# Module Card

**Bachelor Civil Engineering**  
**HCU Hamburg**

<table>
<thead>
<tr>
<th>Module Number</th>
<th>Modul Name</th>
<th>Type (C/CE/E)</th>
<th>Semester (proposed)</th>
<th>Module Coordinator</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIW-B-Mod-101</td>
<td>Engineering Mathematics I</td>
<td>C</td>
<td>1</td>
<td>Prof. Dr.-Ing. Martin Jäschke</td>
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### Subject Area

<table>
<thead>
<tr>
<th>Basics of Civil Engineering Methods</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 Semester</td>
</tr>
</tbody>
</table>

### CP (according to ECTS)

<table>
<thead>
<tr>
<th>Contact Hours/Week (SWS)</th>
<th>Self-study</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 (= 42 h Contact Time)</td>
<td>108 h</td>
</tr>
</tbody>
</table>

### Objectives and Contents

**Objective of Qualification (competencies)**

- Knowledge of the features of elementary functions of analysis
- Mastery of the rules of differential and integral calculus
- Application of geometric and physical/technical tasks

**Contents**

- Fundamentals of differential calculus; Integer sequences and limits, in particular arithmetical and geometric sequences
- Differentiation of power series and rational (linear fractional) functions; Differentiation rules (factor and sum, product, quotient and chain rules), higher order derivatives; Applications: simple tangent and cross-section problems, curvature, extreme value problems
- Fundamentals of integral calculus: Definite and indefinite integrals, fundamental theorem of differential and integral calculus
- Integration by substitution and partial integration
- Applications: calculation of surfaces, centroids, moments of plane area and solids of revolution
- Properties and curve sketching, differentiation, integration of elementary functions, including inverse functions: Trigonometric functions; Trigonometric conversions / addition theorems, trigonometric equations; Exponential, (hyperbolic) and logarithm functions, logarithmic graphing; Examples of use in physics: oscillation / vector diagram

**Recommended Literature**

- Papula, Mathematik für Ingenieure; Vieweg-Verlag, Bd. I und II
- Leupold, W.; u.a.: Mathematik - ein Studienbuch für Ingenieure, Fachbuchverlag Leipzig, Bd. I und II
- Rjasanova, K: Mathematik für Bauingenieure; Hanser-Verlag

**Teaching and Learning Methods**

Lecture (2 Hours per Week) + Practical Seminar (2 Hours per Week) + Tutorial

**Exam(s)**

**Precondition of Examination**

<table>
<thead>
<tr>
<th>Type of Examination</th>
<th>Duration of Examination (if written or oral exam)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written Exam</td>
<td>3 h</td>
</tr>
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</table>

**Composition of Module Mark**

**Mark of Exam**

**Additional Information**

**Previous Knowledge / Conditions for Participation (in form and content)**

Knowledge acquired in preparatory course Mathematics (recommended)

**Applicability of Module**

Successful completion of this module is a prerequisite for the module, Hydraulic Engineering I (required).

**Frequency of Offering**
<table>
<thead>
<tr>
<th>Course Language</th>
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<tbody>
<tr>
<td>valid from:</td>
<td>Sommer Semester 2017</td>
</tr>
<tr>
<td>last updated:</td>
<td>25.09.2018</td>
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### Module Card

**Module Number**: BIW-B-Mod-103  
**Module Name**: Technical Mechanics  
**Type (C/CE/E)**: C  
**Semester (proposed)**: 1  
**Module Coordinator**: Prof. Dr.-Ing. Peter-Matthias Klotz

<table>
<thead>
<tr>
<th>Subject Area</th>
<th>Duration</th>
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<tbody>
<tr>
<td>Basics of Civil Engineering Methods</td>
<td>1 Semester</td>
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<table>
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<th>CP (according to ECTS)</th>
<th>Contact Hours/Week (SWS)</th>
<th>Self-study</th>
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<tbody>
<tr>
<td>5 CP (= 150 h Workload)</td>
<td>5 (= 52.5 h Contact Time)</td>
<td>97.5 h</td>
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### Objectives and Contents

**Objective of Qualification (competencies)**

Students will acquire basic knowledge about the support forces and action-effects of statically determinate structures. They will be able to calculate simple two-dimensional structures.

**Contents**

- Definition of forces and loads: Forces (effect, description, visualization), load assumptions
- Central system of forces: Calculation and drawing methods for adding and breaking down forces, equilibrium of forces
- Non-central system of forces: Calculation and drawing methods for adding and breaking down forces, equilibrium of forces, equilibrium of moments
- Support reaction of one- and several-part frames: Upright, inclined and angled girders, hinged girders, frames, plane frames
- Calculating moment diagrams: Upright, inclined and angled girders, hinged girders, frames, plane frames, torsional moment

### Recommended Literature

- Schneider: Bautabellen
- Bochmann, Michael: Statik im Bauwesen Teil 1 (Statisch bestimmte Systeme); Schumpich: Technische Mechanik Statik
- Lohmeyer: Baustatik 1 Grundlagen und Einwirkungen
- Schatz: Klausurtraining Statik

### Teaching and Learning Methods

Lecture and Practical Seminar (5 Hours per Week)

### Exam(s)

**Precondition of Examination**

- **Type of Examination**: Written Exam
- **Duration of Examination**: 3 h

**Composition of Module Mark**

- **Mark of Exam**:

### Additional Information

**Previous Knowledge / Conditions for Participation (in form and content)**

School-level knowledge in mathematics and physics (recommended)

**Applicability of Module**

Required for the modules Geotechnics I and CAE (mandatory)

**Frequency of Offering**

Every Winter Semester

**Course Language**

German

**Valid from**: Winter Semester 15/16  
**Last updated**: 25.09.2018
Constructing Material Science I

**Objective of Qualification (competencies)**

- Basic knowledge of building materials with reference to their composition, structure, production, processing, mechanical and hygrothermal properties and material-specific damage processes
- Knowledge of measurement methods for determining characteristic material properties in the context of material testing
- Knowledge of structural engineering regulations

This facilitates a critical selection of building materials, and as the case may be, combinations of building materials with regard to their load-bearing capacity and fitness for use, while taking into account exposure conditions and structural engineering regulations.

**Contents**

- Structural engineering regulations
- Structure of materials
- Deformation and strength parameters
- Measurement techniques, non-destructive test procedures
- Metals: metallurgy fundamentals, production, properties, types and identification, welding, corrosion behavior and corrosion control
- Wood and wood-based materials
- Plastics
- Bitumen
- Glass
- Laboratory practical class: testing aggressive chemicals and building materials

**Recommended Literature**


**Teaching and Learning Methods**

Lecture and Practical Seminar (4 Hours per Week)
Practical Laboratory Course I: 5 units, 7,5 h total

**Exam(s)**

**Precondition of Examination**

Successful preliminary test performance, laboratory practical class with 80% mandatory attendance and lab protocols

**Type of Examination**

Pre-Assignment: Documentation of Practical Laboratory Course
Examination: Written Exam

**Duration of Examination (if written or oral exam)**

Written Exam 2 Hours

**Composition of Module Mark**

Subject Area: Basics of Civil Engineering Methods
Duration: 1 Semester

<table>
<thead>
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<th>CP (according to ECTS)</th>
<th>Contact Hours/Week (SWS)</th>
<th>Self-study</th>
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<tr>
<td>5 CP (= 150 h Workload)</td>
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### Additional Information

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<tr>
<td>Applicability of Module</td>
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<td>Frequency of Offering</td>
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<tr>
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<tr>
<td>Course Language</td>
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| valid from: | Summer Semester 2017 | last updated: 25.09.2018 |
BIW-B-Mod-105

Module Name: Building Construction and CAD
Type: C
Semester (proposed): 1 + 2
Module Coordinator: Prof. Dr.-Ing. Peter-Matthias Klotz

Subject Area
Basics of Design and Construction

CP (according to ECTS)
Duration
12.5 CP (= 375 h Workload) 2 Semester

Objectives and Contents

Objective of Qualification (competencies)

Students will acquire basic knowledge of supporting framework structures in building construction as well as selected issues of expansion. They will be able to plan integral structures and construction systems of individual structural components taking into consideration static and structural-physical relationships.

Students will acquire basic knowledge and skills in computer-supported designing, structuring and rendering.

