Course Handbook Civil Engineering Master

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Civil Engineering Master - mandatory courses (overview)

Module name (EN)	Code	SAP-P	Semester	Hours per semester week / Teaching method	ECTS	Module coordinator
Building in Virtual Space	DFMCE-130	P630-0135	1	6VU	6	Prof. Dr.-Ing. Peter Böttcher
Construction Management 6	DFMCE-141		1	4VU	6	Professor/innen des Studiengangs
Construction Management 7	DFMCE-142		1	2VU	2	Professor/innen des Studiengangs
Deutsch 1	DFMCE-101	P630-0125	1	4VU	4	Dr. Julia Frisch
English 1	DFMCE-103	P630-0126	1	2VU	2	Dr. Julia Frisch
French I	DFMCE-102	P630-0128	1	4VU	4	Dr. Julia Frisch
Intercultural Management 1	DFMCE-104	P630-0127	1	2VU	2	Dr. Julia Frisch
Master Thesis	DFMCE-301	T630-0167	3	-	30	Professor/innen des Studiengangs
Operations Management in the Construction Sector 7	DFMCE-140		1	2VU	2	Studienleitung
Rail Traffic	DFMCE-160	P630-0129	1	4VU	6	Prof. Dr.-Ing. Thorsten Cypra

Module name (EN)	Code	SAP-P	Semester	Hours per semester week / Teaching method	ECTS	Module coordinator
Rainwater Treatment, Maintenance of Drainage and Sewer Systems	DFMCE-165	P630-0132	1	4VU	6	Prof. Dr.-Ing. Joachim Dettmar
Safety + Health Protection on Construction Sites	DFMCE-180	P610-0534, P630-0134	1	2VU	2	Prof. Dr.-Ing. Peter Böttcher
Sustainable Urban Planning	DFMCE-169	P630-0131	1	4VU	6	Prof. Dipl.-Ing. Frank Baur

(13 modules)

Civil Engineering Master - optional courses (overview)

Module name (EN)	Code	SAP-P	Semester	Hours per semester week / Teaching method	ECTS	Module coordinator
Specialist Underground Civil Engineering and Tunnel Building	DFMCE-172	P110-0170	2	4VU	6	Prof. Dr.-Ing. Stefan Jung

(1 module)

Civil Engineering Master - mandatory courses

Building in Virtual Space

Module name (EN): Building in Virtual Space
Degree programme: Civil Engineering, Master, ASPO 01.10.2019
Module code: DFMCE-130

Hours per semester week / Teaching method:
6VU (6 hours per week)

ECTS credits:
6

Semester: 1

Mandatory course: yes

Language of instruction:
German

Assessment:
Project with presentation

[*updated 28.09.2020*]

Applicability / Curricular relevance:

BIMA194 (P110-0094) Civil and structural engineering, Master, ASPO 01.10.2017 , semester 1, optional course
BMA401 (P110-0171) Civil and structural engineering, Master, ASPO 01.04.2022 , semester 1, optional course
DFMCE-130 (P630-0135) Civil Engineering, Master, ASPO 01.10.2019 , semester 1, mandatory course

Workload:
90 class hours (= 67.5 clock hours) over a 15-week period.
The total student study time is 180 hours (equivalent to 6 ECTS credits).
There are therefore 112.5 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Prof. Dr.-Ing. Peter Böttcher

Lecturer: Prof. Dr.-Ing. Peter Böttcher

[*updated 09.08.2020*]

Learning outcomes:
Knowledge _ After successfully completing this module, students will:
_ be able to use scientific methods to deepen their knowledge of organizational theory, virtual realities, digital building models (BIM) and their interaction.
Skills _ After successfully completing this module, students will:
_ be able to combine construction site processes into one and design a new concept on the basis of digital building models (synthesis),
_ be able to evaluate, explain and discuss comprehensive subject-specific concepts and plans. They will be able to form an opinion in order to solve a task correctly (evaluation).
Competences _ After successfully completing this module, students will be able to,

_ plan independently and with foresight, set priorities and adhere to a given time frame (organization),
_ understand and classify extensive and complex issues and boil them down to the most important core aspects (analysis),
_ work independently on specific tasks and problems (independence),
_ examine their own organizational structures and covert it into a portfolio of tasks with varying degrees of difficulty (management),
_ Foreign students will be able to deal with the cultural differences in Germany and operate successfully in the country using their country-specific and linguistic skills and knowledge.

