BMB 110  Mathematics I

Lecturer: Prof. Dr. rer. nat. Wilderotter

Type of course unit: Compulsory

Level of course unit: First-cycle

Year of study: First

Semester when the course is delivered: First / winter semester, summer semester

ECTS credits: 5 ECTS

Prerequisites: None

Language of instruction: German

Teaching method / learning activities: Lectures, practical exercises, group work

Mode of delivery: Face-to-face

Attendance: 4 hours/week

Workload: 60 contact hours, 90 hours of independent study

Assessment methods and criteria: Written exam

Recommended optional programme components: Student can choose courses from the General Studies’ program

Course content:
1. Functions: Definition and representation, special properties of functions, special functions, sequences of numbers, limit of a function, continuous functions.
2. Differentiation and the derivative: Definition, derivatives of elementary functions, rules for finding the derivative.
3. Applications of differential calculus: Curve tracing, extreme function values, approximation of functions with the help of their derivatives, Taylor theorem.
4. Integral calculus: Definition of indefinite integrals, integration methods, definite integrals.
5. Applications of integral calculus: Areas, volumes of a solid of revolution.

Learning outcomes: After having successfully completed the course, the students should
• be able to use Mathematics as a tool for solving many engineering and economical problems.

Work placements: n/a

Recommended reading:
Erven/Schwägerl: Mathematik für Ingenieure, Oldenbourg Verlag, 2002
Bartsch: Taschenbuch mathematischer Formeln, Fachbuchverlag Leipzig, 2004
Stöcker: Taschenbuch mathematischer Formeln und moderner Verfahren, Verlag Harri Deutsch, 2003
Biehounek/Schmidt: Mathematik für Bauingenieure, 1. Aufl., Braunschweig/Wiesbaden: Vieweg Verlag, 2002
Grobstich, Strey: Mathematik für Bauingenieure, 1. Aufl., Wiesbaden: Teubner Verlag, 2004
BMB 120 Programming and Standard Software

Lecturer: Prof. Dr. rer. nat. Wilderotter
Assistant Lecturers

Type of course unit: Compulsory

Level of course unit: First-cycle

Year of study: First

Semester when the course is delivered: First / winter semester, summer semester

ECTS credits: 5 cp

Prerequisites: Recommended: basic knowledge of computer use and data administration under Microsoft Windows. CAD: basic knowledge of surface and spatial geometry, and descriptive geometry

Language of instruction: German

Teaching method / learning activities: Lectures, practical exercises, seminar, laboratory, group work

Mode of delivery: Face-to-face

Attendance: 5 hours/week

Workload: 60 contact hours, 90 hours of independent study

Assessment methods and criteria: Written exam, study assignment

Recommended optional programme components: Student can choose courses from the General Studies’ program

Course content: Programming: Microsoft Visual Basic for Applications (VBA), data types, expressions and operators, loops, parameters and arguments, procedures and functions, argument passing. Standard Software: Microsoft Word, Microsoft Excel, Microsoft Power Point.

The lecture takes place in the computer lab. The students apply their acquired knowledge directly in practical exercises. The drafting and design of a building part or entire buildings. Drafts can be created in two dimensions ("2D", Software AutoCAD) and three dimensions ("3D", Software Arriba3D). The students learn the necessary contents and methods for completing a plan. Advantages of the digital project collection are presented. The lecture takes place in the computer lab. The students apply their acquired knowledge directly in practical exercises.

Learning outcomes: After having successfully completed the course, the students should

- be able to work on documents with Word, to create a serial letter, to perform a spread-sheet analysis in Excel and to prepare a presentation with Power Point,
- be able to program in VBA for solving many engineering and economic problems,
- be able to design and draft a part, a product, or even...
entire buildings.

Work placements: n/a

Recommended reading: Handbooks ARRIBA CA3D - System von RIB Software AG
Handouts
Lecturers: Prof. Dr.-Ing. Harich

Type of course unit: Compulsory

Level of course unit: First-cycle

Year of study: First

Semester when the course is delivered: First / winter semester, summer semester

ECTS credits: 5 cp

Prerequisites: None

Language of instruction: German

Teaching method / learning activities: Lectures, practical exercises, group work

Mode of delivery: Face-to-face

Attendance: 4 hours/week

Workload: 60 contact hours, 90 hours of independent study

Assessment methods and criteria: Written exam

Recommended optional programme components: Student can choose courses from the General Studies’ program

Course contents: Theory of forces, centre of gravity of plane areas, use of force equilibrium for statically determined 2D structures.

Learning outcomes: After having successfully completed the course, the students should

- be able to determine the support reactions and the internal forces and moments of statically determined plane trusses, frame structures and continuous beams.

Work placements: n/a

Recommended reading:

Holzmann/Meyer/Schumpich: Technische Mechanik Teil 1 (Statik), 10. Aufl., Stuttgart: B.G. Teubner, 2004

Steger/Sieghart/Glauninger: Technische Mechanik Teil 1 (Statik, Reibung, Festigkeitslehre), Stuttgart: B.G. Teubner 1997


BMB 140  Building Construction

Lecturers:  Prof. Dr. rer. nat. Schubert

Type of course unit:  Compulsory

Level of course unit:  First-cycle

Year of study:  First

Semester when the course is delivered:  First / winter semester, summer semester

ECTS credits:  5 ECTS

Prerequisites:  None

Language of instruction:  German

Teaching method / learning activities:  Lectures, practical exercises, project work, presentation, group work

Mode of delivery:  Face-to-face

Attendance:  4 hours/week

Workload:  60 contact hours, 90 hours of independent study

Assessment methods and criteria:  Written exam

Recommended optional programme components:  Student can choose courses from the General Studies’ program

Course content:  The students are provided with basic knowledge of various construction systems and methods. Constructive elements of buildings, from the building ground to the roof details, will be discussed. The students apply the elementary knowledge learned in a practical study project. They independently develop solutions in teams and present detailed results in plant and factory plans by using CAD techniques.

Learning outcomes:  After having successfully completed the course, the students should
  •  have gained in-depth technical knowledge of design principles as well as basic knowledge of building structures, such as terms and definitions, rules and standards, and structural-physical conditions,
  •  be able to apply their theoretical knowledge in a training projects,
  •  be able to select and use determined methods by means of analysis and comparative examination,
  •  be able to plan and implement an exercise project by independently using developed and appropriate presentation methods.

Work placements:  n/a
Recommended reading:

- Frick/Knöll: Baukonstruktionslehre, Teil 1, Stuttgart/Leipzig/Wiesbaden: Teubner
- Frick/Knöll: Baukonstruktionslehre, Teil 2, Wiesbaden: Teubner
- Mittag: Baukonstruktionslehre, Braunschweig/Wiesbaden: Viehweg
- Franke/Deckelmann: Baukonstruktion im Planungsprozess, Braunschweig/Wiesbaden: Viehweg
### BMB 150  Surveying