Contents

- Building Construction I:
  - Fundamentals: Types of supporting structures, regulations, load assumptions, planning procedure, construction drawings
  - Masonry: Types of, modular coordination, structural rules, load-bearing masonry walls, double-leaf exposed masonry
  - Walls: Exterior walls (types and their construction), bracing and stability, load-bearing interior and light partition walls
  - Stairs: Requirements, types and their construction, railing
  - Windows: Types, installation guidelines (statics, windproofing and airtightness, thermal insulation, sound insulation)
- Building Construction II:
  - Ceilings: Solid ceilings, wooden beam ceilings, steel girder and composite ceilings, vault ceilings
  - Roofs: Roof coverings and seals, roof flashing, inclined roof construction, engineer-quality roof construction, flat roofs (warm and cold roofs)
  - Chimneys
  - Sealing and drainage: Types of seals for soil moisture, with and without water pressure, drainage
  - Excavations and foundations: Excavations, deepening and underpinning, shallow foundations
- Skills – CAD:
  - Fundamentals of descriptive geometry and technical drawing
  - Analysis of constructions and their projection in CAD software with the aid of coordinate systems
  - Constructing virtual 3D models for examining functional plausibility
  - Development and modification of complex unitized components for efficient construction planning
  - Output of final plans to scale
  - Implementation of basic project structures of building practice in a CAD application

Recommended Literature

- Frick, Knöll, Neumann, Weinbrenner: Baukonstruktionslehre
- Schneider, Wormuth, Dierks: Baukonstruktion
- Mittag: Baukonstruktionslehre
- Schneider: Bautabellen für Ingenieure
- AutoCAD Grundlagen; AutoCAD 2D; AutoCAD 3D; Herdt Verlag

Teaching and Learning Methods

Building Construction I, 5 CP: Lecture and Practical Seminar (4 Hours per Week)
Building Construction II, 5 CP: Lecture and Practical Seminar (4 Hours per Week)
CAD, 2.5 CP: Practical Seminar in Computer-Pool (2 Hours per Week)

Exam(s)

Precondition of Examination
Attendance in CAD is mandatory.

Type of Examination
Building Construction I+II (Module): Term Paper and Colloquium
CAD: Term Paper

Composition of Module Mark
### Additional Information

<table>
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<th>Previous Knowledge / Conditions for Participation (in form and content)</th>
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<tbody>
<tr>
<td>General knowledge of the Windows operating system (recommended)</td>
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**Applicability of Module**

Successful completion of this module is required for enrolling in the module CAE (mandatory).

**Frequency of Offering**

- Building Construction I and CAD: every Winter Semester
- Building Construction II: every Summer Semester

**Course Language**

German

| valid from: | Winter Semester 15/16 | last updated: 25.09.2018 |
Module Card

Bachelor Civil Engineering
HCU Hamburg

<table>
<thead>
<tr>
<th>Module Number</th>
<th>Modul Name</th>
<th>Type (C/CE/E)</th>
<th>Semester (proposed)</th>
<th>Module Coordinator</th>
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<tbody>
<tr>
<td>BIW-B-Mod-201</td>
<td>Engineering Mathematics II</td>
<td>C</td>
<td>2</td>
<td>Prof. Dr.-Ing. Martin Jäschke</td>
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Subject Area
Basics of Civil Engineering Methods

Duration
1 Semester

<table>
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<tr>
<th>CP (according to ECTS)</th>
<th>Contact Hours/Week (SWS)</th>
<th>Self-study</th>
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<tbody>
<tr>
<td>5 CP (= 150 h Workload)</td>
<td>4 (= 42 h Contact Time)</td>
<td>108 h</td>
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</table>

Objectives and Contents

Objective of Qualification (competencies)
- Knowledge of the fundamentals of the mentioned subjects, creating a facility with mathematical methods
- Application to physical and technical problems

Contents
- Differential equations (DE): DE with separable variables, linear DE with 1st and 2nd order constant coefficients
- Examples of application, DE problem setups
- Series expansion as method of approximation: (Power) series and convergence, Taylor series, standard series combinations, application of series as approximation and numerical integration
- Calculating probability and descriptive statistics: Fundamentals, combinatorics, distributions, especially: binomial, Poisson and normal Gauss distribution
- Multivariable functions: Graphing, geometric applications, partial derivatives, propagation of uncertainty
- Linear algebra: Elementary 2D and 3D vector analysis, scalar and vector products
- Geometric applications: intersections of straight lines and planes
- Matrices: multiplication, determinants
- Solving systems of linear equations (Gaussian elimination among others)

Recommended Literature
- Papula, Mathematik für Ingenieure; Vieweg-Verlag, Bd. I und II
- Leupold, W.; u.a.: Mathematik - ein Studienbuch für Ingenieure, Fachbuchverlag Leipzig, Bd. I und II
- Rjasanova, K: Mathematik für Bauingenieure; Hanser-Verlag

Teaching and Learning Methods
Lecture (2 Hours per Week) + Practical Seminar (2 Hours per Week) + Tutorial

Exam(s)

Precondition of Examination
None. Pre-Assignment is not mandatory any more.

Type of Examination
Written Exam

Duration of Examination (if written or oral exam)
3 h

Composition of Module Mark

Mark of Exam

Additional Information

Previous Knowledge / Conditions for Participation (in form and content)
Module Engineering Mathematics I (recommended)

Applicability of Module
<table>
<thead>
<tr>
<th>Frequency of Offering</th>
<th>every Summer Semester</th>
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<tbody>
<tr>
<td>Course Language</td>
<td>German</td>
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<tr>
<td>valid from:</td>
<td>Summer Semester 2017</td>
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<tr>
<td>last updated:</td>
<td>25.09.2018</td>
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Module Card

Bachelor Civil Engineering
HCU Hamburg

<table>
<thead>
<tr>
<th>Module Number</th>
<th>Modul Name</th>
<th>Type (C/CE/E)</th>
<th>Semester (proposed)</th>
<th>Module Coordinator</th>
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<tbody>
<tr>
<td>BIW-B-Mod-202</td>
<td>Construction Physics</td>
<td>C</td>
<td>2 + 3</td>
<td>Prof. Dr.-Ing. Peter-Matthias Klotz</td>
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Subject Area

<table>
<thead>
<tr>
<th>Duration</th>
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<tbody>
<tr>
<td>Basics of Civil Engineering Methods</td>
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</table>

<table>
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<tr>
<th>CP (according to ECTS)</th>
<th>Contact Hours/Week (SWS)</th>
<th>Self-study</th>
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<tbody>
<tr>
<td>5 CP (= 150 h Workload)</td>
<td>4 (= 42 h Contact Time) + 6 h Practical Laboratory Course</td>
<td>102 h</td>
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</table>

Objectives and Contents

Objective of Qualification (competencies)

- Physical understanding of simple relationships in thermodynamics and acoustics as well as fundamentals of thermal insulation, humidity protection and sound insulation, including their application in building practice
- Conducting physical experiments, documentation, evaluation

Contents

- Construction Physics I: Heat and humidity
  - Introduction: motivation and overview of the contents and disciplines of construction physics
  - Fundamentals of thermal dynamics
  - Stationary heat transfer through transmission; heat conduction, heat conductivity, heat transfer; multilayered components, temperature profiles, balance of heat transfer; thermal bridges
  - Thermal radiation and summer thermal insulation
  - Unsteady-state heat transfer
  - Thermal balance of a building: losses and gains, significance of the building’s shape, final and primary energy requirements, calculating transmission heat loss, ventilation, physiological foundations, ventilation rate, ventilation heat loss, solar gains, interior heat gains, select basics of the Energy Saving Regulation (EnEV), simple example calculations
  - Behavior of gases, state changes
  - Humidity: vapor pressure, saturated vapor pressure, dew point
  - Moisture transfer processes, balance of water vapor in buildings, surface condensation, water vapor diffusion (Glaser diagram), calculating condensation, moisture damage
- Practical laboratory course I: heat capacity (calorimetry) and moisture (dew point) experiments
- Construction Physics II: Sound
  - Oscillation: harmonic, damped, forced resonance, overlapping
  - Sound waves: wave types, traveling and standing waves (modes), spectral analysis
  - Amplitude: particle velocity, acoustic pressure, sound energy density, sound intensity, sound level, addition of sound energy/levels
  - Sound perception: frequency range of audible sound, loudness, A-weighting, equivalent continuous sound level
  - Sound propagation effects: sound sources and inverse square laws, reflection, absorption, transmission, sound refraction and diffraction (shielding) (basis of urban noise control)
  - Room acoustics: target values, theory of reverberation, diffuse sound field, sound absorbers, optimization and room design
  - Stationary sound field / noise mitigation measures
  - Architectural acoustics / sound insulation in building construction: Airborne sound insulation of single-leaf pliable components (mass law), sound level difference between rooms, bending waves, coincidence, weighted sound reduction index
  - Cavity walls, double wall resonance
  - Sound reduction indexes of one-leaf and cavity wall and ceiling insulations according to DIN 4109 and, if applicable, ISO 12354
  - Sound insulation of adjacent components
  - Influence of flanking transmission
  - Main features of impact (footfall) sound insulation
- Practical laboratory course II: experiments with oscillation and elastic modulus

Recommended Literature

Berber, J.; Bauphysik - Wärmetransport, Feuchtigkeit, Schall; Voigt-Verlag;
Hering, E.; et.al., Physik für Ingenieure; VDI-Verlag;
Krawietz, R.; Heimke; W.; Physik im Bauwesen - Grundwissen und Bauphysik ; Fachbuchverlag Leipzig im Hanser-Verlag;
Fischer, H.M. et.al.; Lehrbuch der Bauphysik; Teubner, Stuttgart
Fasold,W., Veres,E: Schallschutz und Raumakustik in der Praxis; Verlag für Bauwesen, Berlin
Liersch, K.W.: Bauphysik kompakt, Wärme- und Feuchteschutz;
### Teaching and Learning Methods

**Construction Physics I, 2.5 CP:** Lecture (1 Hour per Week) + Practical Seminar (1 Hour per Week) + Tutorial
- Practical Laboratory Course: 2 units each 1.5 h

**Construction Physics II, 2.5 CP:** Lecture (1 Hour per Week) + Practical Seminar (1 Hour per Week) + Tutorial
- Practical Laboratory Course: 2 units each 1.5 h

### Exam(s)

**Precondition of Examination**
Successful preliminary examination, passing mark on term paper and laboratory practical (mandatory attendance). Term papers are offered every semester, the laboratory practical once a year.