[*updated 28.09.2020*]

Module content:
_ Business process management
_ Business process management, ARIS and EPC nets, process modeling
_ Digital building models
_ BIM, analysis of operating systems, 3D models in SketchUp, interfaces used during the planning and construction process
_ Virtual reality
_ 3-D technology, 3-D planning processes, data flow Revit to 3-D web, structure of 3-D models, working in a virtual reality, Compass planning platform

[*updated 28.09.2020*]

Teaching methods/Media:
_ The students will develop a business process with a digital building model and demonstrate its functionality via virtual reality. They must do this independently and then apply the corresponding operational structures

[*updated 28.09.2020*]

Recommended or required reading:
_ A current list of literature will be made available to students at the beginning of the semester.

[*updated 28.09.2020*]

Construction Management 6

Module name (EN): Construction Management 6

Degree programme: Civil Engineering, Master, ASPO 01.10.2019

Module code: DFMCE-141

Hours per semester week / Teaching method:
4VU (4 hours per week)

ECTS credits:
6

Semester: 1

Mandatory course: yes

Language of instruction:
German

Assessment:
Written exam, 90 min.

[*updated 13.05.2025*]

Applicability / Curricular relevance:

DFMCE-141 Civil Engineering, Master, ASPO 01.10.2019 , semester 1, mandatory course

Workload:
60 class hours (= 45 clock hours) over a 15-week period.
The total student study time is 180 hours (equivalent to 6 ECTS credits).
There are therefore 135 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Professor/innen des Studiengangs

Lecturer:
Professor/innen des Studiengangs

[*updated 29.04.2025*]

Learning outcomes:
After successfully completing this module, students will be able to:
analyze basic aspects of site evaluations.
develop basic concepts for the installation of wind farms.
perform and evaluate basic analyses of weather risk.
They will have the skills to:
apply various aspects of project management under new conditions for large-scale projects, e.g., using the principles of planning a construction site for the development of a deck layout for installation vessels.
critically question and evaluate existing installation concepts and develop suggestions for improvement.
work independently on specific tasks and problems (independence).

[*updated 13.05.2025*]

Module content:
Basics of onshore and offshore wind energy
Basic environmental conditions (wind, waves, currents, etc.)
Construction of wind turbines, balance of plant and offshore wind farms
Basic evaluations of economic efficiency
Basic concepts for the installation of offshore wind farms
Overview of the operational phases of wind farms

[*updated 13.05.2025*]

Teaching methods/Media:
Students will apply the methods developed to a virtual offshore
wind farm in the course of the module.

[*updated 13.05.2025*]

Recommended or required reading:
At the beginning of the semester resp. during the lecture, students will be provided with an current literature list
for the module.

[*updated 13.05.2025*]

Construction Management 7

Module name (EN): Construction Management 7

Degree programme: Civil Engineering, Master, ASPO 01.10.2019

Module code: DFMCE-142

Hours per semester week / Teaching method:
2VU (2 hours per week)

ECTS credits:
2

Semester: 1

Mandatory course: yes

Language of instruction:
German

Assessment:
Written exam, 90 min.

[*updated 13.05.2025*]

Applicability / Curricular relevance:

DFMCE-142 Civil Engineering, Master, ASPO 01.10.2019 , semester 1, mandatory course

Workload:
30 class hours (= 22.5 clock hours) over a 15-week period.
The total student study time is 60 hours (equivalent to 2 ECTS credits).
There are therefore 37.5 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Professor/innen des Studiengangs

Lecturer:
Professor/innen des Studiengangs

[*updated 29.04.2025*]

Learning outcomes:
Knowledge - After successfully completing this course, students will have a solid understanding of subject-specific basics.
in the philosophy of the SE (Systems Engineering) approach
Basics and application of the SE approach
Methods of the SE approach
Skills - After successfully completing this module, students will be able to:
name and define terms related to SE (knowledge)
explain the four basic strategies and methodologies of SE (understanding)
transfer the SE approach to construction projects
describe, classify, and identify learning content Students will be able to solve familiar tasks and problems independently (understanding)

[*updated 13.05.2025*]

Module content:
- Introduction to the philosophy of SE
- Basic principles and application of the SE concept
- Methods of the SE concept

[*updated 13.05.2025*]

Recommended or required reading:
Haberfellner/de Weck/ Fricke: Systems Engineering: Grundlagen und Anwendung; orell füssli 2025

[*updated 13.05.2025*]

Deutsch 1

Module name (EN): Deutsch 1

Degree programme: Civil Engineering, Master, ASPO 01.10.2019

Module code: DFMCE-101

Hours per semester week / Teaching method:
4VU (4 hours per week)

