE	3
			Practical Fire Protection (G)	L		2	oE	3
M113:	Decommissioning of Nuclear Facilities	6	Removal and Decontamination of Nuclear Facilities (G)	L/E	2		oE	6
			New Development and Optimization of Decommissioning Machine Technology (G)	L/E	2			
CC933:	Introduction to GIS for Students of Natural, Engineering and Geo Sciences	6	Introduction to GIS for Students of Natural, Engineering and Geo Sciences (G)	L/E	4		ngA [5] wE	3 3
M914:	Technical Energy Systems for Buildings [1]	8	Technical Energy Systems for Buildings 1: Processes, Components (G)	L	2		oE	4
			Technical Energy Systems for Buildings 2: System Concept (G)	L		2	oE	4
M711:	Energy and Indoor Climate Concepts	4	Energy and Indoor Climate Concepts (G)	L		2	EoT	4

(continuing next page)

Table 5: Modules in Profile People and Environment in Construction (continued)

Module			Course				LC	
Code	Name	CP	Name (Language)	Type	HpW / SWS		Type	CP
(tmb)					W	S		
M814:	Environmental Emissions and Life Cycle Assessment	7	Emissions into the Environment (G)	L	2		wE	3,5
			Life Cycle Assessment and Global Forecasts (G)	L	2		wE	3,5
M913:	Constitutional and Administrative Law [1)]	6	Public Law I - Fundamentals (G)	L	2		wE	6
			Public Law II - Public Economic Law (G)	L		2		
M619:	Environmental Law	3	Environmental Law (G)	L	2		wE	3
M712:	Quarter Analysis	4	Quarter Analysis (G)	S	4		EoT	4
M713:	Urban Typologies	4	Urban Typologies (G)	S		2	EoT	4
M915:	Human-oriented Production [1,2)]	8	Human Factors Engineering I: Ergonomics (G)	L	2		wE	4
			Human-oriented Productivity Management: Personnel Management [3,4)] (G)	B	2	2	oE	4
			Productivity Management in Production Systems [3)] (G)	B		2	oE	4
sum specialization modules		**86**			**38**	**20**		

explanations to Table 5:

in general:

LC	learning control
CP	credit point
HpW / SWS	hours per week
W / S	winter term / summer term
G / E	language German / English
1)	Starting the module in winter term (W) is recommended.
2)	In the module two learning controls have to be taken, one can be selected.
3)	Course with the related learning control can be selected.
4)	Course is offered every semester.

type of course:

L	lecture
L/E	lecture and exercise, separate or integrated
S	seminar
B	block course

type of learning control:

wE	written examination
oE	oral examination
EoT	examination of other type
ngA[5)]	not graded accomplishment as examination prerequisite

2.3 Mentoring, module selection, individual curriculum

The selection options within the studies require that each student must compile an individual curriculum. This includes selecting one of the three study profiles with the corresponding modules and selecting modules within the Supplementary Studies (supplementary modules). This selection has to be supervised by a **mentor** chosen by the student (comp. ER/SPO § 17 a). The mentor has to be a professor of the KIT Department Civil Engineering, Geo and Environmental Sciences and to be involved with one module in the selected profile. Possible mentors are:

Profile 1: Prof. S. Haghsheno, Prof. S. Gentes, Prof. K. Lennerts, Jun.-Prof. R. Maalek
Profile 2: Prof. S. Haghsheno, Prof. K. Lennerts, Jun.-Prof. R. Maalek
Profile 3: Prof. K. Lennerts, Prof. S. Gentes, Prof. S. Haghsheno
Profile 4: Jun.-Prof. R. Maalek, Prof. K. Lennerts, Prof. S. Haghsheno
Profile 5: Prof. S. Haghsheno, Prof. K. Lennerts, Prof. S. Gentes

The selected profile determines the four **basic modules**. The **specialization modules** are chosen from the corresponding module catalog (see Tab. 1 - 5) to the extent of at least 42 CP. Within the Supplementary Studies subject-specific modules to the extent of at least 18 CP are selected freely from the master degree program 'Technology and Management in Construction' or any related program.

The form for selecting modules within the study profiles and the supplementary studies is available on the Examination Committee Master Civil Engineering web page, https://www.tmb.kit.edu/english/5583.php (*in German*). This has to be filled in by the student, signed by both student and mentor, and forwarded to the study program coordinator via the mentor for it to be entered into the Campus Management System. The modules must be entered in time to register for the exams in the first semester of the master degree program (comp. ER/SPO § 19 Par. 4). This ensures that the examination management (registration, deregistration if applicable, booking results etc.) can be processed smoothly. The individual curriculum is accessible at any time via the portal Campus Management for Students, https://campus.studium.kit.edu/english/index.php.

The modules should be chosen with care. Firstly, the assignment of the modules to the corresponding part of the program, Profile Studies or Supplementary Studies, is later transferred to the master degree certificate. Secondly, changes in the module selection have to be in agreement with the selected mentor and should be limited to exceptional cases only, e.g. if a compulsory elective module is not offered at short notice. As long as the corresponding module has not yet begun, changes to the module selection are generally possible.

2.4 Interdisciplinary qualifications

Students compile their own module **Interdisciplinary Qualifications** (comp. ER/SPO § 15a) to an extent of 6 CP from the offers on key competences of the KIT House of Competence (HoC) as well as the 'General Studies. Forum Science and Society' (FORUM, formerly ZAK), from the offer of General Studies at FORUM (formerly ZAK) or language courses at the 'Sprachenzentrum' (SpZ, center of language studies). All courses from the civil engineering programs offered by FORUM (formerly ZAK) as key competences or in the General Studies are excluded. Courses accepted generally by the Examination Committee can be selected directly in the module. In special cases, the Examination Committee Master Civil Engineering can permit or approve further suitable courses as interdisciplinary qualifications beyond the mentioned options. This requires the mentor's support.

Registering for courses on key competences of HoC and FORUM (formerly ZAK) as well as the language courses of SpZ takes place directly at HoC, FORUM (formerly ZAK) or SpZ. The examinations results are typically uploaded as 'Not assigned grades'. The students can **assign them in two steps**. Firstly, they **select** the corresponding 'Teilleistung' with the title 'Self Assignment HoC-FORUM-SpZ ...' in the module Interdisciplinary Qualifications according to the grading scale, not graded or graded. Then, they **assign** the corresponding not assigned exam to one of the selected 'Teilleistungen'. The title and credit points are automatically transferred from the exam when credited. To credit exams that could not be assigned by oneself, the form assignment of non-assigned activity statements (*in German*) has to be submitted to the Study Program Service of the department.

Registering for a learning control takes place online for courses offered by General Studies of FORUM (formerly ZAK) or other courses accepted by the Examination Committee Master Civil Engineering. The Study Program Service of the department has to be informed in time, so that the corresponding learning control can be selected in the campus management system within the registration period. Approval has to be provided for the courses accepted by the Examination Committee Master Civil Engineering.

The module Interdisciplinary Qualifications is completed non-graded. A grade can be disclosed in consultation with the lecturer but is not included in the calculation of the module grade.

2.5 Begin and complete a module

Every module and every examination is allowed to be credited once only (comp. ER/SPO § 7 Par. 5). The binding decision whether a module is selected is made by the student at the time of registering for the corresponding examination or partial examination (comp. ER/SPO § 5 Par. 2). The student can revoke this binding selection by deregistering in time. After attending the examination, especially a partial examination, a module cannot be replaced by another one any more. The assignment can be changed on request to the Examination Committee Master Civil Engineering.

A module is **completed** if the general examination of the module has been passed (grade min. 4.0). If a module examination consists of several partial examinations, then the module is completed if all partial examinations are passed (grade min. 4.0) and the minimum credit requirements of this module are met.

2.6 Registration, deregistration, repetition of examinations

Registration for examinations, not graded accomplishments and examination prerequisites takes place online via the portal Campus Management for Students, https://campus.studium.kit.edu/english/index.php. After logging in students can:

- register and deregister for examinations
- retrieve examination results
- assign key competences of HoC, FORUM (formerly ZAK), SpZ by themselves
- print a transcript of records

A successful online registration covers the admission to the examination. The portal Campus Management for Students provides the confirmation, which can serve as proof of registration in case of doubt. If problems occur with an online registration, the Study Program Service of the department as well as the examiner have to be informed as soon as possible to solve the problem in advance of examination date. In the case of an oral examination, the online registration has directly to be combined with the negotiation of an examination date with the examiner.

A registered examination either has to be taken or **deregistered** in advance of the deregistration deadline. This also applies if the date for an oral examination is moved to the following semester as the examinations are managed for each semester individually. The rules for deregistering from an examination are set by the ER/SPO § 10. Deregistration from examinations of other kinds as well as from not graded accomplishments (ER/SPO § 10 Par. 3) must be done by the deadline for the submission or presentation at the latest.

Generally, a failed examination can be repeated once, at the latest by the end of the examination period of the next but one semester to this examination (comp. ER/SPO § 8). If a written repeat examination is failed, a specific oral repeat examination can be taken. This is part of the repeat examination and will not be evaluated independently. After the specific oral repeat examination the overall grade of the repeat examination is either grade 4.0 (passed) or grade 5.0 (failed).

If the **repeat examination** (including a specific oral repeat examination) is failed as well, the **entitlement to the examination** is lost. A potential request for a **second repetition** has to be made without delay after loosing the examination entitlement. Requests for a second repetition of an examination (see https://www.tmb.kit.edu/english/5583.php; *in German*) require the approval of the Examination Committee Master Civil Engineering. A counseling interview is mandatory. The second repetition is registered at the Study Program Services by submitting the approval. As long as the second repetition of the exam has not been passed, further exams can only be taken with reservation. Also, such exams with reservation are registered at the Study Program Services by submitting the approval.

Further information is available in the examination and study regulation (ER/SPO, https://www.sle.kit.edu/english/vorstudium/master-technology-management-construction.php; *in German*), and from the Examination Committee Master Civil Engineering or the 'Fachschaft' (student council).

2.7 Students in special circumstances

Students in special circumstances are students with disabilities or chronic diseases, or on maternity leave, with children or dependents in need of care. The regulations on compensation for disadvantages include preferential access to courses with limited attendance, taking examinations under individually designed conditions, or adjustments to deadlines. These are described in detail in the Satzung über nachteilsausgleichende Regelungen in den Bachelor- und Masterstudiengängen am Karlsruher Institut für Technologie (KIT) (*in German*; see SPO § 12 and 13).

For compensation for a disadvantage, the student should submit an informal application to the Examination Committee Master Civil Engineering and provide the appropriate proof. The Examination Committee Master Civil Engineering decides on the application as well as on the kind and extent of the individually necessary measures and informs the student.

2.8 Crediting and recognition of already obtained accomplishments

In general, accomplishments already obtained can be recognized under the conditions of the ER/SPO (comp. ER/SPO § 18). The recognition has to be made with the corresponding recognition form of the Examination Committee Master Civil Engineering (https://www.tmb.kit.edu/english/5583.php; *in German*). It must unambiguously state at which place in the curriculum the recognized accomplishment is to be credited.

If the accomplishments are mainly **identical** with modules from the curriculum (name, objectives, content) the corresponding lecturer confirms this on the form.

If the accomplishments are **not identical** with modules from the curriculum they can be recognized as well, if the obtained competences contribute to achieve the qualification goals of the study program. These are included into the individual curriculum in agreement with the mentor. The Examination Committee Master Civil Engineering decides in these cases. Usually, modules to the extent of max. 12 CP can be credited for Subject-Specific Supplements. Additional credit points are dropped.

The recognition form has to be submitted to the Examination Committee Master Civil Engineering, which then transfers the creditable accomplishments.

Recognizing accomplishments obtained **outside the higher education system** is possible if the obtained competences contribute to achieving the qualification goals of the study program. For this purpose, an informal request has to be sent to the Examination Committee Master Civil Engineering and a counseling interview has to be arranged. Then, the Examination Committee Master Civil Engineering examines to which extent the obtained knowledge and skills can be recognized and which parts of the higher education study can be replaced by them. No more than than 50 % of the higher education study can be replaced. These accomplishments are to be included in the individual curriculum in agreement with the mentor.

For crediting passed **prior master's examinations** the form Transfer of prior master's examinations (*in German*) has to be filled and transfered to the Study Program Service of the department.

Further information about recognitions is on the Examination Committee Master Civil Engineering (https://www.tmb.kit.edu/english/PAM.php) web page.

2.9 Admission, preparation and completion of the master's thesis

The **Master's Thesis** is usually carried out in the fourth semester in the selected profile (comp. ER/SPO § 14). The topic of the master's thesis has to be assigned by a professor of the KIT Department of Civil Engineering, Geo- and Environmental Sciences. A topic assigned by a person who is not member of the KIT Department of Civil Engineering, Geo- and Environmental Sciences needs permission of the Examination Committee Master Civil Engineering using the corresponding form (see https://www.tmb.kit.edu/english/5583.php; *in German*). Students' wishes can be considered when drafting the topic. If the master's thesis is written outside of KIT, consider the instructions on 'Merkblatt - Externe Abschlussarbeiten' (http://www.haa.kit.edu/downloads/KIT_ALLGEMEIN_Merkblatt_Externe_Abschlussarbeiten.pdf; *in German*).

Students are admitted to the master's thesis after successfully passing modules to an extent of a minimum 42 CP within the master program Technology and Management in Construction. Results obtained in the module Interdisciplinary Qualifications do not count for this purpose. The supervisor initiates the master's thesis to be uploaded to the campus management system. After notification via e-mail, the master's thesis has to be **registered online** in the portal Campus Management for Students. The **admission** follows after the required prerequisites and eventual further conditions are verified. As these steps have to be completed **before starting** the thesis (scheduled starting date), they should be initiated at least two weeks in advance.

The preparation time is six months. The master's thesis can be written in German or English. Within one month after submission it has to be completed with a **presentation** which is considered in the grading. It is highly recommended to have gained all technical and soft skills required to prepare the master's thesis topic in advance.

Further information about the processes related to the master's thesis can be found in "Handreichung Masterarbeiten Bauingenieurwesen" (*in German*) on the website of the Study Program Service under the link "Abschlussarbeiten".

2.10 Semester abroad

The department recommends students to study for one to two semesters at a foreign university. KIT offers a variety of exchange programs. Within Europe, this is the well-known ERASMUS program. General information on planning a stay abroad is available on the website of the International Student Office (IStO), https://www.intl.kit.edu/ostudies/index.php, and specific information is available on the website of the KIT-Department of Civil Engineering, Geo and Environmental Sciences, https://bgu.kit.edu/english/outgoing.php. It is compulsory to agree on the intended accomplishments with the personal mentor in advance particularly with regard to the possibility of crediting in the personal curriculum. The proposed Learning Agreement has to be approved and signed by the Erasmus Coordinator.

2.11 Additional accomplishments

An **additional accomplishment** is a voluntary examination, which is not considered in the overall grade (comp. ER/SPO § 15). In total, additional accomplishments can be taken to the extent of max. 30 CP from offers within KIT.

The examination in the desired additional accomplishment should be registered online by the student within the registration period. The online registration to one of these exams requires first the selection of the module and the desired 'Teilleistungen'. The additional module for the Accompanying Studies of FORUM (formerly ZAK) can be selected directly. If selecting this module it has to be considered that the extent of possible further additional accomplishments is reduced by the extent of the FORUM module even if this is not completed. Additional accomplishments available in the module Further Examinations can be also selected directly. If the designated additional accomplishment or additional module are not available in that list then this must be conveyed to the Study Program Service at the department via e-mail. The desired selection will then be available in the campus management system enabling the online exam registration within the registration period.

Usually, a passed additional accomplishment cannot be transferred subsequently to the individual curriculum. In special cases the Examination Committee Master Civil Engineering can approve an exception.

All additional accomplishments are listed in the transcript of records. Completed modules can be included in the master degree certificate as additional modules if requested by the student. This also applies to additional accomplishments recognized by the Examination Committee Master Civil Engineering.

3 Further information

3.1 About the module handbook . . .

The **module handbook** is the key document describing the structure of the program, providing assistance and guidance during the study time. It contains the descriptions of all program modules and information on:

- the structure of the modules,
- the extent of the modules (in CP),
- the interdependencies between the modules,
- the learning outcomes of the modules,
- the type of assessment and examinations,
- the calculation of the module's grade, and
- the integration of the module in the course of study.

Each module consists of one or more interrelated courses, which are completed with one or more **examinations** or **not graded accomplishments**. With exception of some import modules, the modules comprise 6 CP, which will be credited after the module is successfully completed. The module handbook provides the necessary information for the students to customize the content and time schedule of their interdisciplinary studies according to personal needs, interest and job perspectives.

In addition to the module handbook, the **course catalog** and the institutes (web pages) provide important up-to-date information concerning variable course details (e.g. time and location of the course) as well as short-term modifications.

3.2 About module examinations, examination committee . . .

The module examinations are either a general examination or are split into several partial examinations. If the module examination is a **general examination**, the entire content of the module is reviewed in a single examination. If the module examination consists of **partial examinations**, the content of each course will be reviewed in corresponding partial examinations. Then, the module examinations can be spread out over several semesters. Not graded accomplishments can also be part of the module examination, e.g. as examination prerequisites.

The Examination Committee Master Civil Engineering (https://www.tmb.kit.edu/english/PAM.php) is responsible for all legal questions concerning examinations. Applications, e.g. for a second repetition, extension of deadlines or recognitions, must be submitted to this committee as it decides on and approves all requests.

3.3 About changes in the modules offered . . .

The range of modules changes in the course of the semesters. Modules may be discontinued or added or the module examination may change. When possible, such changes are announced in the module handbook with sufficient time in advance, at latest at the beginning of the semester they are valid from (see Chapt. Current changes).

As a rule, students who started a module (see selection and completion of a module) can complete it in the format it was started. The corresponding examinations are provided onwards over a certain time period usually at least one semester after it has changed. In general, a consultation with the examiner is recommended in such a case.

3.4 Contact persons

Dean of Study Affairs:

Prof. Dr.-Ing. Steffen Freitag
Institute for Structural Analysis, Bldg. 10.50, 2nd floor
consultation: on appointment
Phone: 0721/608-42280
Email: steffen.freitag@kit.edu

Study Program Coordination:

PD Dr. Ulf Mohrlok
KIT Department of Civil Engineering, Geo and Environmental Sciences, Bldg. 10.81, R. 311
consultation: on appointment
Phone: 0721/608-46517
Email: ulf.mohrlok@kit.edu

Examination Committee Master Civil Engineering:

Prof. Dr.-Ing. Kunibert Lennerts (chairperson)
Dr.-Ing. Heike Schmidt-Bäumler (person in charge)
Institute of Technology and Management in Construction, Bldg. 50.31, R. 005 (ground floor)
consultation: on appointment
Phone: 0721/608-46008
Email: pam@bgu.kit.edu
Web: https://www.tmb.kit.edu/english/PAM.php

Students' Advisory Service:

Dr.-Ing. Harald Schneider
Institute of Technology and Management in Construction, Bldg. 50.31, R. 008 (ground floor)
consultation: on appointment
Phone: 0721/608-43881
Email: harald.schneider@kit.edu

Study abroad:

Prof. Dr. Olivier Eiff (Erasmus Coordinator)
Mrs. Angelika Fels (person in charge)
Institute for Water and Environment, Bldg. 10.81, R. 128 (1st floor)
consultation: on appointment
Phone: 0721/608-47245
Email: erasmus-civil@bgu.kit.edu
Web: https://www.bgu.kit.edu/english/outgoing_erasmus.php

Study Program Service ('Studiengangservice Bau-Geo-Umwelt'):

KIT Department of Civil Engineering, Geo and Environmental Sciences, Bldg. 10.81, R. 312
consultation: s. https://www.bgu.kit.edu/english/studiengangservice.php
Email: studiengangservice@bgu.kit.edu
Web: https://www.bgu.kit.edu/english/studiengangservice.php

Fachschaft:

Students in Civil Engineering
Bldg. 10.81 (Altes Bauing. Geb.), R. 317.1 (3rd floor)
consultation: s. http://www.fs-bau.kit.edu
Phone: 0721/608-43895
Email: info@fs-bau.kit.edu
Web: http://www.fs-bau.kit.edu

3.5 Abbreviations, translations

CP/LP	credit points	Leistungspunkte
ER/SPO	examination regulations	Studien- und Prüfungsordnung
HpW/SWS	contact hour per week	Semesterwochenstunde
S	summer term	Sommersemester
Sem.	semester	Semester
W	winter term	Wintersemester

4 Current changes

Major changes will be listed here as from summer term 2025. Despite the fact that this process is mapped with great care, other/ minor changes may occur.

modules not offered anymore as from summer term 2025:

Virtual Engineering Construction - A [tmbM917]

modules not offered anymore as from winter term 2025/26:

Virtual Engineering Construction - B [tmbM918]

changed examinations and not graded accomplishments as from summer term 2025:

Traffic Management and Simulation Methods [tmbM616]:

The 'Exercise Transportation Data Analysis', 0 CP, is not graded examination prerequisite.

5 Modules

M 5.1 Module: Machinery and Process Engineering (tmbM101) [M-BGU-100339]

Responsible: Prof. Dr.-Ing. Sascha Gentes
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile Site Management and Production Methods - Basics
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each winter term	1 term	German	4	3

Mandatory			
T-BGU-100623	Machinery and Process Engineering	5 CR	Gentes
T-BGU-108012	Student Research Project 'Excavation Pit Development and Shuttering Planning'	1 CR	Schneider

Competence Certificate
- 'Teilleistung' T-BGU-108012 with not graded accomplishment according to § 4 Par. 3
- 'Teilleistung' T-BGU-100623 with written examination according to § 4 Par. 2 No. 1

details about the learning controls see at the respective 'Teilleistung'

Prerequisites
none

Competence Goal
The students can name the basic principles and concepts of machine technology and are able to describe the built and function of construction machinery and equipment. They can appropriately name the equipment and select the suitable machines depending on their building tasks. They understand the BGL system (list of construction equipment) and are able to rank and classify machines and equipment as needed. They will realize optimization potentials using suitable process technology and equipment alternatives. Finally, they will be able to plan and size various construction machines and transport devices with respect to static and dynamic effects and impacts.

Content
This module provides machine technology basics to better understand a broad variety of construction equipment and machinery. Further, static and dynamic effects and impacts of construction equipment application will be discussed, various construction machines introduced, their respective applications compared, and basics for their dimensioning provided. Different construction machines and their variations will be presented with the help of the BGL system. In addition, the functions, variations, effectiveness, and applications for diverse construction and productions procedures used in processing technology, earthworks, underground engineering, and hydraulic engineering will be presented and discussed. The curriculum also includes the necessary technical basics for drive systems, power transmission components (mechanic and hydraulic), undercarriages, as well as steering controls, and safety facilities. In addition to a building site visit for practical insight, a practical course on the institute's own test site will be offered to try out construction machinery. Finally, students need to develop two exercises within the scope of their seminar paper as part of this module.

Module grade calculation
grade of the module is grade of the exam

Annotation
none

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- Construction Equipment lecture: 30 h
- Process Engineering lecture: 30 h

independent study:

- preparation and follow-up lectures Construction Equipment: 20 h
- preparation and follow-up lectures Process Engineering: 20 h
- preparation of student research project: 30 h
- examination preparation: 50 h

total: 180 h

Recommendation
none

Literature
1) Baugeräteliste, aktuelle Fassung
2) Hüster, Felix, Leistungsberechnung der Baumaschinen, Shaker, 5. Aufl., Aachen, 2005.
3) Girmscheid, Gerhard: Leistungsermittlungshandbuch für Baumaschinen und Bauprozesse, Springer Berlin Heidelberg, 2010.
4) Drees, Gerhard; Krauß, Siri: Baumaschinen und Bauverfahren - Einsatzgebiete und Einsatzplanung, expert-Verlag, 3., völlig neu bearb. Aufl., Renningen, 2002.

M 5.2 Module: Technology and Production Methods in Turnkey Construction and Civil Engineering Works (tmbM102) [M-BGU-105913]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile Site Management and Production Methods - Basics
Profile Project Management and Lean Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each summer term	1 term	German	4	2

Mandatory			
T-BGU-111899	Technology and Production Methods in Turnkey Construction and Civil Engineering Works	6 CR	Haghsheno

Competence Certificate
- 'Teilleistung' T-BGU-111899 with written examination according to § 4 Par. 2 No. 1

details about the learning control see at the 'Teilleistung'

Prerequisites
none

Competence Goal
The students are able to describe and apply fundamental process and production methods, especially regarding to technical building services. Moreover, they are able to amplify fundamental processes in the subject area of turnkey construction and to analyze correspondent contexts and workflows.

Adding to this, the students are able to amplify essential elements of selected civil engineering structures and, regarding to this, comprehend typical production methods. Furthermore, the students are able to choose, amplify and analyze appropriate production methods for civil engineering structures.

Content
In the subject area of turnkey construction besides the detailed design of shell construction, technical support and technical building services, there is also an explanation of the related basic knowledge in engineering. Also, basics of the technical support belong to the curriculum, e.g., heating installations, ventilation systems, A/C, electric installations. Most of all, there is a focus on regenerative energies. Furthermore, the explanation of the processes in turnkey construction, from design and construction permit to final acceptance of work, is part of the lecture.

In the subject area of civil engineering structures and regenerative energies, besides basic knowledge in construction, there is also a focus on production methods for the construction and maintenance of the selected civil engineering structures. Adding to conventional construction methods there are topics like additive manufacturing in solid construction. This also includes the view on hydraulic constructions (e.g. water locks), waste disposal (e.g. waste disposal sites) and infrastructure constructions (e.g. steel composite bridge). Also, there is a focus on regenerative energies (e.g. wind power stations).

Module grade calculation
grade of the module is grade of the exam

Annotation
none

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- Turnkey Construction lecture/exercise: 30 h
- Civil Engineering Structures and Regenerative Energies lecture/exercise: 30 h

independent study:

- preparation and follow-up lecture/exercises Turnkey Construction: 30 h
- preparation and follow-up lecture/exercises Civil Engineering Structures and Regenerative Energies: 30 h
- examination preparation: 60 h

total: 180 h

Recommendation
none

Literature

Bundesamt für Justiz (Hg.) (2020): Verordnung über die Honorare für Architekten- und Ingenieurleistungen (Honorarordnung für Architekten und Ingenieure - HOAI), Anlage 12

Patt, H; Speerli, J.; Gonsowski, P. (2021): Wasserbau. Grundlagen, Gestaltung von wasserbaulichen Bauwerken und Anlagen. Wiesbaden: Springer Fachmedien.

Bilitewski, B.; Härdtle, G. (2013): Abfallwirtschaft. Handbuch für Praxis und Lehre. Berlin/Heidelberg: Springer-Verlag.

Petzek, E.; Bancila, R. (2015): Economical Bridge Solutions based on innovative composite dowels and integrated abutments. Wiesbaden: Springer Fachmedien.

Hau, W. (2014): Windkraftanlagen. Grundlagen – Technik – Einsatz – Wirtschaftlichkeit. Berlin/Heidelberg: Springer-Verlag.

M 5.3 Module: Production Planning and Control in Construction (tmbM103) [M-BGU-105918]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile Site Management and Production Methods - Basics
Profile Project Management and Lean Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each summer term	1 term	German	4	2

Mandatory			
T-BGU-111901	Production Planning and Control in Construction	5 CR	Haghsheno
T-BGU-108010	Student Research Project 'Cost Estimation in Structural Engineering and Earthworks'	1 CR	Schneider

Competence Certificate
- 'Teilleistung' T-BGU-108010 with not graded accomplishment according to § 4 Par. 3
- 'Teilleistung' T-BGU-111901 with written examination according to § 4 Par. 2 No. 1

details about the learning controls see at the respective 'Teilleistung'

Prerequisites
none

Competence Goal
The students can describe the essential technical, business, and organizational tasks of construction management from the order to acceptance and can analyze and evaluate the individual work steps. They can describe the fundamental processes of construction site planning and handling and assign suitable methods and tasks. Besides, they can design production systems for selected products from the construction industry and apply various techniques and methods for resource and logistics planning. Furthermore, the students can name the essential accident prevention regulations and can describe the active and passive protection measures as well as the organization of the labor protection. In addition, the students can develop approaches to solutions in the area of occupational safety on the basis of problem situations.