<table>
<thead>
<tr>
<th>Type of Examination</th>
<th>Duration of Examination (if written or oral exam)</th>
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<tbody>
<tr>
<td>Construction Physics I: Pre-Assignment: Documentation of Practical, Laboratory Course, Tests Examination: Written Exam</td>
<td>Construction Physics I: Written Exam 2 h</td>
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<tr>
<td>Construction Physics II: Pre-Assignment: Documentation of Practical, Laboratory Course, Tests Examination: Written Exam</td>
<td>Construction Physics II: Written Exam 2 h</td>
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**Composition of Module Mark**
Mark of Exam Construction Physics I 50% and Construction Physics II 50%

### Additional Information

**Previous Knowledge / Conditions for Participation (in form and content)**
Knowledge and skills acquired in school physics (equivalent to a min. 3 years) or the preparatory course, Physics (strongly recommended), Engineering Mathematics (strongly recommended) and for Construction Physics II, Engineering Mathematics II Differential Equations (recommended)

**Applicability of Module**

**Frequency of Offering**
- Construction Physics I: every Summer Semester
- Construction Physics II: every Winter Semester

**Course Language**
German

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<td>Summer Semester 2017</td>
<td>27.09.2018</td>
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# Module Card

<table>
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<th>Module Number</th>
<th>Modul Name</th>
<th>Type (C/CE/E)</th>
<th>Semester (proposed)</th>
<th>Module Coordinator</th>
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<tbody>
<tr>
<td>BIW-B-Mod-203</td>
<td>Theory of Material Strength</td>
<td>C</td>
<td>2</td>
<td>Prof. Dr.-Ing. Peter-Matthias Klotz</td>
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<table>
<thead>
<tr>
<th>Subject Area</th>
<th>Duration</th>
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<tbody>
<tr>
<td>Basics of Civil Engineering Methods</td>
<td>1 Semester</td>
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<tr>
<th>CP (according to ECTS)</th>
<th>Contact Hours/Week (SWS)</th>
<th>Self-study</th>
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</thead>
<tbody>
<tr>
<td>5 CP (= 150 h Workload)</td>
<td>4 (= 42 h Contact Time)</td>
<td>108 h</td>
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</tbody>
</table>

## Objectives and Contents

### Objective of Qualification (competencies)

Students will gain basic knowledge of the relationships among stress resultants, stresses, strains and slippages. They will be capable of creating simple designs using components made of homogenous building materials and documenting them.

### Contents

- Stress and normal force: Definition: stress, strain, lateral strain, Young’s modulus, Hooke’s law; calculating stresses and strains
- Stresses resulting from uniaxial bending with and without normal force: Navier’s hypothesis that plane strain sections remain plane; section properties; normal stresses; compound sections; Steiner’s theorem; building materials without tensile strength
- Normal stresses with biaxial bending with and without normal force: Symmetrical cross-sections; asymmetrical cross-sections
- Shear stresses resulting from lateral force: Shear stresses in vertical and horizontal sections (fundamentals); calculating shear stress with solid cross sections; parallel-axis compound sections
- Shear stresses
- Torsion: Definition of torsion, warp, twist; shear stresses in solid cross-sections and thin-walled open and closed cross-sections

### Recommended Literature

- Schneider: Bautabellen
- Göttzsche, Petersen: Festigkeitslehre klipp und klar
- Holzmann: Technische Mechanik Festigkeitslehre
- Lohmeyer: Baustatik 2 Bemessung und Festigkeitslehre

### Teaching and Learning Methods

Lecture and Practical Seminar (4 Hours per Week)

## Exam(s)

### Precondition of Examination

### Type of Examination

<table>
<thead>
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### Composition of Module Mark

### Mark of Exam

## Additional Information

### Previous Knowledge / Conditions for Participation (in form and content)

### Applicability of Module

### Frequency of Offering

every Summer Semester
<table>
<thead>
<tr>
<th>Course Language</th>
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**Module Card**

Bachelor Civil Engineering  
HCU Hamburg

<table>
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<tr>
<th>Module Number</th>
<th>Module Name</th>
<th>Type (C/CE/E)</th>
<th>Semester (proposed)</th>
<th>Module Coordinator</th>
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<tbody>
<tr>
<td>BIW-B-Mod-204</td>
<td>Constructing Material Science II</td>
<td>C</td>
<td>2</td>
<td>Prof. Dr.-Ing. Gesa Kapteina</td>
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<table>
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<th>Duration</th>
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<tbody>
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<td>Constructing Material Science II</td>
<td>1 Semester</td>
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<th>Contact Hours/Week (SWS)</th>
<th>Self-study</th>
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<tbody>
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<td>5 CP (= 150 h Workload)</td>
<td>4 (= 42 h Contact time) + 18 h Contact Time Practical Laboratory Course)</td>
<td>90 h</td>
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**Objectives and Contents**

**Objective of Qualification (competencies)**
- Basic knowledge of building materials with reference to their composition, structure, production, processing, mechanical and hygrothermal properties and material-specific damage processes
- Knowledge of measurement methods for determining characteristic material properties in the context of material testing
- Knowledge of structural engineering regulations

This facilitates a critical selection of building materials, and as the case may be, combinations of building materials with regard to their load-bearing capacity and fitness for use while taking into account exposure conditions and structural engineering regulations.

**Contents**
- Aggregates
- Binders
- Concrete, mix design, production and processing, deformation and strength parameters, material tests, non-destructive test procedures, durability, special types of concrete
- Masonry
- Laboratory practical class: making and testing concrete

**Recommended Literature**
Zementmerkblätter, Herausgeber: Informationszentrum Beton GmbH, online verfügbar

**Teaching and Learning Methods**
Lecture and Practical Seminar (4 Hours per Week)  
Practical Laboratory Course I: 8 units, 18 h total

**Exam(s)**

**Precondition of Examination**
Successful preliminary test performance, laboratory practical class with 80% mandatory attendance and lab protocols

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<tr>
<th>Type of Examination</th>
<th>Duration of Examination (if written or oral exam)</th>
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<tbody>
<tr>
<td>Pre-Assignment: Documentation of Practical Laboratory Course Examination: Written Exam</td>
<td>2 h</td>
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**Composition of Module Mark**

**Mark of Exam**

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**Additional Information**

**Previous Knowledge / Conditions for Participation (in form and content)**
<table>
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<td>Applicability of Module</td>
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<tr>
<td>Frequency of Offering</td>
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<td>Course Language</td>
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Mocule Card

Bachelor Civil Engineering
HCU Hamburg

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<th>Type (C/CE/E)</th>
<th>Semester (proposed)</th>
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<tr>
<td>BIW-B-Mod-301</td>
<td>Statics of Structures</td>
<td>C</td>
<td>3 + 4</td>
<td>Prof. Dr.-Ing. Annette Bögle</td>
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</table>

Subject Area
Basics of Civil Engineering Methods
Duration 2 Semester

CP (according to ECTS) 10 CP (= 300 h Workload)
Contact Hours/Week (SWS) 8 (= 84 h Contact Time)
Self-study 216 h

Objectives and Contents

Objective of Qualification (competencies)
- Students will gain competence in basic assumptions, principles and methods of statics (idealization and discretization of static tasks, introduction to principles of work and energy and basic design methods)
- Students will learn the computational analysis of load-bearing behavior by calculating the stress resultants and deformation of statically determinate and indeterminate systems
- Students will acquire professional competence in interpreting and critically evaluating calculation results