ECTS credits:
4

Semester: 1

Mandatory course: yes

Language of instruction:
German

Assessment:
Written exam (50%) and tests (50%)

[*updated 21.10.2024*]

Applicability / Curricular relevance:

DFMCE-101 (P630-0125) Civil Engineering, Master, ASPO 01.10.2019 , semester 1, mandatory course

Workload:
60 class hours (= 45 clock hours) over a 15-week period.
The total student study time is 120 hours (equivalent to 4 ECTS credits).
There are therefore 75 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Dr. Julia Frisch

Lecturer:
Dozierende des Studiengangs

[*updated 25.03.2025*]

Learning outcomes:
The module is based on level C1 of the CEFR.

After successfully completing this module, students will:
be able to understand the content of longer, demanding texts on current topics as well as engineering presentations within and outside their subject area and grasp implicit meanings.
have acquired the productive and receptive language skills required for communication in their studies and everyday life.
be able to express themselves in a clear, structured and logically comprehensible manner on current topics from science and society, write a comprehensive written paper on topics from their field of interest or specialization and give a comprehensible lecture/presentation.
be able to apply the central rules of grammar at C1 level.
be able to implement strategies for autonomous learning in order to make their own learning process more effective and improve their own learning ability.

[*updated 21.10.2024*]

Module content:
In this module, students will develop their knowledge of German as a foreign language at an advanced written language level, taking into account subject-related and intercultural aspects.

Based on reading, audio and video examples of current topics of general and subject-specific interest, as well as with the help of selected exercises on vocabulary and grammar, students will review and deepen the strategies that enable them to communicate confidently and fluently in the foreign language.

After successfully completing this module, students will:
be able to review and deepen their knowledge of different types of texts and writing styles,
have expanded their ability to analyze, summarize and critically comment on complex issues, to grasp nuances of meaning and to deepen the accuracy of expression.
have improved their knowledge of selected grammatical structures.

[*updated 21.10.2024*]

Teaching methods/Media:
Additional teaching methods and media:
The learning content is developed in a communicative and action-oriented manner with targeted listening, reading and speaking exercises in individual, partner and group work.
Students will review and deepen selected aspects of grammar in self-study with given (online) materials (on Moodle).
Multimedia-supported teaching and learning material, also online

[*updated 21.10.2024*]

Recommended or required reading:
Recommended literature and working materials will be announced and made available during the course.

[*updated 21.10.2024*]

English 1

Module name (EN): English 1

Degree programme: Civil Engineering, Master, ASPO 01.10.2019

Module code: DFMCE-103

Hours per semester week / Teaching method:
2VU (2 hours per week)

ECTS credits:
2

Semester: 1

Mandatory course: yes

Language of instruction:
English

Assessment:
Written exam (50%) and tests (50%)

[*updated 21.10.2024*]

Applicability / Curricular relevance:

DFMCE-103 (P630-0126) Civil Engineering, Master, ASPO 01.10.2019 , semester 1, mandatory course

Workload:
30 class hours (= 22.5 clock hours) over a 15-week period.
The total student study time is 60 hours (equivalent to 2 ECTS credits).
There are therefore 37.5 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Dr. Julia Frisch

Lecturer:
Dozierende des Studiengangs

[*updated 25.03.2025*]

Learning outcomes:
After successfully completing this module, students will:
understand topic-related English-language specialist texts and product descriptions from the field of engineering science and be able to adequately reproduce their content
have expanded their subject-specific vocabulary as well as their knowledge of situationally appropriate language registers and consolidate both through oral and written practice
be able to explain technical constructions and mechanisms of action using the appropriate language
be able to write their own technical texts such as short reports, descriptions of laboratory experiments and project/product descriptions

[*updated 21.10.2024*]

Module content:
In coordination with the DFHI Master´s degree programs in Electrical Engineering, Computer Science and European Construction Management, the content is based on common general and technical language requirements and expands on the content covered in English 1. The initial level is therefore B1+/B2.
Technical language used in technical standards and instructions
Describing technical systems (on the basis of authentic technical texts, videos, etc.)
Describing cause and effect based on technical systems (language of cause and effect, passive voice)
Composing instructions and reports (test protocols, laboratory reports, test reports)
The changing working world (digitalization)
Presentation techniques and the structure of presentations

[*updated 21.10.2024*]

Teaching methods/Media:
The learning content is developed in a communicative and action-oriented manner with targeted listening, reading and speaking exercises in individual, partner and group work.
Short written or oral reviews of learning progress are possible at any time.