<table>
<thead>
<tr>
<th>Lecturer:</th>
<th>Prof. Dr.-Ing. Bergweiler</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistant Lecturers:</td>
<td></td>
</tr>
<tr>
<td>Type of course unit:</td>
<td>Compulsory</td>
</tr>
<tr>
<td>Level of course unit:</td>
<td>First-cycle</td>
</tr>
<tr>
<td>Year of study:</td>
<td>First</td>
</tr>
<tr>
<td>Semester when the course</td>
<td>First / winter semester, summer semester</td>
</tr>
<tr>
<td>is delivered:</td>
<td></td>
</tr>
<tr>
<td>ECTS credits:</td>
<td>5 cp</td>
</tr>
<tr>
<td>Prerequisites:</td>
<td>none</td>
</tr>
<tr>
<td>Language of instruction:</td>
<td>German</td>
</tr>
<tr>
<td>Teaching method/learning</td>
<td>Lectures, practical exercises, group work</td>
</tr>
<tr>
<td>activities:</td>
<td></td>
</tr>
<tr>
<td>Mode of delivery:</td>
<td>Face-to-face</td>
</tr>
<tr>
<td>Attendance:</td>
<td>6 hours/week</td>
</tr>
<tr>
<td>Workload:</td>
<td>60 contact hours, 90 hours of independent study</td>
</tr>
<tr>
<td>Assessment methods and</td>
<td>Written exam</td>
</tr>
<tr>
<td>criteria:</td>
<td></td>
</tr>
<tr>
<td>Recommended optional</td>
<td>Student can choose courses from the General</td>
</tr>
<tr>
<td>programme components:</td>
<td>Studies’ program</td>
</tr>
<tr>
<td>Course content:</td>
<td>Surveying: Basic geodetic calculations, levelling,</td>
</tr>
<tr>
<td></td>
<td>tachymetric mapping, introductory route</td>
</tr>
<tr>
<td></td>
<td>calculations, longitudinal and cross-sections,</td>
</tr>
<tr>
<td></td>
<td>earthwork calculations</td>
</tr>
<tr>
<td>Learning outcomes:</td>
<td>Acquisition of a sound technical knowledge of</td>
</tr>
<tr>
<td></td>
<td>surveying procedures and methods. Ability to</td>
</tr>
<tr>
<td></td>
<td>apply the theoretical basics by using efficient,</td>
</tr>
<tr>
<td></td>
<td>task-appropriate working procedures. Independent</td>
</tr>
<tr>
<td></td>
<td>and multidisciplinary acquisition of knowledge</td>
</tr>
<tr>
<td></td>
<td>and skills. Skilled in performing tasks and</td>
</tr>
<tr>
<td></td>
<td>analysing results.</td>
</tr>
<tr>
<td>Work placements:</td>
<td>n/a</td>
</tr>
<tr>
<td>Recommended reading:</td>
<td>Resnik/Bill: Vermessungskunde für den Planungs-,</td>
</tr>
<tr>
<td></td>
<td>Bau- und Umweltbereich, 2.Aufl., Stuttgart:</td>
</tr>
<tr>
<td></td>
<td>Herbert Wichmann Verlag, 2003</td>
</tr>
<tr>
<td></td>
<td>Gelhaus/Kolouch: Vermessungskunde für Architekten</td>
</tr>
<tr>
<td></td>
<td>und Bauingenieure, 2. Aufl., Düsseldorf: Werner</td>
</tr>
<tr>
<td></td>
<td>Verlag, 1997</td>
</tr>
<tr>
<td></td>
<td>Witte/Schmidt: Vermessungskunde und Grundlagen</td>
</tr>
<tr>
<td></td>
<td>der Statistik für das Bauwesen, 6. Aufl.,</td>
</tr>
<tr>
<td></td>
<td>Stuttgart: Wichmann, 2006</td>
</tr>
</tbody>
</table>
BMB 160 Construction Management

Lecturers: Prof. Dr.-Ing. Korn
Prof. Dr. Urmersbach

Type of course unit: Compulsory

Level of course unit: First-cycle

Year of study: First

Semester when the course is delivered: First / winter semester, summer semester

ECTS credits: 5 cp

Prerequisites: None

Language of instruction: German

Teaching method/learning activities: Lectures, practical exercises, simulation game

Mode of delivery: Face-to-face

Attendance: 4 hours/week

Workload: 60 contact hours, 90 hours of independent study

Assessment methods and criteria: Written exam

Recommended optional programme components: Student can choose courses from the General Studies’ program

Course content:

- Economic basics, management basics: business objectives, strategic and operational planning, decision making, leading and controlling an organisation.
- Legal forms of companies,
- Entrepreneurship, a company’s organization, the annual financial statement - a company’s business card, balance sheet, income statement
- Controlling and managing via performance indicators
- Marketing management: market research, strategic marketing planning, marketing mix: product, price, place, promotion.

Learning outcomes:

Starting from the basics of economic, managerial and technical parameters pertaining to construction, the students will be able to subdivide the wide spectrum of the construction industry into individual fields of activity and delineate them from the systemic environment.

With a basic understanding of managerial contexts, students will be familiar with the fundamentals of business economics. On this basis, they will be able to make economically meaningful decisions from a range of alternatives.
Work placements: n/a

Recommended reading:
- Skriptum, Statistiken und Aufgaben mit Lösungen digital über Internet.

---

**BMB 210  Mathematics II**

**Lecturers:** Prof. Dr. rer. nat. Wilderotter

**Type of course unit:** Compulsory

**Level of course unit:** First-cycle

**Year of study:** First

**Semester when the course is delivered:** Second / winter semester, summer semester

**ECTS credits:** 5 cp

**Prerequisites:** Recommended: Mathematics I

**Language of instruction:** German

**Teaching method/learning activities:** Lectures, practical exercises, group work

**Mode of delivery:** Face-to-face

**Attendance:** 4 hours/week

**Workload:** 60 contact hours, 90 hours of independent study
Assessment methods and criteria: Written exam

Recommended optional programme components: Student can choose courses from the General Studies’ program

Course content:
1. Linear algebra: Matrix and determinants, system of linear equations, methods of solution, Gaussian elimination, Cramer's rule.
2. Plane Curves, curvature, differential and integral calculus.
3. Topics from mathematical finance: interest periods and effective rates, present value, mortgage loan, investment projects.
4. Differential calculus in higher dimensions, partial derivatives, extrema.
5. Integral calculus in higher dimensions: calculation of volume, centroid, moment of inertia.
6. Ordinary differential equations: differential equation of 1st order, linear differential equation of 2nd order with constant coefficients, applications.

Learning outcomes: After having successfully completed the course, the students should
• be able to use Mathematics as a tool for the solving many engineering and economic problems.

Work placements: n/a

Recommended reading:
**BMB 220  Structural Mechanics II**

<table>
<thead>
<tr>
<th><strong>Lecturers:</strong></th>
<th>Prof. Dr.-Ing. Harich</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of course unit:</strong></td>
<td>Compulsory</td>
</tr>
<tr>
<td><strong>Level of course unit:</strong></td>
<td>First-cycle</td>
</tr>
<tr>
<td><strong>Year of study:</strong></td>
<td>First</td>
</tr>
<tr>
<td><strong>Semester when the course is delivered:</strong></td>
<td>Second / winter semester, summer semester</td>
</tr>
<tr>
<td><strong>ECTS credits:</strong></td>
<td>5 cp</td>
</tr>
<tr>
<td><strong>Prerequisites:</strong></td>
<td>Recommended: Structural Mechanics I, Mathematics I</td>
</tr>
<tr>
<td><strong>Language of instruction:</strong></td>
<td>German</td>
</tr>
<tr>
<td><strong>Teaching method/learning activities:</strong></td>
<td>Lectures, practical exercises, group work</td>
</tr>
<tr>
<td><strong>Mode of delivery:</strong></td>
<td>Face-to-face</td>
</tr>
<tr>
<td><strong>Attendance:</strong></td>
<td>4 hours/week</td>
</tr>
<tr>
<td><strong>Workload:</strong></td>
<td>60 contact hours, 90 hours of independent study</td>
</tr>
<tr>
<td><strong>Assessment methods and criteria:</strong></td>
<td>Written exam</td>
</tr>
<tr>
<td><strong>Recommended optional programme components:</strong></td>
<td>Student can choose courses from the General Studies’ program</td>
</tr>
<tr>
<td><strong>Course content:</strong></td>
<td>Definition of stress, strain and second moment of area. Calculation of stresses, strains and displacements for normal forces, shearing forces, bending moments (including double bending) and torsion. Theory of elasticity and theories of failure. After having successfully completed the course, the students should • be able to determine stresses, strains and displacements of statically determined plane trusses, frame structures and continuous beams.</td>
</tr>
<tr>
<td><strong>Work placements:</strong></td>
<td>n/a</td>
</tr>
</tbody>
</table>
### BMB 230 Building Materials I