Contents

- Statics of Structures I:
  - Introduction and Fundamentals: The functions of statics, model assumptions, design method basics
  - Statically determinate structures: Force and deformation values, moment diagrams, kinematics, deformation calculation methods, qualitative evaluation of bending lines, differential equation of bending line
  - Principles of work and energy & working principles: Virtual work, principle of virtual displacements, principle of virtual forces
  - Influence lines of statically determinate structures for force and displacement values
  - Fundamentals of spatial structures
- Statics of Structures II:
  - Statically determinate and statically indeterminate structures: Definitions, advantages and disadvantages, determining degree of static indeterminacy
  - Flexibility method: Fundamentals, method explanation, compatibility conditions, deformation actions, replacement of unloaded subsystems with tonguing, deformation calculation with the reduction theorem, three-moment equation for analysis of statically indeterminate continuous beams
  - Displacement method / Slope-deflection method: Basics, method explanation, kinematic determinacy, difference between general displacement method and slope-deflection method, application to computer methods
  - Influence lines of statically indeterminate structures for force and displacement values
  - Non-linear structures: Equilibrium in deformed structures, components of compromised stability: flexural buckling, effective buckling length coefficients, substitute member length, theory II. order, basics of cable geometry

Recommended Literature

Teaching and Learning Methods
Statics of Structures I, 5 CP: Lecture and Practical Seminar (4 Hours per Week)
Statics of Structures II, 5 CP: Lecture and Practical Seminar (4 Hours per Week)

Exam(s)

Precondition of Examination
passed Pre-Assignment

Type of Examination Duration of Examination (if written or oral exam)
Statics of Structures I: Pre-Assignment: Term Paper Written Exam 3 h
Statics of Structures II: Pre-Assignment: Term Paper
Examination (module): Written Exam
Composition of Module Mark
Mark of Exam
**Additional Information**

<table>
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<th>Previous Knowledge / Conditions for Participation (in form and content)</th>
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<tbody>
<tr>
<td>For this module knowledge and skills from the modules Technical Mechanics and Engineering Mathematics I are recommended.</td>
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<td>Statics of Structures II: every Summer Semester</td>
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<table>
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<td>German</td>
</tr>
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</table>

| valid from: | Winter Semester 15/16 | last updated: 25.09.2018 |
Objectives and Contents

Objective of Qualification (competencies)
- Students will gain competence in and basic knowledge of structural design in the context of architecture, load-bearing forms, structural framework design, construction and engineering performance.
- Students will acquire the skill of recognizing various types of support structures in real projects as well as the ability to formulate their respective requirements.
- Students gain competence in identifying and analyzing building structures with regards to their main supporting features.

Contents
- Structural design as part of engineering competence: Fundamentals of design, collaboration between architects and engineers assignment of project planning and framework planning tasks
- Load-bearing structure requirements: Design, function, value; cost effectiveness: building costs, maintenance expenses; sustainability, durability; planning and realization processes: planning time, construction period
- Designing load-bearing structures: Load transfer principles and static systems: cable, arch, truss, beam, frame, disk, supporting member; bracing systems; preliminary dimensioning, measuring with empirical formulas
- Load-bearing structure analysis: Identification of load-bearing components, design, hierarchy and static systems
- Rendering load-bearing structures: Introduction to model making

Recommended Literature
Block, P.; u.a.: Faustformel Tragwerksentwurf, Deutsche Verlags-Anstalt, München, 2013.

Exam(s)

Precondition of Examination

Type of Examination: Term Paper
Duration of Examination (if written or oral exam): The term paper consists of various tasks. The exact composition of the overall grade will be announced at the beginning of the semester.

Additional Information

Previous Knowledge / Conditions for Participation (in form and content)

Applicability of Module
<table>
<thead>
<tr>
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valid from: Winter Semester 15/16 last updated: 25.09.2018
Module Card

Bachelor Civil Engineering
HCU Hamburg

<table>
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<tbody>
<tr>
<td>BIW-B-Mod-303</td>
<td>Geotechnics I</td>
<td>C</td>
<td>3</td>
<td>Prof. Dr.-Ing. habil. Kerstin Lesny</td>
</tr>
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</table>

Subject Area | Duration
---|---
Structural Engineering | 1 Semester

CP (according to ECTS) | Contact Hours/Week (SWS) | Self-study
---|---|---
5 CP (= 150 h Workload) | 4.4 (= 48 h Contact Time) | 102 h

Objectives and Contents

Objective of Qualification (competencies)

Students will learn various soil types and be able to describe and classify them. They will understand the soil mechanic behavior of soils, such as deformation and strength behavior, as well as their behavior when influenced by groundwater flow. They will be able to solve relevant problems. Further, they will gain familiarity with site investigation methods as well as soil mechanical laboratory and field experiments for determining soil parameters.

Contents

- Soil types and their formation; description and classification of soils
- Site investigation procedures
- Water in soil; groundwater flow
- Deformation behavior of soils (subsidence and consolidation)
- Strength behavior of soils (states of failure, earth pressure and earth resistance
- Determination of soil mechanical parameters

Recommended Literature

for example:

Teaching and Learning Methods

Lecture and Practical Seminar (4 Hours per Week)
Practical Laboratory Course (4 h, Compulsory Attendance)

Exam(s)

Precondition of Examination

passed Pre-Assignment

Type of Examination | Duration of Examination (if written or oral exam)
---|---
Pre-Assignment: Laboratory Practical Course and Documentation (offered only Winter Semester) | Written Exam 2 h
Examination: Written Exam

Composition of Module Mark

Mark of Exam

Additional Information

Previous Knowledge / Conditions for Participation (in form and content)

Prerequisites include: the knowledge and skills acquired in the modules Engineering Mathematics I and II, Strength of Materials and Statics of Structures. The module Technical Mechanics must be completed upon enrolment (mandatory).

Applicability of Module

Frequency of Offering
<table>
<thead>
<tr>
<th>every Winter Semester</th>
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<td>25.09.2018</td>
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### Module Card

**Module Number**: BIW-B-Mod-304  
**Modul Name**: Basics of Law  
**Type**: C  
**Semester**: 3  
**Module Coordinator**: Prof. Martin Wickel, Prof. Friedrich-Karl Scholtissek

<table>
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<th>Subject Area</th>
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<td>Construction Management</td>
<td>1 Semester</td>
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<tbody>
<tr>
<td>5 CP (= 150 h Workload)</td>
<td>4 (= 42 h Contact Time)</td>
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### Objectives and Contents

#### Objective of Qualification (competencies)
Attainment of the competence to recognize the central instruments of public building law and to be able to integrate them into the constitutional and administrative context

#### Contents

**Public Building Law (FaSt Basics, BS-B-Mod-003):**
1. Constitutional foundations of building law (i.e. fundamental rights, state organization, especially legislative and administrative powers)
2. Administrative foundations of building law (i.e. sources of law, administrative organization, administrative procedures)
3. Plans
   3.1 Urban land-use planning (zoning)
      3.1.1 Procedures and content requirements
      3.1.2 BauNVO
   3.2 Spatial development and technical planning
4. Construction projects (residence, administration, infrastructure, industry)
   4.1 Building permit
   4.2 Legal material requirements
   4.3 Other forms of permission (i.e. license for emission control handling; planning approval)
   4.4 Requirements of environmental law

**Private Building Law:**
1. Introduction to the basic concepts of law
2. Contract for services in accordance with the Federal Building Code (BGB)
3. Accepted engineering standards
4. Fee Structure for Architects and Engineers (HOAI)
5. Federal Construction Contract Procedures (VOB) – Sections A, B, and C

#### Recommended Literature
Public Building Law: literature varies by term, will be announced at first meeting

#### Teaching and Learning Methods

**Public Building Law**, 2.5 CP: Lecture (2 Hours per Week)  
**Private Building Law**, 2.5 CP: Lecture (2 Hours per Week)

### Exam(s)

#### Precondition of Examination

#### Type of Examination | Duration of Examination (if written or oral exam)
---|---
Public Building Law: Written Exam | Public Building Law: Written Exam 1.5 h
Private Building Law: Written Exam | Private Building Law: Written Exam 1.5 h

#### Composition of Module Mark
Mark of exam: Written Exam Public Building Law 50% and Private Building Law 50%

### Additional Information

#### Previous Knowledge / Conditions for Participation (in form and content)
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<td>valid from: Winter Semester 15/16</td>
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Module Card

Bachelor Civil Engineering
HCU Hamburg

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<td>BIW-B-Mod-306</td>
<td>Hydraulic Engineering I</td>
<td>C</td>
<td>3</td>
<td>Prof. Dr.-Ing. habil.</td>
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<tr>
<td></td>
<td></td>
<td></td>
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<td>Kerstin Lesny</td>
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Subject Area       | Duration
Technical Infrastructure   | 1 Semester

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Objectives and Contents

Objective of Qualification (competencies)
Students will understand the meaning of hydromechanics within the specialist disciplines, hydrology/water management and hydraulic engineering. They will master the fundamentals of hydrostatics and hydrodynamics as well as the sediment transport. Building on this, they will be able to perform simple hydraulic calculations for pipes and open channels. They will be further familiarized with the possibilities and limits of hydraulic laboratory practice.