[*updated 21.10.2024*]

Recommended or required reading:
Multimedia-supported teaching and learning material to intensify teaching will be provided in the course and via Moodle.

[*updated 21.10.2024*]

French I

Module name (EN): French I

Degree programme: Civil Engineering, Master, ASPO 01.10.2019

Module code: DFMCE-102

Hours per semester week / Teaching method:
4VU (4 hours per week)

ECTS credits:
4

Semester: 1

Mandatory course: yes

Language of instruction:
French

Assessment:
Written exam (50%) and tests (50%)

[*updated 21.10.2024*]

Applicability / Curricular relevance:

DFMCE-102 (P630-0128) Civil Engineering, Master, ASPO 01.10.2019 , semester 1, mandatory course

Workload:
60 class hours (= 45 clock hours) over a 15-week period.
The total student study time is 120 hours (equivalent to 4 ECTS credits).
There are therefore 75 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Dr. Julia Frisch

Lecturer:
Dozierende des Studiengangs

[*updated 25.03.2025*]

Learning outcomes:
The module is based on level C1 of the CEFR.
After successfully completing this module, students will:
- be able to understand more complex texts, such as scientific articles or technical literature, in French in detail and analyze them adequately,
- be able to use the relevant specialist terminology from the subject area in French in a form relevant to communication,
and competently develop communication strategies for demanding professional situations in international management and apply them accordingly,
- be able to give academic presentations in French and conduct academic discussions in the foreign language while competently representing their points of view,
- be able to negotiate and hold technical discussions in French without any problems and communicate in the same way in general,
and write complex written reports in French in an appropriate form.

[*updated 21.10.2024*]

Module content:
Listening comprehension, reading comprehension, speaking, writing (work-related writing)
In addition, for example.: Professional problem solving strategies (national and international)
Presentations (work-related topics)
Grammar
Vocabulary (focus on technical terms)
Problem solving strategies for professional situations
Technical language used in technical standards and instructions
Describing technical systems (on the basis of authentic technical texts, videos, etc.)

[*updated 21.10.2024*]

Teaching methods/Media:
The learning content is developed in a communicative and action-oriented manner with targeted listening, reading and speaking exercises in individual, partner and group work.
Students will review and deepen selected aspects of grammar in self-study with given (online) materials (on Moodle).
Multimedia-supported teaching and learning material, also online

[*updated 21.10.2024*]

Recommended or required reading:
Recommended literature and working materials will be announced and made available during the course.

[*updated 21.10.2024*]

Intercultural Management 1

Module name (EN): Intercultural Management 1

Degree programme: Civil Engineering, Master, ASPO 01.10.2019

Module code: DFMCE-104

Hours per semester week / Teaching method:
2VU (2 hours per week)

ECTS credits:
2

Semester: 1

Mandatory course: yes

Language of instruction:
German

Assessment:
Written exam 60 min. (50%) and presentation (50%)

[*updated 21.10.2024*]

Applicability / Curricular relevance:

DFMCE-104 (P630-0127) Civil Engineering, Master, ASPO 01.10.2019 , semester 1, mandatory course

Workload:
30 class hours (= 22.5 clock hours) over a 15-week period.
The total student study time is 60 hours (equivalent to 2 ECTS credits).
There are therefore 37.5 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Dr. Julia Frisch

Lecturer:
Maha Tischer, Diplômée de Maîtrise

[*updated 25.03.2025*]

Learning outcomes:
After successfully completing this module, students will:

be able to weigh up different models of intercultural competence(s) against each other
be able to explain strategies for acquiring intercultural competence(s)
be able to work on smaller intercultural training units as part of a simulation/management game
be able to discuss the Euro/US-centric perspective of various common studies and models in the field of intercultural business communication

[*updated 21.10.2024*]

Module content:
Constructive intercultural management
Intercultural learning and intercultural forms of training
Change of perspective: working with multicultural colleagues and team members in the company or within their own projects
Opportunities, limits and risks of comparative cultural models in everyday working life
Case studies and practical exercises
Possible focuses: Europe outside of Germany and France, USA

[*updated 21.10.2024*]

Teaching methods/Media:
Lecturer presentations
(Interactive) exercises and case studies
Group work
Digital content via moodle

[*updated 21.10.2024*]

Recommended or required reading:
Will be announced in the course
Multimedia-supported teaching and learning material to intensify teaching will be provided in the course and via Moodle.