| **Lecturers:** | Prof. Dr. rer. nat. Schubert  
|               | Prof. Dr.-Ing. Gerdes |
| **Type of course unit:** | Compulsory |
| **Level of course unit:** | First-cycle |
| **Year of study:** | First |
| **Semester when the course is delivered:** | Second / winter semester, summer semester |
| **ECTS credits:** | 5 cp |
| **Attendance:** | 4 hours/week |
| **Workload:** | 60 contact hours, 90 hours of independent study |
| **Prerequisites:** | none |
| **Language of instruction:** | German |
| **Teaching method/learning activities:** | Lectures, group work, presentation |
| **Mode of delivery:** | Face-to-face |
| **Assessment methods and criteria:** | Written exam |
| **Recommended optional programme components:** | Student can choose courses from the General Studies’ program |
| **Course content:** | The lecture provides knowledge on the technological basics of construction materials, their parameters and relationships. In addition to an overview on definitions, types, properties, the constitution and the manufacture of selected construction materials, the material properties are explained in the context of type and structure, with a focus on mineral bound materials. The lecture includes the following topics: Introduction, history, material structure and mechanical (building physics) material behavior, binders, aggregates, additives and materials, fresh and hardened concrete properties, durability, special concrete. |
| **Learning outcomes:** | Modern construction materials are frequently composed of various components of an inorganic (e.g. cement) and an organic (e.g. polymers) nature. Not only the manufacture, selection and use of these materials, but also the maintenance and disposal of manufactured components require that a construction engineer must have a detailed knowledge of the chemical properties of these materials. In addition, new financing models ("PPP" projects) will add greater importance to the topic of "durability". The module "Materials I" will provide students with this necessary basic knowledge. In-depth technical knowledge (theory and applications) of
the various materials and their properties. Specialist content, background knowledge and adequate consideration of technical and environmental conditions are needed for selecting building elements and structures. Knowledge of the applications of various materials

Work placements: n/a

Recommended reading:
- Cammenga: Bauchemie – eine Einführung für das Studium, Braunschweig: Vieweg Verlag
- Benedix: Bauchemie - Einführung in die Chemie für Bauingenieure, Stuttgart: B.G. Teubner
- Stark/Wicht: Zement und Kalk, Basel: Birkhäuser Verlag
- Grübl/Weigler/Karl: Beton-Arten, Herstellung, Eigenschaften, Berlin: Verlag Ernst und Sohn
- Reinhardt: Ingenieurbaustoffe, Berlin: Verlag Ernst und Sohn
- Wesche: Baustoffe für Tragende Bauteile, Bd. 1-4, Bauverlag
- König: Hochleistungsbeton, Berlin: Ernst + Sohn Verlag
- Scholz/Hiese: Baustoffkenntnis, Werner Verlag
- Härig/Klausen/Horscheit: Technologie der Baustoffe, C.F. Müller Verlag

BMB 240  Project Planning I

Lecturers: Prof. Dr.-Ing. Korn
Assistant Lecturers

Type of course unit: Compulsory

Level of course unit: First-cycle

Year of study: First

Semester when the course is delivered: Second / winter semester, summer semester

ECTS credits: 5 cp

Language of instruction: German

Attendance: 4 hours/week

Workload: 60 contact hours, 90 hours of independent study

Prerequisites: Recommended: basic knowledge of planning, building materials, practical experience on a building site

Teaching method/learning activities: Lectures, practical exercises

Mode of delivery: Face-to-face

Assessment methods and criteria: Written exam

Recommended optional programme components: Student can choose courses from the General Studies’ program

Course content:
- Project planning - definition and objectives
- Structure of project planning
Assessment of possible methods of production
Optimisation criteria
Necessary information for project planning
Milestone technique
Characteristics of projects
Line chart, Gantt chart

**Learning outcomes:**

After having successfully completed the course, the students should

- know about the structure and methods of production planning in construction management,
- be able to collect the data required for drawing up their own work schedules and for planning site facilities,
- be able to evaluate the technical and social conditions being relevant for project planning,
- be able to identify relevant structures of on-site business processes,
- be able to structure the wide range of working procedures into elements, to plan them locally and temporally, to assign resources to them and finally to choose the right way to join the elements in an appropriate manner.

**Work placements:**

n/a

**Recommended reading:**


Roquette, Andreas et al.: "Handbuch Bauzeit", 1. Auflage 2009, Werner-Verlag, Köln


Hoffmann (Hrsg.): Beispiele für die Baubetriebspraxis, 1. Aufl., Wiesbaden: B. G. Teubner, 2006


Scheffler (Hrsg.): Baumaschinen: Erdbau- und Tagebaumaschinen, 1. Aufl., Braunschweig/Wiesbaden; Vieweg, 2002


Wetzell (Hrsg.): Wendehorst Bautechnische Zahlentafeln,
### BMB 250 Civil Law I

<table>
<thead>
<tr>
<th>Lecturers</th>
<th>Prof. Dr. iur. Andreas Luckey</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of course unit:</strong></td>
<td>Compulsory</td>
</tr>
<tr>
<td><strong>Level of course unit:</strong></td>
<td>First-cycle</td>
</tr>
<tr>
<td><strong>Year of study:</strong></td>
<td>First</td>
</tr>
<tr>
<td><strong>Semester when the course is delivered:</strong></td>
<td>Second / winter semester, summer semester</td>
</tr>
<tr>
<td><strong>ECTS credits:</strong></td>
<td>5 cp</td>
</tr>
<tr>
<td><strong>Language of instruction:</strong></td>
<td>German</td>
</tr>
<tr>
<td><strong>Attendance:</strong></td>
<td>4 hours/week</td>
</tr>
<tr>
<td><strong>Workload:</strong></td>
<td>60 contact hours, 90 hours of independent study</td>
</tr>
<tr>
<td><strong>Prerequisites:</strong></td>
<td>None</td>
</tr>
<tr>
<td><strong>Teaching method/learning activities:</strong></td>
<td>Lectures</td>
</tr>
<tr>
<td><strong>Mode of delivery:</strong></td>
<td>Face-to-face</td>
</tr>
<tr>
<td><strong>Assessment methods and criteria:</strong></td>
<td>Written exam</td>
</tr>
<tr>
<td><strong>Recommended optional programme components:</strong></td>
<td>Student can choose courses from the General Studies’ program</td>
</tr>
<tr>
<td><strong>Course content:</strong></td>
<td>Provision of basic knowledge in Building Regulations Law and Civil Law based on the German Civil Code (BGB)</td>
</tr>
</tbody>
</table>
| **Learning outcomes:**     | After having successfully completed the course, the students should  
  - have basic knowledge in German Civil Law, especially in contract law  
  - be able to plan building projects taking into account legal matters  
  - be able to handle legal texts |
| **Work placements:**       | n/a                            |
| **Recommended reading:**   | Wörlen: BGB AT Einführung in das Recht  
  Rüthers/Stadler: Allgemeiner Teil des BGB  
  Palandt: Bürgerliches Gesetzbuch  
  Alpmann: Skript BGB AT 1 und AT 2  
  Hemmer/Wüst: Skript Sachenrecht  
  Gas: Baurecht - schnell erfasst  
  Hemmer/Wüst: Skript Baurecht Baden-Württemberg  
  Schröder: Baugesetzbuch  
  Boeddinghaus: BauNVO Baunutzungsverordnung  
  Erbguth/Wagner: Grundzüge des öffentlichen Baurechts  
  Finkelnburg/Orloff: Öffentliches Baurecht Band I: |
Bauplanungsrecht
Finkelnburg/Orloff: Öffentliches Baurecht Band II:
Bauordnungsrecht
BMB 260  Road Construction, Hydraulics & Sanitation Eng.