The students can explain the different methods of calculation and the structure of a calculation. They have the knowledge to create tenders and unit prices independently. Furthermore, students can apply current software for the calculation. Furthermore, the course clarifies, how to create, justify and calculate claims based on the VOB/B by using practical examples.

Students can explain the construction contract laws as well as the difference between BGB and VOB. Furthermore, students can explain the different types of procuration. The students are familiar with legal thinking regarding contract and employment law and can apply the basics to construction projects. Thereby, they can assess and evaluate the contents of a construction contract.

Content
The course site management presents the work of foreman, site manager, and project manager and contains significant aspects of management processes of the construction site. In addition to performance reporting, work costing and site management, the technical, legal and economic tasks of the site manager as well as communication and correspondence on the construction site will be highlighted. In addition, accident prevention regulations, active and passive protection measures as well as the organization of the labor protection during operation and on site are discussed.

The area of construction site planning and handling deals in more detail with various production systems and factors from the construction industry. Based on this, resource planning for the management of a construction site is dealt with in more detail. In addition to the resources of financial resources, machines and employees, logistics planning is also dealt with in more detail. In the context of resource planning, in-depth insights into costing are given and the topic of claim management, which deals with the handling of supplements, is also dealt with in particular. In the area of construction law, topics relating to the construction contract are dealt with. In addition, the areas of obstructions, liability and limitation periods are also addressed.

Module grade calculation
grade of the module is grade of the exam

Annotation
none

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- Site Management lecture: 15 h
- Site Planning and Handling lecture/exercise: 45 h

independent study:

- preparation and follow-up lectures Site Management: 15 h
- preparation and follow-up lecture/exercises Site Planning and Handling: 30 h
- preparation of student research project: 30 h
- examination preparation: 45 h

total: 180 h

Recommendation
none

Literature
Elwert, Ulrich, Flassak, Alexander: Nachtragsmanagement in der Baupraxis - Grundlagen, Beispiele, Anwendung, Vieweg, 2., erw. und aktualisierte Aufl., Wiesbaden, 2008.

Berner, Fritz; Kochendörfer, Bernd; Schach, Rainer: Grundlagen der Baubetriebslehre 2 Baubetriebsplanung, Imprint: Springer Vieweg, Wiesbaden, 2013

Hofstadler, Christian: Bauablaufplanung und Logistik im Baubetrieb, Springer, Berlin, 2007

Schach, Rainer; Otto, Jens: Baustelleneinrichtung Grundlagen – Planung – Praxishinweise – Vorschriften und Regeln, Springer Fachmedien Wiesbaden GmbH, Wiesbaden, 2017

Drees, Gerhard; Paul, Wolfgang: Kalkulation von Baupreisen, Beuth Verlag GmbH, Berlin, 2015

Hauptverband d. Deutschen Bauindustrie/Zentralverband d. Deutschen Baugewerbes: Kosten-, Leistungs- und Ergebnisrechnung der Bauunternehmen, Rudolf Müller GmbH & Co. KG, Köln, 2016

M 5.4 Module: Advanced Studies in Construction Engineering (tmbM111) [M-BGU-100344]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile Site Management and Production Methods - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each winter term	1 term	German	4	2

Mandatory			
T-BGU-108003	Advanced Studies in Construction Engineering	6 CR	Haghsheno

Competence Certificate
- 'Teilleistung' T-BGU-108003 with written examination according to § 4 Par. 2 No. 1

details about the learning control see at the 'Teilleistung'

Prerequisites
none

Competence Goal
The students are able to identify terms and modes of operations of specific construction equipment, combination of devices and special procedural systems in the subject areas earthwork and special underground engineering. They are able to understand and evaluate complex combinations of methods and processes with civil engineering works. Adding to this, they can identify the influence of outside influences to the selected devices and output-tool efficiency. Moreover, the students can amplify fundamental construction methods and construction designs of tunnels and galleries including the corresponding machines and devices as much as basic knowledge in blasting engineering.

Content
Earthwork and Underground Construction:

special equipment features and options of devices, mode of operation of the single devices and systems; process engineering of earthworks while mining, transportation, placing and compacting; influences on efficiency; soil improvement; quality control; transport and controls of devices and equipment; methods of underground construction, including special temporary pit supporting systems and foundations; underground improvements; injections; underpinning; tunneling; caisson construction; freezing of soil; quay walls; harbor constructions; statics of floating systems; support devices.

Tunnels and Blasting Engineering:

geological, rock mechanical and geotechnical parameters for underground constructions (tunnels and galleries, caves, etc.); project-related, process-related, and environmental influences; Machines and devices; special methods and advancements; selection criteria for proper tunnel methods; blasting engineering; explosive substances and blasting techniques; basic legal knowledge for blasting; study trip relating to blasting engineering.

Module grade calculation
grade of the module is grade of the exam

Annotation
none

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- Tunnel Construction and Blasting Engineering lecture: 30 h
- Operation Methods for Foundation and Marine Construction lecture: 15 h
- Operation Methods for Earthmoving lecture: 15 h

independent study:

- preparation and follow-up lectures Tunnel Construction and Blasting Engineering: 30 h
- preparation and follow-up lectures Operation Methods for Foundation and Marine Construction: 15 h
- preparation and follow-up lectures Operation Methods for Earthmoving: 15 h
- examination preparation: 60 h

total: 180 h

Recommendation
none

M 5.5 Module: Equipment and Special Construction Techniques in Building Practice (tmbM112) [M-BGU-103918]

Responsible: Prof. Dr.-Ing. Sascha Gentes
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile Site Management and Production Methods - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each term	2 terms	German	4	1

Mandatory			
T-BGU-108009	Equipment and Special Construction Techniques in Building Practice	6 CR	Gentes

Competence Certificate
- 'Teilleistung' T-BGU-108009 with oral examination according to § 4 Par. 2 No. 2

details about the learning control see at the 'Teilleistung'

Prerequisites
none

Competence Goal
The students can name the basic concepts of the presented construction equipment and special construction processes and are able to describe the structure and function of the devices and the procedures. Furthermore, they are able to assess the respective use of devices and processes and they know the current status of Technology of the treated areas.

Content
In this module, construction management basics of practical topics for work preparation and construction are taught. Various devices and special processes from different areas of construction, from formwork to construction and test methods, are presented and explained, especially with regard to innovative new features.

Module grade calculation
grade of the module is grade of the exam

Annotation
none

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- Equipment and specific Methods in Construction I lecture: 30 h
- Equipment and specific Methods in Construction II lecture: 30 h

independent study:

- preparation and follow-up lectures Equipment and specific Methods in Construction I: 30 h
- preparation and follow-up lectures Equipment and specific Methods in Construction II: 30 h
- examination preparation: 60 h

total: 180 h

Recommendation
none

M 5.6 Module: Decommissioning of Nuclear Facilities (tmbM113) [M-BGU-100345]

Responsible: Prof. Dr.-Ing. Sascha Gentes
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile Site Management and Production Methods - Specialization
Profile People and Environment in Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each winter term	1 term	German	4	1

Mandatory			
T-BGU-100627	Decommissioning of Nuclear Facilities	6 CR	Gentes

Competence Certificate
- 'Teilleistung' T-BGU-100627 with oral examination according to § 4 Par. 2 No. 2

details about the learning control see at the 'Teilleistung'

Prerequisites
none

Competence Goal
The students can name the processes, equipments and machinery for decommissioning nuclear facilities. They can explain analytical methods for the procedure, the required techniques and processes for decommissioningand can develop decommissioning concepts. They are able to analyse self-reliantly decommissioning projects of nuclear facilities and to work in teams. They can prepare proposal for approval considereing the respective laws.

Content
This course provides an overview about the state of research and technology in mechanical process engineering for the decommissioning of nuclear facilities. This involves decontamination procedures, remote-handled procedures, and procedures for the separation of reinforced concrete, etc.

The required approvals and licenses and the involved authorities will be introduced and discussed using examples and legal sources, e.g. the German Atomic Energy Act (Atomgesetz). The basics of radiation protection together with the pertaining measurement technology will be explained in step with actual practice. Furthermore, a suitable system to successfully manage decommissioning projects will be presented as well as the numerous stakeholders involved.

A visit to a nuclear facility currently under decommissioning is part of the course. The new findings will be further discussed in conjunction with existing decommissioning projects which will also be presented by the involved industry partners.

Module grade calculation
grade of the module is grade of the exam

Annotation
none

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- Removal and Decontamination of Nuclear Facilities lecture, exercise: 30 h
- New Development and Optimization of Decommissioning Machine Technology lecture, exercise: 30 h

independent study:

- preparation and follow-up lectures, exercises Removal and Decontamination of Nuclear Facilities: 30 h
- preparation and follow-up lectures, exercises New Development and Optimization of Decommissioning Machine Technology: 30 h
- examination preparation: 60 h

total: 180 h

Recommendation
none

Literature

1) Kohli, Rajiv [Hrsg.]: Developments in surface contamination and cleaning - fundamentals and applied aspects, Knovel library, USA, 2008.
2) Rahman, A.: Decommissioning and radioactive waste management, Whittles, Dunbeath, 2008.
3) Thierfeldt, S.; Schartmann,F.: Stillegung und Rückbau kerntechnischer Anlagen - Erfahrungen und Perspektiven, 4. Neu bearbeitete Auflage, Brenk Systemplanung Aachen, 2012.
4) Zeiher, Marco: Ein Entscheidungsunterstützungsmodell für den Rückbau massiver Betonstrukturen in kerntechnischen Anlagen, Karlsruhe, Univ., Diss., 2009.
5) Fortschrittsbericht über den Stand der BMBF – Stilllegungsprojekte und der vom BMBF geförderten FuE-Arbeiten zu 'Stilllegung / Rückbau kerntechnischer Anlagen'

M 5.7 Module: Seminar Construction Machinery (tmbM114) [M-BGU-105921]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile Site Management and Production Methods - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each summer term	1 term	German	4	1

Mandatory			
T-BGU-111907	Seminar Construction Machinery	6 CR	Haghsheno

Competence Certificate
- 'Teilleistung' T-BGU-111907 with examination of other type according to § 4 Par. 2 No. 3

details about the learning control see at the 'Teilleistung'

Prerequisites
none

Competence Goal
The students can describe the functions and the use of different machine components. Furthermore, they can identify the different components of a construction machine on a real object of study. In addition, they are able to explain and plan the usage of specific components for concrete machine functions. The students can identify different malfunctions. They can evaluate maintenance repair work activities. In specific cases they manage some maintenance activities by themselves.

The students are capable of describing how selected construction machine sensors work. Furthermore, they can choose which sensors are appropriate for scientific test setups to examine machine and process optimization.

Also, the students learned to develop solutions for construction machine specific tasks by themselves. These solutions should be in accordance with the rules of good scientific practice.

Content
The teaching content is orientated on specific construction machines. The focus in each semester will be on one or several various machines. This is the reason why the specific content can variate from semester to semester.

The following content is part of the seminar:

- function, design and areas of application for specific construction machines
- function of specific machine components (for example hydraulic systems, motors, sensors and other machine components)

Module grade calculation
grade of the module is grade of the exam

Annotation
The content of the seminar will be created together between the lecturers and the students. Beside theoretical parts there will be practical exercises on our testing field in Linkenheim-Hochstetten. Therefore, regular participation in person will be necessary.

IMPORTANT: The number of participants is limited to 10 students. Further information for the application procedure will be announced on the homepage of the institute. When necessary, the academic progress of the student is going to decide which student will be chosen to attend on the course. The latest point of the confirmation is the end of the first week in the semester.

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- seminar/field exercise: 60 h

independent study:

- preparation and follow-up seminar/field exercises: 60 h
- portfolio, incl. report and presentation (examination): 60 h

total: 180 h

Recommendation
none

Literature

König, H.: Maschinen im Baubetrieb, Grundlagen und Anwendung. Springer Vieweg, Wiesbaden, 2014.

Grote, K.-H. und Feldhusen, J.: Dubbel Taschenbuch für den Maschinenbau. Springer, Berlin/Heidelberg/New York, 2007.

M 5.8 Module: Project Management in Construction and Real Estate Industry (tmbM201) [M-BGU-100338]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile Project Management and Lean Construction - Basics
Profile Site Management and Production Methods - Specialization
Profile Real Estate and Facility Management - Specialization
Profile Digital Technologies in Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each winter term	1 term	German	4	5

Mandatory			
T-BGU-100622	Project Management in Construction and Real Estate Industry	5 CR	Haghsheno
T-BGU-108011	Student Research Project 'Scheduling and Building Site Facilities'	1 CR	Schneider

Competence Certificate
- 'Teilleistung' T-BGU-108011 with not graded accomplishment according to § 4 Par. 3
- 'Teilleistung' T-BGU-100622 with examination of other type according to § 4 Par. 2 No. 3

details about the learning controls see at the respective 'Teilleistung'

Prerequisites
none

Competence Goal
Students have basic and in-depth knowledge and skills in project management in the construction and real estate industry.

They know the necessary skills for successful project management according to the ICB4 standard of the International Project Management Association (IPMA) in the areas of context, methods, personality and social issues.

They will be able to apply selected project management content (especially project objectives and determination of requirements, project execution implementation strategies and award procedures, schedule management, cost management and quality management) and transfer project management methods to specific construction projects as part of a project setup.

They are also familiar with the job description of project manager/project controller in the German construction and real estate industry and their corresponding tasks in a construction project.

Furthermore, students will be able to collaborate effectively in teams and to present jointly developed content as a group (to a potential client) in the context of project work.

Content
The focus is on the following areas of action and expertise:

- project objectives and determination of requirements
- project execution implementation strategies and award procedures
- schedule management
- cost management
- quality management

Module grade calculation
grade of the module is grade of the exam

Annotation
none

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- Lecture/exercise: 45 h

independent study:

- preparation and follow-up of lecture/exercises: 30 h
- teamwork: working on the case study, report and presentation of results (part of the examination): 60 h
- preparation of colloquium (part of the examination): 15 h
- preparation of student research project (not graded accomplishment): 30 h

total: 180 h

Recommendation
course 'Project Management' (6200106)

Literature
Ahrens, Hannsjörg; Bastian, Klemens; Muchowski, Lucian (Hrsg.) (2021): Handbuch Projektsteuerung - Baumanagement: Ein praxisorientierter Leitfaden mit zahlreichen Hilfsmitteln und Arbeitsunterlagen, 6. Auflage, Fraunhofer IRB Verlag, Stuttgart

Fewings, Peter; Henjewele, Christian (2019): Construction Project Management – An Integrated Approach, 3. Auflage, Routledge, New York (USA)

GPM Deutsche Gesellschaft für Projektmanagement e. V. (Hrsg.) (2017): Individual Competence Baseline für Projektmanagement (Version 4.0), 1. Auflage, GPM Deutsche Gesellschaft für Projektmanagement e. V., Nürnberg

Haghsheno, Shervin; John, Paul Christian (2024): Bauherrnseitige Projektmanagement-Dienstleistungen in Deutschland, Forschungsbericht, DVP – Deutscher Verband für Projektmanagement in der Bau- und Immobilienwirtschaft e. V.

Huemann, Martina; Turner, J. Rodney (Hrsg.) (2024): The Handbook of Project Management, 6. Auflage, Routledge, New York (USA)

Kochendörfer, Bernd; Liebchen, Jens H.; Viering, Markus G. (2021): Bau-Projekt-Management: Grundlagen und Vorgehensweisen, 5. Auflage, Springer Vieweg, Wiesbaden

Schulz, Markus (2020): Projektmanagement: Zielgerichtet. Effizient. Klar., 2. Auflage, UVK Verlag, Tübingen

M 5.9 Module: Lean Construction (tmbM202) [M-BGU-100104]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile Project Management and Lean Construction - Basics
Profile Site Management and Production Methods - Specialization
Profile Digital Technologies in Construction - Specialization
Profile People and Environment in Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each winter term	1 term	German	4	3

Mandatory			
T-BGU-101007	Project Paper Lean Construction	1,5 CR	Haghsheno
T-BGU-108000	Lean Construction	4,5 CR	Haghsheno

Competence Certificate
- 'Teilleistung' T-BGU-101007 with examination of other type according to § 4 Par. 2 No. 3
- 'Teilleistung' T-BGU-108000 with written examination according to § 4 Par. 2 No. 1

details about the learning controls see at the respective 'Teilleistung'

Prerequisites
none

Competence Goal
The students are able to explain the theoretical basics of Lean Construction. They are able to choose the right process management approach for a project and to adapt and improve it during the project. Furthermore, students will be able to identify and analyze problems in construction projects from a process perspective. The students are able to explain the different tools of Lean Construction and select, combine and apply them according to the problem.

Content
In this module, the theoretical basics of Lean Construction are presented at the beginning and deepened through learning simulations and exercises. Subsequently, the Last Planner System™, value stream mapping and cooperative contract forms, among others, are examined in depth. Aspects such as construction site logistics, cost and quality management and planning management from a lean perspective. In the exercise, students work in small groups on selected topics based on provided literature and analyze them in the context of the knowledge from the lecture. The results of the small group work are compiled in a written paper and presented at the end of the lecture. To consolidate and reflect on the learning objective, a joint follow-up of the small group work will take place, in which the individual works will be placed in an overall context.

Module grade calculation
grade of the module is CP weighted average of grades of the partial exams

Annotation
none

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- lecture, exercise: 60 h

independent study:

- preparation and follow-up lectures, exercises: 30 h
- preparation of project with report (partial exam): 30 h
- examination preparation (partial exam): 60 h

total: 180 h

Recommendation
none

Literature

Gehbauer, F. (2013) *Lean Management Im Bauwesen*. Skript des Instituts für Technologie und Management im Baubetrieb, Karlsruher Institut für Technologie (KIT).

Liker, J. & Meier, D. (2007) *Praxisbuch, der Toyota Weg: für jedes Unternehmen*. Finanzbuch Verlag.

Rother, M., Shook, J., & Wiegand, B. (2006). *Sehen lernen: mit Wertstromdesign die Wertschöpfung erhöhen und Verschwendung beseitigen*. Lean Management Institut.

M 5.10 Module: Lean Integrated Project Delivery (Lean IPD) (tmbM203) [M-BGU-105925]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile Project Management and Lean Construction - Basics
Profile Site Management and Production Methods - Specialization
Profile Real Estate and Facility Management - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each summer term	1 term	German	4	1

Mandatory			
T-BGU-111911	Project Lean Integrated Project Delivery	3 CR	Haghsheno
T-BGU-111910	Lean Integrated Project Delivery	3 CR	Haghsheno

Competence Certificate
- 'Teilleistung' T-BGU-111911 with examination of other type according to § 4 Par. 2 No. 3
- 'Teilleistung' T-BGU-111910 with written examination according to § 4 Par. 2 No. 1

details about the learning controls see at the respective 'Teilleistung'

Prerequisites
none

Competence Goal
Students will be able to describe the basic approaches of Integrated Project Delivery (IPD) and its international models (IPD, Alliancing, Project Partnering) and to explain the associated functionalities and elements (values, culture, organization, economics, methods, and legal characteristics of a multi-party contract). In particular, they are able to analyze the interrelationships between IPD and lean management approaches and to present them from different perspectives. In addition, students will be able to apply appropriate Lean methods using practical examples for the development, planning and execution phases of construction projects, which are essential for the success of IPD projects (including Conditions of Satisfaction, Target Value Design, Set based Design, Choosing by Advantages).

Content
The following content will be covered in this module:

- challenges of traditional project delivery models in the construction industry
- basics of Integrated Project Delivery as an innovative approach, incl. the development in the international context
- development of IPD in Germany
- characteristics and model elements of IPD
- phase model of Integrated Project Delivery
- specifics of multi-party contracts and the selection process of project partners
- IPD from the perspective of lean management philosophy
- selected Lean methods with special relevance for IPD projects (Conditions of Satisfaction, Target Value Design, Set based Design, Choosing by Advantages)

In the context of a case study, the contents of an IPD project are worked on by teams. The results of the case study are documented in the form of a report and presented by the students at the end of the module.

Module grade calculation
grade of the module is CP weighted average of grades of the partial exams

Annotation
The module set-up follows the 'flipped classroom' approach. This means that after a short common introduction the case study is to be prepared by team work. At selected dates events (meetings, interim presentations etc.) in the plenum are arranged.

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- lecture/exercise: 45 h

independent study:

- preparation and follow-up lecture/exercises: 45 h
- case study as team work, preparation of report and presentation (partial examination): 45 h
- examination preparation (partial examination): 45 h

total: 180 h

Recommendation
module Lean Construction [tmbM202]

Literature
AIA California Council (2014): Integrated Project Delivery: an Updated. American Institute of Architects.

Allison, M.; Ashcarft, H.; Cheng, R.; Klawens, S.; Pease, J. (2018): Integrated Project Delivery - An Action Guide for Leaders.

Ashcraft, H. (2011): IPD Teams: Creation, Organization and Management.

Breyer, W. (2017): Partnering Modelle - ein internationaler Vergleich. In: Planen, Errichten und Betreiben. Digitalisierung im Bau. 4. Internationaler BBB-Kongress. Hrsg. von Fritz Berner. BBB Professoren. Stuttgart: Institut für Baubetriebslehre, Universität Stuttgart, S. 163–177.

Fiedler, M. (2018): Lean Construction – Das Managementhandbuch – Agile Methoden und Lean Management im Bauwesen. Springer, Berlin, Heidelberg.

Fischer, M.; Khanzode, A.; Reed, D.; Ashcraft, H. W. (2017): Integrated Project Delivery. John Wiley & Sons, Somerset.

Haghsheno, S.; Baier, C.; Schilling Miguel, A.; Talmon, P.; Budau, M. (2020): Integrated Project Delivery (IPD) – Ein neues Projektabwicklungsmodell für komplexe Bauvorhaben. In: Bauwirtschaft, 5 (2), 80–93

Heidemann, A. (2011): Kooperative Projektabwicklung im Bauwesen unter der Berücksichtigung von Lean-Prinzipien - Entwicklung eines Lean- Projektabwicklungssystems. Internationale Untersuchungen im Hinblick auf die Umsetzung und Anwendbarkeit in Deutschland". Karlsruhe: Universität Karlsruhe. ISBN: 978-3-86644-583-3.

Lahdenperä, P. (2012): Making sense of the multi-party contractual arrangements of project partnering, project alliancing and integrated project delivery. In: Construction Management and Economics 30, S. 57–79.

Schlabach, C. (2013): Untersuchungen zum Transfer der australischen Projektabwicklungsform Project Alliancing auf den deutschen Hochbaumarkt. Dissertation, Kassel, Universität Kassel. ISBN: 9783862194902.

Thomsen, C.; Darrington, J.; Dunne, D.; Lichtig, W. (2009): Managing Integrated Project Delivery. Construction Management Association of America.

Walker, D. H. T.; Rowlinson, S. (Hrsg) (2020): Routledge handbook of integrated project delivery. 1. Aufl. Routledge handbooks. London, Routledge. ISBN: 9781138736689.

M 5.11 Module: Research Seminar Construction Management (tmbM211) [M-BGU-103917]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile Site Management and Production Methods - Specialization
Profile Project Management and Lean Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each term	2 terms	German	4	1

Mandatory			
T-BGU-108008	Research Seminar Construction Management	6 CR	Haghsheno

Competence Certificate
- 'Teilleistung' T-BGU-108008 with examination of other type according to § 4 Par. 2 No. 3

details about the learning control see at the 'Teilleistung'

Prerequisites
none

Competence Goal
The students can name the principles of the theory of science and different research methods and can apply them self-reliantly to scientific problems in the context of construction management. They are able to prepare self-reliantly scientific papers.

Content

- theory of science
- research methods in context of research questions in construction management
- basics for scientific working
- structure, form and style of scientific papers
- application at example of specific and current research questions in the field of construction management
- intermediate and final presentations of current research with discussion
- semester accomanying seminar paper

Module grade calculation
grade of the module is grade of the exam

Annotation
The module can be started with in the summer and in the winter semester as well. The courses of the module do not depend on each other and can be taken in arbitrary order.

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- Research Seminar Construction Management I: 30 h
- Research Seminar Construction Management II: 30 h

independent study:

- preparation and follow-up Research Seminar Construction Management I: 30 h
- preparation and follow-up Research Seminar Construction Management II: 30 h
- project work, preparation of report and colloquium (exam): 60 h

total: 180 h

Recommendation
none

M 5.12 Module: Real Estate Management (tmbM301) [M-BGU-100346]

Responsible: Prof. Dr.-Ing. Kunibert Lennerts
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile Real Estate and Facility Management - Basics
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each winter term	1 term	German	4	1

Mandatory			
T-BGU-100629	Real Estate Management	6 CR	Lennerts

Competence Certificate
- 'Teilleistung' T-BGU-100629 with written examination according to § 4 Par. 2 No. 1

details about the learning control see at the 'Teilleistung'

Prerequisites
none

Competence Goal
Students can distinguish between the prevailing real estate investment alternatives and apply the common controlling instruments in real estate management. They can evaluate real estate by means of different valuation methods and to prepare expert opinions. Furthermore, they can explain the basic features and specifics of real estate management in the public sector and the management of corporate real estate. Furthermore, they have knowledge of the decision-making bases and the implementation of public-private partnership projects and can clarify the benefits and limits of this procurement alternative. Furthermore, the students gain insight into the project development of real estate based on theoretical principles and case studies from practice and are put in a position to solve problems in project development.

Content

- controlling in real estate management
- valuation of real estate with the preparation of expert opinions
- special features in the management of corporate real estate
- special features in the real estate management of the public sector
- contract models and financing structures in PPP projects
- theoretical transfer and case studies from practice in the field of project development of real estate

Module grade calculation
grade of the module is grade of the exam

Annotation
none

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- Real Estate Management Controlling lecture: 15 h
- Property Valuation Basics lecture: 15 h
- Corporate and Public Real Estate Management lecture: 15 h
- Project Development with Case Study lecture: 15 h

independent study:

- preparation and follow-up lectures Real Estate Management Controlling: 15 h
- preparation and follow-up lectures Property Valuation Basics: 15 h
- preparation and follow-up lectures Corporate and Public Real Estate Management: 15 h
- preparation and follow-up lectures Project Development with Case Study: 15 h
- examination preparation: 60 h

total: 180 h

Recommendation
none

M 5.13 Module: Facility Management (tmbM302) [M-BGU-105922]

Responsible: Prof. Dr.-Ing. Kunibert Lennerts
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile Real Estate and Facility Management - Basics
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each winter term	1 term	German	4	1

Mandatory			
T-BGU-111908	Facility Management	6 CR	Lennerts

Competence Certificate
- 'Teilleistung' T-BGU-111908 with written examination according to § 4 Par. 2 No. 1

details about the learning control see at the 'Teilleistung'

Prerequisites
none

Competence Goal
The students can name the term as well as the goals and tasks of FM and explain and differentiate the structures and work areas of commercial, infrastructural, and technical FM.

The students can classify and communicate risks for owners and operators of facilities and assign the operator responsibility to different actors. They can recognise, assess, and communicate potential legal consequences.

Furthermore, the students can name the basics of the concepts in maintenance management in general as well as in the areas of construction and maintenance.

The students can also apply the central standards, guidelines and laws of space management, measure and evaluate space utilisation costs and assess potentials for space optimisation in companies.