[*updated 21.10.2024*]

Master Thesis

Module name (EN): Master Thesis

Degree programme: Civil Engineering, Master, ASPO 01.10.2019

Module code: DFMCE-301

Hours per semester week / Teaching method:
-

ECTS credits:
30

Semester: 3

Mandatory course: yes

Language of instruction:
German

Assessment:

[*still undocumented*]

Applicability / Curricular relevance:

BIMA320 (T110-0107) Civil and structural engineering, Master, ASPO 01.04.2012 , semester 3, mandatory course
BIMA320 (T110-0107) Civil and structural engineering, Master, ASPO 01.04.2015 , semester 3, mandatory course
BIMA320 (T110-0107) Civil and structural engineering, Master, ASPO 01.10.2017 , semester 3, mandatory course
BMA105 (T110-0108) Civil and structural engineering, Master, ASPO 01.04.2022 , semester 3, mandatory course
DFMCE-301 (T630-0167) Civil Engineering, Master, ASPO 01.10.2019 , semester 3, mandatory course

Workload:
The total student study time for this course is 900 hours.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Professor/innen des Studiengangs

Lecturer: Professor/innen des Studiengangs

[*updated 09.08.2020*]

Learning outcomes:
After successfully completing this module, students will:
_ be able to work independently on a special or interdisciplinary topic from the field of civil engineering using scientific methods within a given time period and document their results in writing.

[*updated 28.09.2020*]

Module content:
_ Students are given approx. four months to write their Master thesis. It must be written independently and in the style of a scientific paper. The student´s personal contribution must be clearly recognizable in their thesis. The written thesis is an essential component of the assessment work. Both the approach and the result(s) of the work must be described.
_ The results will be presented by the student in a public lecture with a scientific discourse.
_ This presentatioon of the thesis by the resp. student shows that he/she has mastered not only the written but also the verbal presentation of their results within a given time period, in a clearly structured manner and that they can answer questions on their respective topic.
_ There will be a regular exchange between the student and his/her supervisor during the period in which the student is writing his/her thesis. This will allow the supervisor to take countermeasures in good time, should the student require guidance during the period in which they are writing their thesis.

[*updated 28.09.2020*]

Teaching methods/Media:
_ Independent work

[*updated 28.09.2020*]

Recommended or required reading:
Independent research

[*updated 28.09.2020*]

Operations Management in the Construction Sector 7

Module name (EN): Operations Management in the Construction Sector 7

Degree programme: Civil Engineering, Master, ASPO 01.10.2019

Module code: DFMCE-140

Hours per semester week / Teaching method:
2VU (2 hours per week)

ECTS credits:
2

Semester: 1

Mandatory course: yes

Language of instruction:
German

Assessment:
Oral

[*updated 13.05.2025*]

Applicability / Curricular relevance:

DFMCE-140 Civil Engineering, Master, ASPO 01.10.2019 , semester 1, mandatory course

Workload:
30 class hours (= 22.5 clock hours) over a 15-week period.
The total student study time is 60 hours (equivalent to 2 ECTS credits).
There are therefore 37.5 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Studienleitung

Lecturer:
Studienleitung

[*updated 29.04.2025*]

Learning outcomes:
Proficiency - After successfully completing this module, students will:
have deepened their subject-specific knowledge of data collection based on REFA methodology.

Skills - After successfully completing this module, students will:
be able to combine the parameters for data collection and design new work systems (synthesis).

Competences - After successfully completing this module, students will:
be able to work independently on specific tasks and problems (independence).
Foreign students will be able to deal with the cultural differences in Germany and operate successfully in the country using their country-specific and linguistic skills and knowledge.

[*updated 13.05.2025*]

Module content:
Data collection / REFA methodology
Fundamentals of work science according to REFA
Basics of data collection, time types, process types
Methods of data collection, work sampling, comparison and estimation, individual time recording
Development of time catalogs
Basics of ergonomics

[*updated 13.05.2025*]

Teaching methods/Media:
Special features/methodology:

Data collection / REFA methodology
Conducting a work sampling study

[*updated 13.05.2025*]

Recommended or required reading:
Data collection / REFA methodology
REFA; Datenermittlung Methodenlehre der Betriebsorganisation, Hanser Verlag 1997
REFA; Datenermittlung in der Baupraxis; ztv-Verlag 1986
Böttcher, Peter; Arbeitsgestaltung im Baubetrieb; htw saar; YouTube.de; 2021
Haller-Wedel; Multimoment Aufnahmen in Theorie und Praxis; Hanser-Verlag 1962

[*updated 13.05.2025*]

Rail Traffic

Module name (EN): Rail Traffic

Degree programme: Civil Engineering, Master, ASPO 01.10.2019

Module code: DFMCE-160

Hours per semester week / Teaching method:
4VU (4 hours per week)