Contents
- Meaning of hydromechanics within the specialist disciplines hydrology/water management/hydraulic engineering
- Hydrostatics (i.e. water pressure on flat and curved surfaces, buoyancy)
- Laws of hydrodynamics (conservation of mass, conservation of energy, momentum equation, energy and friction losses)
- Description and calculation of pipe and open-channel flow
- Fundamentals of sediment transport
- Hydrodynamics of coastal areas (tides, waves and swell)
- Hydraulic laboratory practice (modeling regularities, hydromechanical models, conducting simple experiments to understand hydromechanical processes)

Recommended Literature
for example:

Teaching and Learning Methods
Lecture and Practical Seminar (4 Hours per Week)
Practical Laboratory Course (3 h, Compulsory Attendance)

Exam(s)
Precondition of Examination
passed Pre-Assignment
Type of Examination | Duration of Examination (if written or oral exam)
Pre-Assignment: Laboratory Practical Course and Documentation (offered only Winter Semester) | Examination: Written Exam
Composition of Module Mark
Mark of Exam

Additional Information
Previous Knowledge / Conditions for Participation (in form and content)
Prerequisites include: knowledge and skills acquired in the modules, Engineering Mathematics I, Engineering Mathematics II and Technical Mechanics (recommended). The module, Engineering Mathematics I must be completed (mandatory).

Applicability of Module
<table>
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<td>Course Language</td>
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valid from: Summer Semester 2017  
last updated: 25.09.2018
# Module Card

**Bachelor Civil Engineering**

**HCU Hamburg**

<table>
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<tr>
<td>BIW-B-Mod-402</td>
<td>Designing of Building Structures</td>
<td>C</td>
<td>4</td>
<td>Prof. Dr.-Ing. Annette Bögle</td>
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## Subject Area

<table>
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<td>129 h</td>
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## Objectives and Contents

### Objective of Qualification (competencies)
- Students will acquire the skills necessary to apply their knowledge of load-bearing structure design in their own discipline-specific project.
- Students will acquire the skill of integrating installments into the design and planning processes.
- Students gain competence in independently conducting a design project in the field of load-bearing structures.

### Contents
- Introduction to the task: Presentation of the context of the design task: location and content
- Input workshops on specific subjects:
  - Team formation and acquaintance with the task
  - Project-relevant subjects (such as frame, functionality, executing an idea, detailing)
  - Rendering (plans, models)
- Corrective feedback: Students and teachers will meet in voluntary and mandatory feedback sessions distributed throughout the semester. The students’ current state of progress and any arising issues will be addressed; problems will be addressed and solutions formulated.
- Presentation: Mandatory presentations occur on specific dates throughout the semester. They are an opportunity to convey one’s own project to an audience as well as for the teachers to discuss students’ individual projects.
- Independent discipline-specific teamwork

### Recommended Literature
- Block, P.; u.a.: Faustformel Tragwerksentwurf, Deutsche Verlags-Anstalt, München, 2013.
- Wüstenrot Stiftung (Hrsg.): Raumpilot Grundlagen, Karl Kraemer Verlag, Stuttgart und Zürich, 2014.

### Teaching and Learning Methods
- Lecture and Project (2 Hours per Week)

### Exam(s)

#### Precondition of Examination

- Mandatory Attendance at (interim) Presentations, Workshops and Excursions

#### Type of Examination

- Documentation and Presentation

#### Duration of Examination (if written or oral exam)

- Presentation and Documentation are graded. The composition of the overall grade will be announced at the beginning of the semester.

### Additional Information

#### Previous Knowledge / Conditions for Participation (in form and content)

- Skills and knowledge acquired in Basics of Designing Building Structures (recommended)
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valid from: Winter Semester 15/16  
last updated: 27.09.2018
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<tr>
<td>BIW-B-Mod-403</td>
<td>Geotechnics II</td>
<td>C</td>
<td>4</td>
<td>Prof. Dr.-Ing. habil. Kerstin Lesny</td>
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<th>Subject Area</th>
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<td>Structural Engineering</td>
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<th>CP (according to ECTS)</th>
<th>Contact Hours/Week (SWS)</th>
<th>Self-study</th>
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<tbody>
<tr>
<td>5 CP (= 150 h Workload)</td>
<td>4 (= 42 h Contact Time)</td>
<td>108 h</td>
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### Objectives and Contents

**Objective of Qualification (competencies)**

Students will understand the basic principles of various geotechnical structures, such as shallow and deep foundations as well as simple systems of revetment and dewatering. They will be able to describe the static system as well as the load transfer behavior of these systems and to dimension these according to the Eurocode 7 and DIN 1054 design rules.

**Contents**

- Safety concept and design rules according to Eurocode 7 and DIN 1054
- Load-bearing capacity and fitness for use of shallow foundations (individual and strip footing)
- Load-bearing capacity and fitness for use of pile foundations (axially loaded piles)
- Slope stability
- Building pit sheeting design for simple static systems
- Dewatering basics

**Recommended Literature**


### Teaching and Learning Methods

Lecture and Practical Seminar (4 Hours per Week)

### Exam(s)

**Precondition of Examination**

**Type of Examination**

<table>
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<th>Written Exam</th>
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**Composition of Module Mark**

**Mark of Exam**

### Additional Information

**Previous Knowledge / Conditions for Participation (in form and content)**

Prerequisites include: the knowledge and skills acquired in the modules, Engineering Mathematics I and II, Strength of Materials and Statics of Structures (recommended). The module, Technical Mechanics, must be completed upon enrolment (mandatory).

**Applicability of Module**

**Frequency of Offering**

every Summer Semester

**Course Language**
Module Card
Bachelor Civil Engineering
HCU Hamburg

<table>
<thead>
<tr>
<th>Module Number</th>
<th>Modul Name</th>
<th>Type (C/CE/E)</th>
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<td>BIW-B-Mod-404</td>
<td>Steel and Timber Structures</td>
<td>C</td>
<td>4 + 5</td>
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<th>Duration</th>
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<td>Structural Engineering</td>
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<th>CP (according to ECTS)</th>
<th>Contact Hours/Week (SWS)</th>
<th>Self-study</th>
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<tr>
<td>10 CP (= 300 h Workload)</td>
<td>8 (= 84 h Contact Time)</td>
<td>216 h</td>
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Objectives and Contents

Objective of Qualification (competencies)

Students will master the fundamentals of structural components and connections as well as the structural detailing of load-bearing structures in timber and steel construction engineering.

Contents

- Steel construction engineering
  - Examples of completed steel structures
  - Elastic and plastic limit loads of cross-sections
  - Welded and screwed connections
  - Design and construction of a load-bearing structure
  - Flexural buckling, lateral torsional buckling, plate buckling

- Timber engineering
  - Examples of completed timber structures
  - Wood as material
  - Design
  - Connections
  - Sideways buckling
  - Saddle roof girders

Recommended Literature


Teaching and Learning Methods

Steel and Timber Structures I, 5 CP: Lecture and Practical Seminar (4 Hours per Week)
Steel and Timber Structures II, 5 CP: Lecture and Practical Seminar (4 Hours per Week)

Exam(s)

Precondition of Examination

Type of Examination | Duration of Examination (if written or oral exam)
---------------------|------------------------------------------------|
Steel and Timber Structures I+II (module): Written Exam | 3 h
Composition of Module Mark
Mark of Exam

Additional Information

Previous Knowledge / Conditions for Participation (in form and content)

Prerequisites include: knowledge and skills acquired in Technical Mechanics, Strength of Materials and Statics of Structures (recommended).

Applicability of Module

Frequency of Offering

Steel and Timber Structures I: every Summer Semester
<table>
<thead>
<tr>
<th>Steel and Timber Structures II: every Winter Semester</th>
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<td>Course Language</td>
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<td>German</td>
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<tr>
<td>valid from:        Winter Semester 16/17</td>
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</table>
# Concrete Structures

## Subject Area
- Structural Engineering

## Duration
- 2 Semester

## CP (according to ECTS)
- 10 CP (= 300 h Workload)

## Contact Hours/Week (SWS)
- 8 (= 84 h Contact Time)

## Self-study
- 216 h

## Objectives and Contents

### Objective of Qualification (competencies)
Students will learn basic knowledge and skills of calculation methods in concrete construction and of the dimensioning and building of structural elements commonly used in the structural engineering of concrete structures. On completion of the module students should be able to design and dimension simple concrete structures. The basic principles learned will enable students to expand their knowledge accordingly to meet the demands of practice.