Content

- introduction to commercial, infrastructural, and technical FM
- maintenance management
- space management
- resources management
- operator responsibility
- interdisciplinary tasks in FM

Module grade calculation
grade of the module is grade of the exam

Annotation
none

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- lecture/exercise: 60 h

independent study:

- preparation and follow-up lecture/exercises: 60 h
- examination preparation: 60 h

total: 180 h

Recommendation
none

M 5.14 Module: Sustainability in Real Estate Management (tmbM303) [M-BGU-100112]

Responsible: Prof. Dr.-Ing. Kunibert Lennerts
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile Real Estate and Facility Management - Basics
Profile People and Environment in Construction - Basics
Profile Project Management and Lean Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each summer term	1 term	German	4	1

Mandatory			
T-BGU-100149	Sustainability in Real Estate Management	6 CR	Lennerts

Competence Certificate
- 'Teilleistung' T-BGU-100149 with written examination according to § 4 Par. 2 No. 1

details about the learning control see at the 'Teilleistung'

Prerequisites
none

Competence Goal
The students can present the essential interrelationships within sustainable construction and operation and understand the importance of multi-criteria analyses. The students analyse current scientific publications in this field independently with the aim of arguing thematically and scientifically in society. They can explain the focus of international real estate sustainability certification systems, describe differences in their assessment methodology and highlight their advantages and disadvantages.

Furthermore, the students can apply selected assessment criteria of the systems presented. The students understand questions of economic and ecological assessment along the life cycle of buildings and can independently carry out life cycle analyses. They can interpret the results of life cycle analyses and to evaluate system limits and calculation parameters in published analyses.

Content

- definition and history of the term sustainability
- study of current peer-reviewed papers
- economic, ecological, and socio-cultural significance of the built environment
- costs and environmental impacts of real estate
- national and international sustainability assessment procedures for real estate
- calculation methods for life cycle costs
- life cycle assessment for buildings
- external costs in building construction and their integration in life cycle costing

Module grade calculation
grade of the module is grade of the exam

Annotation
none

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- Sustainability in Real Estate Management lecture/exercise: 45 h
- Life Cycle Management of Real Estate lecture: 15 h

independent study:

- preparation and follow-up lecture/exercises Sustainability in Real Estate Management: 45 h
- preparation and follow-up lectures Life Cycle Management of Real Estate: 15 h
- examination preparation: 60 h

total: 180 h

Recommendation
courses Facility und Real Estate Management I (6200414), Life Cycle Management (6200615)

M 5.15 Module: Real Estate and Facility Management - on Site Lectures (tmbM311) [M-BGU-105924]

Responsible: Prof. Dr.-Ing. Kunibert Lennerts
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile Real Estate and Facility Management - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each summer term	1 term	German	4	2

Mandatory			
T-BGU-111909	Real Estate and Facility Management - on Site Lectures	6 CR	Lennerts

Competence Certificate
- 'Teilleistung' T-BGU-111909 with examination of other type according to § 4 Par. 2 No. 3

details about the learning control see at the 'Teilleistung'

Prerequisites
The modules Real Estate Management [tmbM301] and Facility Management [tmbM302] must be passed.

Modeled Conditions
The following conditions have to be fulfilled:

1. The module M-BGU-100346 - Real Estate Management must have been passed.
2. The module M-BGU-105922 - Facility Management must have been passed.

Competence Goal
The students can work independently on questions from real estate-related practice (research or application-oriented) using scientific methods and structure a given problem and present the results orally. They can select and apply methods and instruments appropriate to the problem in a well-founded manner. The students can work out the 'state-of-the-art' of a problem and a procedure for the solutions of the practical cases, to critically question and, if necessary, to adapt as well as to discard the previously worked out solution results accordingly and to derive new ones.

Content

- systematic evaluation, practice and application of scientific methods in the context of real estate-related practice
- specifying research objectives and conducting literature research
- drafting and elaboration of a research design
- derivation of scientifically based decisions for real estate-related practice
- written summary of the project work with colloquium

Module grade calculation
grade of the module is grade of the exam

Annotation
none

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- lecture/exercise: 60 h

independent study:

- preparation and follow-up lecture/exercises: 40 h
- work on student project incl. report and presentation/colloquium: 80 h

total: 180 h

Recommendation
none

M 5.16 Module: Agile Project Management in Facility and Real Estate Management (tmbM313) [M-BGU-105920]

Responsible: Prof. Dr.-Ing. Kunibert Lennerts
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile Real Estate and Facility Management - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each summer term	1 term	English	4	1

Mandatory			
T-BGU-111906	Agile Project Management in Facility and Real Estate Management	6 CR	Lennerts

Competence Certificate
- 'Teilleistung' T-BGU-111906 with examination of other type according to § 4 Par. 2 No. 3

details about the learning control see at the 'Teilleistung'

Prerequisites
none

Competence Goal
The students get familiar with the basics of agile PM and can name and explain the different roles and their tasks in relevant project teams. In addition, the tasks of the different roles in project teams are taught from an agile perspective as well as agile principles and the Scrum method. They can describe, compare and differentiate between different agile PM methods. Through the semester-long project work, the students can apply learned team management principles and innovative techniques such as prototyping, design thinking, etc., to a practical application in the field of real estate and facility management. Thereby, the students recognize the most important roles and processes in the context of a small and less complex project and subsequently acquire broad knowledge of agile project management and the practical application for planning and controlling projects.

Content

- agile project management: terminology and principles
- scrum method: roles, artifacts & in-class method simulation
- team dynamics: development phases & conflict management
- overview on prototyping & visualization tools & techniques
- design thinking & innovation

Module grade calculation
grade of the module is grade of the exam

Annotation
none

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- lecture/exercise: 60 h

independent study:

- preparation and follow-up lecture/exercises: 40 h
- preparation of project Agile Project Management in Facility and Real Estate Management, incl. report and presentation (examination): 80 h

total: 180 h

Recommendation
none

M 5.17 Module: Facility Management in Hospitals (tmbM314) [M-BGU-106454]

Responsible: Prof. Dr.-Ing. Kunibert Lennerts
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile Real Estate and Facility Management - Specialization (Usage from 10/1/2023)
Subject-Specific Supplements (Usage from 10/1/2023)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each winter term	1 term	German	4	1

Mandatory			
T-BGU-108004	Facility Management in Hospitals	6 CR	Lennerts

Competence Certificate
- 'Teilleistung' T-BGU-108004 with examination of other type according to § 4 Par. 2 No. 3

details about the learning control see at the 'Teilleistung'

Prerequisites
The module must not be taken together with the module Facility Management in Hospitals and Hospital Management [tmbM312] not offered anymore.

Competence Goal
Students will be able to describe the basic features of the German health system with its Diagnosis Related Groups (DRG) system and understand the principle of hospital financing. They can explain the cost structures in a hospital and can understand these based on hospital accounting. Furthermore, the students can give an overview of broad areas of hospital management.

The students can distinguish between primary and secondary processes in a hospital. Students can carry out strategic planning for selected facility management processes (secondary processes). They understand the basic features of hospital planning with a focus on master planning, space and function programme and layout planning. Furthermore, the students independently carry out operating theatre simulations and understand the hygiene factor in this area.

Content

- introduction to the special property of hospitals,
- facility organizational structures and their working conditions,
- hospital new construction and renovation and their financing,
- facility cost structure based on a DRG (Diagnosis Related Group) system,
- facility management processes in hospitals,
- strategic planning and cost structure of selected facility management services,
- sustainable hospitals,
- master planning, space and functional program, and layout planning of hospitals,
- operating room simulation and hygiene in hospitals,
- process mining in healthcare,
- written summary of the project work with colloquium

Module grade calculation
grade of the module is grade of the exam

Annotation
none

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- lecture/exercise: 60 h

independent study:

- preparation and follow-up lecture/exercises: 45 h
- written summary of the project work Facility management in hospitals with colloquium: 75 h

total: 180 h

Recommendation
course Facility and Real Estate Management (6200414)

M 5.18 Module: Digital Engineering and Construction (tmbM401) [M-BGU-105830]

Responsible: Jun.-Prof. Dr. Reza Maalek
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile Digital Technologies in Construction - Basics
Profile Site Management and Production Methods - Specialization
Profile Project Management and Lean Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each winter term	1 term	English	4	1

Mandatory			
T-BGU-111695	Digital Engineering and Construction	6 CR	Maalek

Competence Certificate
- 'Teilleistung' T-BGU-111604 with examination of other type according to § 4 Par. 2 No. 3

details about the learning control see at the 'Teilleistung'

Prerequisites
none

Competence Goal
Students will be able to describe the main digital technologies for the engineering design process throughout the lifecycle of construction projects. They can explain the role of the practical applications of these technologies within the engineering design process of a real project. They are also able to apply some selected basic principles of these technologies in practical settings in the context of lab assignments.

Content
Recent advancements in digital and remote sensing technologies in construction engineering and management is paving the path to the conception of industry 4.0 in construction (construction 4.0). A full digitization and automation of the construction industry is projected to produce annual cost savings of around € 1.3 trillion globally compared to current practices according to the most reliable sources (e.g., World Economic forum). The full digitization and automation must start from the early design stages of the project and continue throughout the construction, facility management and operations, and dismantling phases. The advancements in digital technologies now enables large scale 3D visualization, 4D and 5D simulation, design enhancements and optimizations, which were amiss in traditional design practices. The growth in information technologies has enabled the addition of intelligence through information modeling concepts onto a single model, which can then be utilized for further engineering analysis (e.g., solar, wind, structural), design optimization, and clash detection, particularly in larger projects. With the introduction of virtual reality tools, project stakeholders can now virtually walk through the project (e.g., a building) before it is built, which can reduce the possibility of change orders due to misunderstanding of design requirements. To further enhance communication between the construction labourers and the digital design, augmented and mix reality has been showing potential. This can further mitigate the risk of incorrect construction, saving time and cost of rework due to miscommunication of expectations. Another possibility is robotics and additive manufacturing, which can further help mitigate the risk of information loss between the digital and real worlds. Finally, to ensure the built complies with the design in terms of design standards and requirements, field information, such as 3D point clouds using laser scanners or smartphones, and non-destructive testing (NDT) methods can be performed so as to determine the discrepancies early on and prevent costly rework when the degree of influence on the project becomes less. This course is designed to provide the learners with the tools necessary to understand the digital engineering and construction framework, and the cutting-edge technologies used to foster construction automation, along with the challenges, limitations and future progressions.

Module grade calculation
grade of the module is grade of the exam

Annotation
none

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- lecture/lab assignment: 60 h

independent study:

- preparation and follow-up lecture/lab assignments: 60 h
- examination preparation: 60 h

total: 180 h

Recommendation
modules Building Information Modeling (BIM) [tmbM402], Digital Planning and Building Information Modeling [bauiM1S42-tmbM614]

course Computer Aided Design (CAD) (6200520)

M 5.19 Module: Building Information Modeling (BIM) (tmbM402) [M-BGU-103916]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile Digital Technologies in Construction - Basics
Profile Site Management and Production Methods - Specialization
Profile Project Management and Lean Construction - Specialization
Profile Real Estate and Facility Management - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each summer term	1 term	German	4	1

Mandatory			
T-BGU-108007	Building Information Modeling (BIM)	6 CR	Haghsheno

Competence Certificate
- 'Teilleistung' T-BGU-108007 with examination of other type according to § 4 Par. 2 No. 3

details about the learning control see at the 'Teilleistung'

Prerequisites
none

Competence Goal
The students can describe the BIM method and the theoretical foundations of different perspectives of building digitalisation. Furthermore, they can apply CAD in practice in the construction industry and carry out modelling steps and link the modelled components with further information themselves. The students can present the different interests of the project participants within the framework of BIM and assess the perspectives of different project participants in a construction project. Thus, they are able to work in a team on planning and construction processes with different project participants.

Content
"Building Information Modelling (BIM) is a collaborative working methodology that uses digital models of a building to consistently capture and manage the information and data relevant to its life cycle and to exchange them in transparent communication between the parties involved or to transfer them for further processing" [2]. The module deals with the historical development of the method and provides the theoretical foundations necessary for understanding and applying BIM. Further application possibilities such as linking the building model with production planning and ERP systems or in the area of virtual building simulation are demonstrated. In addition, a project is modelled throughout several process phases in the context of group work, taking into account the goals of various participants. Since the creation of a three-dimensional building model is an essential prerequisite for the application of BIM, an introduction to CAD is provided as part of this module. In addition, CAD exercises are offered for practical application.

Module grade calculation
grade of the module is grade of the exam

Annotation
For participation, it is necessary to have access to a notebook with a Windows operating system (64bit). The required software will be provided as student versions during the course.

registration procedure:

The number of participants is limited to 50 persons. Registration details will be published in advance on the institute's homepage. If necessary, a selection will be made taking into account the student's progress primarily students in Civil Engineering and Technology and Management in Construction. Confirmation of participation will be issued by the end of the first week of lectures.

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- lecture/exercise: 60 h

independent study:

- preparation and follow-up lecture/exercises, tutorials: 60 h
- project work, preparation of report and presentation (exam): 60 h

total: 180 h

Recommendation
course Computer Aided Design (CAD) (6200520)

topic 'Cost Estimation' in the course Economics in Construction Operation (6200412) from the module Technology and Management in Construction [bauiBFP6-TMB]

course Site Planning and Handling (6241803) from the module Production Planning and Control in Construction [tmbM103]

Literature
[1] Borrmann, André; Köni, Markus; Koch, Christian; Beetz, Jakob; König, Markus (Hg.) (2015): Building information modeling // Building Information Modeling. Technologische Grundlagen und industrielle Praxis. Wiesbaden: Springer Vieweg (VDI-Buch).
[2] Bundesministerium für Verkehr und digitale Infrastruktur (Hg.) (2015): Stufenplan Digitales Planen und Bauen. Einführung moderner, IT-gestützter Prozesse und Technologien bei Planung, Bau und Betrieb von Bauwerken.
[3] Hausknecht, Kerstin; Liebich, Thomas (2016): BIM-Kompendium. Building Information Modeling als neue Planungsmethode. Stuttgart: Fraunhofer IRB Verlag.

M 5.20 Module: Digital Technologies in Field Information Modeling (tmbM403) [M-BGU-105638]

Responsible: Jun.-Prof. Dr. Reza Maalek
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile Digital Technologies in Construction - Basics
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each summer term	1 term	English	4	1

Mandatory			
T-BGU-111276	Digital Technologies in Field Information Modeling	6 CR	Maalek

Competence Certificate
- 'Teilleistung' T-BGU-111276 with examination of other type according to § 4 Par. 2 No. 3

details about the learning control see at the 'Teilleistung'

Prerequisites
none

Competence Goal
This course discusses the practical methods to digitally document, model, store, and share required spatial and temporal information throughout the construction project's lifecycle. Students will get familiarized with the different state-of-the-art remote sensing technologies applicable to automating the collection of field construction information. The students will be able to use technologies, such as laser scanners, to automate construction engineering and management processes, including, progress monitoring, quality control, structural integrity assessment, and safety management. Students will be provided with the practical strategies and tools necessary to analyze the acquired field information to promote the seamless transfer of information between the real and digital worlds. These technologies and methodologies will allow the students to apply the domain of field information modeling (FIM) in practical settings.

Content
Construction project information modeling frameworks, such as building information modeling (BIM), heritage building information modeling (H-BIM), or bridge information modeling (BrIM), involve modeling and integrating intelligent and semantic information within multi-dimensional (n-D) computer-aided design (CAD) models. During the design stages, the 3-dimensional (3D) digital model of a construction project can be created, whereby each element is classified based on attributes such as functional type (e.g. structural wall), elemental relationships (e.g. structural wall and floor slab connectivity and interaction), and geometric properties (e.g. shape and size). Further modeling can be carried out so as to integrate project planning and control information, such as work sequences and duration (e.g. 4D BIM), as well as cost (e.g. 5D BIM), enabling the project management team to directly evaluate the impact of design changes on the project's schedule and cost. During construction, the designed n-D model serves as a detailed baseline to aid field construction work. Relevant field data must then be collected and compared to the designed model to ensure compliance. Particularly within the lean project delivery, recording fast, frequent, and reliable field data is desired to foster continual improvement. In the context of schedule and cost control for instance, daily measurement of percent planned complete, recommended as a part of the Last Planner® system, combined with frequent earned value analysis, require up-to-date knowledge of the progress of activities. Hence, Field Information Modeling (FIM) is essential to model and transform collected field data into intelligent, tangible and semantic digital models as a means of promoting the seamless flow of information between the field and the digital worlds. This course is designed to provide the learners with the tools necessary to understand the concept of FIM, the cutting-edge technologies that can be used to foster the FIM process, and methods to fully automate the FIM process along with the challenges, limitations and future progressions.

Module grade calculation
grade of the module is grade of the exam

Annotation
none

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- lecture/exercise: 60 h

independent study:

- preparation and follow-up lecture/exercises, tutorials: 60 h
- project work, preparation of report and presentation (examination): 60 h

total: 180 h

Recommendation
module Digital Engineering and Construction [tmbM401]

M 5.21 Module: Digitalization in Facility and Real Estate Management (tmbM404) [M-BGU-104348]

Responsible: Prof. Dr.-Ing. Kunibert Lennerts
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile Digital Technologies in Construction - Basics
Profile Real Estate and Facility Management - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each winter term	1 term	German	4	1

Mandatory			
T-BGU-108941	Digitalization in Facility and Real Estate Management	6 CR	Lennerts

Competence Certificate
- 'Teilleistung' T-BGU-108941 with examination of other type according to § 4 Par. 2 No. 3

details about the learning control see at the 'Teilleistung'

Prerequisites
none

Competence Goal
Students will acquire basic knowledge of sensor networks, building automation and the application of the 'Internet of Things' (IoT) in facility and real estate management. They will be able to take a critical look of the technologies of digitization (including network structures, cloud storage, sensor distribution, information privacy, augmented reality) and evaluate them according to the requirements of facility and real estate management. In addition, students will be able to implement simple sensor networks and the basics of 'augmented reality' by using a HoloLens.

Content

- Basic information of concepts of digitalization
- Execute Internet of Things in building automation
- Integration of sensor signals in FM processes
- Visualize of maintenance and inspection work through 'augmented reality' (HoloLens)
- Producing project work during the semester colloquium

Module grade calculation
grade of the module is grade of the exam

Annotation
none

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- Digitalization in Facility and Real Estate Management lecture/exercise: 60 h

independent study:

- preparation and follow-up lecture/exercises Digitalization in Facility and Real Estate Management: 40 h
- preparation of project Digitalization in Facility and Real Estate Management, incl. report and presentation (examination): 80 h

total: 180 h

Recommendation
none

M 5.22 Module: Environmentally-friendly Recycling and Disassembly of Buildings (tmbM501) [M-BGU-100110]

Responsible: Prof. Dr.-Ing. Sascha Gentes
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile Site Management and Production Methods - Basics
Profile People and Environment in Construction - Basics
Profile Real Estate and Facility Management - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each summer term	1 term	German	4	1

Mandatory			
T-BGU-100146	Environmentally-Friendly Recycling and Disassembly of Buildings	6 CR	Gentes

Competence Certificate
- 'Teilleistung' T-BGU-100146 with oral examination according to § 4 Par. 2 No. 2

details about the learning control see at the 'Teilleistung'

Prerequisites
none

Competence Goal
The students can independently plan demolition, dismantling and disposal work for structural and technical systems, apply for them and implement them on site. They recognize the need and the sense of qualified demolition and the associated recycling related to the entire construction operation. They can explain various methods and procedures for implementation and realization. The students can assess demolition objects and demolition waste according to the current legal situation, implement safety requirements for demolition work and write risk assessments. They are able to evaluate recycling and disposal options and thus independently plan the necessary resources for demolition work (personnel, machines, processes) and create corresponding calculations.

Content
Information about the state of research and technology with respect to machined disassembly, transport, conditioning, dumping, and disposal of demolition waste, as well as the latest developments in machine technology is imparted. The entire approval process from the demolition license application to machine deployment plans will be discussed in addition to technical aspects. This also involves occupational safety, immission control, as well as handling pollutants in buildings to be demolished. Specific tasks, e.g. the partial demolition of existing buildings, will be explained and calculated using existing examples. VDI (The Association of German Engineers) guidelines pertaining to demolition projects will be introduced and an excursion to a recycling facility will provide the opportunity to discuss landfill directives.

Module grade calculation
grade of the module is grade of the exam

Annotation
none

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- Project Studies lecture, exercise: 30 h
- Disassembly Process Engineering lecture, exercise: 30 h

independent study:

- preparation and follow-up lectures, exercises Project Studies: 30 h
- preparation and follow-up lectures, exercises Disassembly Process Engineering: 30 h
- examination preparation: 60 h

total: 180 h

Recommendation
none

Literature

1) Seemann, Axel: Entwicklung integrierter Rückbau- und Recyclingkonzepte für Gebäude - ein Ansatz zur Kopplung von Demontage, Sortierung und Aufbereitung, Shaker, Aachen, 2003.
2) RAL, Deutsches Institut für Gütesicherung und Kennzeichnung e.V.: Ausbau und Entsorgung von Gefahrstoffen in Bauwerken - Gütesicherung, Beuth, Ausg. Juni 2004, Berlin, 2004.
3) Schröder, Marcel [Red.]: Abbrucharbeiten - Grundlagen, Vorbereitung, Durchführung, Müller, 3., aktualisierte und erw. Aufl., Köln, 2015.
4) VDI 6202 "Schadstoffsanierung"
5) VDI 6210 "Abbruch"

M 5.23 Module: Leadership and Communication (tmbM502) [M-BGU-105917]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile Project Management and Lean Construction - Basics
Profile People and Environment in Construction - Basics
Profile Site Management and Production Methods - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each summer term	1 term	German	4	2

Mandatory			
T-BGU-111900	Leadership and Communication	6 CR	Haghsheno

Competence Certificate
- 'Teilleistung' T-BGU-111900 with written examination according to § 4 Par. 2 No. 1

details about the learning control see at the 'Teilleistung'

Prerequisites
none

Competence Goal
Students are taught how to explain the basics of leadership. They are able to classify leadership in the business management functions. They will also be able to list, describe and differentiate between various organizational and legal forms of companies. In the area of strategic planning, they can recognize types of strategy in construction companies and analyze their implementation. In the context of labor law, students will be able to define the concept of employee and distinguish it from self-employment. They are aware of the essential elements of a legally compliant admonition, warning and termination and are able to draft these writings.

The students are furthermore able to describe different communication models and to apply different communication techniques. They can explain the important basics from the topic area of public participation and know the associated concepts and methods. Furthermore, they are able to describe the components of conflict management systems and know about the role of communication in the context of conflict prevention as well as conflict resolution and are sensitized to the stages of conflict escalation. They also know methods of conflict resolution and can explain the concept of mediation in particular.

Content
In the area of management, generic strategies for construction companies and their implementation in the context of organizational structures and legal forms are taught. The procedures and processes for developing a corporate strategy and its implementation are explained. Furthermore, leadership principles as well as tasks and tools in the context of leadership are taught. The fundamentals and methods of personnel management, including determining personnel requirements, development, recruitment and motivation, are dealt with and illustrated by means of an example. In addition, the basics of labor law are taught with a focus on personnel management and personnel responsibility.

In the area of communication, communication models and communication techniques are presented and their application is tested with the help of a group exercise. As an example of communication in the context of construction projects, the topic of public participation is dealt with. In addition to the theoretical basics, a practical example will be presented. Furthermore, the topic of communication in conflict situations will be discussed with the aspects of conflict prevention, escalation and resolution. Furthermore, methods of conflict resolution are presented with a focus on the concept of mediation.

Module grade calculation
grade of the module is grade of the exam

Annotation
none

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- lecture/exercise: 60 h

independent study:

- preparation and follow-up lecture/exercises: 60 h
- examination preparation: 60 h

total: 180 h

Recommendation
keine

M 5.24 Module: Upgrading of Existing Buildings and Energetic Refurbishment (tmbM503) [M-BGU-100108]

Responsible: Prof. Dr.-Ing. Kunibert Lennerts
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile Real Estate and Facility Management - Basics
Profile People and Environment in Construction - Basics
Profile Site Management and Production Methods - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each winter term	1 term	German	4	3

Mandatory			
T-BGU-100621	Term Paper Upgrading of Existing Buildings and Energetic Refurbishment	1,5 CR	Lennerts
T-BGU-108001	Upgrading of Existing Buildings and Energetic Refurbishment	4,5 CR	Lennerts

Competence Certificate
- 'Teilleistung' T-BGU-100621 with examination of pther type according to § 4 Par. 2 No. 3
- 'Teilleistung' T-BGU-108001 with written examination according to § 4 Par. 2 No. 1

details about the learning controls see at the respective 'Teilleistung'

Prerequisites
none

Competence Goal
Students understand the economic, ecological and cultural significance of the building stock and to describe the specific tasks for a civil engineer in this field of activity. You can explain the advantages and disadvantages of different maintenance strategies and maintenance budgets can be calculated for real estate stocks. You know the basics of a technical due diligence and the basics of building information modeling. In addition, students may constitute the legal framework for energy rehabilitation measures and can use the methods of the energy performance of buildings apply.

Content

- durability and wear of components
- determination of component lifetimes
- budgeting of maintenance costs
- condition assessment & action planning
- monument and Historic Monuments
- building Information Modeling (BIM)
- policy development and historical development of the energy savings
- forms of energy and calculation of energy use
- energy efficiency of buildings by Energy Saving Ordinance
- renewables

Module grade calculation
grade of the module is CP weighted average of grades of the partial exams

Annotation
none

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- Upgrading of Existing Buildings lecture, exercise: 45 h
- Energetic Refurbishment lecture: 15 h

independent study:

- preparation and follow-up lectures/exercises Upgrading of Existing Buildings: 30 h
- preparation and follow-up lectures Energetic Refurbishment: 15 h
- preparation of term paper (partial examination): 25 h
- examination preparation (partial examination): 50 h

total: 180 h

Recommendation
none

M 5.25 Module: Building Preservation of Concrete and Masonry Constructions (tmbM611) [M-BGU-100058]

Responsible: Dr.-Ing. Michael Vogel
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile Site Management and Production Methods - Specialization
Profile Real Estate and Facility Management - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each summer term	1 term	German	4	3

Mandatory			
T-BGU-100175	Student Research Project 'Building Preservation of Concrete and Masonry Constructions'	1 CR	Vogel
T-BGU-100038	Building Preservation of Concrete and Masonry Constructions	5 CR	Vogel

Competence Certificate
- 'Teilleistung' T-BGU-100175 with not graded accomplishment according to § 4 Par. 3
- 'Teilleistung' T-BGU-100038 with oral examination according to § 4 Par. 2 No. 2

details about the learning controls see at the respective 'Teilleistung'

Prerequisites
none

Competence Goal
After successful completion of the module the students have detailed knowledge about the relevant causes and processes of degradation in concrete and masonry constructions. Thus they are able to take appropriate measures to enhance the durability of solid buildings and to plan and execute effective measures to repair damaged concrete and masonry constructions. Moreover the students have also the knowledge about the main aspects and basic techniques of building reinforcement.

Content
This course provides fundamental knowledge of the possibilities to preserve concrete and masonry constructions. Besides an introduction into the characteristics of masonry, plaster, concrete and reinforced concrete structures, various damage patterns and their origins are discussed. Based on the knowledge of the essential damage processes, efficient measures for the increase of the durability are described, which include material and constructional precautions as well as additional preventive measures. Furthermore the course focuses on the repair of already damaged concrete and masonry constructions. In this connection different research methods for the analysis of damages are presented and various possibilities are shown to predict the time-development of these damages. Finally repair materials as well as procedures are described which are necessary for the realization of a durable repair measure. A further main part of the course covers the different possibilities of an additional reinforcement of concrete and masonry constructions. Applicable materials and their characteristics in design and construction are introduced and discussed. In the accompanying exercises the subject matter shall independently be developed and the practical realization will be practised by means of several design problems.