ECTS credits:
6

Semester: 1

Mandatory course: yes

Language of instruction:
German

Assessment:
Written exam

[*updated 28.09.2020*]

Applicability / Curricular relevance:

BIMA140 (P110-0115) Civil and structural engineering, Master, ASPO 01.04.2012 , semester 1, optional course
BIMA140 (P110-0115) Civil and structural engineering, Master, ASPO 01.04.2015 , semester 1, optional course,
BIMA140 (P110-0115) Civil and structural engineering, Master, ASPO 01.10.2017 , semester 1, optional course,
DFMCE-160 (P630-0129) Civil Engineering, Master, ASPO 01.10.2019 , semester 1, mandatory course,

Workload:
60 class hours (= 45 clock hours) over a 15-week period.
The total student study time is 180 hours (equivalent to 6 ECTS credits).
There are therefore 135 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Prof. Dr.-Ing. Thorsten Cypra

Lecturer: Prof. Dr.-Ing. Thorsten Cypra

[*updated 09.08.2020*]

Learning outcomes:
After successfully completing this module, students will:
_ have acquired the technical competence to design systems for rail-bound traffic and implement them in practical designs.
_ be able to apply the special features characteristic for the operation of such transport systems and the legal principles, as well as the scientific findings to practice-oriented problems.

[*updated 28.09.2020*]

Module content:
_ Overview of rail-bound transportation systems
_ Legal principles, definitions
_ Designing railway systems in terms of their position and elevation (driving dynamics, routing, switches, railway crossings)
_ Operational infrastructure
_ Dimensioning the superstructure
_ Technical equipment (signalling systems, overhead line, block division)
_ Planning for railways (HOAI, approval procedure, tender)

[*updated 28.09.2020*]

Recommended or required reading:
EBO: Eisenbahn Bau- und Betriebsordnung mit Kommentar von Thoma, Dr.-Ing. Alfons, Hestra Verlag;
Fiedler: Bahnwesen, Werner-Verlag
Matthews, Volker: Bahnbau, Vieweg + Teubner- Verlag
Schiemann, Wolfgang: Schienenverkehrstechnik, Vieweg + Teubner- Verlag

[*updated 28.09.2020*]

Rainwater Treatment, Maintenance of Drainage and Sewer Systems

Module name (EN): Rainwater Treatment, Maintenance of Drainage and Sewer Systems

Degree programme: Civil Engineering, Master, ASPO 01.10.2019

Module code: DFMCE-165

Hours per semester week / Teaching method:
4VU (4 hours per week)

ECTS credits:
6

Semester: 1

Mandatory course: yes

Language of instruction:
German

Assessment:
Written exam

[*updated 28.09.2020*]

Applicability / Curricular relevance:

BIMA340 (P110-0113) Civil and structural engineering, Master, ASPO 01.04.2012 , semester 3, optional course
BIMA340 (P110-0113) Civil and structural engineering, Master, ASPO 01.04.2015 , semester 3, optional course
BIMA340 (P110-0113) Civil and structural engineering, Master, ASPO 01.10.2017 , semester 3, optional course
DFMCE-165 (P630-0132) Civil Engineering, Master, ASPO 01.10.2019 , semester 1, mandatory course

Workload:
60 class hours (= 45 clock hours) over a 15-week period.
The total student study time is 180 hours (equivalent to 6 ECTS credits).
There are therefore 135 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Prof. Dr.-Ing. Joachim Dettmar

Lecturer: Prof. Dr.-Ing. Joachim Dettmar

[*updated 09.08.2020*]

Learning outcomes:
After successfully completing this module, students will:
_ recognize and understand the connection between wastewater disposal, flood and environmental protection based on lectures on wastewater treatment (Bachelor).
_ understand how important integral and interdisciplinary task processing is.
_ understand complex physical and hydraulic interrelationships and methods and can thus develop economically and ecologically optimized planning concepts for the construction, operation and maintenance of sewage systems and integrated special structures.
_ be able to apply scientific methods and scientific findings to solving new problems, as well as processing practice-oriented tasks.

[*updated 28.09.2020*]

Module content:
_ Hydrological and hydrodynamic methods and models for sewer network and pollution load calculation;
_ Methods for limiting the input of pollutants in water;
_ Methods for preserving/optimizing the hydraulic performance and structural maintenance of sewer systems.