### Contents

1. **Fundamentals**
   - Load-bearing structural forms and structural elements in reinforced concrete construction / material properties
   - Load-bearing characteristics of concrete structures/durability/safety concept
2. **Features of internal forces determination**
   - Bearing length / moment distribution / section moments
3. **Bending analysis**
   - Fundamentals of bending calculation / design method
   - Calculation of square cross-sections and T-beam cross-sections
   - Limiting span/depth ratio
4. **Shear design**
   - Fundamentals / design method / shear force roofing
5. **Types of reinforcement and reinforcement guidelines**
   - General reinforcement guidelines / bond stresses / anchorages
   - Overlap joints / tensile roof covering / layout of reinforcement
6. **Design and construction of continuous beams**
   - Determining permissible stress / design / structural details / rules of reinforcement
7. **Design and construction of uniaxial and biaxial plate load-bearing structures**
   - Determining permissible stress / design / structural details / rules of reinforcement
8. **Design and construction of stairs**
   - Load-bearing structural forms / determining permissible stress / reinforcement layout
9. **Design for bending and normal force**
   - Uniaxial bending and normal force / biaxial bending and normal force
10. **Buckling safety checks**
    - Effective length and slenderness /centrically loaded supports
    - Fundamentals of theory II order
    - Simplified design methods for isolated compression members with uniaxial relative eccentricity
11. **Centrically loaded foundation**
    - Strip and pad foundations; reinforced / unreinforced foundations
12. **Analysis of usability limit state**
    - Analysis of steel stress; analysis of concrete compressive stresses; analysis of crack width

### Recommended Literature

- Avak, Conchon, Aldejohann: Stahlbetonbau in Beispielen Teil 1, ab 7. Auflage, Bundesanzeiger Verlag, Köln (2016)
- Schneider: Bautabellen für Ingenieure, ab 20. Auflage, Köln, Werner Verlag

### Teaching and Learning Methods

- Concrete Structures I, 5 CP: Lecture and Practical Seminar (4 Hours per Week)
- Concrete Structures II, 5 CP: Lecture and Practical Seminar (4 Hours per Week)

### Exam(s)

#### Precondition of Examination

#### Type of Examination
- Duration of Examination (if written or oral exam)
Concrete Structures I+II (module): Written Exam
Note: A voluntary homework assignment will be given.

<table>
<thead>
<tr>
<th>Composition of Module Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mark of Exam</td>
</tr>
</tbody>
</table>

**Additional Information**

**Previous Knowledge / Conditions for Participation (in form and content)**
Prerequisites include: knowledge and skills acquired in Theory of Material Strength and Statics of Structures (recommended).

**Applicability of Module**

**Frequency of Offering**
Concrete Structures I: every Summer Semester
Concrete Structures II: every Winter Semester

**Course Language**
German

valid from: Winter Semester 16/17  last updated: 28.09.2018
### Module Card

#### Bachelor Civil Engineering

<table>
<thead>
<tr>
<th>Module Number</th>
<th>Modul Name</th>
<th>Type (C/CE/E)</th>
<th>Semester (proposed)</th>
<th>Module Coordinator</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIW-B-Mod-406</td>
<td>Hydraulic Engineering II</td>
<td>C</td>
<td>4</td>
<td>Prof. Dr.-Ing. habil. Kerstin Lesny</td>
</tr>
</tbody>
</table>

#### Subject Area

- Technical Infrastructure

#### Duration

- 1 Semester

#### CP (according to ECTS)

- 5 CP (= 150 h Workload)

#### Contact Hours/Week (SWS)

- 4,3 (= 45 h Contact Time)

#### Self-study

- 105 h

### Objectives and Contents

#### Objective of Qualification (competencies)

Students will gain mastery of the standard hydrological basics and become familiar with the essential aspects of water management planning and development tasks. They will become acquainted with various approaches to the development of flowing water, including river engineering facilities and renaturation. They will understand the construction, expansion and principles of operation of navigable waterway construction and flood protection facilities and are able to design and calculate the main features of simple structures.

#### Contents

- Fundamentals of hydrology (water circulation, soil moisture regime, groundwater, flood routing), water ecology
- Fundamentals of water management planning and development tasks
- Development of flowing waters
- Weir and dam facilities
- Navigable waterway construction facilities
- Flood protection facilities

#### Recommended Literature

- http://www.hamburg.de/wrrl/
- https://www.umweltbundesamt.de/daten/gewaesserbelastung/flieessgewaesser

#### Teaching and Learning Methods

- Lecture and Practical seminar (4 Hours per Week)

### Exam(s)

#### Precondition of Examination

#### Type of Examination

- Written Exam

#### Duration of Examination (if written or oral exam)

- 2 h

#### Composition of Module Mark

#### Mark of Exam

### Additional Information

#### Previous Knowledge / Conditions for Participation (in form and content)

Prerequisites include: knowledge and skills acquired in Engineering Mathematics, I, Engineering Mathematics II and Technical
<table>
<thead>
<tr>
<th><strong>Mechanics (recommended). Engineering Mathematics I must be completed (mandatory).</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Applicability of Module</strong></td>
</tr>
<tr>
<td><strong>Frequency of Offering</strong></td>
</tr>
<tr>
<td>every Summer Semester</td>
</tr>
<tr>
<td><strong>Course Language</strong></td>
</tr>
<tr>
<td>German</td>
</tr>
<tr>
<td>valid from: Winter Semester 16/17</td>
</tr>
</tbody>
</table>
Module Card

Module Number: BIW-B-Mod-501
Module Name: CAE
Type: C
Semester (proposed): 5
Module Coordinator: Prof. Dr.-Ing. Frank Wellershoff

Subject Area: Structural Engineering
Duration: 1 Semester

CP (according to ECTS): 5 CP (= 150 h Workload)
Contact Hours/Week (SWS): 4 (= 42 h Contact Time)
Self-study: 108 h

Objectives and Contents

Objective of Qualification (competencies)
- Efficient and effective use of high-quality CAD software. This requires an understanding of the mathematical description of complex geometries (NURBS) as well as methods of parameterization.
- Controlled data interchange between a CAD program and frame design software
- Confident use of complex frame design software. This requires working knowledge of numerical computerized techniques (calculation algorithms) as well as how to evaluate results.

Contents
- Introduction to CAD software: Learning and deepening the grasp of fundamentals and basic drawing comments, drawing design and data backup and data transfer to frame design software
- Introduction to frame design software: Theory of consistent deformations method, theory I, II and III. order, theory of calculation algorithms, input, monitoring and editing a CAD model, frame design model setup, creating load cases and load case combinations for measuring fitness for use and load-bearing capacity, selection of calculation parameters, readouts, checking and reading program messages and calculation results, creation of documented and verifiable statics

Recommended Literature
Pottmann et. al.: Architekturgeometrie, Springer Verlag
Helmut Schober: Transparente Schalen, Ernst & Sohn Verlag
Tedeschi: Parametric Architecture with Grashopper, Le Penseur
Lumpe; Gensichen: Evaluierung der linearen und nichtlinearen Stabstatik in Theorie und Software, Ernst & Sohn Verlag

Teaching and Learning Methods
Seminar (4 Hours per Week) in Computer-Pool

Exam(s)
Precondition of Examination

Type of Examination
Duration of Examination (if written or oral exam)
Term Paper
The term paper consists of subtasks worked on throughout the semester.

Composition of Module Mark
The highest mark for the term paper is 100 points. It determines students’ overall mark.

Additional Information
Previous Knowledge / Conditions for Participation (in form and content)
Prerequisites include: Technical Mechanics, Building Construction and CAD (mandatory).

Applicability of Module

Frequency of Offering
every Winter Semester
<table>
<thead>
<tr>
<th>Course Language</th>
<th>German</th>
</tr>
</thead>
<tbody>
<tr>
<td>valid from:</td>
<td>Winter Semester 15/16</td>
</tr>
<tr>
<td>last updated:</td>
<td>25.09.2018</td>
</tr>
</tbody>
</table>
Objective of Qualification (competencies)

Students will acquire basic knowledge in the subject areas of building industry and construction management. They will be able to plan, manage and carry out construction projects.

Contents

- Construction Management and Operations I:
  - Building industry: Business-management basics, operational accounting, finances, operating taxes, operational insurance, working groups
  - Site management: Site facilities, construction equipment and construction methods, formwork and scaffolding
  - Safety technology: A certificate can be earned in accordance with RAB 30, annex B, “Occupational Safety and Health Proficiency,” as well as the knowledge and skills for branch-specific training as an occupational health and safety practitioner, Level III, P V “building sector.”