Module grade calculation
grade of the module is grade of the exam

Annotation
none

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- Protection, Rehabilitation and Reinforcement of Concrete and Masonry Constructions lecture, exercise: 45 h
- Building Analysis lecture: 15 h

independent study:

- preparation and follow-up lectures, exercises Protection, Rehabilitation and Reinforcement of Concrete and Masonry Constructions: 25 h
- preparation and follow-up lectures Building Analysis: 15 h
- preparation of student research project "Building Preservation of Concrete and Masonry Constructions": 40 h
- examination preparation: 40 h

total: 180 h

Recommendation
none

Literature
Hand-outs and (selection):
[1] Blaich, J.: Bauschäden - Analyse und Vermeidung; EMPA; Stuttgart, 1999
[2] Pfefferkorn, W.: Rißschäden an Mauerwerk, Ursachen erkennen - Rißschäden vermeiden; Stuttgart, IRB Verlag, 1994
[3] Reichert, H.: Konstruktiver Mauerwerksbau, Bildkommentar zur DIN 1053-1, Rudolf Müller Verlag, Köln, 1999
[4] Ruffert, G.: Ausbessern und Verstärken von Betonbauteilen; 2. Aufl.; Beton Verlag, 1982
[5] SIVV - Handbuch: Schützen, Instandsetzen, Verbinden und Verstärken von Betonbauteilen; Verarbeiten von Kunststoffen im Betonbau beim Deutschen Beton- und Bautechnik-Verein E.V.; IRB Verlag, Stuttgart, 2008
[6] Stark, J.; Wicht, B.: Dauerhaftigkeit von Beton - Der Baustoff als Werkstoff, Hrsg.: Bauhaus-Univ. Weimar, F.A. Finger-Institut für Baustoffkunde -FIB-; 2001
[7] Tausky, R.: Betontragwerke mit Außenbewehrung; Birkhäuser Verlag, Basel, 1993

M 5.26 Module: Building Physics I (tmbM612) [M-BGU-103950]

Responsible: Prof. Dr.-Ing. Frank Dehn
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile Real Estate and Facility Management - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each winter term	1 term	German	4	1

Mandatory			
T-BGU-100039	Applied Building Physics	3 CR	Altmann
T-BGU-100040	Building Technology	3 CR	Wirth

Competence Certificate
- 'Teilleistung' T-BGU-100039 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-100040 with oral examination according to § 4 Par. 2 No. 2

details about the learning controls see at the respective 'Teilleistung'

Prerequisites
none

Competence Goal
see German version

Content
see German version

Module grade calculation
grade of the module is CP weighted average of grades of the partial exams

Annotation
none

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- Applied Building Physics lecture: 30 h
- Building Technology lecture: 30 h

independent study:

- preparation and follow-up lectures Applied Building Physics: 30 h
- examination preparation Applied Building Physics (partial exam): 30 h
- preparation and follow-up lectures Building Technology: 30 h
- examination preparation Building Technology (partial exam): 30 h

total: 180 h

Recommendation
none

M 5.27 Module: Building Physics II (tmbM613) [M-BGU-100060]

Responsible: Prof. Dr.-Ing. Frank Dehn
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile Site Management and Production Methods - Specialization
Profile Real Estate and Facility Management - Specialization
Profile People and Environment in Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each summer term	1 term	German	4	4

Mandatory			
T-BGU-108024	Practical Noise Control	3 CR	Zander
T-BGU-100042	Practical Fire Protection	3 CR	Egelhaaf

Competence Certificate
- 'Teilleistung' T-BGU-108024 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-100042 with oral examination according to § 4 Par. 2 No. 2

details about the learning controls see at the respective 'Teilleistung'

Prerequisites
none

Competence Goal
see German version

Content
see German version

Module grade calculation
grade of the module is CP weighted average of grades of the partial exams

Annotation
none

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- Practical Noise Control lecture: 30 h
- Practical Fire Protection lecture: 30 h

independent study:

- preparation and follow-up lectures Practical Noise Control: 30 h
- examination preparation Practical Noise Control (partial exam): 30 h
- preparation and follow-up lectures Practical Fire Protection: 30 h
- examination preparation Practical Fire Protection (partial exam): 30 h

total: 180 h

Recommendation
none

M 5.28 Module: Digital Planning and Building Information Modeling (tmbM614) [M-BGU-105135]

Responsible: Dr.-Ing. Tim Zinke
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile Digital Technologies in Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each winter term	1 term	German	4	1

Mandatory			
T-BGU-110382	Digital Planning and Building Information Modeling	6 CR	Zinke

Competence Certificate
- 'Teilleistung' T-BGU-110382 with examination of other type according to § 4 Par. 2 No. 3

details about the learning control see at the 'Teilleistung'

Prerequisites
none

Competence Goal
see German version

Content
see German version

Module grade calculation
grade of the module is grade of the exam

Annotation
further information see German version

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- lecture, exercise: 60 h

independent study:

- preparation and follow-up lectures/exercises, tutorials: 40 h
- project work, modeling, preparation of BIM flat pattern plan and report with presentation: 80 h

total: 180 h

Recommendation
course Computer Aided Design (CAD) (6200520)

course Steel and Composite Structures (6212801 und 6212802)

Literature
[1] Borrmann, A.; König, M.; Koch, C.; Beetz, J. (Hrsg.) (2015): Building Information Modeling – Technologische Grundlagen und industrielle Praxis. Wiesbaden: Springer Vieweg (VDI-Buch).
[2] Baldwin, M. (2018): Der BIM-Manager – Praktische Anleitung für das BIM-Projektmanagement. Berlin, Wien, Zürich: Beuth.
[3] Hausknecht, Kerstin; Liebich, Thomas (2017): BIM-Kompendium: Building Information Modeling als neue Planungsmethode. Stuttgart: Fraunhofer IRB.

M 5.29 Module: Models and Methods in Traffic Engineering and Transportation Planning (tmbM615) [M-BGU-100008]

Responsible: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile Digital Technologies in Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each winter term	1 term	German	4	1

Mandatory			
T-BGU-100012	Models and Methods in Traffic Engineering and Transportation Planning	6 CR	Vortisch

Competence Certificate
- 'Teilleistung' T-BGU-100012 with oral examination according to § 4 Par. 2 No. 2

details about the learning control see at the 'Teilleistung'

Prerequisites
none

Competence Goal
see German version

Content
Methods and models in transport planning as well as the relevant tools and methods for the traffic engineer. Transport Planning:

- four-Step-Algorithm
- aggregate versus individual models
- choice modeling

Traffic Engineering:

- measuring traffic flow data
- description of traffic conditions / fundamental diagram
- capacity of roads and intersections with and without traffic signals

Module grade calculation
grade of the module is grade of the exam

Annotation
none

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- Methods and Models in Transportation Planning lectures/exercises: 30 h
- Traffic Engineering lectures/exercises: 30 h

independent study:

- preparation and follow-up Methods and Models in Transportation Planning lectures/exercises: 30 h
- preparation and follow-up Traffic Engineering lectures/exercises: 30 h
- examination preparation: 60 h

total: 180 h

Recommendation
none

Literature
lecture notes with additional references / exercises

M 5.30 Module: Traffic Management and Simulation Methods (tmbM616) [M-BGU-100015]

Responsible: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile Digital Technologies in Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each summer term	1 term	German	4	2

Mandatory			
T-BGU-113971	Exercise Transportation Data Analysis	0 CR	Vortisch
T-BGU-100008	Traffic Management und Simulation Methods	6 CR	Vortisch

Competence Certificate
- 'Teilleistung' T-BGU-113971 with with not graded accomplishment according to § 4 Par. 3 as examination prerequisite
- 'Teilleistung' T-BGU-100008 with oral examination according to § 4 Par. 2 No. 2

details about the learning controls see at the respective 'Teilleistung'

Prerequisites
none

Competence Goal
Acquisition of the specific and advanced knowledge and the relevant methodologies in the field of traffic engineering. Basic considerations in the development and the application of simulation models in transport planning and traffic engineering.

Content
In excess of the basic module "Model approaches and methods in transportation" more advanced methods of traffic engineering will be dealt with (advanced signalisation, control of routes and networks). Furthermore methods for the development of simulation models as well as their application will be in the focus (application of professional software tools for transport planning and traffic engineering). Another issue are transport telematics and intelligent transportation system.

Module grade calculation
grade of the module is grade of the exam

Annotation
As from summer term 2025 the Exercise Transportation Data Analysis will be implmented as examination prerequisite.

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- Traffic Management and Transport Telematics lectures/exercises: 30 h
- Traffic Flow Simulation lectures/exercises: 30 h

independent study:

- preparation and follow-up Traffic Management and Transport Telematics lectures/exercises: 30 h
- preparation and follow-up Traffic Flow Simulation lectures/exercises: 30 h
- preparation of the Exercises Transportation Data Analysis (not graded examination prerequisite): 10 h
- examination preparation: 50 h

total: 180 h

Recommendation
none

Literature
lecture notes

guidelines ('Handbuch zur Bemessung von Straßen', 'Richtlinien für Lichtsignalanlagen'),

software documentations

M 5.31 Module: 2D/3D Image Analysis and Image Based Tracking Methods (tmbM617) [M-BGU-100674]

Responsible: Prof. Dr.-Ing. Stefan Hinz
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile Digital Technologies in Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each winter term	1 term	German	4	2

Mandatory			
T-BGU-101166	Basics in Computer Vision (2D/3D)	3 CR	Ulrich
T-BGU-101167	Image Sequence Analysis	3 CR	Hinz

Competence Certificate
- 'Teilleistung' T-BGU-101166 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-101167 with oral examination according to § 4 Par. 2 No. 2

details about the learning controls see at the respective 'Teilleistung'

Prerequisites
none

Module grade calculation
grade of module is defined by weighted average according credit points of grades of the partial examinations

Annotation
none

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- 2D Computer Vision lectures: 15 h
- 3D Computer Vision lectures: 30 h
- Image Sequence Analysis lectures: 30 h

independent study:

- preparation and follow-up 2D Computer Vision lectures: 15 h
- preparation and follow-up 3D Computer Vision lectures: 15 h
- examination preparation Basics in Computer Vision: 15 h
- preparation and follow-up Image Sequence Analysis lectures: 30 h
- examination preparation Image Sequence Analysis: 30 h

total: 180 h

Recommendation
none

M 5.32 Module: Introduction to GIS for Students of Natural, Engineering and Geo Sciences (tmbM618) [M-BGU-101846]

Responsible: Dr.-Ing. Sven Wursthorn
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
KIT Department of Mathematics
Part of: Profile Digital Technologies in Construction - Specialization
Profile People and Environment in Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each winter term	1 term	German	4	4

Mandatory			
T-BGU-103541	Introduction to GIS for Students of Natural, Engineering and Geo Sciences, Prerequisite *This item will not influence the grade calculation of this parent.*	3 CR	Wursthorn
T-BGU-101681	Introduction to GIS for Students of Natural, Engineering and Geo Sciences	3 CR	Wursthorn

Competence Certificate
- 'Teilleistung' T-BGU-103541 with not graded accomplishment according to § 4 Par. 3 as examination prerequisite
- 'Teilleistung' T-BGU-101681 with written examination according to § 4 Par. 2 No. 1

details about the learning controls see at the respective 'Teilleistung'

Prerequisites
none

Module grade calculation
grade of the module is grade of the exam

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- lecture, exercise: 60 h

independent study:

- preparation and follow-up lectures, exercises: 60 h
- preparation online test (examination prerequisite): 15 h
- examination preparation: 45 h

total: 180 h

Recommendation
none

M 5.33 Module: Environmental Law (tmbM619) [M-BGU-106042]

Responsible: Dr. Urich Smeddinck
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile People and Environment in Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
3	Grade to a tenth	Each winter term	1 term	German	4	1

Mandatory			
T-BGU-111102	Environmental Law	3 CR	Smeddinck

Competence Certificate
- 'Teilleistung' T-BGU-111102 with written examination according to § 4 Par. 2 No. 1

details about the learning control see at the 'Teilleistung'

Prerequisites
none

Module grade calculation
grade of the module is grade of the exam

Annotation
None

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- lecture: 30 h

independent study:

- preparation and follow-up lectures: 45 h
- examination preparation: 15 h

total: 90 h

Recommendation
none

M 5.34 Module: Environmental Communication (tmbM620) [M-BGU-101108]

Responsible: Dr. rer. nat. Charlotte Kämpf
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile People and Environment in Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each term	1 term	German	4	1

Mandatory			
T-BGU-106620	Examination Prerequisite Environmental Communication	0 CR	Kämpf
T-BGU-101676	Environmental Communication	6 CR	Kämpf

Competence Certificate
- 'Teilleistung' T-BGU-106620 with not graded accomplishment according to § 4 Par. 3 as examination prerequisite
- 'Teilleistung' T-BGU-101676 with examination of other type according to § 4 Par. 2 No. 3

details about the learning controls see at the respective 'Teilleistung'

Prerequisites
none

Competence Goal
(see German version)

Content
(see German version)

Module grade calculation
grade of the module is grade of the exam

Annotation
none

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- seminar (lecture): 20 h

independent study:

- preparation and follow-up seminar: 40 h
- preparation of literature annotations and short presentation (exam prerequisite): 45 Std.
- preparation of presentation, manuscript and poster (exam): 75 Std.

total: 180 h

Recommendation
none

Literature
(see German version)

M 5.35 Module: Urban Renewal (tmbM621) [M-BGU-100013]

Responsible: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile People and Environment in Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each summer term	1 term	German	4	3

Mandatory			
T-BGU-108441	History of Urban Planning	3 CR	Ross
T-BGU-113672	Examination Prerequisite Urban Management	1 CR	Karmann-Woessner
T-BGU-108442	Urban Management	2 CR	Karmann-Woessner

Competence Certificate
- 'Teilleistung' T-BGU-108441 with oral written according to § 4 Par. 2 No. 1
- 'Teilleistung' T-BGU-113672 with not graded accomplishment according to § 4 Par. 3 as examination prerequisite to 'Teilleistung' T-BGU-108442
- 'Teilleistung' T-BGU-108442 with oral examination according to § 4 Par. 2 No. 2

details about the learning controls see at the respective 'Teilleistung'

Prerequisites
none

Competence Goal
The aim is to convey the principles and methods of urban renewal. In the module adaptation strategies are taught, by which cities and city regions react to changing conditions. These changes -such as climate change, demographics or changing economic practices- are encountered by urban concepts city-wide, on the level of city quarters or on the building level. In addition to the urban redevelopment in Germany selected references from Europe are examined.

Content
Based on the core module 'Urban and Regional Planning' the lectures are focused on adaptation strategies of cities and urban regions. In addition to a classification in the current discussions on urban redevelopment basic methods and tools are taught. The students of the module Urban Renewal shall be able to elaborate strategies of urban renewal and redevelopment. The basic methodological framework is the discussion of projects as examples for good practice in the course 'Urban Management'. The module will be supplemented by the course 'History of Urban Planning and the Built Environment' to consider the historical development and cultural heritage.

Module grade calculation
grade of the module average of grades of the partial exams

Annotation
Please note:

The course Urban Management (6231801), 2 HpW/SWS, will exceptionally not be offered in the summer semester 2024 but in the winter semester 2024/25.

As from winter semester 2024/25 there is an examination prerequiste to the examination Urban Management.

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- Urban Management lectures/exercises: 30 h
- Urban Planning I: History of Urban Planning and the Built Environment lectures: 30 h

independent study:

- preparation and follow-up Urban Management lectures/exercises: 10 h
- preparation of a presentation or seminar paper (examination prerequisite): 30 h
- examination preparation Urban Management (partial examination): 20 h
- preparation and follow-up Urban Planning I: History of Urban Planning and the Built Environment lectures: 30 h
- examination preparation History of Urban Planning (partial examination): 30 h

total: 180 h

Recommendation
none

Literature
list of literature to module

M 5.36 Module: Environmental Geotechnics (tmbM622) [M-BGU-100079]

Responsible: Dr.-Ing. Andreas Bieberstein
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Profile People and Environment in Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each winter term	1 term	German	4	1

Mandatory			
T-BGU-100084	Landfills	3 CR	Bieberstein
T-BGU-100089	Brownfield Sites - Investigation, Evaluation, Rehabilitation	3 CR	Bieberstein

Competence Certificate
- 'Teilleistung' T-BGU-100084 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-100089 with oral examination according to § 4 Par. 2 No. 2

details about the learning control see at the 'Teilleistung'

Prerequisites
none

Competence Goal
The students can describe the legal guidelines regarding the disposal of wastes and the permitted threshold value for brownfields. They can outline the geotechnical concerns in the construction of landfill sites depending on the particular landfill classification, landfill elements, their relevant requirements and necessary certifications. They are able to interlink interdisciplinarily the chemical, mineralogical, biological, hydraulic and geotechnical aspects dealing with brownfileds. They can choose reasonably between the relevant remediation technologies and assess their limits of applications and risks.

Content
The module covers geotechnical techniques in dealing with waste and brownfields. The environmental engineering, scientific and legal basics are discussd. Working steps of project planning, building materials, ways of construction and proofs are presented. Techniques for burning and immobilisation are explained as well as different microbiological, electrokinetic, hydraulic and pneumatic soil remediation methods.

Module grade calculation
grade of the module is CP weighted average of grades of the partial exams

Annotation
none

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- Landfills lecture/exercise: 30 h
- Brownfield Sites - Investigation, Evaluation, Rehabilitation lecture: 30 h
- Excursion: 10 h

independent study:

- preparation and follow-up lecture/exercises Landfills: 25 h
- examination preparation Landfills (partial exam): 30 h
- preparation and follow-up lectures Brownfield Sites - Investigation, Evaluation, Rehabilitation: 25 h
- examination preparation Brownfield Sites - Investigation, Evaluation, Rehabilitation (partial exam): 30 h

total: 180 h

Recommendation
none

Literature
DGGT, GDA-Empfehlungen – Geotechnik der Deponien und Altlasten, Ernst und Sohn, Berlin
Drescher (1997), Deponiebau, Ernst und Sohn, Berlin
Reiersloh, D und Reinhard, M. (2010): Altlastenratgeber für die Praxis, Vulkan-V. Essen

M 5.37 Module: Energy and Indoor Climate Concepts (tmbM711) [M-ARCH-103663]

Responsible: Prof. Andreas Wagner
Organisation: KIT Department of Architecture
Part of: Profile Real Estate and Facility Management - Specialization
Profile People and Environment in Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
4	Grade to a tenth	Each summer term	1 term	German	4	2

Mandatory			
T-ARCH-107406	Energy and Indoor Climate Concepts	4 CR	Wagner

Competence Certificate
Completed coursework consisting of working on a project (building analysis) and an oral exam (30 minutes).

Prerequisites
None

Competence Goal
The students:

- know the various different concepts and technologies of energy-efficient building as well as their parameters and they understand the influence these have on the performance of a building. From this they can deduce questions and investigation objectives for the optimization of an architectural design from the viewpoint of a constructive-physical and building-technical analysis.
- develop an examination strategy for answering their questions and the goals they have defined with regard to the energetic analysis of a building.
- undertake independent examinations regarding the set down construction-physical or building-technical enquiries and document their results.
- are able to independently evaluate their examination results and to communicate these. For this they utilize the commonly used tools from planning and consultation praxis.
- can argumentatively defend their way of approaching the issue as well as the solutions they have come up with whilst also being able to categorize these within the context of sustainable building.

Content
In this module the students are made familiar with the concepts and technologies of energy-efficient building. In the lecture the topics that are dealt with are constructional heat insulation, passive usage of solar energy as well as ventilation technology and systems. With a focus on non-residential buildings, concepts and technologies relating to passive cooling systems and (daylight) illumination are also dealt with. New ways regarding regenerative heat and power supply facilitation show the way forward in the direction of climate-neutral energy concepts. In addition to teaching the general principles, planning aspects are also discussed in-depth. Based on practical examples, energy and indoor climate concepts for various different building usages are looked at in more detail and are analyzed with regard to the presented parameters and evaluation criteria as well as architectural points of view. An excursion supplements this course offer. During the project work phase concrete buildings are examined regarding their energetic quality based on measurements taken and calculations made.

Module grade calculation
Module grade is the grade of the completed coursework.

Workload
Attendance time: Seminar 45 h

Self-study: preparation / follow-up, homework / project work 75 h

M 5.38 Module: Quarter Analysis (tmbM712) [M-ARCH-103633]

Responsible: Prof. Markus Neppl
Organisation: KIT Department of Architecture
Part of: Profile Real Estate and Facility Management - Specialization
Profile People and Environment in Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
4	Grade to a tenth	Each winter term	1 term	German/English	4	1

Mandatory			
T-ARCH-107375	Quarter Analysis	4 CR	Neppl

Competence Certificate
Other examination requirements consisting of an oral presentation of the work results (duration approx. 15 minutes).

Prerequisites
None

Competence Goal
The students:

- are capable of organizing their work processes in a timely and content-related manner and are able to present the work results in an appropriate manner within the team.
- can, using a variety of methods, analyze, structure and formally describe problems within the field of urban design. They are especially capable of recognizing and interpreting urban-sociological relationships and to be able to use these for their own work.
- are apply to apply various different methods of analysis that they learned during their studies. In addition, they are able to apply new methods such as active citizen participation and other user-centered survey methods coming from the field of urban sociology.
- can develop integrative solutions for problems.
- are able to express their analysis results in an oral, written and drawn format and are able to place these within an urban-sociological context.

Content
Within the module large-scale urban spaces are examined as to their usage, structure and social-spatial interaction. At the same time the term of the urban quarter or district is to be defined and is analyzed as to its relevance within urban planning and development. The basics of urban sociology and contents pertaining to this are taught. One focus hereby is on the interlinking of urban-sociological contents and user-centered analysis methods such as citizen surveys and methods of participation.

Module grade calculation
The module grade is the grade of the other examination requirements.

Workload
In-class time: Seminar 30 h
Self-study: Preparation/follow-up, written paper/project 90 h

M 5.39 Module: Urban Typologies (tmbM713) [M-ARCH-103632]

Responsible: Prof. Markus Neppl
Organisation: KIT Department of Architecture
Part of: Profile Real Estate and Facility Management - Specialization
Profile People and Environment in Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
4	Grade to a tenth	Each summer term	1 term	German/English	4	1

Mandatory			
T-ARCH-107374	Urban Typologies	4 CR	Neppl

Competence Certificate
Other examination requirements consisting of an oral presentation of the work results (duration approx. 15 minutes).

Prerequisites
None

Competence Goal
The students:

- are capable of organizing their work processes in a timely and content-related manner and are able to present the work results in an appropriate manner within the team.
- are able to analyze various different building development and usage structures as well as different typologies coming from a historical or modern context.
- are able to produce their own individual layouts and floor plans for both residential and office buildings.
- are able to present the analysis results in an oral, written and drawing format.

Content
Analysis and systematization of various different building development and usage structures. Analysis of examples of different typologies from a historical and a modern context. In-depth look at the usage foci residential living. Basics of the layouts and floor plans of both residential and office buildings. Teaching development systems for different typologies. Working out an example of a hybrid residential and office building.

Module grade calculation
The module grade is the grade of the other examination requirements.

Workload
In-class time: Seminar 45 h
Self-study: Preparation/follow-up, written paper/project 75 h

M 5.40 Module: Entrepreneurship (EnTechnon) (tmbM811) [M-WIWI-106035]

Responsible: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Economics and Management
Part of: Profile Project Management and Lean Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each term	1 term	German/English	4	1

Mandatory			
T-WIWI-102864	Entrepreneurship	3 CR	Terzidis
T-WIWI-102866	Design Thinking	3 CR	Terzidis

Competence Certificate
- 'Teilleistung' T-WIWI-102749 with written examination according to § 4 Par. 2 No. 1
- 'Teilleistung' T-WIWI-102749 with examination of other type according to § 4 Par. 2 No. 3

details about the learning controls see at the respective 'Teilleistung'

Prerequisites
none

Competence Goal
Students are familiar with the basics and contents of entrepreneurship and ideally are able to start a company during or after their studies. The courses are therefore structured sequentially in modules, although in principle they can also be attended in parallel. In this way, the skills are taught to generate business ideas, to develop inventions into innovations, to write business plans for start-ups and to successfully establish a company. In the lecture, the basics of entrepreneurship will be developed, in the seminar, individual contents will be deepened. The overall learning objective is to enable students to develop and implement business ideas.

Content
The lecture form the basis of the module and give an overview of the overall topic. The seminar deepens the phases of the foundation processes, in particular the identification of opportunities, the development of a value proposition (especially based on inventions and technical innovations), the design of a business model, business planning, the management of a start-up, the implementation of a vision as well as the acquisition on resources and the handling of risks. The lecture Entrepreneurship provides an overarching and connecting framework for this.

Module grade calculation
grade of the module is CP weighted average of grades of the partial exams

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- Entrepreneurship lecture: 30 h
- Design Thinking seminar: 30 h

independent study:

- preparation and follow-up lectures Entrepreneurship: 30 h
- examination preparation Entrepreneurship (partial examination): 30 h
- preparation of seminar presentation and report Design Thinking (partial examination): 60 h

total: 180 h

Recommendation
none

M 5.41 Module: Industrial Production I (tmbM812) [M-WIWI-101437]

Responsible: Prof. Dr. Frank Schultmann
Organisation: KIT Department of Economics and Management
Part of: Profile Project Management and Lean Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German/English	4	4

Mandatory			
T-WIWI-102606	Fundamentals of Production Management	5,5 CR	Schultmann
Supplementary Courses (Election: 3,5 credits)			
T-WIWI-102870	Logistics and Supply Chain Management	3,5 CR	Schultmann
T-WIWI-102820	Production Economics and Sustainability	3,5 CR	Schultmann, Volk

Competence Certificate
- 'Teilleistung' T-WIWI-102606 (compulsory) with written examination according to § 4 Par. 2 No. 1

according to the selected course:

- 'Teilleistung' T-WIWI-102870 (compulsory elective) with written examination according to § 4 Par. 2 No. 1
- 'Teilleistung' T-WIWI-102820 (compulsory elective) with written examination according to § 4 Par. 2 No. 1

details about the learning controls see at the respective 'Teilleistung'

Prerequisites
none

Competence Goal

- Students shall be aware of the important role of industrial production and logistics for production management.
- Students shall use relevant concepts of production management and logistics in an adequate manner.
- Students shall be able to reflect on decision principles in firms and their circumstances in the light of the production management aspects studied.
- Students shall be proficient in describing essential tasks, difficulties and solutions to problems in production management and logistics
- Students shall be able to describe relevant approaches of modeling production and logistic systems.
- Students shall be aware of the important role of material and energy-flows in production systems.
- Students shall be proficient in using exemplary methods for solving selected problems.

Content
This module is designed to introduce students into the wide area of industrial production and logistics management. It focuses on strategic production management under the aspect of sustainability. The courses use interdisciplinary approaches of systems, also theory to describe the central tasks of industrial production management and logistics. Herein, attention is drawn upon strategic corporate planning, research and development as well as site selection. Students will obtain knowledge in solving internal and external transport and storage problems with respect to supply chain management and disposal logistics.

Module grade calculation
grade of the module is CP weighted average of grades of the compulsory exam and the selected partial exam

Workload
contact hours (1 HpW = 1 h x 15 weeks), according to the selected course:

- Fundamentals of Production Management lecture, exercise (compulsory): 60 h
- Logistics and Supply Chain Management lecture, exercise (compulsory elective): 45 h
- Production Economics and Sustainability lecture (compulsory elective): 30 h

independent study, according to the selected course:

- preparation and follow-up lectures, exercises Fundamentals of Production Management: 45 h
- examination preparation Fundamentals of Production Management (partial examination, compulsory): 60 h
- preparation and follow-up lectures, exercises Logistics and Supply Chain Management: 15 h
- examination preparation Logistics and Supply Chain Management (partial examination, compulsory elective): 45 h
- preparation and follow-up lectures Production Economics and Sustainability: 30 h
- examination preparation Production Economics and Sustainability (partial examination, compulsory elective): 45 h

total: 270 h

Recommendation
none

M 5.42 Module: Digital Service Systems (tmbM813) [M-WIWI-106046]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: Profile Digital Technologies in Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	2

Election notes
Two courses totaling 9 credit points must be selected.