Lecturers: Prof. Dr.-Ing. Wittland

Type of course unit: Compulsory

Level of course unit: First-cycle

Year of study: First

Semester when the course is delivered: Second / winter semester, summer semester

ECTS credits: 5 cp

Language of instruction: German

Attendance: 4 hours/week

Workload: 60 contact hours, 90 hours of independent study

Prerequisites: Recommended: practical experience on the building site, basic knowledge of building materials

Teaching method/learning activities: Lectures, practical exercises, presentation, project work, laboratory, group work

Mode of delivery: Face-to-face

Assessment methods and criteria: Written exam

Recommended optional programme components: Student can choose courses from the General Studies’ program

Course content:
- Road planning: History of road construction, basics of road design, draft elements (limit and reference values)
- Road construction engineering: Building materials (and their requirements) and building procedures, road superstructure and requirements placed on the substructure and/or the underground, total thickness of the frost-proof superstructure, standardisation of the superstructure for traffic surfaces, road drainage, noise protection, examples
- Water: Quality requirements of drinking water; raw water catchment from ground and surface water; design and construction of wells; water conveyance, pumping stations; water treatment, water storage
- Wastewater: concept and design of sewerage systems, design, construction and rehabilitation of sewers, hydraulic and process design of wastewater treatment plants for primary, secondary and tertiary wastewater treatment, principles, concepts and design of stormwater management facilities

Learning outcomes:
- After having successfully completed the course, the students should
  - be acquainted with the topics mentioned above.
  - have achieved advanced theoretical background knowledge in the field of hydraulics and sanitation engineering,
  - be able to apply the main principles and methods
Work placements: n/a

Recommended reading:

Girmscheid: Leistungsermittlungshandbuch für Baumaschinen und Bauprozesse, 1. Aufl., vdf, 2002
Gerster/Kohl: Baubetrieb in Beispielen, 1. Aufl., Werner, 2003
Hoffmann (Hrsg.): Zahlentafeln für den Baubetrieb, 7. Aufl., Teubner, 2006
Hoffmann (Hrsg.): Beispiele für die Baubetriebspraxis, 1. Aufl., Teubner, 2006
Scheffler (Hrsg.): Baumaschinen. 1. Aufl., Vieweg, 2002
Schneider (Hrsg.): Bautabellen für Ingenieure. 17. Aufl., Werner, 2006
Vollenschar (Hrsg.): Wendehorst Baustoffkunde, 26. Aufl., Teubner, 2004
Wetzell (Hrsg.): Wendehorst Bautechnische Zahlentafeln, 31. Aufl., Teubner, 2004
Wetzell (Hrsg.): Wendehorst Beispiele aus der Baupraxis, 1. Aufl., Wiesbaden: Teubner, 2005
Grombach: Handbuch der Wasserversorgungstechnik, 3. Auflage, 2000
DWA (früher ATV-DVWK): ATV-Handbücher zu folgenden Themen:
- Planung, Bau und Betrieb der Kanalisation
- Mechanische Abwasserreinigung
- Biologische und weitergehende Abwasserreinigung
- Klärschlamm
- Betriebstechnik, Kosten und Rechtsgrundlagen der Abwasserreinigung.
Imhoff: Taschenbuch der Stadtentwässerung, 29. Auflage, Oldenbourg, 1999
# BMB 310  Cost Accounting in Construction Industries

<table>
<thead>
<tr>
<th>Lecturers:</th>
<th>Prof. Dr. Urmersbach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of course unit:</td>
<td>Compulsory</td>
</tr>
<tr>
<td>Level of course unit:</td>
<td>First-cycle</td>
</tr>
<tr>
<td>Year of study:</td>
<td>Second</td>
</tr>
<tr>
<td>Semester when the course is delivered:</td>
<td>Third / winter semester, summer semester</td>
</tr>
<tr>
<td>ECTS credits:</td>
<td>5 cp</td>
</tr>
<tr>
<td>Language of instruction:</td>
<td>German</td>
</tr>
<tr>
<td>Attendance:</td>
<td>4 hours/week</td>
</tr>
<tr>
<td>Workload:</td>
<td>60 contact hours, 90 hours of independent study</td>
</tr>
<tr>
<td>Prerequisites:</td>
<td>Recommended: Student should be familiar with processes at a construction site and in a construction company.</td>
</tr>
<tr>
<td>Teaching method / learning activities:</td>
<td>Lectures, practical exercises, presentation, group work</td>
</tr>
<tr>
<td>Mode of delivery:</td>
<td>Face-to-face</td>
</tr>
<tr>
<td>Assessment methods and criteria:</td>
<td>Written exam</td>
</tr>
<tr>
<td>Recommended optional programme components:</td>
<td>Student can choose courses from the General Studies’ program</td>
</tr>
</tbody>
</table>

### Course content:

- Pricing (strategies) in an economic environment.
- Financial accounting - Double-entry bookkeeping and balance sheet: asset accounts and profit-and-loss accounts, accounting records, common accounting transaction: amortisation, value added tax (VAT), wages and salaries with social contributions
- Cost and activity accounting: cost-type accounting, cost-centre accounting and cost unit accounting; cost allocation sheet
- Financial statements and profitability analysis regarding enterprise, sector, subsidiary or construction site

### Learning outcomes:

After having successfully completed the course, the students should

- have a basic knowledge of pricing in an economic environment. (real cash flows of a company help the students to understand financial accounting and cost-and-activity accounting),
- be able to understand balance sheets and profit-and-loss statements of a construction firm and know the basics of financing an enterprise and building contracts (it will be demonstrated how financial accounting becomes part of cost-and-activity accounting),
- know how to use common calculation methods to find a standard price.
Work placements: n/a

Recommended reading:

<table>
<thead>
<tr>
<th>Lecturers:</th>
<th>Prof. Dr.-Ing. Korn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of course unit</td>
<td>Compulsory</td>
</tr>
<tr>
<td>Level of course unit:</td>
<td>First-cycle</td>
</tr>
<tr>
<td>Year of study:</td>
<td>Second</td>
</tr>
<tr>
<td>Semester when the course is delivered:</td>
<td>Third / winter semester, summer semester</td>
</tr>
<tr>
<td>ECTS credits:</td>
<td>5 cp</td>
</tr>
<tr>
<td>Language of instruction:</td>
<td>German</td>
</tr>
<tr>
<td>Attendance:</td>
<td>4 hours/week</td>
</tr>
<tr>
<td>Workload:</td>
<td>60 contact hours, 90 hours of independent study</td>
</tr>
<tr>
<td>Prerequisite:</td>
<td>Recommended: basic knowledge of the economic agents</td>
</tr>
<tr>
<td>Teaching method/learning activities:</td>
<td>Lectures, practical exercises, project work, laboratory, group work</td>
</tr>
<tr>
<td>Mode of delivery:</td>
<td>Face-to-face</td>
</tr>
<tr>
<td>Assessment methods and criteria:</td>
<td>Written exam</td>
</tr>
<tr>
<td>Recommended optional programme components:</td>
<td>Student can choose courses from the General Studies’ program</td>
</tr>
<tr>
<td>Course content:</td>
<td>• Structure of the various tendering procedures</td>
</tr>
<tr>
<td></td>
<td>• European legal framework</td>
</tr>
<tr>
<td></td>
<td>• Tendering procedures in Germany</td>
</tr>
<tr>
<td></td>
<td>• Technical specifications</td>
</tr>
<tr>
<td></td>
<td>• Bill of quantities</td>
</tr>
<tr>
<td></td>
<td>• Amendments</td>
</tr>
<tr>
<td></td>
<td>• Accounting</td>
</tr>
<tr>
<td></td>
<td>• Cost estimation as a prerequisite</td>
</tr>
<tr>
<td>Learning outcomes:</td>
<td>After having successfully completed the course, the students should</td>
</tr>
<tr>
<td></td>
<td>• know about the major steps of tendering procedures of public and private employers,</td>
</tr>
<tr>
<td></td>
<td>• be able to choose the correct tendering procedure and plan the structure of this proceeding,</td>
</tr>
<tr>
<td></td>
<td>• have achieved detailed insights into the existing tendering procedures in Germany,</td>
</tr>
<tr>
<td></td>
<td>• be able to judge interests and motivations of both client and tenderer,</td>
</tr>
<tr>
<td></td>
<td>• be able to create technical specifications by means of bills of quantities and get an impression of output-oriented specifications.</td>
</tr>
<tr>
<td>Work placements:</td>
<td>n/a</td>
</tr>
</tbody>
</table>
**Recommended reading:**

- Kapellmann, Klaus / Langen, Werner: "Einführung in die VOB/B – Basiswissen für die Praxis", 20. Auflage 2011, Werner Verlag, Köln
- Ohne Verfasser: "VOB - HOAI", 28. Auflage 2011, dtv Verlag, München
### BMB 330  Foundation and Soil Engineering

**Lecturers:** Prof. Dr.-Ing. Pawlowski  
Assistant Lecturers

**Type of course unit:** Compulsory

**Level of course unit:** First-cycle

**Year of study:** Second

**Semester when the course is delivered:** Third / winter semester, summer semester

**ECTS credits:** 5 cp

**Language of instruction:** German

**Attendance:** 4 hours/week

**Workload:** 60 contact hours, 90 hours of independent study

**Prerequisites:** Recommended: Knowledge in Mathematics and Structural Mechanics

**Teaching method/learning activities:** Lectures, practical exercises, laboratory

**Mode of delivery:** Face-to-face

**Assessment methods and criteria:** Written exam

**Recommended optional programme components:** Student can choose courses from the General Studies’ program

**Course content:** Building ground and soil, soil classification, parameters of earthwork mechanics, description of subsoil and groundwater conditions, soil improvement, compaction of earth materials, earth-moving operations, water in the soil, excavation and protection of excavations, groundwater lowering methods, dam construction, stability of slopes. Material parameters of soil (e.g. shear parameters, constrained modulus, permeability) earth pressure calculations, retaining wall calculations, drainage, ground failure, settlement calculations.