[*updated 28.09.2020*]

Recommended or required reading:
_ DWA rules and regulations: Worksheets: A110, A118, A128, A166, Information sheets: M176, M143, M149
_ DWA-Handbuch zur Abwasserableitung (Bauhaus-Universität Weimar)

_ Schröder: Hydraulische Methoden zur Erfassung von Rauheiten (DVWK-Schriftenreihe)
_ Hager: Fließformeln für turbulente Strömungen
_ Althaus: Vergleich von Modellregen zur Kanalnetzberechnung (Institut Hydr. TU Hannover)
_ Euler u. a.: Die Berechnung des Schmutzfrachtabflusses aus Niederschlägen

[*updated 28.09.2020*]

Safety + Health Protection on Construction Sites

Module name (EN): Safety + Health Protection on Construction Sites

Degree programme: Civil Engineering, Master, ASPO 01.10.2019

Module code: DFMCE-180

Hours per semester week / Teaching method:
2VU (2 hours per week)

ECTS credits:
2

Semester: 1

Mandatory course: yes

Language of instruction:
German

Assessment:
Project with presentation

[*updated 28.09.2020*]

Applicability / Curricular relevance:

BIMA195 (P110-0116) Civil and structural engineering, Master, ASPO 01.10.2017 , semester 1, optional course
DFMCE-180 (P610-0534, P630-0134) Civil Engineering, Master, ASPO 01.10.2019 , semester 1, mandatory course

Workload:
30 class hours (= 22.5 clock hours) over a 15-week period.
The total student study time is 60 hours (equivalent to 2 ECTS credits).
There are therefore 37.5 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Prof. Dr.-Ing. Peter Böttcher

Lecturer: Prof. Dr.-Ing. Peter Böttcher

[*updated 09.08.2020*]

Learning outcomes:

[*still undocumented*]

Module content:

[*still undocumented*]

Recommended or required reading:

[*still undocumented*]

Sustainable Urban Planning

Module name (EN): Sustainable Urban Planning

Degree programme: Civil Engineering, Master, ASPO 01.10.2019

Module code: DFMCE-169

Hours per semester week / Teaching method:
4VU (4 hours per week)

ECTS credits:
6

Semester: 1

Mandatory course: yes

Language of instruction:
German

Assessment:
Project work with presentation (presentation accounts for 20% of the grade)

[*updated 05.06.2025*]

Applicability / Curricular relevance:

BIMA351 (P110-0109) Civil and structural engineering, Master, ASPO 01.10.2017 , semester 3, optional course

BMA211 (P110-0165) Civil and structural engineering, Master, ASPO 01.04.2022 , semester 1, optional course, course inactive since 02.12.2024
DFMCE-169 (P630-0131) Civil Engineering, Master, ASPO 01.10.2019 , semester 1, mandatory course

Workload:
60 class hours (= 45 clock hours) over a 15-week period.
The total student study time is 180 hours (equivalent to 6 ECTS credits).
There are therefore 135 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Prof. Dipl.-Ing. Frank Baur

Lecturer: Prof. Dipl.-Ing. Frank Baur

[*updated 09.08.2020*]

Learning outcomes:
After successfully completing this module, students will:

be able to independently link existing knowledge of technical infrastructure planning with the aspects and requirements of sustainable urban planning in order to derive holistic solutions.

be able to develop an ecological, economic, and strategic understanding of the effects of regional and global interrelationships on the necessity of integrated urban planning, taking social aspects into account.

be familiar with municipal decision-making processes and stakeholders in connection with the implementation of the developed solutions.

be able to apply the knowledge they have acquired and the solutions they have derived from it in the context of specific, interdisciplinary projects, to substantiate them with arguments, and to defend them in situational discussions.

[*updated 05.06.2025*]

Module content:
Due in no small part to the commitments made at climate protection conferences in recent years, the foreseeable shortage of essential raw materials, and the already apparent effects of climate change, we must rethink urban planning. In particular, building planning and infrastructure aspects must be realigned with regard to their impact on climate protection, adaptation to climate change, and resource conservation, while taking demographic developments and social aspects into account. Keywords such as urban densification, solar architecture, sustainable mobility concepts, zero-emission strategies, sufficiency and efficiency, regional material cycles, and water-sensitive urban development are becoming increasingly important. In this context, there is also a need for greater integration between urban planning, infrastructure planning, and architecture (function and design). The following content will be developed in this module:

General potential for optimization, e.g., in the areas of mobility, energy supply, building materials/structural design, regional material cycles, supply/disposal, climate impact issues, etc.

Aspects of sustainable urban planning; linking architectural and engineering planning approaches.