Compulsory Elective Courses (Election: at most 2 items)			
T-WIWI-102884	Operations Research in Health Care Management	4,5 CR	Nickel
T-WIWI-102715	Operations Research in Supply Chain Management	4,5 CR	Nickel
T-WIWI-112757	Digital Services: Innovation & Business Models	4,5 CR	Satzger

Competence Certificate
according to the selected course:

- 'Teilleistung' T-WIWI-102884 (compulsory elective) with written examination according to § 4 Par. 2 No. 1
- 'Teilleistung' T-WIWI-102715 (compulsory elective) with written examination according to § 4 Par. 2 No. 1
- 'Teilleistung' T-WIWI-112757 (compulsory elective) with written examination according to § 4 Par. 2 No. 1

details about the learning controls see at the respective 'Teilleistung'

Prerequisites
none

Competence Goal
The student

- Understands the differences between innovation and invention, and that disruptive change can have rapid and far-reaching effects on a market,
- knows examples of innovation in process, organization and business models and understands how service and product innovation differ,
- understands the link between risk and innovation, knows hurdles to innovation and how to overcome them,
- Knows and uses basic and advanced modeling techniques required for appropriate solution procedures in current supply chain management problems,
- Models problems using a mathematical approach to technical and economic issues, and derives optimal solutions,
- conceptualizes problems and classifies them mathematically by identifying essential variables and parameters in specific applications,
- Evaluates current developments in operations research in supply chain management.
- Is knowledgeable of basic and advanced operations research techniques in the healthcare field,
- possesses the ability to apply quantitative models in scheduling and internal logistics (scheduling, transportation, OR and duty scheduling, as well as inventory and layout planning) in the hospital environment,
- explains possible applications of simulation models in the health care sector as well as methods for planning ambulatory care services,
- uses the learned methods in detail on the basis of case studies in a practice-oriented manner

Content
The module focuses on teaching both theoretical principles and solution procedures for optimization problems in the service context, with an emphasis on supply chain management and health care.

Module grade calculation
grade of the module is CP weighted average of grades of the selected partial exams

Workload
contact hours (1 HpW = 1 h x 15 weeks), according to the selected course:

- Operations Research in Health Care Management lecture, exercise (compulsory elective): 45 h
- Operations Research in Supply Chain Management lecture, exercise (compulsory elective): 45 h
- Digital Services: Innovation & Business Models lecture (compulsory elective): 30 h

independent study, according to the selected course:

- preparation and follow-up lectures, exercises Operations Research in Health Care Management: 45 h
- examination preparation Operations Research in Health Care Management (partial examination, compulsory elective): 45 h
- preparation and follow-up lectures, exercises Operations Research in Supply Chain Management: 45 h
- examination preparation Operations Research in Supply Chain Management (partial examination, compulsory elective): 45 h
- preparation and follow-up lectures Digital Services: Innovation & Business Models: 45 h
- examination preparation Digital Services: Innovation & Business Models (partial examination, compulsory elective): 60 h

total: 270 h

Recommendation
none

M 5.43 Module: Environmental Emissions and Life Cycle Assessment (tmbM814) [M-WIWI-106036]

Responsible: Prof. Dr. Frank Schultmann
Organisation: KIT Department of Economics and Management
Part of: Profile People and Environment in Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
7	Grade to a tenth	Each winter term	1 term	German/English	4	2

Mandatory			
T-WIWI-102634	Emissions into the Environment	3,5 CR	Karl
T-WIWI-113107	Life Cycle Assessment – Basics and Application Possibilities in an Industrial Context	3,5 CR	Schultmann

Competence Certificate
- 'Teilleistung' T-WIWI-102634 with written examination according to § 4 Par. 2 No. 1
- 'Teilleistung' T-WIWI-112155 with written examination according to § 4 Par. 2 No. 1

details about the learning controls see at the respective 'Teilleistung'

Prerequisites
none

Competence Goal

- The student can name problems from the field of technical environmental protection.
- The student knows solution approaches for the named problems and can apply them.
- The student will learn the basics and methodology of the system-analytical instrument Life Cycle Assessment.
- Ability to apply Life Cycle Assessment in practical decision-making contexts, in particular in the economy

Content
emissions into the environment:

Emission sources/emission capture/emission reduction: an overview is given of relevant emissions of air pollutants and greenhouse gases, their capture and reduction, and the relevant legal regulations at national and international level. Basics of circular economy and recycling are also explained.

Outline:

Air Pollution Control

- Introduction, terms and definitions
- Sources and pollutants
- Legal framework of immission control
- Technical measures for emission reduction

Circular economy and recycling

- Introduction, legal basics
- Dual systems, disposal logistics
- Recycling, landfilling
- Thermal and biological waste treatment

Life Cycle Assessment and Forecasts of Global Development:

This lecture focuses on the analysis of the environmental impact of products by means of Life Cycle Assessment (LCA). Structure and steps are taught in detail and selected further developments are shown. In order to classify potential environmental impacts in a global context, forecasts of global development using integrated assessment models and system dynamics are also addressed.

Topics include:

- Attributional LCA
- Life Cycle Sustainability Assessment, Social LCA and Life Cycle Costing
- Consequential LCA
- Dynamic LCA
- System Dynamics
- Integrated Assessment Models in the Context of Climate Change

Module grade calculation
grade of the module is CP weighted average of grades of the partial exams

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- Emissions into the Environment lecture: 30 h
- Life Cycle Assessment and Global Forecasts lecture: 30 h

independent study:

- preparation and follow-up lectures Emissions into the Environment: 30 h
- examination preparation Emissions into the Environment (partial examination): 45 h
- preparation and follow-up lectures Life Cycle Assessment and Global Forecasts: 30 h
- examination preparation Life Cycle Assessment and Global Forecasts (partial examination): 45 h

total: 210 h

Recommendation
none

M 5.44 Module: Foundations of Informatics I (tmbM815) [M-WIWI-106032]

Responsible: Dr.-Ing. Tobias Käfer
Organisation: KIT Department of Economics and Management
Part of: Profile Digital Technologies in Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
5	Grade to a tenth	Each term	1 term	German	4	1

Mandatory			
T-WIWI-102749	Foundations of Informatics I	5 CR	Käfer

Competence Certificate
- 'Teilleistung' T-WIWI-102749 with written examination according to § 4 Par. 2 No. 1

details about the learning control see at the 'Teilleistung'

Prerequisites
none

Competence Goal
The student

- knows the essential principles, methods and systems of Informatics,
- is able to use this knowledge for applications in advanced Informatic lectures and other areas appropriate to the situation to solve problems,
- is able to find strategic and creative answers in the search for solutions to well-defined, concrete and abstract problems.
- The student will be able to reinforce the learned concepts, methods and systems of Informatics in advanced Informatic lectures.

Content
In this module, the topics of modeling, logic, algorithms, sorting and search methods, complexity theory, problem specifications, and data structures are addressed. In the area of theoretical computer science, formal models for automata, languages, and algorithms are introduced. In addition, there is an introduction to technical computer science, from maximum integration to computer architecture and computer arithmetic to operating systems and programming languages as well as file organization.

Module grade calculation
grade of the module is grade of the exam

Workload
contact hours (1 HpW = 1 h x 15 weeks), according to the selected course:

- lecture, exercise: 60 h

independent study, according to the selected course:

- preparation and follow-up lectures, exercises: 45 h
- examination preparation: 45 h

total: 150 h

Recommendation
none

M 5.45 Module: Foundations of Informatics II (tmbM816) [M-WIWI-106033]

Responsible: Dr.-Ing. Gunther Schiefer
Organisation: KIT Department of Economics and Management
Part of: Profile Digital Technologies in Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
5	Grade to a tenth	Each term	1 term	German	4	1

Mandatory			
T-WIWI-102707	Foundations of Informatics II	5 CR	Lazarova-Molnar

Competence Certificate
- 'Teilleistung' T-WIWI-102707 with written examination according to § 4 Par. 2 No. 1

details about the learning control see at the 'Teilleistung'

Prerequisites
none

Competence Goal

- Students should acquire broad knowledge of methods and concepts of theoretical Informatics and computer architecture.
- Based on the imparted knowledge and the acquired skills, the students should be able to select and correctly apply the appropriate methods and concepts for well-defined problems.
- The active participation of the students in the exercises should enable them to work out appropriate solutions for problems in interaction with others on the basis of the imparted basics and to acquire necessary knowledge.

Content
The module deals with formal models for automata, languages, and algorithms as well as with real-world manifestations of these models, i.e., computer architecture and organization (hardware design, computer arithmetic, architecture concepts), programming languages (different language levels from microprogramming to higher programming languages, as well as program translation and execution), operating systems and modes (structure and properties of operating systems, concrete operating system tasks, client-server systems), file organization and data management (file organization forms, primary/ secondary organization).

Module grade calculation
grade of the module is grade of the exam

Workload
contact hours (1 HpW = 1 h x 15 weeks), according to the selected course:

- lecture, tutorial: 60 h

independent study, according to the selected course:

- preparation and follow-up lectures, tutorials: 45 h
- examination preparation: 45 h

total: 150 h

Recommendation
The previous attendance of the course *Foundations of Informatics I* [2511010] is recommended.
Active participation in the exercises is strongly recommended.

M 5.46 Module: Introduction to Programming (tmbM817) [M-WIWI-101581]

Responsible: Prof. Dr.-Ing. Johann Marius Zöllner
Organisation: KIT Department of Economics and Management
Part of: Profile Digital Technologies in Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
5	Grade to a tenth	Each winter term	1 term	German	4	1

Mandatory			
T-WIWI-102735	Introduction to Programming with Java	5 CR	Zöllner

Competence Certificate
- 'Teilleistung' T-WIWI-102735 with written examination according to § 4 Par. 2 No. 1

details about the learning control see at the 'Teilleistung'

Prerequisites
none

Competence Goal

- Knowledge of the fundamental principles, methods and systems of informatics.
- Students acquire the ability to independently solve algorithmic problems in the programming language Java, which is predominant in the field of business applications.
- This enables them to find strategic and creative answers in the search for solutions to precisely defined, concrete and abstract problems.

Content
With an introduction to systematic programming, the module provides essential practical foundations for all advanced computer science lectures. Based on considerations on the structured and systematic design of algorithms, the most important constructs of modern higher programming languages and programming methods are explained and illustrated using examples. One focus is on teaching the concepts of object-oriented programming. Java is used as the programming language. Knowledge of this language is assumed in the advanced computer science lectures.

Module grade calculation
grade of the module is grade of the exam

Workload
contact hours (1 HpW = 1 h x 15 weeks), according to the selected course:

- lecture, tutorial, computer lab: 90 h

independent study, according to the selected course:

- preparation and follow-up lectures, tutorials: 15 h
- examination preparation: 45 h

total: 150 h

Recommendation
none

M 5.47 Module: Applied Informatics (tmbM818) [M-WIWI-106034]

Responsible: Dr.-Ing. Tobias Käfer
Prof. Dr. Andreas Oberweis
Prof. Dr. Ali Sunyaev
Prof. Dr. Melanie Volkamer

Organisation: KIT Department of Economics and Management

Part of: Profile Digital Technologies in Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Level	Version
9	Grade to a tenth	Each term	1 term	4	2

Mandatory			
T-WIWI-102747	Advanced Programming - Java Network Programming	4,5 CR	Ratz, Zöllner
Compulsory Elective Area (Election: 1 item)			
T-WIWI-110340	Applied Informatics – Applications of Artificial Intelligence	4,5 CR	Käfer
T-WIWI-114156	Applied Informatics – Cybersecurity	4,5 CR	Volkamer
T-WIWI-110341	Applied Informatics – Database Systems	4,5 CR	Oberweis
T-WIWI-110339	Applied Informatics – Principles of Internet Computing: Foundations for Emerging Technologies and Future Services	4,5 CR	Sunyaev
T-WIWI-113957	Applied Informatics – Mobile Computing	4,5 CR	Oberweis
T-WIWI-110338	Applied Informatics – Modelling	4,5 CR	Oberweis
T-WIWI-110343	Applied Informatics – Software Engineering	4,5 CR	Oberweis

Competence Certificate
- 'Teilleistung' T-WIWI-102747 (compulsory) with written examination according to § 4 Par. 2 No. 1

according to the selected course:

- 'Teilleistung' T-WIWI-110340 (compulsory elective) with written examination according to § 4 Par. 2 No. 1
- 'Teilleistung' T-WIWI-110341 (compulsory elective) with written examination according to § 4 Par. 2 No. 1
- 'Teilleistung' T-WIWI-110342 (compulsory elective) with written examination according to § 4 Par. 2 No. 1
- 'Teilleistung' T-WIWI-110339 (compulsory elective) with written examination according to § 4 Par. 2 No. 1
- 'Teilleistung' T-WIWI-110338 (compulsory elective) with written examination according to § 4 Par. 2 No. 1
- 'Teilleistung' T-WIWI-110343 (compulsory elective) with written examination according to § 4 Par. 2 No. 1

details about the learning controls see at the respective 'Teilleistung'

Prerequisites
none

Competence Goal
The student

- has the capability of dealing with the practical application of the Java programming language (which is the dominating programming language in many application areas)
- knows in depth methods and systems of a core area or a core application area of Informatics according to the contents dealt with in the lectures,
- can choose these methods and system situation adequately and can furthermore design and employ them for problem-solving,
- is able to independently find strategic and creative answers in the finding of solutions to well-defined, concrete, and abstract problems.

Content
In this module, object-oriented programming skills using the Java programming language are further deepened. Based on a core application area, basic methods and techniques of computer science are presented.

Module grade calculation
grade of the module is CP weighted average of grades of the compulsory exam and the selected partial exam

Workload
contact hours (1 HpW = 1 h x 15 weeks), according to the selected course:

- Advanced Programming - Java Network Programming lecture, tutorial, computer lab (compulsory): 90 h
- Applied Informatics – Applications of Artificial Intelligence lecture, exercise (compulsory elective): 45 h
- Applied Informatics – Database Systems lecture, exercise (compulsory elective): 45 h
- Applied Informatics – Information Security lecture, exercise (compulsory elective): 45 h
- Applied Informatics – Principles of Internet Computing lecture, exercise (compulsory elective): 45 h
- Applied Informatics – Modelling lecture, exercise (compulsory elective): 45 h
- Applied Informatics – Software Engineering lecture, exercise (compulsory elective): 45 h

independent study, according to the selected course:

- preparation and follow-up lectures, tutorials Advanced Programming - Java Network Programming: 15 h
- examination preparation Advanced Programming - Java Network Programming (partial examination, compulsory): 30 h
- preparation and follow-up lectures, exercises Applied Informatics – Applications of Artificial Intelligence: 45 h
- examination preparation Applied Informatics – Applications of Artificial Intelligence (partial examination, compulsory elective): 45 h
- preparation and follow-up lectures, exercises Applied Informatics – Database Systems: 45 h
- examination preparation Applied Informatics – Database Systems (partial examination, compulsory elective): 45 h
- preparation and follow-up lectures, exercises Applied Informatics – Information Security: 45 h
- examination preparation Applied Informatics – Information Security (partial examination, compulsory elective): 45 h
- preparation and follow-up lectures, exercises Applied Informatics – Principles of Internet Computing: 45 h
- examination preparation Applied Informatics – Principles of Internet Computing (partial examination, compulsory elective): 45 h
- preparation and follow-up lectures, exercises Applied Informatics – Modelling: 45 h
- examination preparation Applied Informatics – Modelling (partial examination, compulsory elective): 45 h
- preparation and follow-up lectures, exercises Applied Informatics – Software Engineering: 45 h
- examination preparation Applied Informatics – Software Engineering (partial examination, compulsory elective): 45 h

total: 270 h

Recommendation
none

M 5.48 Module: Quality Management (tmbM911) [M-MACH-105332]

Responsible: Prof. Dr.-Ing. Gisela Lanza
Organisation: KIT Department of Mechanical Engineering

Part of: Profile Project Management and Lean Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
4	Grade to a tenth	Each winter term	1 term	German	4	2

Mandatory			
T-MACH-102107	Quality Management	4 CR	Lanza

Competence Certificate
- 'Teilleistung' T-MACH-102107 with written examination according to § 4 Par. 2 No. 1

details about the learning control see at the 'Teilleistung'

Prerequisites
none

Competence Goal
The students …

- are capable to comment on the content covered by the module.
- are capable of substantially quality philosophies.
- are able to apply the QM tools and methods they have learned about in the module to new problems from the context of the module.
- are able to analyze and evaluate the suitability of the methods, procedures and techniques they have learned about in the module for a specific problem.

Content
Based on the quality philosophies Total Quality Management (TQM) and Six-Sigma, the module will specifically address the needs of a modern quality management. The process orientation in a modern company and the process-specific fields of quality assurance are presented in detail. Preventive as well as non-preventive quality management methods, which are state of the art in operational practice today, are content of the module. The use of suitable measurement techniques in production engineering (production measurement technology) as well as their potential levels of integration in the production system are discussed. The use of suitable statistical methods for data analysis and their modern extension by methods of artificial intelligence are be discussed. The contents are complemented by legal aspects in the field of quality management.

Main topics of the module:

- The term "Quality"
- Total Quality Management (TQM)
- Six-Sigma and universal methods and tools within the DMAIC cycle
- QM in early product stages – Determination and realization of customer requirements
- QM in product development
- Production measurement Technology
- QM in production - statistical Methods
- Artificial intelligence and machine learning in quality Management
- Operating behaviour and reliability
- Legal aspects in QM

Module grade calculation
grade of the module is grade of the exam

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- lecture: 30 h

independent study:

- preparation and follow-up lectures: 45 h
- examination preparation: 45 h

total: 120 h

Recommendation
none

Learning type
Lecture

M 5.49 Module: Integrated Production Planning in the Age of Industry 4.0 (tmbM912) [M-MACH-105350]

Responsible: Prof. Dr.-Ing. Gisela Lanza
Organisation: KIT Department of Mechanical Engineering

Part of: Profile Project Management and Lean Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
8	Grade to a third	Each summer term	1 term	German	4	2

Mandatory			
T-MACH-108849	Integrated Production Planning in the Age of Industry 4.0	8 CR	Lanza

Competence Certificate
- 'Teilleistung' T-MACH-108849 with oral examination according to § 4 Par. 2 No. 2

details about the learning control see at the 'Teilleistung'

Prerequisites
none

Competence Goal
The students …

- can discuss basic questions of production technology.
- are able to apply the methods of integrated production planning they have learned about to new problems.
- are able to analyze and evaluate the suitability of the methods, procedures and techniques they have learned about for a specific problem.
- can apply the learned methods of integrated production planning to new problems.
- can use their knowledge targeted for efficient production technology.

Content
Integrated production planning in the age of industry 4.0 will be taught in the context of this engineering science module. In addition to a comprehensive introduction to Industry 4.0, the following topics will be addressed at the beginning of the module:

- Basics, history and temporal development of production
- Integrated production planning and integrated digital engineering
- Principles of integrated production systems and further development with Industry 4.0

Building on this, the phases of integrated production planning are taught in accordance with VDI Guideline 5200, whereby special features of parts production and assembly are dealt with in the context of case studies:

- Factory planning system
- Definition of objectives
- Data collection and analysis
- Concept planning (structural development, structural dimensioning and rough layout)
- Detailed planning (production planning and control, fine layout, IT systems in an industry 4.0 factory)
- Preparation and monitoring of implementation
- Start-up and series support

The module contents are rounded off by numerous current practical examples with a strong industry 4.0 reference.

Module grade calculation
grade of the module is grade of the exam

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- lecture/exercise: 90 h

independent study:

- preparation and follow-up lecture/exercises: 90 h
- examination preparation: 60 h

total: 240 h

Recommendation
none

Learning type
Lecture

M 5.50 Module: Constitutional and Administrative Law (tmbM913) [M-INFO-101192]

Responsible: Prof. Dr. Nikolaus Marsch
Organisation: KIT Department of Informatics
Part of: Profile Project Management and Lean Construction - Specialization
Profile People and Environment in Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each term	2 terms	German	4	5

Mandatory			
T-INFO-110300	Public Law I & II	6 CR	N.N.

Competence Certificate
- 'Teilleistung' T-INFO-110300 with written examination according to § 4 Par. 2 No. 1

details about the learning control see at the 'Teilleistung'

Prerequisites
none

Module grade calculation
grade of the module is grade of the exam

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- Public Law I - Basic Principles lecture: 30 h
- Public Law II lecture: 30 h

independent study:

- preparation and follow-up lectures Public Law I - Basic Principles lecture: 30 h
- preparation and follow-up lectures Public Law II: 30 h
- examination preparation: 60 h

total: 180 h

Recommendation
none

M 5.51 Module: Technical Energy Systems for Buildings (tmbM914) [M-MACH-106179]

Responsible: Dr. Ferdinand Schmidt
Organisation: KIT Department of Mechanical Engineering
Part of: Profile Real Estate and Facility Management - Specialization
Profile People and Environment in Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
8	Grade to a tenth	Each winter term	2 terms	German	4	1

Mandatory			
T-MACH-105559	Technical Energy Systems for Buildings 1: Processes & Components	4 CR	Schmidt
T-MACH-105560	Technical Energy Systems for Buildings 2: System Concept	4 CR	Schmidt

Competence Certificate
- 'Teilleistung' T-BGU-100624 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-100625 with oral examination according to § 4 Par. 2 No. 2

details about the learning controls see at the respective 'Teilleistung'

Prerequisites
none

Competence Goal
After completing the module "Technical Energy Systems for Buildings", students have an overview of the technologies for supplying buildings with heat, cooling and, if necessary, on-site generated electricity. They know the procedures for the ecological, primary energy and economic evaluation of these technologies and can apply them to concrete case studies. They know the development status of the most relevant heating technologies for saving CO2 emissions and primary energy for existing buildings and can classify the potentials of these technologies for the energy transition in the building sector.

Content
details about the content see at the respective 'Teilleistung'

Module grade calculation
grade of the module is CP weighted average of grades of the partial exams

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- Technical Energy Systems for Buildings 1: Processes & Components lecture: 30 h
- Technical Energy Systems for Buildings 2: System Concept lecture: 30 h

independent study:

- preparation and follow-up lectures Technical Energy Systems for Buildings 1: Processes & Components: 30 h
- examination preparation Technical Energy Systems for Buildings 1: Processes & Components (partial exam): 60 h
- preparation and follow-up lectures Technical Energy Systems for Buildings 2: System Concept: 30 h
- examination preparation Technical Energy Systems for Buildings 2: System Concept (partial exam): 60 h

total: 240 h

Recommendation
none

Learning type
Lecture

Base for
none

M 5.52 Module: Human-oriented Production (tmbM915) [M-MACH-106031]

Responsible: Prof. Dr.-Ing. Barbara Deml
Organisation: KIT Department of Mechanical Engineering
Part of: Profile Project Management and Lean Construction - Specialization
Profile People and Environment in Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
8	Grade to a tenth	Each term	2 terms	German	4	1

Mandatory			
T-MACH-105518	Human Factors Engineering I	4 CR	Deml
Human-oriented Productivity (Election: 1 item as well as 4 credits)			
T-MACH-106374	Human-oriented Productivity Management: Personnel Management	4 CR	Stock
T-MACH-105523	Productivity Management in Production Systems	4 CR	Stowasser

Competence Certificate
- 'Teilleistung' T-MACH-105518 (compulsory) with written examination to § 4 Par. 2 No. 1

according to the selected course:

- 'Teilleistung' T-MACH-106374 (compulsory elective 1) with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-MACH-105523 (compulsory elective 2) with oral examination according to § 4 Par. 2 No. 2

details about the learning controls see at the respective 'Teilleistung'

Prerequisites
none

Module grade calculation
grade of the module is CP weighted average of grades of the compulsory exam and the selected partial exam

Workload
contact hours (1 HpW = 1 h x 15 weeks), according to the selected course:

- Human Factors Engineering I lecture (compulsory): 30 h
- Human-oriented Productivity Management: Personnel Management lecture (compulsory elective 1): 30 h
- Productivity Management in Production Systems lecture (compulsory elective 2): 30 h

independent study, according to the selected course:

- preparation and follow-up lectures Human Factors Engineering I: 45 h
- examination preparation Human Factors Engineering I (partial examination, compulsory): 45 h
- preparation and follow-up lectures Human-oriented Productivity Management: Personnel Management: 45 h
- examination preparation Human-oriented Productivity Management: Personnel Management (partial examination, compulsory elective 1): 45 h
- preparation and follow-up lectures Productivity Management in Production Systems: 45 h
- examination preparation Productivity Management in Production Systems (partial examination, compulsory elective 2): 45 h

total: 240 h

Recommendation
none

M 5.53 Module: Logistics and Supply Chain Management (tmbM916) [M-MACH-105298]

Responsible: Prof. Dr.-Ing. Kai Furmans
Organisation: KIT Department of Mechanical Engineering

Part of: Profile Project Management and Lean Construction - Specialization
Subject-Specific Supplements

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each summer term	1 term	English	4	2

Mandatory			
T-MACH-110771	Logistics and Supply Chain Management	9 CR	Furmans

Competence Certificate
- 'Teilleistung' T-MACH-110771 with written examination according to § 4 Par. 2 No. 1

details about the learning control see at the 'Teilleistung'

Prerequisites
none

Competence Goal
The student

- has comprehensive and well-founded knowledge of the central challenges in logistics and supply chain management, an overview of various practical issues and the decision-making requirements and models in supply chains,
- can model supply chains and logistics systems using simple models with sufficient accuracy,
- identifies cause-effect relationships in supply chains,
- is able to evaluate supply chains and logistics systems based on the methods they have mastered.

Content
Logistics and Supply Chain Management provides comprehensive and well-founded fundamentals for the crucial issues in logistics and supply chain management. Within the scope of the lectures, the interaction of different design elements of supply chains is emphasized. For this purpose, qualitative and quantitative description models are used. Methods for mapping and evaluating logistics systems and supply chains are also covered. The lecture contents are enriched by exercises and case studies and partially the comprehension of the contents is provided by case studies. The interacting of the elements will be shown, among other things, in the supply chain of the automotive industry.

Module grade calculation
grade of the module is grades of the exam

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- lecture: 60 h

independent study:

- preparation and follow-up lectures: 90 h
- preparation of case studies: 60 h
- examination preparation: 60 h

total: 270 h

Recommendation
none

Learning type
Lectures, tutorials, case studies.

Literature
Knut Alicke: Planung und Betrieb von Logistiknetzwerken: Unternehmensübergreifendes Supply Chain Management, 2003

Dieter Arnold et. al.: Handbuch Logistik, 2008

Marc Goetschalkx: Supply Chain Engineering, 2011

M 5.54 Module: Virtual Engineering Construction - B (tmbM918) [M-MACH-105992]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: Profile Digital Technologies in Construction - Specialization (Usage until 9/30/2025)
Subject-Specific Supplements (Usage until 9/30/2025)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
8	Grade to a tenth	Each summer term	1 term	German/English	4	3

Mandatory			
T-MACH-102124	Virtual Engineering II	4 CR	Ovtcharova
Elective Supject VE Bau B (Election: 1 item)			
T-MACH-109933	Business Administration for Engineers and IT Professionals	4 CR	Sebregondi
T-MACH-113669	Hot Research Topics in AI for Engineering Applications	4 CR	Meyer
T-MACH-106743	IoT Platform for Engineering	4 CR	Ovtcharova
T-MACH-102153	PLM-CAD Workshop	4 CR	Ovtcharova
T-MACH-102181	PLM for Product Development in Mechatronics	4 CR	Eigner
T-MACH-106740	Virtual Engineering Lab	4 CR	Ovtcharova

Competence Certificate
- 'Teilleistung' T-MACH-102124 (compulsory) with written examination according to § 4 Par. 2 No. 1

according to the selected course:

- 'Teilleistung' T-MACH-109933 (compulsory elective) with examination of other type according to § 4 Par. 2 No. 3
- 'Teilleistung' T-MACH-113669 (compulsory elective) with examination of other type according to § 4 Par. 2 No. 3
- 'Teilleistung' T-MACH-106743 (compulsory elective) with examination of other type according to § 4 Par. 2 No. 3
- 'Teilleistung' T-MACH-102153 (compulsory elective) with examination of other type according to § 4 Par. 2 No. 3
- 'Teilleistung' T-MACH-102181 (compulsory elective) with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-MACH-106740 (compulsory elective) with examination of other type according to § 4 Par. 2 No. 3

details about the learning controls see at the respective 'Teilleistung'

Prerequisites
none

Competence Goal
Students

- have basic knowledge about innovative visualization techniques like Virtual Reality and know feasible application of Virtual Mock-Ups (VMU) for validating product properties,
- are able to estimate potentials and limitations of current Virtual Reality Systems in product creation,
- can explain the added value of cross-company information technology for the product life cycle,
- can classify management decisions in companies and justify the importance of digitalisation for the processes of product creation.