**Learning outcomes:** Knowledge of the treatment of soil as a building material and building foundation, as well as of the relevant physical soil properties associated with the ability to perform soil and earth-moving calculations. Students are able to make engineer-like assessments of the stability of structures in earthworks and foundations.

Handling of soil as a material with its diverse properties as building ground and building material. Students will be able to perform stability and settlement calculations.

**Work placements:** n/a

**Recommended reading:** See handout
BMB 340 Building Materials II

Lecturers: Prof. Dr. rer. nat. Schubert

Type of course unit: Compulsory

Level of course unit: First-cycle

Year of study: Second

Semester when the course is delivered: Third / winter semester, summer semester

ECTS credits: 5 cp

Attendance: 4 hours/week

Workload: 60 contact hours, 90 hours of independent study

Prerequisites: Recommended: Building Materials I

Language of instruction: German

Teaching method/learning activities: Lecture, practical exercises, presentation, group work

Mode of delivery: Face-to-face

Assessment methods and criteria: Written exam

Recommended optional programme components: Student can choose courses from the General Studies’ program

Course content: The lecture provides knowledge on the technological basics of construction materials, their parameters and relationships. In addition to an overview on definitions, types, properties, the constitution and the manufacture of selected construction materials, the material properties are explained in the context of type and structure. The lectures covers the following topics: introduction, steel and nonferrous metals, microstructure and properties of metals, exercise examples of metals, metal corrosion, composites, masonry, wood, plastics and glass, exercise examples of masonry, wood and plastics, asphalt and bitumen, natural materials, and environmentally friendly construction.

Learning outcomes: After having successfully completed the course, the students should
- be acquainted with the topics mentioned above
- be able to use the knowledge for applied problem-solving

Work placements: n/a

Recommended reading: Grüb/Weigler/Karl: Beton-Arten, Herstellung, Eigenschaften, Berlin: Verlag Ernst und Sohn
Reinhardt: Ingenieurbaustoffe, Berlin: Verlag Ernst und Sohn
Wesche: Baustoffe für Tragende Bauteile, Bd. 1-4,
Wiesbaden: Bauverlag
König: Hochleistungsbeton, Berlin: Ernst + Sohn Verlag
Scholz/Hiese: Baustoffkenntnis, Werner Verlag
Härig/Klausen/Horscheit: Technologie der Baustoffe, Heidelberg: C.F. Müller Verlag
BMB 350  Reinforced Concrete Design I

<table>
<thead>
<tr>
<th>Lecturers:</th>
<th>Prof. Dr.-Ing. Harich</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of course unit:</strong></td>
<td>Compulsory</td>
</tr>
<tr>
<td><strong>Level of course unit:</strong></td>
<td>First-cycle</td>
</tr>
<tr>
<td><strong>Year of study:</strong></td>
<td>Second</td>
</tr>
<tr>
<td><strong>Semester when the course is delivered:</strong></td>
<td>Third / winter semester, summer semester</td>
</tr>
<tr>
<td><strong>ECTS credits:</strong></td>
<td>5 cp</td>
</tr>
<tr>
<td><strong>Attendance:</strong></td>
<td>4 hours/week</td>
</tr>
<tr>
<td><strong>Workload:</strong></td>
<td>60 contact hours, 90 hours of independent study</td>
</tr>
<tr>
<td><strong>Prerequisites:</strong></td>
<td>Structural Mechanics I and II</td>
</tr>
<tr>
<td><strong>Language of instruction:</strong></td>
<td>German</td>
</tr>
<tr>
<td><strong>Teaching method/learning activities:</strong></td>
<td>Lectures, practical exercises, group work</td>
</tr>
<tr>
<td><strong>Assessment methods and criteria:</strong></td>
<td>Written exam</td>
</tr>
<tr>
<td><strong>Recommended optional programme components:</strong></td>
<td>Student can choose courses from the General Studies’ program</td>
</tr>
<tr>
<td><strong>Course content:</strong></td>
<td>Design and construction for flexion, shear and crack control of beam elements with reinforced concrete sections in accordance with DIN 1045-1</td>
</tr>
</tbody>
</table>
| **Learning outcomes:** | After having successfully completed the course, the students should  
  - be able to apply and understand the methods of analysis and design of reinforced concrete beam structures in accordance with DIN 1045-1  
  - be able to understand and draw up formwork and reinforcement plans |
| **Work placements:** | n/a                  |
| **Recommended reading:** | Wommelsdorf: Stahlbeton Teil 1 (Grundlagen, Biegebeanspruchte Bauteile), 7.Auflage, Düsseldorf: Werner-Verlag, 2002  
<table>
<thead>
<tr>
<th><strong>BMB 360 Structural Analysis</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lecturers:</strong></td>
</tr>
<tr>
<td><strong>Type of course unit:</strong></td>
</tr>
<tr>
<td><strong>Level of course unit:</strong></td>
</tr>
<tr>
<td><strong>Year of study:</strong></td>
</tr>
<tr>
<td><strong>Semester when the course is delivered:</strong></td>
</tr>
<tr>
<td><strong>ECTS credits:</strong></td>
</tr>
<tr>
<td><strong>Attendance:</strong></td>
</tr>
<tr>
<td><strong>Workload:</strong></td>
</tr>
<tr>
<td><strong>Prerequisites:</strong></td>
</tr>
<tr>
<td><strong>Language of instruction:</strong></td>
</tr>
<tr>
<td><strong>Teaching method/learning activities:</strong></td>
</tr>
<tr>
<td><strong>Mode of delivery:</strong></td>
</tr>
<tr>
<td><strong>Assessment methods and criteria:</strong></td>
</tr>
<tr>
<td><strong>Recommended optional programme components:</strong></td>
</tr>
</tbody>
</table>
| **Course content:**          | Statically determined systems (degree of indeterminacy, system, analysis, internal forces and reactions)  
                       | Principle of virtual forces  
                       | Principle of virtual displacement  
                       | Handling a menu-driven analysis program for the analysis of plane systems  
                       | Statically indeterminate structures (flexibility method, deformation analysis, reduction solution) |
| **Learning outcomes:**       | After having successfully completed the course, the students should  
                       |  be able to apply different analysis methods and tools in the field of structural analysis,  
                       |  comprehend the load bearing capacity of statically determined and simple statically indeterminate structures. |
| **Work placements:**         | n/a                         |
| **Recommended reading:**     | See handout                 |
### BMB 410  Project Planning II