Working on a specific case study (neighborhood in the district) until a solution is found, taking into account the identified potential for improvement and the possible interests of those affected.

Technical, environmental, and economic evaluation of the approach.

Situational presentation, explanation, and defense of the approach.

[*updated 05.06.2025*]

Teaching methods/Media:
The project work is accompanied by keynote lectures/presentations on selected topics (e.g., water-sensitive urban development, municipal climate protection, stakeholder management, urban planning, mobility, etc.).
Site visits
Development of a neighborhood (preparation of draft plans)

[*updated 05.06.2025*]

Recommended or required reading:
Albers, G.; Wekel, J. (2017): Stadtplanung: Eine illustrierte Einführung. WBG (Wissenschaftliche Buchgesellschaft), aktualisierte Auflage (10. Juli 2017)
Altrock, U.; Bertram, G. (2012): Wer entwickelt die Stadt? Geschichte und Gegenwart lokaler Governance, Akteure Strategien Strukturen
BBR Bund (1997): Leipzig Charta. Informationen zur Raumentwicklung, Heft 4.2010
URL: www.bbr.bund.de/BBSR/DE/Veroeffentlichungen/IzR/2010/4/Inhalt/DL_LeipzigCharta.pdf%3F__blob%3DpublicationFile%26v%3D2
Lynch, K. (1965): Das Bild der Stadt. Neuauflage 2001, Bauwelt Fundamente, Bd. 16, Birkhäuser Verlag
Reicher, C. (2011): Städtebauliches Entwerfen. Vieweg+Teubner Verlag
UN Habitat (2017): New Urban Agenda. (URL: http://habitat3.org/wp-content/uploads/NUA-English.pdf)
Tietz, Hans-Peter: Systeme der Ver- und Entsorgung, Springer Vieweg Verlag (2006)

[*updated 05.06.2025*]

Civil Engineering Master - optional courses

Specialist Underground Civil Engineering and Tunnel Building

Module name (EN): Specialist Underground Civil Engineering and Tunnel Building

Degree programme: Civil Engineering, Master, ASPO 01.10.2019

Module code: DFMCE-172

Hours per semester week / Teaching method:
4VU (4 hours per week)

ECTS credits:
6

Semester: 2

Mandatory course: no

Language of instruction:
German

Assessment:
Written exam

[*updated 28.09.2020*]

Applicability / Curricular relevance:

BIMA280 (P110-0117) Civil and structural engineering, Master, ASPO 01.04.2012 , semester 2, optional course
BIMA280 (P110-0117) Civil and structural engineering, Master, ASPO 01.04.2015 , semester 2, optional course,
BIMA280 (P110-0117) Civil and structural engineering, Master, ASPO 01.10.2017 , semester 2, optional course,
BMA313 (P110-0170) Civil and structural engineering, Master, ASPO 01.04.2022 , semester 2, optional course,
DFMCE-172 (P110-0170) Civil Engineering, Master, ASPO 01.10.2019 , semester 2, optional course

Workload:
60 class hours (= 45 clock hours) over a 15-week period.
The total student study time is 180 hours (equivalent to 6 ECTS credits).
There are therefore 135 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Prof. Dr.-Ing. Stefan Jung

Lecturer: Prof. Dr.-Ing. Stefan Jung

[*updated 01.10.2022*]

Learning outcomes:
After successfully completing this module, students will:
_ have advanced knowledge in the methods of foundation engineering and the geological/geotechnical constraints of tunnel construction.
_ be able to coordinate tunnelling technology and rock behavior.
_ have basic knowledge in the fields of tunnel construction and tunnel equipment.
_ be able to contribute their technical competence in both disciplines to team projects.
_ be able to develop solutions for open, complex problems using scientific methods.

[*updated 28.09.2020*]

Module content:
_ Specialized Underground Civil Engineering: Diaphragm walls, underpinnings, injection technology, jet grouting, vibratory tamping columns, subsoil improvement
_ Tunnel Building: Geological basics, design criteria, construction methods, blasting, mechanical tunnel driving, securing and lining, tunnel equipment, fire protection, stress conditions in the rock, excavation

classes, basics of calculation

[*updated 28.09.2020*]

Recommended or required reading:
_ Eichler et al.: Spezialtiefbau
_ Maybaum et al.: Verfahrenstechnik und Baubetrieb im Grund- und Spezialtiefbau
_ Kolymbas: Tunnelbau und Tunnelmechanik
_ Maidl: Tunnel- und Stollenbau
_ Müller-Salzburg: Der Felsbau _ Tunnelbau

[*updated 28.09.2020*]