Content
Virtual reality applications, digitalization, product life cycle, operations management, information management

Module grade calculation
grade of the module is CP weighted average of grades of the compulsory exam and the selected partial exam

Workload
contact hours (1 HpW = 1 h x 15 weeks), according to the selected course:

- Virtual Engineering I lecture/exercise (compulsory): 60 h
- Business Administration for Engineers and IT professionals seminar (compulsory elective): 30 h
- Hot Research Topics in AI for Engineering Applications project (compulsory elective): 60 h
- IoT Platform for Engineering project (compulsory elective): 100 h
- PLM-CAD Workshop project (compulsory elective): 120 h
- PLM for Product Development in Mechatronics lecture (compulsory elective): 30 h
- Virtual Engineering Lab project (compulsory elective): 120 h

independent study, according to the selected course:

- preparation and follow-up lecture/exercises Virtual Engineering I: 30 h
- examination preparation Virtual Engineering I (partial examination, compulsory): 30 h
- preparation of implementation task and final presentation (partial examination, compulsory elective): 60 h
- preparation seminar report Business Administration for Engineers and IT professionals (partial examination, compulsory elective): 90 h
- preparation final presentation project IoT Platform for Engineering (partial examination, compulsory elective): 20 h
- preparation and follow-up lectures PLM for Product Development in Mechatronics: 45 h
- examination preparation PLM for Product Development in Mechatronics (partial examination, compulsory): 45 h

total: 240 h

Recommendation
none

Learning type
Lectures, exercises, project work in teams, written assignments and presentations

M 5.55 Module: Module Master's Thesis (tmbMSC-THESIS) [M-BGU-106121]

Responsible: Studiendekan:in der KIT-Fakultät für Bauingenieur-, Geo- und Umweltwissenschaften
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Master's Thesis

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
30	Grade to a tenth	Each term	1 term	German/English	5	1

Mandatory			
T-BGU-112486	Master's Thesis	30 CR	Studiendekan:in der KIT-Fakultät für Bauingenieur-, Geo- und Umweltwissenschaften

Competence Certificate
thesis and final presentation according to § 14 ER/SPO

Prerequisites
Modules in extent of minimum 42 CP has to be passed in order to be admitted to the Master Thesis according to ER/SPO § 14 Par. 1. Results obtained in the module Key Competences [tmbMW0-UEQUAL] cannot be counted for this purpose.

Competence Goal
The student is able to investigate independently a complex problem within a particular research field of his choice in limited time, following scientific methods. He can search autonomously for literature, can find own approaches, can evaluate his results and can classify them according to the state of the art. He is further able to present clearly the essential matter and results in his master thesis and in a comprehensive presentation.

Content
The Master Thesis is an independent written report and comprises the theoretical or experimental work on a complex problem within a particular field of civil engineering with scientific methods. The topic of the master thesis derives from the students choice of a particular field. The student and can make proposals for the topic.

Module grade calculation
The grade of the module results from the evaluation of the Master Thesis and the final presentation.

Annotation
Information about the procedure regarding admission and registration of the Master Thesis see chap. 2.9.

Workload

- working on thesis project: 720 h
- thesis writing: 150 h.
- preparation of presentation: 30 h

total: 900 h

Recommendation
All technical skills and soft skills required for working on the selected topic and the preparation of the thesis should be attained.

M 5.56 Module: Interdisciplinary Qualifications (tmbMW0-UEQUAL) [M-BGU-106122]

Responsible: Studiendekan:in der KIT-Fakultät für Bauingenieur-, Geo- und Umweltwissenschaften
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Interdisciplinary Qualifications

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	pass/fail	Each term	2 terms	German/English	4	2

Election notes
Courses accepted gererally by the Examination Committee are available directly as selection option in the module.

For self assignment of taken interdisciplinary qualifications of HoC, FORUM (formerly ZAK) or 'Sprachenzentrums' (SpZ) the 'Teilleistungen' with the title "Self Assignment HoC-FORUM-SpZ ..." have to be selected according to the grading scale, not graded or graded (see module handbook Sect. 2.4). Title and CP of the taken exam are taken over by the assignment.

Interdisciplinary Qualifications (Election: at least 6 credits)			
T-BGU-106765	Introduction to Matlab	3 CR	Ehret
T-BGU-112598	Introduction to Python	3 CR	Cermak, Fuchs
T-BGU-112487	Self Assignment HoC-FORUM-SpZ 1 not graded	2 CR	
T-BGU-112488	Self Assignment HoC-FORUM-SpZ 2 not graded	2 CR	
T-BGU-112489	Self Assignment HoC-FORUM-SpZ 3 not graded	2 CR	
T-BGU-112839	Self Assignment HoC-FORUM-SpZ 7 not graded	2 CR	
T-BGU-112490	Self Assignment HoC-FORUM-SpZ 4 graded	2 CR	
T-BGU-112491	Self Assignment HoC-FORUM-SpZ 5 graded	2 CR	
T-BGU-112492	Self Assignment HoC-FORUM-SpZ 6 graded	2 CR	

Competence Certificate
according to taken courses

Prerequisites
none

Competence Goal
Learning outcomes can be divided into three main complementary categories:

1. Contextual Knowledge

- Students are aware of the cultural context of their position and are in a position to consider the views and interests of others (beyond the boundaries of subject, culture, and language).
- They have enhanced their ability to participate properly and appropriately in academic or public discussions.

2. Practical Focus

- Students have gained an insight into the routines of professional life.
- They have further developed their capability to learn.
- They have improved their scope of action by extending their knowledge of foreign languages.
- They are able to relate their field of experience to basic aspects of business administration and law.

3. Basic Competences

- The students autonomously acquire new knowledge in a planned, specific, and methodologically founded manner and use it for solving tasks and problems.
- They can evaluate own work.
- They possess efficient work techniques, can set priorities, take decisions, and assume responsibility.

Content
With the key competences, the House of Competence (HoC) and the 'General Studies. Forum Science and Society' (FORUM, formerly ZAK) offer a wide range of courses, which are bundled thematically for better orientation. The contents are explained in detail in the descriptions of the courses on the internet pages of HoC (https://studium.hoc.kit.edu/index.php/lehrangebot-gesamtuebersicht/; in German) and FORUM (https://www.forum.kit.edu/english/general_studies.php). Further, courses of the General Studies of FORUM (ehemals ZAK) or language courses of the 'Sprachenzentrums' (https://www.spz.kit.edu/index.php; in German) can be taken as Interdisciplinary Qualifications.

Module grade calculation
not graded

Annotation
In exceptional cases the Examination Committee can accept or recognize further suitable courses as Interdisciplinary Qualifications which are not listed in the mentioned offers of HoC, FORUM (formerly ZAK) and 'Sprachenzentrum'. Further information about the Interdisciplinary Qualifications (selection, registration, etc.) see Sect. 2.4 (module handbook).

In agreement with the examiner the passing of the respective course can be marked. This mark is not considered for the grade of the module as the module is not graded.

Workload
according to taken courses; see course description of HoC, lecture descriptions of FORUM (formerly ZAK) , descriptions of language courses

Recommendation
none

M 5.57 Module: Further Examinations (tmbMZL) [M-BGU-106178]

Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Additional Examinations

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
30	pass/fail	Each term	1 term	German	4	1

M 5.58 Module: Supplementary Studies on Science, Technology and Society [M-FORUM-106753]

Responsible: Dr. Christine Mielke
Christine Myglas

Organisation:

Part of: Additional Examinations (Usage from 10/1/2024)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
16	Grade to a tenth	Each term	3 terms	German	4	1

Election notes
Students have to self-record the achievements obtained in the Supplementary Studies on Science, Technology and Society in their study plan. FORUM (formerly ZAK) records the achievements as "non-assigned" under "ÜQ/SQ-Leistungen". Further instructions on self-recording of achievements can be found in the FAQ at https://campus.studium.kit.edu/ and on the FORUM homepage at https://www.forum.kit.edu/english/. The title of the examination and the amount of credits override the modules placeholders.

If you want to use FORUM achievements for both your Interdisciplinary Qualifications and for the Supplementary Studies, please record them in the Interdisciplinary Qualifications first. You can then get in contact with the FORUM study services (stg@forum.kit.edu) to also record them in your Supplementary Studies.

In the Advanced Unit you can choose examinations from three subject areas: "About Knowledge and Science", "Science in Society" and "Science in Social Debates". It is advised to complete courses from each of the three subject areas in the Advanced Unit.

To self-record achievements in the Advanced Unit, you have to select a free placeholder partial examination first. The placeholders' title do *not* affect which achievements the placeholder can be used for!

Mandatory			
T-FORUM-113578	Lecture Series Supplementary Studies on Science, Technology and Society - Self Registration	2 CR	Mielke, Myglas
T-FORUM-113579	Basic Seminar Supplementary Studies on Science, Technology and Society - Self Registration	2 CR	Mielke, Myglas
Advanced Unit Supplementary Studies on Science, Technology and Society (Election: at least 12 credits)			
T-FORUM-113580	Elective Specialization Supplementary Studies on Science, Technology and Society / About Knowledge and Science - Self-Registration	3 CR	Mielke, Myglas
T-FORUM-113581	Elective Specialization Supplementary Studies on Science, Technology and Society / Science in Society - Self-Registration	3 CR	Mielke, Myglas
T-FORUM-113582	Elective Specialization Supplementary Studies on Science, Technology and Society / Science in Public Debates - Self Registration	3 CR	Mielke, Myglas
Mandatory			
T-FORUM-113587	Registration for Certificate Issuance - Supplementary Studies on Science, Technology and Society	0 CR	Mielke, Myglas

Competence Certificate
The monitoring is explained in the respective partial achievement.

They are composed of:
- Protocols
- Reflection reports
- Presentations
- Preparation of a project work
- An individual term paper
- An oral examination
- A written exam

Upon successful completion of the supplementary studies, graduates receive a graded report and a certificate issued by the FORUM.

Prerequisites
The course is offered during the course of study and does not have to be completed within a defined period. Enrollment is required for all assessments of the modules in the supplementary studies.
Participation in the supplementary studies is regulated by § 3 of the statutes. KIT students register for the supplementary studies by selecting this module in the student portal and booking a performance themselves. Registration for courses, assessments, and exams is regulated by § 8 of the statutes and is usually possible shortly before the start of the semester.
The course catalog, module description (module manual), statutes (study regulations), and guidelines for creating the various written performance requirements can be downloaded from the FORUM homepage at https://www.forum.kit.edu/begleitstudium-wtg.php.

Registration and exam modalities

PLEASE NOTE:
Registration on the FORUM, i.e. additionally via the module selection in the student portal, enables students to receive up-to-date information about courses or study modalities. In addition, registering on the FORUM ensures that you have proof of the credits you have earned. As it is currently (as of winter semester 24-25) not yet possible to continue additional credits acquired in the Bachelor's programme electronically in the Master's programme, we strongly advise you to digitally secure the credits you have earned by archiving the Bachelor's transcript of records yourself and by registering on FORUM.
In the event that a transcript of records of the Bachelor's certificate is no longer available - we can only assign the achievements of registered students and thus take them into account when issuing the certificate.

Competence Goal
Graduates of the Supplementary Studies on Science, Technology, and Society gain a solid foundation in understanding the interplay between science, the public, business, and politics. They develop practical skills essential for careers in media, political consulting, or research management. The program prepares them to foster innovation, influence social processes, and engage in dialogue with political and societal entities. Participants are introduced to interdisciplinary perspectives, encompassing social sciences and humanities, to enhance their understanding of science, technology, and society. The teaching objectives of this supplementary degree program include equipping participants with both subject-specific knowledge and insights from epistemological, economic, social, cultural, and psychological perspectives on scientific knowledge and its application in various sectors. Students are trained to critically assess and balance the implications of their actions at the intersection of science and society. This training prepares them for roles as students, researchers, future decision-makers, and active members of society.

Through the program, participants learn to contextualize in-depth content within broader frameworks, independently analyze and evaluate selected course materials, and communicate their findings effectively in both written and oral formats. Graduates are adept at analyzing social issues and problem areas, reflecting on them critically from a socially responsible and sustainable standpoint.

Content
The Supplementary Studies on Science, Technology and Society can be started in the 1st semester of the enrolled degree programme and is not limited in time. The wide range of courses offered by FORUM makes it possible to complete the program usually within three semesters. The supplementary studies comprises 16 or more credit points (LP). It consists of **two modules: the Basic Module (4 LP) and the Advanced Module (12 LP)**.

The **basic Module** comprises the compulsory courses 'Lecture Series Supplementary Studies on Science, Technology and Society' and a basic seminar with a total of 4 LP.

The **Advanced Module** comprises courses totalling 12 LP in the humanities and social sciences subject areas 'On Knowledge and Science', 'Science in Society' and 'Science in Public Debates'. The allocation of courses to the accompanying study programme can be found on the homepage https://www.forum.kit.edu/wtg-aktuellland in the printed FORUM course catalogue.

The 3 thematic subject areas:

Subject area 1: About Knowledge and Science

This is about the internal perspective of science: students explore the creation of knowledge, distinguishing between scientific and non-scientific statements (e.g., beliefs, pseudo-scientific claims, ideological statements), and examining the prerequisites, goals, and methods of knowledge generation. They investigate how researchers address their own biases, analyze the structure of scientific explanatory and forecasting models in various disciplines, and learn about the mechanisms of scientific quality assurance.

After completing courses in the "Knowledge and Science" area, students can critically reflect on the ideals and realities of contemporary science. They will be able to address questions such as: How robust is scientific knowledge? What are the capabilities and limitations of predictive models? How effective is quality assurance in science, and how can it be improved? What types of questions can science answer, and what questions remain beyond its scope?

Subject area 2: Science in Society

This focuses on the interactions between science and different areas of society, such as how scientific knowledge influences social decision-making and how social demands impact scientific research. Students learn about the specific functional logics of various societal sectors and, based on this understanding, estimate where conflicts of goals and actions might arise in transfer processes—for example, between science and business, science and politics, or science and journalism. Typical questions in this subject area include: How and under what conditions does an innovation emerge from a scientific discovery? How does scientific policy advice work? How do business and politics influence science, and when is this problematic? According to which criteria do journalists incorporate scientific findings into media reporting? Where does hostility towards science originate, and how can social trust in science be strengthened?

After completing courses in the "Sciene in Society" area, students can understand and assess the goals and constraints of actors in different societal sectors. This equips them to adopt various perspectives of communication and action partners in transfer processes and to act competently at various social interfaces with research in their professional lives.

Subject area 3: Science in Public Debates

The courses in this subject area provide insights into current debates on major social issues such as sustainability, digitalization, artificial intelligence, gender equality, social justice, and educational opportunities. Public debates on complex challenges are often polarized, leading to oversimplifications, defamation, or ideological thinking. This can hinder effective social solution-finding processes and alienate people from the political process and from science. Debates about sustainable development are particularly affected, as they involve a wide range of scientific and technological knowledge in both problem diagnosis (e.g., loss of biodiversity, climate change, resource consumption) and solution development (e.g., nature conservation, CCS, circular economy).

By attending courses in "Science in Public Debates," students are trained in an application-oriented way to engage in factual debates—exchanging arguments, addressing their own prejudices, and handling contradictory information. They learn that factual debates can often be conducted more deeply and with more nuance than is often seen in public discourse. This training enables them to handle specific factual issues in their professional lives independently of their own biases and to be open to differentiated, fact-rich arguments.

Supplementary credits:
Additional LP (supplementary work) totalling a maximum of 12 LP can also be acquired from the complementary study programme (see statutes for the WTG complementary study programme § 7). § 4 and § 5 of the statutes remain unaffected by this. These supplementary credits are not included in the overall grade of the accompanying study programme. At the request of the participant, the supplementary work will be included in the certificate of the accompanying study programme and marked as such. Supplementary coursework is listed with the grades provided for in § 9.

Module grade calculation
The overall grade of the supplementary course is calculated as a credit-weighted average of the grades that were achieved in the advanced module.

Annotation
Climate change, biodiversity crisis, antibiotic resistance, artificial intelligence, carbon capture and storage, and gene editing are just a few areas where science and technology can diagnose and address numerous social and global challenges. The extent to which scientific findings are considered in politics and society depends on various factors, such as public understanding and trust, perceived opportunities and risks, and ethical, social, or legal considerations.
To enable students to use their expertise as future decision-makers in solving social and global challenges, we aim to equip them with the skills to navigate the interfaces between science, business, and politics competently and reflectively. In the Supplementary Studies, they acquire foundational knowledge about the interactions between science, technology, and society.

They learn:
- How reliable scientific knowledge is produced,
- how social expectations and demands influence scientific research, and
- how scientific knowledge is adopted, discussed, and utilized by society.

The program integrates essential insights from psychology, philosophy, economics, social sciences, and cultural studies into these topics. After completing the supplementary studies programme, students can place the content of their specialized studies within a broader social context. This prepares them, as future decision-makers, to navigate competently and reflectively at the intersections between science and various sectors of society, such as politics, business, or journalism, and to contribute effectively to innovation processes, public debates, or political decision-making.

Workload
The workload is made up of the number of hours of the individual modules:

- Basic Module approx. 120 hours
- Advanced Module approx. 390 hours
> Total: approx. 510 hours

In the form of supplementary services, up to approximately 390 hours of work can be added.

Recommendation
It is recommended to complete the supplementary study program in three or more semesters, beginning with the lecture series on science, technology, and society in the summer semester. Alternatively, you can start with the basic seminar in the winter semester and then attend the lecture series in the summer semester.

Courses in the Advanced Module can be taken simultaneously. It is also advised to complete courses from each of the three subject areas in the advanced unit.

Learning type
- Lectures
- Seminars/Project Seminars
- Workshops

6 Courses

T 6.1 Course: Advanced Programming - Java Network Programming [T-WIWI-102747]

Responsible: Prof. Dr. Dietmar Ratz
Prof. Dr.-Ing. Johann Marius Zöllner

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-106034 - Applied Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	5

Events					
ST 2025	2511020	Advanced Programming - Java Network Programming	2 SWS	Lecture / 🗣	Ratz
ST 2025	2511021	Tutorium zu Programmierung kommerzieller Systeme - Anwendungen in Netzen mit Java	1 SWS	Tutorial (/ 🧩	Ratz, Stegmaier, Mütsch
ST 2025	2511023	Rechnerpraktikum zu Programmierung kommerzieller Systeme - Anwendungen in Netzen mit Java	2 SWS	/ 🧩	Ratz, Stegmaier, Mütsch

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam, 90 min.

Prerequisites
none

Recommendation
none

Annotation
The registration for the participation in the computer lab (precondition for the exam participation) already takes place in the first lecture week!

Workload
135 hours

T 6.2 Course: Advanced Studies in Construction Engineering [T-BGU-108003]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-100344 - Advanced Studies in Construction Engineering

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	6	Grade to a third	Each term	1 terms	1

Events					
WT 24/25	6241903	Tunnel Construction and Blasting Engineering	2 SWS	Lecture / 🗣	Haghsheno, Scheuble
WT 24/25	6241904	Underground Construction	1 SWS	Lecture / 🗣	Haghsheno, Schneider
WT 24/25	6241905	Earthwork	1 SWS	Lecture / 🗣	Haghsheno, Waleczko

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
written exam, 90 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
180 hours

T 6.3 Course: Agile Project Management in Facility and Real Estate Management [T-BGU-111906]

Responsible: Prof. Dr.-Ing. Kunibert Lennerts
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-105920 - Agile Project Management in Facility and Real Estate Management

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	6	Grade to a third	Each summer term	1 terms	1

Events					
ST 2025	6242805	Agile Project Management in Facility and Real Estate Management	4 SWS	Lecture / Practice (/ 🗣	Lennerts

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
project:

report, appr. 10 pages, and
presentation, appr. 10 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
180 hours

T 6.4 Course: Applied Building Physics [T-BGU-100039]

Responsible: Frank Altmann
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-103950 - Building Physics I

Type	Credits	Grading scale	Recurrence	Expansion	Version
Oral examination	3	Grade to a third	Each term	1 terms	3

Events					
WT 24/25	6211909	Angewandte Bauphysik	2 SWS	Lecture / 🗣	Vogel, Dehn, Altmann

Legend: 💻 Online, 🎛 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral exam, appr. 20 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
90 hours

T 6.5 Course: Applied Informatics – Applications of Artificial Intelligence [T-WIWI-110340]

Responsible: Dr.-Ing. Tobias Käfer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-106034 - Applied Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	2

Events					
WT 24/25	2511314	Applied Informatics - Applications of Artificial Intelligence	2 SWS	Lecture /	Käfer, Kinder
WT 24/25	2511315	Exercises to Applied Informatics - Applications of Artificial Intelligence	1 SWS	Practice /	Käfer, Qu , Kinder

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
written exam, 60 min.

Prerequisites
none

Recommendation
Basics in logic, e.g. from lecture Foundations of Informatics 1 are important.

Annotation
none

Workload
135 hours

T 6.6 Course: Applied Informatics – Cybersecurity [T-WIWI-114156]

Responsible: Prof. Dr. Melanie Volkamer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-106034 - Applied Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2025	2511550	Applied Informatics – Cybersecurity	2 SWS	Lecture / 🗣	Volkamer
ST 2025	2511551	Exercise Applied Informatics – Cybersecurity	1 SWS	Practice / 🗣	Volkamer, Berens, Ballreich

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam, 60 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
135 hours

T 6.7 Course: Applied Informatics – Database Systems [T-WIWI-110341]

Responsible: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-106034 - Applied Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	2

Events					
ST 2025	2511200	Applied Informatics - Database Systems	2 SWS	Lecture / 🗣	Sommer
ST 2025	2511201	Exercises Applied Informatics - Database Systems	1 SWS	Practice / 🗣	Sommer

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam, 60 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
135 hours

T 6.8 Course: Applied Informatics – Mobile Computing [T-WIWI-113957]

Responsible: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-106034 - Applied Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2025	2511226	Applied Informatics - Mobile Computing	2 SWS	Lecture / 🗣	Schiefer
ST 2025	2511227	Exercises Applied Informatics - Mobile Computing	1 SWS	Practice / 🗣	Schiefer, Forell, Fritsch

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Success is assessed in the form of a written (60 min) or oral examination.

Prerequisites
None

Workload
135 hours

T 6.9 Course: Applied Informatics – Modelling [T-WIWI-110338]

Responsible: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-106034 - Applied Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	2

Events					
WT 24/25	2511030	Applied Informatics - Modelling	2 SWS	Lecture / 🗣	Schiefer, Schüler
WT 24/25	2511031	Exercises to Applied Informatics - Modelling	1 SWS	Practice / 🗣	Schiefer, Schüler

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam, 60 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
135 hours

T 6.10 Course: Applied Informatics – Principles of Internet Computing: Foundations for Emerging Technologies and Future Services [T-WIWI-110339]

Responsible: Prof. Dr. Ali Sunyaev
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-106034 - Applied Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	see Annotations	2

Events					
ST 2025	2511032	Applied Informatics - Internet Computing	2 SWS	Lecture / 🗣	Lins, Kannengießer, Schmidt-Kraepelin, Sturm, Thiebes
ST 2025	2511033	Übungen zu Angewandte Informatik - Internet Computing	1 SWS	Practice / 🧩	Lins, Kannengießer, Schmidt-Kraepelin, Sturm, Thiebes, Guse, Rank

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam, 60 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
135 hours

T 6.11 Course: Applied Informatics – Software Engineering [T-WIWI-110343]

Responsible: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-106034 - Applied Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	see Annotations	2

Competence Certificate
written exam, 60 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
135 hours

T 6.12 Course: Basic Seminar Supplementary Studies on Science, Technology and Society - Self Registration [T-FORUM-113579]

Responsible: Dr. Christine Mielke
Christine Myglas

Organisation:

Part of: M-FORUM-106753 - Supplementary Studies on Science, Technology and Society

Type	Credits	Grading scale	Recurrence	Expansion	Version
Completed coursework	2	pass/fail	Each summer term	1 terms	1

Competence Certificate
Study achievement in the form of a presentation or a term paper or project work in the selected course.

Prerequisites
None

Self service assignment of supplementary stdues
This course can be used for self service assignment of grade aquired from the following study providers:

- Studium Generale. Forum Wissenschaft und Gesellschaft (FORUM) (ehem. ZAK)
- FORUM (ehem. ZAK) Begleitstudium

Recommendation
It is recommended that the basic seminar be completed during the same semester as the lecture series "Science in Society". If it is not possible to attend the lecture series and the basic seminar in the same semester, the basic seminar can also be attended in the semesters before the lecture series.
However, attending courses in the advanced unit before attending the basic seminar should be avoided.

Annotation

T 6.13 Course: Basics in Computer Vision (2D/3D) [T-BGU-101166]

Responsible: Prof. Dr.-Ing. Markus Ulrich
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-100674 - 2D/3D Image Analysis and Image Based Tracking Methods

Type	Credits	Grading scale	Recurrence	Expansion	Version
Oral examination	3	Grade to a third	Each winter term	1 terms	2

Events					
WT 24/25	6041101	2D Computer Vision	1 SWS	Lecture / 🗣	Ulrich
WT 24/25	6041102	3D Computer Vision	2 SWS	Lecture / 🗣	Jutzi

Legend: 💻 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral exam, appr. 30 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
90 hours

T 6.14 Course: Brownfield Sites - Investigation, Evaluation, Rehabilitation [T-BGU-100089]

Responsible: Dr.-Ing. Andreas Bieberstein
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-100079 - Environmental Geotechnics

Type	Credits	Grading scale	Recurrence	Expansion	Version
Oral examination	3	Grade to a third	Each winter term	1 terms	1

Events					
WT 24/25	6251915	Brownfield Sites - Investigation, Evaluation, Rehabilitation	2 SWS	Lecture / 🗣	Bieberstein, Eiche, Würdemann, Mohrlok

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral exam, appr. 20 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
90 hours

T 6.15 Course: Building Information Modeling (BIM) [T-BGU-108007]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-103916 - Building Information Modeling (BIM)

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	6	Grade to a third	Each summer term	1 terms	1

Events					
ST 2025	6241812	Building Information Modeling	4 SWS	Lecture / Practice (/	Haghsheno

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
project report appr. 10 pages and presentation appr. 10 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
180 hours

T 6.16 Course: Building Preservation of Concrete and Masonry Constructions [T-BGU-100038]

Responsible: Dr.-Ing. Michael Vogel
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-100058 - Building Preservation of Concrete and Masonry Constructions

Type	Credits	Grading scale	Recurrence	Expansion	Version
Oral examination	5	Grade to a third	Each term	1 terms	2

Events					
ST 2025	6211811	Protection, Rehabilitation and Reinforcement of Concrete and Masonry Constructions	2 SWS	Lecture / 🗣	Vogel
ST 2025	6211812	Exercises to Protection, Rehabilitation and Reinforcement of Concrete and Masonry Constructions	1 SWS	Practice / 🗣	Vogel
ST 2025	6211813	Building Analysis	1 SWS	Lecture / 🗣	Vogel

Legend: 💻 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral exam, appr. 30 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
140 hours

T 6.17 Course: Building Technology [T-BGU-100040]

Responsible: PD Dr.-Ing. Stephan Wirth
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-103950 - Building Physics I

Type	Credits	Grading scale	Recurrence	Expansion	Version
Oral examination	3	Grade to a third	Each term	1 terms	2

Events					
WT 24/25	6211910	Gebäudetechnik	2 SWS	Lecture / 🗣	Wirth

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral exam, appr. 20 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
90 hours

T 6.18 Course: Business Administration for Engineers and IT Professionals [T-MACH-109933]

Responsible: Heinz-Peter Sebregondi
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-105992 - Virtual Engineering Construction - B

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4	Grade to a third	Each term	2

Events					
WT 24/25	2122303	Business Administration for Engineers and IT professionals	2 SWS	Seminar / 🗣	Sebregondi
ST 2025	2122303	Business Administration for Engineers and IT professionals	2 SWS	Seminar / 🗣	Sebregondi

Legend: 🖥 Online, 🌸 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
2 presentations, appr. 10 min. each, seminar report in 6 parts, approx. 10 pages each part; working on the topics in teams

Prerequisites
none

Recommendation
none

Annotation
none

Workload
120 hours

T 6.19 Course: Decommissioning of Nuclear Facilities [T-BGU-100627]

Responsible: Prof. Dr.-Ing. Sascha Gentes
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-100345 - Decommissioning of Nuclear Facilities

Type	Credits	Grading scale	Recurrence	Expansion	Version
Oral examination	6	Grade to a third	Each term	1 terms	1

Events					
WT 24/25	6243901	Removal and Decontamination of Nuclear Facilities	2 SWS	Lecture / Practice (/ 🗣	Gentes, Mitarbeiter/innen
WT 24/25	6243903	New Development and Optimization of Decommissioning Machine Technology	2 SWS	Lecture / Practice (/ 🗣	Gentes, Mitarbeiter/innen

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral exam, appr. 30 min.