| Lecturers:                          | Prof. Dr.-Ing. Korn  
<table>
<thead>
<tr>
<th></th>
<th>Prof. Dr.-Ing. Bahr</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of course unit:</strong></td>
<td>Compulsory</td>
</tr>
<tr>
<td><strong>Level of course unit:</strong></td>
<td>First-cycle</td>
</tr>
<tr>
<td><strong>Year of study:</strong></td>
<td>Second</td>
</tr>
<tr>
<td><strong>Semester when the course is delivered:</strong></td>
<td>Fourth / winter semester, summer semester</td>
</tr>
<tr>
<td><strong>ECTS credits:</strong></td>
<td>5 cp</td>
</tr>
<tr>
<td><strong>Attendance:</strong></td>
<td>4 hours/week</td>
</tr>
<tr>
<td><strong>Workload:</strong></td>
<td>60 contact hours, 90 hours of independent study</td>
</tr>
<tr>
<td><strong>Prerequisites:</strong></td>
<td>None</td>
</tr>
<tr>
<td><strong>Language of instruction:</strong></td>
<td>German</td>
</tr>
<tr>
<td><strong>Teaching method/learning activities:</strong></td>
<td>Lectures, practical exercises, project work</td>
</tr>
<tr>
<td><strong>Mode of delivery:</strong></td>
<td>Face-to-face</td>
</tr>
<tr>
<td><strong>Assessment methods and criteria:</strong></td>
<td>Written exam</td>
</tr>
<tr>
<td><strong>Recommended optional programme components:</strong></td>
<td>Student can choose courses from the General Studies’ program</td>
</tr>
</tbody>
</table>
| **Course content:**                | Complex examples of production planning: multi-storey building sites, road building sites  
|                                    | Network planning techniques  
|                                    | Optimisation of time, resources and costs  
|                                    | Planning of site facilities  
|                                    | Cost estimation based on DIN 276, alternatively on DIN 277, methods of cost planning and cost control, risk analysis and risk management, basics of project development methods, net present value methods, exercises  
| **Learning outcomes:**             | After having successfully completed the course, the students should  
|                                    | be able to solve complex problems related to production planning,  
|                                    | have gained insight into the mathematical basics of graph theory and the deducible business process models,  
|                                    | be able to use common software for time scheduling,  
|                                    | comprehend the different functional, spatial and temporal dependencies between on-site facilities.  
|                                    | have learned how to estimate target costs for building projects,  
|                                    | know how to manage cost risks and price increases,  
|                                    | understand the basics of project development and |
development calculation,
- have done exercises and be able to transfer the knowledge to other projects.

Work placements:

n/a

Recommended reading:

Schwarze, Jochen: "Projektmanagement mit Netzplantechnik", 10. Auflage 2010, Verlag Neue Wirtschafts-Briefe, Herne
DIN 69900:2009: "Netzplantechnik; Beschreibungen und Begriffe"
"Arbeitsgemeinschaftsvertrag"; Hrsg.: Zentralverband des Deutschen Baugewerbes e.V. u.a., 1. Auflage 1995, Bauverlag, Berlin
EDV-Datei zur BGL, Hrsg.: Hauptverband der Deutschen Bauindustrie e.V., 2000, Bauverlag, Berlin
**BMB 420  Applied Mathematics, Construction Logistics**

<table>
<thead>
<tr>
<th>Lecturers:</th>
<th>Prof. Dr. rer. nat. Wilderotter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Assistant Lecturers</td>
</tr>
<tr>
<td><strong>Type of course unit:</strong></td>
<td>Compulsory; for students of the specialization in Construction Management only</td>
</tr>
<tr>
<td><strong>Level of course unit:</strong></td>
<td>First-cycle</td>
</tr>
<tr>
<td><strong>Year of study:</strong></td>
<td>Second</td>
</tr>
<tr>
<td><strong>Semester when the course is delivered:</strong></td>
<td>Fourth / winter semester, summer semester</td>
</tr>
<tr>
<td><strong>ECTS credits:</strong></td>
<td>5 cp</td>
</tr>
<tr>
<td><strong>Attendance:</strong></td>
<td>4 hours/week</td>
</tr>
<tr>
<td><strong>Workload:</strong></td>
<td>60 contact hours, 90 hours of independent study</td>
</tr>
<tr>
<td><strong>Prerequisites:</strong></td>
<td>Mathematics I and II, basic knowledge in Civil Law, Construction Management</td>
</tr>
<tr>
<td><strong>Language of instruction:</strong></td>
<td>German</td>
</tr>
<tr>
<td><strong>Teaching method/learning activities:</strong></td>
<td>Lectures, practical exercises, presentation, group work</td>
</tr>
<tr>
<td><strong>Mode of delivery:</strong></td>
<td>Face-to-face</td>
</tr>
<tr>
<td><strong>Assessment methods and criteria:</strong></td>
<td>Written exam</td>
</tr>
<tr>
<td><strong>Recommended optional programme components:</strong></td>
<td>Student can choose courses from the General Studies’ program</td>
</tr>
</tbody>
</table>
| **Course content:**      | Applied Mathematics 1: Describing data, correlation and linear regression, discrete and continuous random variables, probability distribution of a random variable, indicators of probability distribution, special probability distributions (binomial and Poisson distribution, normal distribution), point and interval estimates, hypothesis tests  
Legal basics of construction logistics (immissions, material handling, waste disposal, logistic systems and workflows), technical basics of construction logistics (selection of equipment, material flow), linear optimisation (capacity and transportation problem), queueing theory |
| **Learning outcomes:**   | After having successfully completed the course, the students should  
  • be able to use the gained mathematical knowledge to solve problems,  
  • have gained insight into the legal and economic basics to use for logistics in project planning |
| **Work placements:**     | n/a                              |
| **Recommended reading:** | Papula: Mathematik für Ingenieure und Naturwissenschaftler, Bd.3; 4. Aufl. |
Braunschweig/Wiesbaden: Vieweg Verlag, 2001
Oestreich, Romberg „Keine Panik vor Statistik“
Marti/Gröger: Einführung in die lineare und nichtlineare Optimierung, Heidelberg: Physica-Verlag, 2000
Hofstadler: Bauablaufplanung und Logistik im Baubetrieb, Berlin/Heidelberg: Springer-Verlag, 2006
Zeitschrift Bauportal
**BMB 430  Tax Law II**

<table>
<thead>
<tr>
<th>Lecturers:</th>
<th>Prof. Dr. iur. Andreas Luckey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of course unit:</td>
<td>Compulsory; for students of the specialization in Construction Management only</td>
</tr>
<tr>
<td>Level of course unit:</td>
<td>First-cycle</td>
</tr>
<tr>
<td>Year of study:</td>
<td>Second</td>
</tr>
<tr>
<td>Semester when the course is delivered:</td>
<td>Fourth / winter semester, summer semester</td>
</tr>
<tr>
<td>ECTS credits:</td>
<td>5 cp</td>
</tr>
<tr>
<td>Attendance:</td>
<td>4 hours/week</td>
</tr>
<tr>
<td>Workload:</td>
<td>60 contact hours, 90 hours of independent study</td>
</tr>
<tr>
<td>Prerequisites:</td>
<td>None</td>
</tr>
<tr>
<td>Language of instruction:</td>
<td>German</td>
</tr>
<tr>
<td>Teaching method/learning activities:</td>
<td>Lectures</td>
</tr>
<tr>
<td>Mode of delivery:</td>
<td>Face-to-face</td>
</tr>
<tr>
<td>Assessment methods and criteria:</td>
<td>Written exam</td>
</tr>
<tr>
<td>Recommended optional programme components:</td>
<td>Student can choose courses from the General Studies’ program</td>
</tr>
<tr>
<td>Course content:</td>
<td>Tax Law: Students will be taught the systems of tax law; the constitutional background of tax law, basic principles and basic concepts of tax law; presentation of the main features of the fiscal code; presentation of the basics of income tax, corporation tax, business tax, sales tax, property transfer tax, gift and inheritance tax; extra-judicial and judicial procedural tax law. Engineering Law: Contract Law in the Civil Code (BGB); systems and content of the HOAI / VOF / DIN 276, basics of RifT, professional law – law of chambers of commerce and industry</td>
</tr>
</tbody>
</table>
| Learning outcomes:  | After having successfully completed the course, the students should  
  - have gained an overview of German tax law and basic knowledge of the structures and contents of different kinds of taxes, as well as understood about the connections to other areas of law (e.g. insolvency, occupational law, etc.)  
  - have gained an overview and basic knowledge about other areas of law and regulations which are relevant to construction  
  - be able to understand and deal with the legal side of |
complex problems and work out a solution.