- Construction Management and Operations II:
  - Scheduling
  - Specification of services: Model format for building services specifications, standard service catalog, freestyle texts with German Construction Contract Procedures (VOB)
  - Construction price calculation: Setup, execution, budgeting and cost processing

Recommended Literature

Detailed information (i.e. relevance, availability in the library) will be given in the first class meeting.
Krause: Zahlentafeln für den Baubetrieb
Berner: Grundlagen der Baubetriebslehre
Krause: Beispiele für die Baubetriebspraxis
Schach: Baustelleneinrichtung

Teaching and Learning Methods

Construction Management I, 5 CP: Lecture and Practical Seminar (4 Hours per Week)
Construction Management I+II (module): Term Paper
Construction Management II, 2,5 CP: Lecture (2 Hours per Week)

Exam(s)

Precondition of Examination
passed Pre-Assignment

Type of Examination | Duration of Examination (if written or oral exam)
--- | ---
Construction Management I: Pre-Assignment: Exam in Safety Engineering | Pre-Assignment: Written Exam 1 h
Construction Management I-II (module): Term Paper |  

Composition of Module Mark

Mark of Term Paper

Additional Information

Previous Knowledge / Conditions for Participation (in form and content)

Applicability of Module
<table>
<thead>
<tr>
<th>Frequency of Offering</th>
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</thead>
<tbody>
<tr>
<td>Construction Management I: every Winter Semester</td>
</tr>
<tr>
<td>Construction Management II: every Summer Semester</td>
</tr>
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<td>Course Language</td>
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valid from: Winter Semester 15/16 last updated: 25.09.2018
## Module Card

**Bachelor Civil Engineering**

**HCU Hamburg**

<table>
<thead>
<tr>
<th>Module Number</th>
<th>Modul Name</th>
<th>Type (C/CE/E)</th>
<th>Semester (proposed)</th>
<th>Module Coordinator</th>
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<tbody>
<tr>
<td>BIW-B-Mod-503</td>
<td>Transport Planning and Traffic Infrastructure</td>
<td>C</td>
<td>5</td>
<td>Prof. Dr.-Ing. Martin Jäschke</td>
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</table>

<table>
<thead>
<tr>
<th>Subject Area</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical Infrastructure</td>
<td>2 Semester</td>
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<table>
<thead>
<tr>
<th>CP (according to ECTS)</th>
<th>Contact Hours/Week (SWS)</th>
<th>Self-study</th>
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</thead>
<tbody>
<tr>
<td>10 CP (= 300 h Workload)</td>
<td>8 (= 84 h Contact Time)</td>
<td>216 h</td>
</tr>
</tbody>
</table>

### Objectives and Contents

**Objective of Qualification (competencies)**

Knowing, understanding and using the basic principles and interrelations of road and railway transportation

**Contents**

- **Transport Planning and Infrastructure I:**
  - Basic principles of transport: Mobility and transport, spatial development and transport; ecological, social and economic effects and interdependency, assessment methods, selection, emissions prevention and reduction, main focus: noise
  - Designing road transportation sites: Traffic surveys, prognoses, distribution (modal split) and assignment; calculating junctions, manual and computer-assisted; elements of design, site plan, topographic map and cross section; optical range analysis; substantiation of transport quality; road drainage; cross section design; bicycle traffic; stationary traffic

- **Transport Planning and Infrastructure II:**
  - Road construction and maintenance: Rode surface construction codes, stresses and strains, dimensioning and building techniques; building methods of federal highways and municipal roads; road maintenance and the pavement management system (PMS)
  - Designing railway sites, railway construction and operation: Legal foundations; road and vehicle interaction; standard operating procedure; railway construction and timetable; planning and building railway systems; crossings

**Recommended Literature**

Becker: Grundwissen Verkehrsökologie; Steierwald: Stadtverkehrsplanung; Lippold: Der Elsner 20xx; Matthews: Bahnbau; Pacht: Systemtechnik des Schienenverkehrs; Internet: FGSV, BAS, UBA, EBA

**Teaching and Learning Methods**

Transport Planning and Traffic Infrastructure I, 5 CP: Lecture and Practical Seminar (4 Hours per Week)
Transport Planning and Traffic Infrastructure II, 5 CP: Lecture and Practical Seminar (4 Hours per Week)

**Exam(s)**

**Precondition of Examination**

<table>
<thead>
<tr>
<th>Type of Examination</th>
<th>Duration of Examination (if written or oral exam)</th>
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<tbody>
<tr>
<td>Transport Planning and Traffic Infrastructure I+II (module): Written Exam</td>
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**Composition of Module Mark**

<table>
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<tr>
<th>Mark of Exam</th>
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</thead>
</table>

**Additional Information**

**Previous Knowledge / Conditions for Participation (in form and content)**

**Applicability of Module**

**Frequency of Offering**
| Transport Planning and Traffic Infrastructure I: every Winter Semester |
| Transport Planning and Traffic Infrastructure II: every Summer Semester |
| Course Language |
| German |
| valid from: Winter Semester 16/17 | last updated: 28.09.2018 |
Objectives and Contents

Objective of Qualification (competencies)
- Basic principles in understanding and implementing simple surveying techniques
- Simple position and height measurements
- Necessary calculation, analysis and representation methods in surveying technology

Contents
- Geodesy (from GEO-B-Mod-101)
  - Survey of Geomatic Engineering, history, standardizations (DIN, SI), reference and coordinate systems, height reference surfaces, using levels and optical plummets (leveling and centering), basic measuring techniques (orthogonal, polar, simple leveling)
- Geodesy practical course
  - Fundamentals of coordinate and height systems
  - Using instruments: leveling, optical-mechanical theodolites, electronic tachymeters
  - Position measurement: orthogonal and polar techniques
  - Height measurement: geometric and trigonometric leveling

Recommended Literature

Teaching and Learning Methods
Geodesy I, 2,5 CP: Lecture (2 Hours per Week)
Practical Course Geodesy, 2, 5 CP: Practical Course (2 Hours per Week)

Exam(s)

Precondition of Examination
Compulsory Attendance in Practical Course 80%

Type of Examination | Duration of Examination (if written or oral exam)
--- | ---
Geodesy I: Written Exam | Written Exam 1,5 h
Practical Course Geodesy: Term Paper, Colloquium |
Composition of Module Mark | 50% Written Exam Geodesy I and 50% Term Paper

Additional Information

Previous Knowledge / Conditions for Participation (in form and content)
For the internship in the 6th semester participation in the theoretical part of Geodesy I is required in the 5th semester (mandatory).

Applicability of Module

Frequency of Offering
<table>
<thead>
<tr>
<th>Course</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geodesy I: every Winter Semester</td>
<td>Practical Course Geodesy: every Summer Semester</td>
</tr>
<tr>
<td>Course Language</td>
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valid from: Summer Semester 2017  
last updated: 25.09.2018
Module Card

<table>
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<tr>
<th>Module Number</th>
<th>Modul Name</th>
<th>Type (C/CE/E)</th>
<th>Semester (proposed)</th>
<th>Module Coordinator</th>
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<tbody>
<tr>
<td>BIW-B-Mod-601</td>
<td>Thesis (ASPO 2015)</td>
<td>C</td>
<td>6</td>
<td>Prof. Dr.-Ing. Annette Bögle</td>
</tr>
</tbody>
</table>

Subject Area: Thesis

Duration:

- Thesis: 1 Semester

CP (according to ECTS) | Contact Hours/Week (SWS) | Self-study |
-----------------------|--------------------------|------------|
10 CP (= 300 h Workload) |                           | 300 h      |

Objectives and Contents

Objective of Qualification (competencies)
The bachelor's thesis is an examination paper. It will demonstrate the candidate's ability to work through a problem in civil engineering independently, according to scientific methods and by a predetermined deadline.

Contents
The exam consists of a problem from the bachelor's curriculum in civil engineering. The first examiner will hand out the topic.

Recommended Literature
Varies by subject

Teaching and Learning Methods
Independent Written Term Paper
For further information, see "Informationen zur Bachelor-/Masterthesis" on the homepage

Exam(s)

Precondition of Examination
Preconditions for the examination paper are stipulated in the general and degree-specific examination regulations of HCU Hamburg.