Prerequisites
keine

Recommendation
none

Annotation
none

Workload
180 hours

T 6.20 Course: Design Thinking [T-WIWI-102866]

Responsible: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-106035 - Entrepreneurship (EnTechnon)

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Irregular	1

Events					
WT 24/25	2545008	Design Thinking (Track 1)	2 SWS	Seminar /	Terzidis, Malik, Jochem
ST 2025	2545008	Design Thinking (Track 1)	2 SWS	Seminar /	Osaro, Jochem, Terzidis

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
development and testing of a prototype product in teams

Prerequisites
none

Recommendation
none

Annotation
The seminar content will be published on the website of the institute.

Workload
90 hours

T 6.21 Course: Digital Engineering and Construction [T-BGU-111695]

Responsible: Jun.-Prof. Dr. Reza Maalek
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-105830 - Digital Engineering and Construction

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	6	Grade to a third	Each winter term	1 terms	1

Events					
WT 24/25	6244901	Digital Engineering and Construction	4 SWS	Lecture / Practice (/	Maalek

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
4 weekly assignments, term paper approx. 10 pages, presentation approx. 15-20 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
180 hours

T 6.22 Course: Digital Planning and Building Information Modeling [T-BGU-110382]

Responsible: Dr.-Ing. Tim Zinke
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-105135 - Digital Planning and Building Information Modeling

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	6	Grade to a third	Each winter term	1 terms	1

Events					
WT 24/25	6212912	Digital Planning and Building Information Modeling	4 SWS	Lecture / Practice (/	Zinke

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
preparation of BIM flat pattern plan and report, approx. 20 pages, with presentation, approx. 10 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
180 hours

T 6.23 Course: Digital Services: Innovation & Business Models [T-WIWI-112757]

Responsible: Prof. Dr. Gerhard Satzger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-106046 - Digital Service Systems

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	2

Events					
ST 2025	2595468	Digital Services: Innovation & Business Models	1.5 SWS	Lecture /	Satzger, Benz, Schüritz, Heinz
ST 2025	2595469	Übung zu Digital Services: Innovation & Business Models	1.5 SWS	Practice /	Satzger, Benz, Schüritz, Heinz

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
The assessment consists of a written exam (60 min.).

Prerequisites
None

Recommendation
None

Annotation
The course "Digital Services: Innovation & Business Models" replaces the course Service Innovation, based on a revised course concept and content. The focus will be on the closer integration of the topics of service innovation and digitalization. Previous foundational content (e.g., on service innovation challenges or human-centered innovation methods) will remain. New content will cover topics such as digital platforms and ecosystems, IoT and smart service innovation, and business models.

T 6.24 Course: Digital Technologies in Field Information Modeling [T-BGU-111276]

Responsible: Jun.-Prof. Dr. Reza Maalek
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-105638 - Digital Technologies in Field Information Modeling

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	6	Grade to a third	Each term	1 terms	2

Events					
ST 2025	6244801	Digital Technologies in Field Information Modeling	4 SWS	Lecture / Practice (/	Maalek

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
4 weekly assignments, term paper approx. 10 pages, presentation approx. 15 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
180 hours

T 6.25 Course: Digitalization in Facility and Real Estate Management [T-BGU-108941]

Responsible: Prof. Dr.-Ing. Kunibert Lennerts
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-104348 - Digitalization in Facility and Real Estate Management

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	6	Grade to a third	Each term	1 terms	1

Events					
WT 24/25	6242907	Digitalization in Facility- and Real Estate Management	4 SWS	Lecture / Practice (/ 🗣	Lennerts, Mitarbeiter/innen

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
project work incl. report, appr. 15 pages, and presentation/colloquium, appr. 15 min

Prerequisites
none

Recommendation
none

Annotation
none

Workload
180 hours

T 6.26 Course: Elective Specialization Supplementary Studies on Science, Technology and Society / About Knowledge and Science - Self-Registration [T-FORUM-113580]

Responsible: Dr. Christine Mielke
Christine Myglas

Organisation:

Part of: M-FORUM-106753 - Supplementary Studies on Science, Technology and Society

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Competence Certificate
Another type of examination assessment under § 5, section 3 involves a presentation, term paper, or project work within the chosen course.

Prerequisites
None

Self service assignment of supplementary stdues
This course can be used for self service assignment of grade aquired from the following study providers:

- Studium Generale. Forum Wissenschaft und Gesellschaft (FORUM) (ehem. ZAK)
- FORUM (ehem. ZAK) Begleitstudium

Recommendation
The contents of the basic module are helpful. The basic module should be completed or attended in parallel, but not after the advanced module.
The reading recommendations for primary and specialist literature are determined individually by the respective lecturers according to the subject area and course.

Annotation
This placeholder can be used for any achievement in the Advanced Unit of the Supplementary Studies.

In the Advanced Module, students can choose their own individual focus, e.g. sustainable development, data literacy, etc. The focus should be discussed with the module coordinator at the FORUM.

T 6.27 Course: Elective Specialization Supplementary Studies on Science, Technology and Society / Science in Public Debates - Self Registration [T-FORUM-113582]

Responsible: Dr. Christine Mielke
Christine Myglas

Organisation:

Part of: M-FORUM-106753 - Supplementary Studies on Science, Technology and Society

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Competence Certificate
Another type of examination assessment under § 5, section 3 involves a presentation, term paper, or project work within the chosen course.

Prerequisites
None

Self service assignment of supplementary stdues
This course can be used for self service assignment of grade aquired from the following study providers:

- Studium Generale. Forum Wissenschaft und Gesellschaft (FORUM) (ehem. ZAK)
- FORUM (ehem. ZAK) Begleitstudium

Recommendation
The contents of the basic module are helpful. The basic module should be completed or attended in parallel, but not after the advanced module.
The reading recommendations for primary and specialist literature are determined individually by the respective lecturers according to the subject area and course.

Annotation
This placeholder can be used for any achievement in the Advanced Unit of the Supplementary Studies.

T 6.28 Course: Elective Specialization Supplementary Studies on Science, Technology and Society / Science in Society - Self-Registration [T-FORUM-113581]

Responsible: Dr. Christine Mielke
Christine Myglas

Organisation:

Part of: M-FORUM-106753 - Supplementary Studies on Science, Technology and Society

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Competence Certificate
Another type of examination assessment under § 5, section 3 involves a presentation, term paper, or project work within the chosen course.

Prerequisites
None

Self service assignment of supplementary stdues
This course can be used for self service assignment of grade aquired from the following study providers:

- Studium Generale. Forum Wissenschaft und Gesellschaft (FORUM) (ehem. ZAK)
- FORUM (ehem. ZAK) Begleitstudium

Recommendation
The contents of the basic module are helpful. The basic module should be completed or attended in parallel, but not after the advanced module.
The reading recommendations for primary and specialist literature are determined individually by the respective lecturers according to the subject area and course.

Annotation
This placeholder can be used for any achievement in the Advanced Unit of the Supplementary Studies.

T 6.29 Course: Emissions into the Environment [T-WIWI-102634]

Responsible: Ute Karl
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-106036 - Environmental Emissions and Life Cycle Assessment

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each winter term	1

Events					
WT 24/25	2581962	Emissions into the Environment	2 SWS	Lecture / 🗣	Karl

Legend: 💻 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam, 60 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
105 hours

T 6.30 Course: Energy and Indoor Climate Concepts [T-ARCH-107406]

Responsible: Prof. Andreas Wagner
Organisation: KIT Department of Architecture
Part of: M-ARCH-103663 - Energy and Indoor Climate Concepts

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4	Grade to a third	Each summer term	2

Events					
ST 2025	1720970	Energy and Indoor Climate Concepts	2 SWS	Lecture / 🗣	Wagner

Legend: 📱 Online, 🎭 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Completed coursework consisting of working on a project (building analysis) and an oral exam (30 minutes).

Prerequisites
none

T 6.31 Course: Entrepreneurship [T-WIWI-102864]

Responsible: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-106035 - Entrepreneurship (EnTechnon)

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each term	1

Events					
WT 24/25	2545001	Entrepreneurship	2 SWS	Lecture /	Terzidis, Dang
ST 2025	2545001	Entrepreneurship	2 SWS	Lecture /	Terzidis, Dang

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Students are offered the opportunity to earn a grade bonus through separate assignments. If the grade of the written exam is between 4.0 and 1.3, the bonus improves the grade by a maximum of one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the lecture.

Prerequisites
None

Recommendation
None

T 6.32 Course: Environmental Communication [T-BGU-101676]

Responsible: Dr. rer. nat. Charlotte Kämpf
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101108 - Environmental Communication

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	6	Grade to a third	Each term	1 terms	2

Events					
WT 24/25	6224905	Environmental Communication	2 SWS	Seminar / 🗣	Kämpf
ST 2025	6224905	Environmental Communication	2 SWS	Seminar / 🗣	Kämpf

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
presentation, appr. 15 min.,
manuscript, appr. 6000 words, and
Poster DIN-A3

Prerequisites
The accomplishment 'Examination Prerequisite Environmental Communication' (T-BGU-106620) has to be passend.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-BGU-106620 - Examination Prerequisite Environmental Communication must have been passed.

Recommendation
none

Annotation
none

Workload
135 hours

T 6.33 Course: Environmental Law [T-BGU-111102]

Responsible: Dr. Urich Smeddinck
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-106042 - Environmental Law

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	3	Grade to a third	Each winter term	1 terms	1

Events					
WT 24/25	6111177	Environmental Law	2 SWS	Lecture / 🗣	Smeddinck

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written exam with 120 min

Prerequisites
None

Annotation
None

Workload
90 hours

T 6.34 Course: Environmentally-Friendly Recycling and Disassembly of Buildings [T-BGU-100146]

Responsible: Prof. Dr.-Ing. Sascha Gentes
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-100110 - Environmentally-friendly Recycling and Disassembly of Buildings

Type	Credits	Grading scale	Recurrence	Expansion	Version
Oral examination	6	Grade to a third	Each term	1 terms	1

Events					
ST 2025	6243801	Project Studies	2 SWS	Lecture / Practice (/	Gentes
ST 2025	6243803	Dismantling Techniques	2 SWS	Lecture / Practice (/	Gentes

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
oral exam, appr. 30 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
180 hours

T 6.35 Course: Equipment and Special Construction Techniques in Building Practice [T-BGU-108009]

Responsible: Prof. Dr.-Ing. Sascha Gentes
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-103918 - Equipment and Special Construction Techniques in Building Practice

Type	Credits	Grading scale	Recurrence	Expansion	Version
Oral examination	6	Grade to a third	Each term	2 terms	1

Events					
WT 24/25	6243905	Equipment and special Construction Techniques in Building Practice II	2 SWS	Lecture / 🗣	Gentes, Schneider
ST 2025	6241815	Equipment and Special Construction Techniques in Building Practice I	2 SWS	Lecture / 🗣	Gentes, Schneider

Legend: 🖥 Online, 🌸 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral exam, appr. 45 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
180 hours

T 6.36 Course: Examination Prerequisite Environmental Communication [T-BGU-106620]

Responsible: Dr. rer. nat. Charlotte Kämpf
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101108 - Environmental Communication

Type	Credits	Grading scale	Recurrence	Expansion	Version
Completed coursework	0	pass/fail	Each term	1 terms	1

Events					
WT 24/25	6224905	Environmental Communication	2 SWS	Seminar / 🗣	Kämpf
ST 2025	6224905	Environmental Communication	2 SWS	Seminar / 🗣	Kämpf

Legend: 💻 Online, 🌐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
2 literature annotations, appr. 150 words each, and
short presentation, appr. 10 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
45 hours

T 6.37 Course: Examination Prerequisite Urban Management [T-BGU-113672]

Responsible: Prof. Dr. Anke Karmann-Woessner
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-100013 - Urban Renewal

Type	Credits	Grading scale	Recurrence	Expansion	Version
Completed coursework	1	pass/fail	Each summer term	1 terms	1

Events					
WT 24/25	6231801	City Management	2 SWS	Lecture / Practice (/	Karmann-Woessner

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
presentation, 5-10 min., or seminar paper, 5-10 pages, defined by the selected topic;
Topics and dates are presented at the beginning of the semester.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
30 hours

T 6.38 Course: Exercise Transportation Data Analysis [T-BGU-113971]

Responsible: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-100015 - Traffic Management and Simulation Methods

Type	Credits	Grading scale	Recurrence	Expansion	Version
Completed coursework	0	pass/fail	Each summer term	1 terms	1

Events					
ST 2025	6232802	Traffic Management and Telematics	2 SWS	Lecture / Practice (/	Vortisch

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
programming exercise with Python

Prerequisites
none

Recommendation
none

Annotation
will be offered newly as examination prerequisite as from summer term 2025

Workload
10 hours

T 6.39 Course: Facility Management [T-BGU-111908]

Responsible: Prof. Dr.-Ing. Kunibert Lennerts
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-105922 - Facility Management

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	6	Grade to a third	Each term	1 terms	2

Events					
WT 24/25	6242908	Facility and Service Management	3 SWS	Lecture / Practice (/	Lennerts
WT 24/25	6242909	Facility and Real Estate Management II	1 SWS	Lecture /	Lennerts

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
written exam, 90 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
180 hours

T 6.40 Course: Facility Management in Hospitals [T-BGU-108004]

Responsible: Prof. Dr.-Ing. Kunibert Lennerts
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-106454 - Facility Management in Hospitals

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	6	Grade to a third	Each winter term	1 terms	2

Events					
WT 24/25	6242905	Facility Management in Hospitals	4 SWS	Lecture / Practice (/	Lennerts, Mitarbeiter/ innen

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
term paper appr. 10 pages, with final presentation appr. 10 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
180 hours

T 6.41 Course: Foundations of Informatics I [T-WIWI-102749]

Responsible: Dr.-Ing. Tobias Käfer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-106032 - Foundations of Informatics I

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each summer term	2

Events					
ST 2025	2511010	Foundations of Informatics I	2 SWS	Lecture / 🗣	Käfer
ST 2025	2511011	Exercises to Foundations of Informatics I		Practice / 🗣	Käfer, Popovic, Noullet, Kinder

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of an 1h written exam according to Section 4 (2), 1 of the examination regulation.

The exam takes place every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

T 6.42 Course: Foundations of Informatics II [T-WIWI-102707]

Responsible: Prof. Dr. Sanja Lazarova-Molnar
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-106033 - Foundations of Informatics II

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each winter term	1

Events					
WT 24/25	2511012	Foundations of Informatics II	3 SWS	Lecture / 🗣	Lazarova-Molnar
WT 24/25	2511013	Tutorien zu Grundlagen der Informatik II	1 SWS	Tutorial (/ 🗣	Lazarova-Molnar, Götz, Khodadadi

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam according to Section 4(2), 1 of the examination regulation. The examination takes place every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Recommendation
It is recommended to attend the course "Foundations of Informatics I" beforehand.

Active participation in the practical lessons is strongly recommended.

T 6.43 Course: Fundamentals of Production Management [T-WIWI-102606]

Responsible: Prof. Dr. Frank Schultmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101437 - Industrial Production I

Type	Credits	Grading scale	Recurrence	Version
Written examination	5,5	Grade to a third	Each summer term	1

Events					
ST 2025	2581950	Fundamentals of Production Management	2 SWS	Lecture / 🗣	Schultmann
ST 2025	2581951	Übungen Grundlagen der Produktionswirtschaft	2 SWS	Practice / 🗣	Frank, Braun

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (90 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

T 6.44 Course: History of Urban Planning [T-BGU-108441]

Responsible: Steven Christopher Ross
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-100013 - Urban Renewal

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	3	Grade to a third	Each term	1 terms	2

Events					
ST 2025	6328016	Urban Planning I: Urban Planning History	2 SWS	Lecture / 🗣	Ross

Legend: 💻 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam, 90 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
90 hours

T 6.45 Course: Hot Research Topics in AI for Engineering Applications [T-MACH-113669]

Responsible: Prof. Dr.-Ing. Anne Meyer
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-105992 - Virtual Engineering Construction - B

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	4	Grade to a third	Each winter term	1 terms	1

Events					
WT 24/25	2121341	Hot Research Topics in AI for Engineering Applications	3 SWS	Project (P / 🗣	Meyer, Dörr

Legend: Online, Blended (On-Site/Online), 🗣 On-Site, × Cancelled

Competence Certificate
The grade is determined by an examination of another type. This consists of an individual knowledge check after the lecture part, the continuous assessment of teamwork during the implementation task and a final presentation. The overall impression is assessed; in addition to the implementation task, the knowledge test and the final presentation are also taken into account.

Prerequisites
none

Recommendation
Basic knowledge of artificial intelligence and machine learning, Programming experience, preferably in Python, English proficiency

Annotation
Limited number of participants.

Workload
120 hours

T 6.46 Course: Human Factors Engineering I [T-MACH-105518]

Responsible: Prof. Dr.-Ing. Barbara Deml
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106031 - Human-oriented Production

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each winter term	2

Events					
WT 24/25	2109035	Human Factors Engineering I: Ergonomics	2 SWS	Lecture / 🗣	Deml

Legend: 📱 Online, 🎛 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam, 60 minutes

The exams are only offered in German!

Prerequisites
none

Workload
120 hours

T 6.47 Course: Human-oriented Productivity Management: Personnel Management [T-MACH-106374]

Responsible: Dr.-Ing. Patricia Stock
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106031 - Human-oriented Production

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2025	2109021	Human-oriented Productivity Management: Personnel Management	2 SWS	Block /	Stock

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
oral exam (approx. 20 min)

The exam is offered in German only!

Annotation
The course is capacity-limited, therefore the allocation of places is based on § 5 para. 4 in the module handbook: **Registration and admission to module examinations and courses** . This results in the following selection criteria:

- Students of the degree program have priority over students from outside the degree program

- Among students within the degree program, a decision may be made based on academic progress (not just with subject semesters)
- In the case of equal academic progress according to waiting time
- In the case of equal waiting time by lot

The exact procedure is explained on **ILIAS**.

"Successful participation requires active and continuous participation in the course."

Workload
120 hours

T 6.48 Course: Image Sequence Analysis [T-BGU-101167]

Responsible: Prof. Dr.-Ing. Stefan Hinz
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-100674 - 2D/3D Image Analysis and Image Based Tracking Methods

Type	Credits	Grading scale	Recurrence	Expansion	Version
Oral examination	3	Grade to a third	Each winter term	1 terms	2

Events					
WT 24/25	6043103	Image Sequence Analysis, Lecture	2 SWS	Lecture / 🗣	Meidow

Legend: 💻 Online, 🎭 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral exam, appr. 20 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
90 hours

T 6.49 Course: Integrated Production Planning in the Age of Industry 4.0 [T-MACH-108849]

Responsible: Prof. Dr.-Ing. Gisela Lanza
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-105350 - Integrated Production Planning in the Age of Industry 4.0

Type	Credits	Grading scale	Recurrence	Version
Oral examination	8	Grade to a third	Each summer term	2

Events					
ST 2025	2150660	Integrated Production Planning in the Age of Industry 4.0	6 SWS	Lecture / Practice (/ 🗣	Lanza

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
oral exam, appr. 40 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
240 hours

T 6.50 Course: Introduction to GIS for Students of Natural, Engineering and Geo Sciences [T-BGU-101681]

Responsible: Dr.-Ing. Sven Wursthorn
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101846 - Introduction to GIS for Students of Natural, Engineering and Geo Sciences

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	4

Events					
WT 24/25	6071101	Introduction to GIS for Students of Natural Sciences, Engineering and Geosciences, L+E	4 SWS	Lecture / Practice (/ 🗣	Wursthorn

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
written exam, 90 min.

Prerequisites
'Introduction to GIS for Students of Natural, Engineering and Geo Sciences, Prerequisite' (T-BGU-103541) has to be passed

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-BGU-103541 - Introduction to GIS for Students of Natural, Engineering and Geo Sciences, Prerequisite must have been passed.

Recommendation
none

Annotation
none

Workload
90 hours

T 6.51 Course: Introduction to GIS for Students of Natural, Engineering and Geo Sciences, Prerequisite [T-BGU-103541]

Responsible: Dr.-Ing. Sven Wursthorn
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101846 - Introduction to GIS for Students of Natural, Engineering and Geo Sciences

Type	Credits	Grading scale	Recurrence	Expansion	Version
Completed coursework	3	pass/fail	Each winter term	1 terms	4

Events					
WT 24/25	6071101	Introduction to GIS for Students of Natural Sciences, Engineering and Geosciences, L+E	4 SWS	Lecture / Practice (/ 🗣	Wursthorn

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
The achievement control takes place via accepted exercises.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
90 hours

T 6.52 Course: Introduction to Matlab [T-BGU-106765]

Responsible: PD Dr.-Ing. Uwe Ehret
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-106122 - Interdisciplinary Qualifications

Type	Credits	Grading scale	Recurrence	Expansion	Version
Completed coursework	3	pass/fail	Each winter term	1 terms	1

Events					
WT 24/25	6224907	Introduction to Matlab	2 SWS	Lecture / Practice (/	Ehret, Wienhöfer

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
Implementation of a Matlab code within a class exercise

Prerequisites
none

Recommendation
none

Annotation
The course is limited to 60 participants. Please register via the student portal (Studierendenportal). Only in case that this should not be possible: Please register via e-mail to the responsible lecturer. Participants are selected according to their progress of study considering the following order: students of Water Science and Engineering, then students of Civil Engineering with focus 'Water and Environment', then other students.

Workload
90 hours

T 6.53 Course: Introduction to Programming with Java [T-WIWI-102735]

Responsible: Prof. Dr.-Ing. Johann Marius Zöllner
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101581 - Introduction to Programming

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each winter term	2

Events					
WT 24/25	2511000	Introduction to Programming with Java	3 SWS	Lecture / 🗣	Zöllner
WT 24/25	2511002	Tutorien zu Programmieren I: Java	1 SWS	Tutorial (	Zöllner, Stegmaier, Mütsch
WT 24/25	2511003	Computer lab Introduction to Programming with Java	2 SWS		Zöllner, Stegmaier, Mütsch

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written resp. computer-based exam (60 min) according to Section 4 (2),1 of the examination regulation.

The successful completion of the compulsory tests in the computer lab is prerequisited for admission to the written resp. computer-based exam.

The examination takes place every semester. Re-examinations are offered at every ordinary examination date.

Annotation
see german version

T 6.54 Course: Introduction to Python [T-BGU-112598]

Responsible: Prof. Dr. Jan Cermak
Dr. Julia Fuchs
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-106122 - Interdisciplinary Qualifications

Type	Credits	Grading scale	Recurrence	Expansion	Version
Completed coursework (practical)	3	pass/fail	Each winter term	1 terms	2

Events					
WT 24/25	6020130	Introduction to Python	2 SWS	Lecture / Practice (/	Fuchs, Bork-Unkelbach

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
Successfully completed exercises focussing on implementation and documentation of a Python code.

Prerequisites
None

Recommendation
None

Annotation
The associated lecture is especially intended for students of the MSc Geodäsie und Geoinformatik and MSc Remote Sensing and Geoinformatics.
External students may attend the course if there is sufficient capacity. External students communicate their individual interest to participate in this lecture at the latest one week before the start of the lectures via e-mail to anja.carle@kit.edu receive positive/ negative feedback regarding the possibility of participation.

The total workload is 90 hours and has to be invested in

- Contact hours: 20 hours
- Self-study: 70 hours
  - consolidation of subject by recapitulation of lectures, by use of references and by own inquiry (40 hours)
  - working on exercises (30 hours)

Workload
90 hours

T 6.55 Course: IoT Platform for Engineering [T-MACH-106743]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-105992 - Virtual Engineering Construction - B

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4	Grade to a third	Each term	2

Events					
WT 24/25	2123352	IoT platform for engineering	3 SWS	Project (P / 🗣	Meyer, Maier, Rönnau
ST 2025	2123352	IoT platform for engineering	3 SWS	Project (P / 🗣	Meyer, Maier

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
process implementation by means of an IT-system and hardware within a team, final presentation, appr. 30 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
120 hours

T 6.56 Course: Landfills [T-BGU-100084]

Responsible: Dr.-Ing. Andreas Bieberstein
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-100079 - Environmental Geotechnics

Type	Credits	Grading scale	Recurrence	Expansion	Version
Oral examination	3	Grade to a third	Each winter term	1 terms	1

Events					
WT 24/25	6251913	Landfills	2 SWS	Lecture / Practice (/	Bieberstein

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
oral exam, appr. 20 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
90 hours

T 6.57 Course: Leadership and Communication [T-BGU-111900]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-105917 - Leadership and Communication

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	6	Grade to a third	Each term	1 terms	1

Events					
ST 2025	6241805	Leadership and Communication	4 SWS	Lecture / Practice (/	Haghsheno, Eschen

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
written exam, 90 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
180 hours

T 6.58 Course: Lean Construction [T-BGU-108000]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-100104 - Lean Construction

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	4,5	Grade to a third	Each term	1 terms	1

Events					
WT 24/25	6241901	Lean Construction	4 SWS	Lecture / Practice (/	Haghsheno, Mitarbeiter/innen

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
written exam, 70 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
140 hours

T 6.59 Course: Lean Integrated Project Delivery [T-BGU-111910]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-105925 - Lean Integrated Project Delivery (Lean IPD)

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	3	Grade to a third	Each term	1 terms	1

Events					
ST 2025	6241817	Lean Integrated Project Delivery	3 SWS	Lecture / 🗣	Haghsheno

Legend: 💻 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam, 60 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
90 hours

T 6.60 Course: Lecture Series Supplementary Studies on Science, Technology and Society - Self Registration [T-FORUM-113578]

Responsible: Dr. Christine Mielke
Christine Myglas
Organisation:
Part of: M-FORUM-106753 - Supplementary Studies on Science, Technology and Society

Type	Credits	Grading scale	Recurrence	Expansion	Version
Completed coursework	2	pass/fail	Each summer term	1 terms	1

Competence Certificate
Active participation, learning protocols, if applicable.

Prerequisites
None

Self service assignment of supplementary stdues
This course can be used for self service assignment of grade aquired from the following study providers:

- Studium Generale. Forum Wissenschaft und Gesellschaft (FORUM) (ehem. ZAK)
- FORUM (ehem. ZAK) Begleitstudium

Recommendation
It is recommended that you complete the lecture series "Science in Society" before attending events in the advanced module and in parallel with attending the basic seminar.
If it is not possible to attend the lecture series and the basic seminar in the same semester, the lecture series can also be attended after attending the basic seminar.
However, attending events in the advanced module before attending the lecture series should be avoided.