Work placements: n/a

Recommended reading:
- Tipke/Lang: Steuerrecht
- Klein: Abgabenordnung
- Hemmer/Wüst: Skript Abgabenordnung, Skript Einkommensteuerrecht
- Alpmann/Schmidt: Skript Allgemeines Steuerrecht, Skript Einkommensteuerrecht, Skript Umsatzsteuerrecht
- Vock: Das Recht der Ingenieure
- Knipp: Architekten- und Ingenieurverträge
- Wirth/Broocks: Architekten- und Ingenieurrecht praxisnah
- Eich/Eich: HOAI Spezial: Ingenieurvertragshandbuch
- Korbion/Mantscheff/Vygen: HOAI-Kommentar
- Locher/Koeble/Frik: Kommentar zur HOAI mit Einführung in das Recht der Architekten und Ingenieure
- Diederichs: VOF-Kommentar zur Auftragsvergabe und zum Rechtsschutzverfahren
- Kaufhold/Mayerhofer/Reichl: Die VOF im Vergaberecht, Gesamtüberblick und Kommentar mit Praxisbeispielen für Architekten und Ingenieure
- Richtlinien der Staatlichen Vermögens- und Hochbauverwaltung Baden-Württemberg für die Beteiligung freiberuflich Tätiger (RfT) mit Vertragsmustern, Hinweisen und Mustern der einzelnen Verfahren für den nationalen bzw. europäischen Bereich, Staatliche Hochbauverwaltung Baden-Württemberg
BMB 440  Building Physics

Lecturers:  Prof. Dr.-Ing. Urmersbach  
            Prof. Dr. iur. Luckey

Type of course unit:  Compulsory

Level of course unit:  First-cycle

Year of study:  Second

Semester when the course is delivered:  Fourth / winter semester, summer semester

ECTS credits:  5 cp

Attendance:  4 hours/week

Workload:  60 contact hours, 90 hours of independent study

Prerequisites:  Recommended: Student should be familiar with processes at a construction site and in a construction company.

Language of instruction:  German

Teaching method/learning activities:  Lectures, practical exercises, presentation

Mode of delivery:  Face-to-face

Assessment methods and criteria:  Written exam

Recommended optional programme components:  Student can choose courses from the General Studies’ program

Course content:

Construction law:
• Classification of the legal system
• Jurisdiction and court cases
• BGB (Civil Code) general part and general contract law
• Terminology / Definitions in building law
• Definition and content of BGB and VOB / B
• The VOB (German construction contract procedures) system (A, B, and C)
• Basic types of construction contracts and remuneration calculations
• Modifications to services

Learning outcomes:

Students are provided with an overview of the legal situation in construction processes, starting from the pre-contractual phase, contract conclusion and contract content, the construction phase and acceptance up to the expiry of the warranty period. Students will also learn about construction-related areas of the law such as property development law. Students will learn to handle processes and real-life issues related to construction regulations appropriately and completely. They will arrive at practically orientated solutions via correct and concrete applications of the law, as well as contract design.

A planning task requires timely information-gathering on
the employment situation of the company and subsequently on structuring the task in hand. This includes decisions on order acceptance, compliance with corporate governance, evaluation of employees and specifications for operational and strategic decisions. The structure of the tasks requires thinking in overall contexts, whereby the use of various disciplines from e.g. the economic and the ethical environment must be taken into account.

**Work placements:**  
n/a

**Recommended reading:**  
Kapellmann/Langen, Einführung in die VOB/B, Basiswissen für die Praxis  
Kimmich/Bach, VOB für Bauleiter  
Werner/Pastor, Der Bauprozess  
Ingenstau/Korbion, VOB Teile A und B  
Kapellmann/Messerschmidt, VOB Teile A und B  
Messerschmidt/Voit, Privates Baurecht  
Kniffka/Koeble, Kompendium des Baurechts  
Roquette/Otto, Vertragsbuch Privates Baurecht  
Hök, Handbuch des internationalen und ausländischen Baurechts  
Kutsch/Schiffers: Marketing im Bauwesen, Freundeskreis Baubetrieb der FHKA (Hrsg.), Bd. 10, Karlsruhe, 1993  
Scheerschmidt: Organisationshandbuch in der Bauunternehmung, Freundeskreis Baubetrieb der FHKA (Hg), Bd. 11, Karlsruhe, 1993
# BMB 450 Reinforced Concrete Design II and Steel Design

<table>
<thead>
<tr>
<th>Lecturers:</th>
<th>Prof. Dr.-Ing. Harich</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of course unit:</strong></td>
<td>Compulsory</td>
</tr>
<tr>
<td><strong>Level of course unit:</strong></td>
<td>First-cycle</td>
</tr>
<tr>
<td><strong>Year of study:</strong></td>
<td>Second</td>
</tr>
<tr>
<td><strong>Semester when the course is delivered:</strong></td>
<td>Fourth / winter semester, summer semester</td>
</tr>
<tr>
<td><strong>ECTS credits:</strong></td>
<td>5 cp</td>
</tr>
<tr>
<td><strong>Attendance:</strong></td>
<td>4 hours/week</td>
</tr>
<tr>
<td><strong>Workload:</strong></td>
<td>60 contact hours, 90 hours of independent study</td>
</tr>
<tr>
<td><strong>Prerequisites:</strong></td>
<td>Reinforced Concrete Design I, Structural Mechanics, Structural Analysis</td>
</tr>
<tr>
<td><strong>Language of instruction:</strong></td>
<td>German</td>
</tr>
<tr>
<td><strong>Teaching method/learning activities:</strong></td>
<td>Lectures, practical exercises, group work</td>
</tr>
<tr>
<td><strong>Mode of delivery:</strong></td>
<td>Face-to-face</td>
</tr>
<tr>
<td><strong>Assessment methods and criteria:</strong></td>
<td>Written exam</td>
</tr>
<tr>
<td><strong>Recommended optional programme components:</strong></td>
<td>Student can choose courses from the General Studies’ program</td>
</tr>
<tr>
<td><strong>Course content:</strong></td>
<td>Design and construction of reinforced concrete sections with torsion moments. Design and construction of slabs and slender columns. Provision of basic knowledge in steel structures: Principles of steel design, material properties of steel, load-bearing capacity and serviceability of steel structures (tension and compression bars, bending beams, stability, joints in steel structures) After having successfully completed the course, the students should</td>
</tr>
</tbody>
</table>
| **Learning outcomes:**   | • be able to apply and understand the methods of analysis and design  
                         | • be able to analyze and create simple parts  
                         | • be able to create sufficiently detailed formwork plans and reinforcement drawings  
                         | • be able to apply complex methods for measuring and construction |
| **Work placements:**     | n/a                   |
| **Recommended reading:** | Wommelsdorf: Stahlbeton Teil 2 (Stützen und Sondergebiete des Stahlbetonbaus), 6. Auflage, Düsseldorf: Werner-Verlag, 2003  
                          | Avak: Stahlbetonbau in Beispielen, Teil 2: Stützen, Sondergebiete des Stahlbetonbaus, 2. Auflage, |
Düsseldorf: Werner Verlag, 2002
Quast: Stützenbemessung, in: Betonkalender 2004, Teil 2, Berlin: Verlag Ernst & Sohn
Krüger: Stahlbau, Teile 1 und 2, 3. Auflage, Berlin: Ernst & Sohn, 2003
Wagenknecht: Stahlbau-Praxis mit Berechnungsbeispielen, Bände 1 u. 2, Berlin: Bauwerk Verlag, 2004
Hünersen, Fritzche: Stahlbau in Beispielen, Düsseldorf: Werner, 2001
BMB 460  Construction Engineering

Lecturers:  Prof. Dr. rer. nat. Schubert  
           Prof. Dr.-Ing. Bahr

Type of course unit:  Compulsory

Level of course unit:  First-cycle

Year of study:  Second

Semester when the course is delivered:  Fourth / winter semester, summer semester

ECTS credits:  5 cp

Attendance:  4 hours/week

Workload:  60 contact hours, 90 hours of independent study

Prerequisites:  Recommended: basic knowledge of building materials, Building Construction, construction chemistry

Language of instruction:  German

Teaching method/learning activities:  Lectures, practical exercises, project work, presentation, group work

Mode of delivery:  Face-to-face

Assessment methods and criteria:  Written exam

Recommended optional programme components:  Student can choose courses from the General Studies’ program

Course content:  Components of heating, sizing of heating systems, individual heating in low energy houses, use of alternative energy sources such as the use of near-surface geothermal energy for heating buildings, cost effectiveness studies in heating, ventilation of low-energy and passive houses, assessment of thermodynamic processes for rooms with air conditioning with help of the h, x-diagram, components of air conditioners, air-conditioned comfort in buildings, parts of drinking water installations, hygiene in drinking water installations, components of drainage systems, creation of a drainage request, sizing of drainage facilities, special topics of Sanitary Engineering (rain and gray water use), cost effectiveness of water-saving drinking water installations.