Type of Examination | Duration of Examination (if written or oral exam)
---------------------|-----------------------------------------------
Thesis               | 12 Weeks
2 copies (each with a hard copy and a digital copy on CD) | 12 Weeks

Composition of Module Mark
Thesis mark worth 100% (first and second examiners' marks each comprise one half of the evaluation)

Additional Information

Previous Knowledge / Conditions for Participation (in form and content)

Applicability of Module

Frequency of Offering
any time

Course Language
German

valid from: Winter Semester 15/16

last updated: 25.09.2018
**Module Card**

**Bachelor Civil Engineering**

**HCU Hamburg**

<table>
<thead>
<tr>
<th>Module Number</th>
<th>Modul Name</th>
<th>Type (C/CE/E)</th>
<th>Semester (proposed)</th>
<th>Module Coordinator</th>
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<tbody>
<tr>
<td>BIW-B-Mod-604</td>
<td>Sanitary Environmental Engineering</td>
<td>C</td>
<td>6</td>
<td>Prof. Dr.-Ing. Wolfgang Dickhaut</td>
</tr>
</tbody>
</table>

**Subject Area**

**Duration**

<table>
<thead>
<tr>
<th>Subject Area</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural Engineering</td>
<td>1 Semester</td>
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**CP (according to ECTS)**

<table>
<thead>
<tr>
<th>CP (according to ECTS)</th>
<th>Contact Hours/Week (SWS)</th>
<th>Self-study</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 CP (= 150 h Workload)</td>
<td>4 (= 42 h contact time)</td>
<td>108 h</td>
</tr>
</tbody>
</table>

**Objectives and Contents**

**Objective of Qualification (competencies)**

- Knowledge about fundamental problems concerning sanitary environmental engineering, methods of resolution and systems
- Ability to calculate simple property and district related measurings

**Contents**

- Basics of Sanitary Environmental Engineering: Strategies of a sustainable Sanitary Environmental Engineering; Biological, chemical and hydraulic basics; Legal requirements: objectives from the perspective of water protection, water quality, wastewater and rain-water inflow and discharge, quality and quantity, drainage processes
- Systems of Sanitary Environmental Engineering on regional and urban level: (operating modes, techniques/materials, measurement basis), water supply (e.g. requirements, supply, sup-port, cleaning, distribution) – an overview; sewage disposal: systems for rainwater usage (mixed and seperate sewer system – operating principle; systems e.g. sewer system, pump stations, stormwater overflow and a stormwater tank) – planning and calculation; sewage treatment: systems for waste water cleaning/sewage tre-atment plants (development of mechanical and biological cleaning, e.g. preclarification, revival, elimination of phosphate, Secondary clarification) – an overview
- Systems of Sanitary Environmental Engineering on district and property level: (operating modes, techniques/materials, measurement basis) - planning and calculation; decentralized rainwa-ter usage (e.g. evaporation, infiltration, retention, usage); waste water cleaning (decentralized systems, e.g. separation and treatment of material flow, grey water recycling, planted soil filters)

**Recommended Literature**

DWA_Regelwerke
Gujer, Willi; Siedlungswasserwirtschaft; 2006

**Teaching and Learning Methods**

Lecture and Practical Seminar (4 Hours per Week)

**Exam(s)**

**Precondition of Examination**

<table>
<thead>
<tr>
<th>Type of Examination</th>
<th>Duration of Examination (if written or oral exam)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written Exam</td>
<td>2 h</td>
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</table>

**Composition of Module Mark**

<table>
<thead>
<tr>
<th>Mark of Exam</th>
</tr>
</thead>
</table>

**Additional Information**

**Previous Knowledge / Conditions for Participation (in form and content)**

This module builds on knowledge acquired in the module Hydraulic Engineering (recommended).

**Applicability of Module**

**Frequency of Offering**

every Summer Semester
<table>
<thead>
<tr>
<th>Course Language</th>
<th>German</th>
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<tbody>
<tr>
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<td>Winter Semester 16/17</td>
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# Module Card

**Bachelor Civil Engineering**  
**HCU Hamburg**

<table>
<thead>
<tr>
<th>Module Number</th>
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<tr>
<td>BIW-B-Mod-605</td>
<td>Elective</td>
<td>CE</td>
<td>5</td>
<td>Prof. Dr.-Ing. Annette Bögle</td>
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<table>
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<th>Subject Area</th>
<th>Duration</th>
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<tbody>
<tr>
<td>Compulsory Elective</td>
<td>1 Semester</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CP (according to ECTS)</th>
<th>Contact Hours/Week (SWS)</th>
<th>Self-study</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 CP (= 150 h Workload)</td>
<td>4 (= 42 h Contact Time)</td>
<td>108 h or 2 x 54 h</td>
</tr>
<tr>
<td>OR</td>
<td>2 x 2.5 CP (= 2 x 75 h Workload)</td>
<td></td>
</tr>
<tr>
<td>2 x 2 (= 2 x 21 h Contact Time)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Objectives and Contents**

**Objective of Qualification (competencies)**
- Increasing breadth and depth of particular disciplinary knowledge
- Profiling the personal portfolio

**Contents**
- A course worth 5 CP is to be chosen from the catalog of mandatory electives for the civil engineering program.  
  OR  
- Two courses worth 2.5 CP each are to be chosen from the catalog of mandatory electives for the civil engineering program.

**Recommended Literature**  
Varies by course

**Teaching and Learning Methods**  
Lecture + Practical Course (4 Hours per Week or 2 x 2 Hours per Week)

**Exam(s)**

<table>
<thead>
<tr>
<th>Precondition of Examination</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Varies by course</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Type of Examination</th>
<th>Duration of Examination (if written or oral exam)</th>
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</thead>
<tbody>
<tr>
<td>Varies by course</td>
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</table>

<table>
<thead>
<tr>
<th>Composition of Module Mark</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Varies by type of examination</td>
<td></td>
</tr>
</tbody>
</table>

**Additional Information**

**Previous Knowledge / Conditions for Participation (in form and content)**  
To be determined by the teacher of the course

**Applicability of Module**

**Frequency of Offering**
- every Semester

**Course Language**
- German

**valid from:** Winter Semester 15/16  
**last updated:** 25.09.2018
### Module Card

**Bachelor Civil Engineering**  
**HCU Hamburg**

<table>
<thead>
<tr>
<th>Module Number</th>
<th>Modul Name</th>
<th>Type (C/CE/E)</th>
<th>Semester (proposed)</th>
<th>Module Coordinator</th>
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</thead>
<tbody>
<tr>
<td>SK-B-Mod-002 (BIW)</td>
<td>Skills: Instruments for Analysis and Visualization</td>
<td>CE</td>
<td>2 + 3</td>
<td>Prof. Dr. rer. nat. Thomas Schramm, Dipl.-Ing. Jens Köster</td>
</tr>
</tbody>
</table>

#### Subject Area
- Interdisciplinary Studies

#### Duration
- 2 Semester

<table>
<thead>
<tr>
<th>CP (according to ECTS)</th>
<th>Contact Hours/Week (SWS)</th>
<th>Self-study</th>
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</thead>
<tbody>
<tr>
<td>2 x 2.5 CP (= 2 x 75 Std. Workload)</td>
<td>2 x 2 (= 2 x 21 h Contact Time)</td>
<td>2 x 54 h</td>
</tr>
</tbody>
</table>

### Objectives and Contents

#### Objective of Qualification (competencies)
- **SKILLS (selectable):**
  - Interdisciplinary competences in analysis and visualization to understand and design urban environment
  - Computer Science:
    - Calculation and visualization by spreadsheets
    - Solution of simple programming tasks
    - Simple calculations with statics programs

#### Contents
- **SKILLS (selectable):** Teaching of instruments for analysis and visualization, e.g.:
  - Typical design software like adobe photoshop, InDesign, Illustrator
  - CAD
  - Geo-information systems
  - Film
  - Foto
  - and others
- **Computer Science:**
  - Introduction to Excel: Learning and improvement of basic calculation functions, presentation of results in diagrams
  - Introduction to VBA: development of functions and programs
  - Introduction to programs for shell structures as well as a common statics program: entering of systems and loads, calculation of cut sizes and deformation

### Recommended Literature

**Computer Science:**
- Excel und VBA (Verlag Springer Vieweg)
- Excel 2013 – Automatisierung und Programmierung (RRZN-Handbuch Leibniz Universität Hannover)

### Teaching and Learning Methods

**SKILLS (selectable), 2.5 CP:** Seminar (2 Hours per Week)  
**Computer Science, 2.5 CP:** Practical course (2 Hours per Week) in Computer Pool

### Exam(s)

**Precondition of Examination**
- Compulsory Attendance 80%

**Type of Examination**

#### Duration of Examination (if written or oral exam)
- **SKILLS (selectable):** varies by course
- **Computer Science: Written Exam** 1.5 h

**Composition of Module Mark**
- Mark of Exam Computer Science 50%, Mark of Skills (selectable) 50%

### Additional Information

**Previous Knowledge / Conditions for Participation (in form and content)**
<table>
<thead>
<tr>
<th>Computer Skills</th>
<th></th>
</tr>
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<tbody>
<tr>
<td>Applicability of Module</td>
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<td>Frequency of Offering</td>
<td>every Winter Semester</td>
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<td>Course Language</td>
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**valid from:** Winter Semester 15/16  
**last updated:** 25.09.2018