Annotation
The basic module consists of the lecture series "Science in Society" and the basic seminar. The lecture series is only offered during the summer semester.
The basic seminar can be attended in the summer or winter semester.

T 6.61 Course: Life Cycle Assessment – Basics and Application Possibilities in an Industrial Context [T-WIWI-113107]

Responsible: Prof. Dr. Frank Schultmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-106036 - Environmental Emissions and Life Cycle Assessment

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each winter term	1

Events					
WT 24/25	2581995	Life Cycle Assessment - Basics and Application Possibilities in an Industrial Context	2 SWS	Lecture / 🗣	Treml, Schultmann, Schneider

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of an oral (approx. 30 minutes) or written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None.

Recommendation
None

T 6.62 Course: Logistics and Supply Chain Management [T-WIWI-102870]

Responsible: Prof. Dr. Frank Schultmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101437 - Industrial Production I

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each summer term	2

Events					
ST 2025	2581996	Logistics and Supply Chain Management	2 SWS	Lecture / 🗣	Schultmann, Rosenberg

Legend: 💻 Online, 🎭 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam, 60 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
105 hours

T 6.63 Course: Logistics and Supply Chain Management [T-MACH-110771]

Responsible: Prof. Dr.-Ing. Kai Furmans
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-105298 - Logistics and Supply Chain Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	9	Grade to a third	Each summer term	5

Events					
ST 2025	2118078	Logistics and Supply Chain Management	4 SWS	Lecture /	Furmans, Alicke

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
written exam, 120 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
270 hours

T 6.64 Course: Machinery and Process Engineering [T-BGU-100623]

Responsible: Prof. Dr.-Ing. Sascha Gentes
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-100339 - Machinery and Process Engineering

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	5	Grade to a third	Each term	1 terms	2

Events					
WT 24/25	6241703	Process Engineering	2 SWS	Lecture / 🗣	Schneider, Waleczko
WT 24/25	6243701	Construction Equipment	2 SWS	Lecture / 🗣	Gentes, Dörfler, Schneider

Legend: 💻 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam, 90 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
150 hours

T 6.65 Course: Master's Thesis [T-BGU-112486]

Responsible: Studiendekan:in der KIT-Fakultät für Bauingenieur-, Geo- und Umweltwissenschaften
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-106121 - Module Master's Thesis

Type	Credits	Grading scale	Recurrence	Expansion	Version
Final Thesis	30	Grade to a third	Each term	1 terms	1

Competence Certificate
duration appr. 6 months
presentation within one month after submission of the thesis

Prerequisites
defined for the module Master Thesis

Final Thesis
This course represents a final thesis. The following periods have been supplied:

Submission deadline	6 months
Maximum extension period	3 months
Correction period	8 weeks

This thesis requires confirmation by the examination office.

Recommendation
see module

Annotation
Information about the procedure regarding admission and registration of the Master Thesis see chap. 2.9.

Workload
900 hours

T 6.66 Course: Models and Methods in Traffic Engineering and Transportation Planning [T-BGU-100012]

Responsible: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-100008 - Models and Methods in Traffic Engineering and Transportation Planning

Type	Credits	Grading scale	Recurrence	Expansion	Version
Oral examination	6	Grade to a third	Each term	1 terms	1

Events					
WT 24/25	6232701	Calculation Methods and Models in Traffic Planning	2 SWS	Lecture / Practice (/ 🗣	Vortisch, Mitarbeiter/innen
WT 24/25	6232703	Road Traffic Engineering	2 SWS	Lecture / Practice (/ 🗣	Vortisch, Mitarbeiter/innen

Legend: 📱 Online, 🌸 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral exam, appr. 20 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
180 hours

T 6.67 Course: Operations Research in Health Care Management [T-WIWI-102884]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-106046 - Digital Service Systems

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each term	3

Events					
WT 24/25	2550495	Operations Research in Health Care Management	2 SWS	Lecture /	Graß
WT 24/25	2550496	Übungen zu OR im Health Care Management	1 SWS	Practice	Graß
ST 2025	2550495	Operations Research in Health Care Management	2 SWS	Lecture /	Graß
ST 2025	2550496	Übungen zu OR im Health Care Management	1 SWS	Practice /	Graß

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
Success is assessed in the form of a 60-minute written examination (in accordance with §4(2), 1 SPO).

The examination is offered every semester.

Prerequisites
None

Recommendation
Basic knowledge as co nveyed in the module "Introduction to Operations Research" is assumed.

Annotation
The course is offered irregularly. Planned lectures for the next three years can be found in the internet at http://dol.ior.kit.edu/english/Courses.php.

T 6.68 Course: Operations Research in Supply Chain Management [T-WIWI-102715]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-106046 - Digital Service Systems

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	2

Events					
ST 2025	2550480	Operations Research in Supply Chain Management	2 SWS	Lecture / 🗣	Nickel
ST 2025	2550481	Übungen zu OR in Supply Chain Management	1 SWS	Practice / 🗣	Hoffmann

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment is a 60 minutes written examination (according to §4(2), 1 of the examination regulation).

The examination is held in the term of the lecture and the following lecture.

Prerequisites
None

Recommendation
Basic knowledge as conveyed in the module Introduction to Operations Research and in the lectures Facility Location and Strategic SCM,Tactical and operational SCMis assumed.

Annotation
The course is offered irregularly. Planned lectures for the next three years can be found in the internet at http://dol.ior.kit.edu/english/Courses.php.

T 6.69 Course: PLM for Product Development in Mechatronics [T-MACH-102181]

Responsible: Prof. Dr.-Ing. Martin Eigner
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-105992 - Virtual Engineering Construction - B

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	2

Competence Certificate
oral exam, appr. 20 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
120 hours

T 6.70 Course: PLM-CAD Workshop [T-MACH-102153]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-105992 - Virtual Engineering Construction - B

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4	Grade to a third	Each term	3

Events					
WT 24/25	2121357	PLM-CAD Workshop	4 SWS	Project (P / 🗣	Mitarbeiter, Rönnau
ST 2025	2121357	PLM-CAD Workshop	4 SWS	Project (P / 🗣	Rönnau, Meyer

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
development and production of a proto type in a team

Prerequisites
none

Recommendation
none

Annotation
none

Workload
120 hours

6.71 Course: Practical Fire Protection [T-BGU-100042]

Responsible: Thomas Egelhaaf
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-100060 - Building Physics II

Type	Credits	Grading scale	Recurrence	Expansion	Version
Oral examination	3	Grade to a third	Each term	1 terms	1

Events					
ST 2025	6211815	Practical Fire Protection	2 SWS	Lecture / 🗣	Egelhaaf

Legend: 🖥 Online, ❈ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral exam, appr. 20 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
90 hours

T 6.72 Course: Practical Noise Control [T-BGU-108024]

Responsible: Christian Zander
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-100060 - Building Physics II

Type	Credits	Grading scale	Recurrence	Expansion	Version
Oral examination	3	Grade to a third	Each term	1 terms	3

Events					
ST 2025	6211814	Practical Noise Control	2 SWS	Lecture / 🗣	Zander

Legend: 📱 Online, ⛒ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral exam, appr. 20 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
90 hours

T 6.73 Course: Production Economics and Sustainability [T-WIWI-102820]

Responsible: Prof. Dr. Frank Schultmann
Dr.-Ing. Rebekka Volk

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101437 - Industrial Production I

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each winter term	1

Events					
WT 24/25	2581960	Production Economics and Sustainability	2 SWS	Lecture / 🗣	Volk, Schultmann, Bischof

Legend: 💻 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam, 60 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
105 hours

T 6.74 Course: Production Planning and Control in Construction [T-BGU-111901]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-105918 - Production Planning and Control in Construction

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	5	Grade to a third	Each term	1 terms	1

Events					
ST 2025	6241801	Site Management	1 SWS	Lecture / Practice (/ 🗣	N.N.
ST 2025	6241803	Site Planning and Handling	3 SWS	Lecture / Practice (/ 🗣	Miernik, Kohlhammer, Haghsheno, Mitarbeiter/innen

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam, 90 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
150 hours

T 6.75 Course: Productivity Management in Production Systems [T-MACH-105523]

Responsible: Prof. Dr.-Ing. Sascha Stowasser
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106031 - Human-oriented Production

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2025	2110046	Productivity Management in Production Systems	3 SWS	/ 🗣	Stowasser

Legend: 💻 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral exam (approx. 30 min)

The exam is offered in German only!

Prerequisites
none

Annotation
The course is capacity-limited, therefore the **allocation of places** is based on § 5 para. 4 in the module handbook: **Registration and admission to module examinations and courses** . This results in the following selection criteria:

- Students of the degree program have priority over students from outside the degree program

- Among students within the degree program, a decision may be made based on academic progress (not just with subject semesters)
- In the case of equal academic progress according to waiting time
- In the case of equal waiting time by lot

The exact procedure is explained on **ILIAS**.

"Successful participation requires active and continuous participation in the course."

Workload
120 hours

T 6.76 Course: Project Lean Integrated Project Delivery [T-BGU-111911]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-105925 - Lean Integrated Project Delivery (Lean IPD)

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	3	Grade to a third	Each summer term	1 terms	1

Events					
ST 2025	6241817	Lean Integrated Project Delivery	3 SWS	Lecture /	Haghsheno

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
case study report, appr. 15 pages;
final presentation and colloquium, appr. 30 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
90 hours

T 6.77 Course: Project Management in Construction and Real Estate Industry [T-BGU-100622]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-100338 - Project Management in Construction and Real Estate Industry

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	5	Grade to a third	Each term	1 terms	4

Events					
WT 24/25	6241701	Construction Project Management	4 SWS	Lecture / Practice (/ 🗣	Haghsheno, Mitarbeiter/innen

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
case study during the semester:

report: appr. 20 pages
final presentations with discussion: appr. 10 min. each
colloquium at the end of the semester: appr. 20 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
150 hours

T 6.78 Course: Project Paper Lean Construction [T-BGU-101007]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-100104 - Lean Construction

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	1,5	Grade to a third	Each winter term	1 terms	1

Events					
WT 24/25	6241901	Lean Construction	4 SWS	Lecture / Practice (/	Haghsheno, Mitarbeiter/innen

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
project:

report, appr. 10 pages, and
presentation, appr. 10 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
40 hours

T 6.79 Course: Public Law I & II [T-INFO-110300]

Responsible: N.N.
Organisation: KIT Department of Informatics
Part of: M-INFO-101192 - Constitutional and Administrative Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each summer term	1

Events					
WT 24/25	2424016	Öffentliches Recht I - Grundlagen	2 SWS	Lecture / 🗣	Zufall
ST 2025	24520	Öffentliches Recht II - Öffentliches Wirtschaftsrecht	2 SWS	Lecture / 🗣	Zufall

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 6.80 Course: Quality Management [T-MACH-102107]

Responsible: Prof. Dr.-Ing. Gisela Lanza
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-105332 - Quality Management

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each winter term	3

Events					
WT 24/25	2149667	Quality Management	2 SWS	Lecture /	Lanza, Stamer

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
written exam, 60 min

Prerequisites
It is not possible to combine this brick with brick Quality Management [T-MACH-112586].

Recommendation
none

Annotation
none

Workload
120 hours

T 6.81 Course: Quarter Analysis [T-ARCH-107375]

Responsible: Prof. Markus Neppl
Organisation: KIT Department of Architecture
Part of: M-ARCH-103633 - Quarter Analysis

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4	Grade to a third	Each winter term	1

Events					
WT 24/25	1731095	Quarter Analysis: Urban India - Spatial Structures and Typologies in Metropolitan Areas	2 SWS	Seminar /	Neppl, Giralt

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Other examination requirements consisting of an oral presentation of the work results (duration approx. 15 minutes).

Prerequisites
none

T 6.82 Course: Real Estate and Facility Management - on Site Lectures [T-BGU-111909]

Responsible: Prof. Dr.-Ing. Kunibert Lennerts
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-105924 - Real Estate and Facility Management - on Site Lectures

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	6	Grade to a third	Each summer term	1 terms	1

Events					
ST 2025	6242804	Real Estate und Facility Management – on site lectures	4 SWS	Lecture / Practice (/ 🗣	Lennerts, Schmidt-Bäumler

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
report appr. 15 pages and presentatin/colloquium appr. 15 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
180 hours

T 6.83 Course: Real Estate Management [T-BGU-100629]

Responsible: Prof. Dr.-Ing. Kunibert Lennerts
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-100346 - Real Estate Management

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	6	Grade to a third	Each term	1 terms	2

Events					
WT 24/25	6242901	Real Estate Management Controlling	1 SWS	Lecture / 🗣	Lennerts
WT 24/25	6242902	Property Valuation Basics	1 SWS	Lecture / 🗣	Lennerts
WT 24/25	6242903	Corporate and Public Real Estate Management	1 SWS	Lecture / 🗣	Lennerts
WT 24/25	6242904	Projectdevelopment with Case Study	1 SWS	Lecture / 🗣	Lennerts, Mitarbeiter/ innen

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam, 90 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
180 hours

T 6.84 Course: Registration for Certificate Issuance - Supplementary Studies on Science, Technology and Society [T-FORUM-113587]

Responsible: Dr. Christine Mielke
Christine Myglas

Organisation:

Part of: M-FORUM-106753 - Supplementary Studies on Science, Technology and Society

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	0	pass/fail	Each term	1

Prerequisites
In order to register, it is mandatory that the basic module and the advanced module have been completed and that the grades for the partial performances in the advanced module are available.

Registration as a partial achievement means the issue of a certificate.

T 6.85 Course: Research Seminar Construction Management [T-BGU-108008]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-103917 - Research Seminar Construction Management

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	6	Grade to a third	Each term	2 terms	1

Events					
WT 24/25	6241906	Research Seminar Construction Management II	2 SWS	Seminar / 🗣	Haghsheno, Mitarbeiter/innen
ST 2025	6241814	Baubetriebliches Forschungsseminar I	2 SWS	Seminar / 🗣	Haghsheno, Mitarbeiter/innen

Legend: 🖥 Online, 🎭 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
project report, appr. 25 pages, and colloquium, appr. 30 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
180 hours

T 6.86 Course: Self Assignment HoC-FORUM-SpZ 1 not graded [T-BGU-112487]

Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-106122 - Interdisciplinary Qualifications

Type	Credits	Grading scale	Recurrence	Expansion	Version
Completed coursework	2	pass/fail	Each term	1 terms	1

Competence Certificate
according to the assignment to be credited

Prerequisites
none

Self service assignment of supplementary stdues
This course can be used for self service assignment of grade aquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Studium Generale. Forum Wissenschaft und Gesellschaft (FORUM) (ehem. ZAK)

Recommendation
none

Annotation
'Not assigned grades' can be assigned by the students themselves; titel and CP of the grades are taken over

Workload
60 hours

T 6.87 Course: Self Assignment HoC-FORUM-SpZ 2 not graded [T-BGU-112488]

Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-106122 - Interdisciplinary Qualifications

Type	Credits	Grading scale	Recurrence	Expansion	Version
Completed coursework	2	pass/fail	Each term	1 terms	1

Competence Certificate
according to the assignment to be credited

Prerequisites
none

Self service assignment of supplementary stdues
This course can be used for self service assignment of grade aquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Studium Generale. Forum Wissenschaft und Gesellschaft (FORUM) (ehem. ZAK)

Recommendation
none

Annotation
'Not assigned grades' can be assigned by the students themselves; titel and CP of the grades are taken over

Workload
60 hours

T 6.88 Course: Self Assignment HoC-FORUM-SpZ 3 not graded [T-BGU-112489]

Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-106122 - Interdisciplinary Qualifications

Type	Credits	Grading scale	Recurrence	Expansion	Version
Completed coursework	2	pass/fail	Each term	1 terms	1

Competence Certificate
according to the assignment to be credited

Prerequisites
none

Self service assignment of supplementary stdues
This course can be used for self service assignment of grade aquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Studium Generale. Forum Wissenschaft und Gesellschaft (FORUM) (ehem. ZAK)

Recommendation
none

Annotation
'Not assigned grades' can be assigned by the students themselves; titel and CP of the grades are taken over

Workload
60 hours

T 6.89 Course: Self Assignment HoC-FORUM-SpZ 4 graded [T-BGU-112490]

Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-106122 - Interdisciplinary Qualifications

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	2	Grade to a third	Each term	1 terms	1

Competence Certificate
according to the assignment to be credited

Prerequisites
none

Self service assignment of supplementary stdues
This course can be used for self service assignment of grade aquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Studium Generale. Forum Wissenschaft und Gesellschaft (FORUM) (ehem. ZAK)

Recommendation
none

Annotation
'Not assigned grades' can be assigned by the students themselves; titel and CP of the grades are taken over

Workload
60 hours

T 6.90 Course: Self Assignment HoC-FORUM-SpZ 5 graded [T-BGU-112491]

Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-106122 - Interdisciplinary Qualifications

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	2	Grade to a third	Each term	1 terms	1

Competence Certificate
according to the assignment to be credited

Prerequisites
none

Self service assignment of supplementary stdues
This course can be used for self service assignment of grade aquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Studium Generale. Forum Wissenschaft und Gesellschaft (FORUM) (ehem. ZAK)

Recommendation
none

Annotation
'Not assigned grades' can be assigned by the students themselves; titel and CP of the grades are taken over

Workload
60 hours

T 6.91 Course: Self Assignment HoC-FORUM-SpZ 6 graded [T-BGU-112492]

Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-106122 - Interdisciplinary Qualifications

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	2	Grade to a third	Each term	1 terms	1

Competence Certificate
according to the assignment to be credited

Prerequisites
none

Self service assignment of supplementary stdues
This course can be used for self service assignment of grade aquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Studium Generale. Forum Wissenschaft und Gesellschaft (FORUM) (ehem. ZAK)

Recommendation
none

Annotation
'Not assigned grades' can be assigned by the students themselves; titel and CP of the grades are taken over

Workload
60 hours

T 6.92 Course: Self Assignment HoC-FORUM-SpZ 7 not graded [T-BGU-112839]

Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-106122 - Interdisciplinary Qualifications

Type	Credits	Grading scale	Recurrence	Expansion	Version
Completed coursework	2	pass/fail	Each term	1 terms	1

Competence Certificate
according to the assignment to be credited

Prerequisites
none

Self service assignment of supplementary stdues
This course can be used for self service assignment of grade aquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Studium Generale. Forum Wissenschaft und Gesellschaft (FORUM) (ehem. ZAK)

Recommendation
none

Annotation
'Not assigned grades' can be assigned by the students themselves; titel and CP of the grades are taken over

Workload
60 hours

T 6.93 Course: Seminar Construction Machinery [T-BGU-111907]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-105921 - Seminar Construction Machinery

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	6	Grade to a third	Each summer term	1 terms	1

Events					
ST 2025	6241816	Seminar Construction Machinery	4 SWS	Seminar / 🗣	Schneider

Legend: Online, Blended (On-Site/Online), 🗣 On-Site, × Cancelled

Competence Certificate
portfolio:

report appr. 15 pages
presentation appr. 30 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
180 hours

T 6.94 Course: Student Research Project 'Building Preservation of Concrete and Masonry Constructions' [T-BGU-100175]

Responsible: Dr.-Ing. Michael Vogel
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-100058 - Building Preservation of Concrete and Masonry Constructions

Type	Credits	Grading scale	Recurrence	Expansion	Version
Completed coursework	1	pass/fail	Each summer term	1 terms	2

Events					
ST 2025	6211811	Protection, Rehabilitation and Reinforcement of Concrete and Masonry Constructions	2 SWS	Lecture / 🗣	Vogel
ST 2025	6211812	Exercises to Protection, Rehabilitation and Reinforcement of Concrete and Masonry Constructions	1 SWS	Practice / 🗣	Vogel
ST 2025	6211813	Building Analysis	1 SWS	Lecture / 🗣	Vogel

Legend: 💻 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
student research paper, 15-20 pages

Prerequisites
none

Recommendation
none

Annotation
none

Workload
40 hours

T 6.95 Course: Student Research Project 'Cost Estimation in Structural Engineering and Earthworks' [T-BGU-108010]

Responsible: Dr.-Ing. Harald Schneider
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-105918 - Production Planning and Control in Construction

Type	Credits	Grading scale	Recurrence	Expansion	Version
Completed coursework	1	pass/fail	Each summer term	1 terms	2

Events					
ST 2025	6241801	Site Management	1 SWS	Lecture / Practice (/ 🗣	N.N.

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
term paper, appr. 15 pages, with test

Prerequisites
none

Recommendation
none

Annotation
none

Workload
30 hours

T 6.96 Course: Student Research Project 'Excavation Pit Development and Shuttering Planning' [T-BGU-108012]

Responsible: Dr.-Ing. Harald Schneider
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-100339 - Machinery and Process Engineering

Type	Credits	Grading scale	Recurrence	Expansion	Version
Completed coursework	1	pass/fail	Each winter term	1 terms	2

Events					
WT 24/25	6241703	Process Engineering	2 SWS	Lecture / 🗣	Schneider, Waleczko
WT 24/25	6243701	Construction Equipment	2 SWS	Lecture / 🗣	Gentes, Dörfler, Schneider

Legend: 💻 Online, 🌸 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
term paper, appr. 15 pages, with test

Prerequisites
none

Recommendation
none

Annotation
none

Workload
30 hours

T 6.97 Course: Student Research Project 'Scheduling and Building Site Facilities' [T-BGU-108011]

Responsible: Dr.-Ing. Harald Schneider
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-100338 - Project Management in Construction and Real Estate Industry

Type	Credits	Grading scale	Recurrence	Expansion	Version
Completed coursework	1	pass/fail	Each winter term	1 terms	2

Events					
WT 24/25	6241701	Construction Project Management	4 SWS	Lecture / Practice (/ 🗣	Haghsheno, Mitarbeiter/innen

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
term paper, appr. 15 pages, with test

Prerequisites
none

Recommendation
none

Annotation
none

Workload
30 hours

T 6.98 Course: Sustainability in Real Estate Management [T-BGU-100149]

Responsible: Prof. Dr.-Ing. Kunibert Lennerts
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-100112 - Sustainability in Real Estate Management

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	6	Grade to a third	Each term	1 terms	1

Events					
ST 2025	6242801	Sustainability in Real Estate Management	3 SWS	Lecture / Practice (/	Lennerts
ST 2025	6242803	Life Cycle Management of Real Estate	1 SWS	Lecture /	Lennerts

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
written exam, 90 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
180 hours

T 6.99 Course: Technical Energy Systems for Buildings 1: Processes & Components [T-MACH-105559]

Responsible: Dr. Ferdinand Schmidt
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106179 - Technical Energy Systems for Buildings

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 24/25	2157200	Technical energy systems for buildings 1: Processes & components	2 SWS	Lecture / 🗣	Schmidt

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
oral exam, approx. 30 minutes

Prerequisites
none

Workload
120 hours

T 6.100 Course: Technical Energy Systems for Buildings 2: System Concept [T-MACH-105560]

Responsible: Dr. Ferdinand Schmidt
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106179 - Technical Energy Systems for Buildings

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2025	2158201	Technical energy systems for buildings 2: System concepts	2 SWS	Lecture / 🗣	Schmidt

Legend: 🖳 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral exam, approx. 30 minutes

Prerequisites
none

Workload
120 hours

T 6.101 Course: Technology and Production Methods in Turnkey Construction and Civil Engineering Works [T-BGU-111899]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-105913 - Technology and Production Methods in Turnkey Construction and Civil Engineering Works

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	6	Grade to a third	Each term	1 terms	1

Events					
ST 2025	6241808	Turnkey Construction	2 SWS	Lecture / Practice (/	Teizer
ST 2025	6241810	Civil Engineering Structures and Regenerative Energies	2 SWS	Lecture / Practice (/	Haghsheno, Mitarbeiter/innen

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
written exam, 90 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
180 hours

T 6.102 Course: Term Paper Upgrading of Existing Buildings and Energetic Refurbishment [T-BGU-100621]

Responsible: Prof. Dr.-Ing. Kunibert Lennerts
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-100108 - Upgrading of Existing Buildings and Energetic Refurbishment

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	1,5	Grade to a third	Each winter term	1 terms	1

Events					
WT 24/25	6240901	Bauen im Bestand	3 SWS	Lecture / Practice (/ 🗣	Lennerts, Schneider
WT 24/25	6240903	Energetic Refurbishment	1 SWS	Lecture / 🗣	Kropp, Münzl, Schneider

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
term paper, appr. 10 pages, and
presentation, appr. 10 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
40 hours

T 6.103 Course: Traffic Management und Simulation Methods [T-BGU-100008]

Responsible: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-100015 - Traffic Management and Simulation Methods

Type	Credits	Grading scale	Recurrence	Expansion	Version
Oral examination	6	Grade to a third	Each term	1 terms	2

Events					
ST 2025	6232802	Traffic Management and Telematics	2 SWS	Lecture / Practice (/	Vortisch
ST 2025	6232804	Traffic Simulation	2 SWS	Lecture / Practice (/	Vortisch, Mitarbeiter/innen

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
oral exam, appr. 20 min.

Prerequisites
Exercise Transportation Data Analysis must be passed

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-BGU-113971 - Exercise Transportation Data Analysis must have been passed.

Recommendation
none

Annotation
as from summer term 2025 the Exercise Transportation Data Analysis will be implemented as examination prerequisite

Workload
180 hours

T 6.104 Course: Upgrading of Existing Buildings and Energetic Refurbishment [T-BGU-108001]

Responsible: Prof. Dr.-Ing. Kunibert Lennerts
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-100108 - Upgrading of Existing Buildings and Energetic Refurbishment

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	4,5	Grade to a third	Each term	1 terms	1

Events					
WT 24/25	6240901	Bauen im Bestand	3 SWS	Lecture / Practice (/ 🗣	Lennerts, Schneider
WT 24/25	6240903	Energetic Refurbishment	1 SWS	Lecture / 🗣	Kropp, Münzl, Schneider

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam, 70 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
140 hours

T 6.105 Course: Urban Management [T-BGU-108442]

Responsible: Prof. Dr. Anke Karmann-Woessner
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-100013 - Urban Renewal

Type	Credits	Grading scale	Recurrence	Expansion	Version
Oral examination	2	Grade to a third	Each term	1 terms	2

Events					
WT 24/25	6231801	City Management	2 SWS	Lecture / Practice (/	Karmann-Woessner
ST 2025	6231801	City Management	2 SWS	Lecture / Practice (/	Karmann-Woessner

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
oral exam, appr. 15 min.

Prerequisites
The Examination Prerequisite Urban Management (T-BGU-113672) has to be passed.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-BGU-113672 - Examination Prerequisite Urban Management must have been passed.

Recommendation
none

Annotation
Please note:

The course Urban Management (6231801), 2 HpW/SWS, was exceptionally not offered in the summer semester 2024 but is offered in the winter semester 2024/25.

Workload
60 hours

T 6.106 Course: Urban Typologies [T-ARCH-107374]

Responsible: Prof. Markus Neppl
Organisation: KIT Department of Architecture
Part of: M-ARCH-103632 - Urban Typologies

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4	Grade to a third	Each summer term	1

Events					
ST 2025	1731097	Urban Typologies: Architecture Journalism Workshop: We Write About Architecture	4 SWS	Seminar / 🗣	Coenen

Legend: 💻 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Other examination requirements consisting of an oral presentation of the work results (duration approx. 15 minutes).

Prerequisites
none

T 6.107 Course: Virtual Engineering II [T-MACH-102124]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-105992 - Virtual Engineering Construction - B

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each summer term	3

Events					
ST 2025	2122378	Virtual Engineering II		Lecture / Practice (/	Häfner, Ovtcharova

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
written exam, 90 min.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
120 hours

T 6.108 Course: Virtual Engineering Lab [T-MACH-106740]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-105992 - Virtual Engineering Construction - B

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4	Grade to a third	Each term	1

Events					
WT 24/25	2123350	Virtual Engineering Lab	3 SWS	Project (P / 🗣	Ovtcharova, Häfner

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
preparation of an VR application in a team

Prerequisites
none

Recommendation
none

Annotation
none

Workload
120 hours