The physical requirements related to the construction of commercial and residential buildings are increasingly higher. With special regard to the overall objective of reducing global CO2 emissions as well as an increase in energy efficiency, the focus of this lecture is on the thermal behavior of built structures and the optimization of the energy performance of buildings. In addition, the moisture behavior of building materials and building structures as well as human demands on comfort in the living and working environment are discussed. Moreover, the
fundamentals of sound transmission and sound insulation as well as preventive structural fire protection are dealt with. Apart from the basics, the principles of building planning in the aforementioned areas are discussed more thoroughly. Finally, the students are provided with an overview of the regulatory standards situation.

**Learning outcomes:**

Building on their basic technical knowledge, students learn to coordinate trade-spanning interfaces. Economic feasibility studies as a basis for investment decisions. Learn to select and apply methods for solving problems of building physics. Use of building physics software packages. Sound knowledge and overview of the implications for planning and implementing projects with a building physics background in areas such as: building physics evaluation of construction materials, structural design and buildings; confident handling of building physics calculation methods: DIN EN ISO 6946, EnEV Energy Saving Ordinance, damp-proofing; understanding the impact of material and environmental interaction.

**Work placements:**

n/a

**Recommended reading:**

Wirth: Schäden an Installationsanlagen, Fraunhofer IRB Verlag
RWE-Bauhandbuch.
Laasch: Haustechnik, Stuttgart: Teubner Verlag
Daniels: Technologie des ökologischen Bauens, Birkhäuser Verlag
Lohmeyer/Bergmann/Post: Praktische Bauphysik, Wiesbaden: Teubner
Willems/Schild/Dinter: Handbuch Bauphysik Teil 1 u. Teil 2, Vieweg
Horschler/Jagnow: Planungs- und Ausführungshandbuch zur neuen EnEV, Bauwerk
Lutz: Lehrbuch der Bauphysik, Stuttgart/Leipzig/Wiesbaden: Teubner
### BMB 470 Structural Analysis; Masonry Construction

<table>
<thead>
<tr>
<th>Lecturers:</th>
<th>Prof. Dr.-Ing. Pawlowski</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of course unit:</td>
<td>Compulsory; for students of the specialization in Construction Engineering only</td>
</tr>
<tr>
<td>Level of course unit:</td>
<td>First-cycle</td>
</tr>
<tr>
<td>Year of study:</td>
<td>Second</td>
</tr>
<tr>
<td>Semester when the course is delivered:</td>
<td>Fourth / winter semester, summer semester</td>
</tr>
<tr>
<td>ECTS credits:</td>
<td>5 cp</td>
</tr>
<tr>
<td>Attendance:</td>
<td>4 hours/week</td>
</tr>
<tr>
<td>Workload:</td>
<td>60 contact hours, 90 hours of independent study</td>
</tr>
<tr>
<td>Prerequisites:</td>
<td>Structural Mechanics, Mathematics, Building Materials, Structural Analysis</td>
</tr>
<tr>
<td>Language of instruction:</td>
<td>German</td>
</tr>
<tr>
<td>Teaching method/learning activities:</td>
<td>Lectures, practical exercises, group work</td>
</tr>
<tr>
<td>Mode of delivery:</td>
<td>Face-to-face</td>
</tr>
<tr>
<td>Assessment methods and criteria:</td>
<td>Written exam</td>
</tr>
<tr>
<td>Recommended optional programme components:</td>
<td>Student can choose courses from the General Studies’ program</td>
</tr>
<tr>
<td>Course content:</td>
<td>Provision of basis knowledge in timber structures: Principles of timber design, Material properties of timber, Tension and compression bars, Bending beams, Joints in timber structures, Provision of basic knowledge in masonry construction: Principles of masonry design and construction, Material properties of masonry, Measuring and construction of masonry structures, Heat protection, sound protection, fire protection</td>
</tr>
<tr>
<td>Learning outcomes:</td>
<td>After having successfully completed the course, the students should • be able to apply different analysis methods and tools in the field of timber design, • comprehend the complexity of timber structures, • be able to apply different analysis tools in the field of masonry design and analysis, • comprehend the load-bearing capacity of masonry steel structures.</td>
</tr>
<tr>
<td>Work placements:</td>
<td>n/a</td>
</tr>
<tr>
<td>Recommended reading:</td>
<td>See handout</td>
</tr>
</tbody>
</table>
## BMB 480 Mathematics III

**Lecturers:** Prof. Dr. rer. nat. Wilderotter

**Type of course unit:** Compulsory; for students of the specialization in Construction Engineering only

**Level of course unit:** First-cycle

**Year of study:** Second

**Semester when the course is delivered:** Fourth / winter semester, summer semester

**ECTS credits:** 5 cp

**Attendance:** 4 hours/week

**Workload:** 60 contact hours, 90 hours of independent study

**Prerequisites:** Mathematics I and II

**Language of instruction:** German

**Teaching method/learning activities:** Lectures, practical exercises, group work, study assignment, presentation

**Mode of delivery:** Face-to-face

**Assessment methods and criteria:** Written exam, study assignment, presentation

**Recommended optional programme components:** Student can choose courses from the General Studies’ program

**Course content:** Probability theory and statistics, definition of probability, discrete probability distributions, continuous probability distributions, special probability distributions, expected value and variance, point and interval estimates, correlation and regression. Numerical mathematics, discretisation and numerical integration, generation and propagation of errors, computing zero of functions, interpolation, regression, numerical differentiation and integration, solving linear systems of equations, solving ordinary differential equations.

**Learning outcomes:** After having successfully completed the course, the students should

- be able to apply statistical methods for solving engineering and economic problems
- be able to apply numerical methods for solving engineering and economic problems.

**Work placements:** n/a

**Recommended reading:**
- Stoer: Numerische Mathematik I, Berlin: Springer Verlag,
2005
Stoer, Bulirsch: Numerische Mathematik II, 5. Auflage, Berlin/Heidelberg: Springer Verlag, 2005
**BMB5P1 Internship Preparation: Facility Management, Corporate Planning**

**Lecturers:**
- Prof. Dr.-Ing. Matthias Urmersbach
- Prof. Dr.-Ing. Bahr

**Type of course unit:**
Compulsory; for students of the specialization in Construction Management only

**Level of course unit:**
First-cycle

**Year of study:**
Third

**Semester when the course is delivered:**
Fifth / winter semester, summer semester

**ECTS credits:**
3 cp

**Attendance:**
3 hours/week

**Workload:**
30 contact hours, 60 hours of independent study

**Prerequisite:**
Successful completion of foundation courses. Recommended: basics of construction, knowledge of relevant regulations (VOB, HOAI, DIN)

**Language of instruction:**
German

**Teaching method/learning activities:**
Lectures, practical exercises, group work, presentation

**Mode of delivery:**
Face-to-face

**Assessment methods and criteria:**
Written exam

**Recommended optional programme components:**
Student can choose courses from the General Studies’ program

**Course content:**
- know how facility management is defined,
- know about technical, infrastructural and commercial facility management,
- be able to determine the organisation of an operation,
- be able to define the responsibility of an operation,
- be able to specify requirements for CAFM systems,
- be able to calculate life cycle costs.

Company planning:
Basics: terminology, role of planning, planning authorities, policies, uncertainty, forecasting, planning process
Planning preparations: information, planning guidelines, documentation
Strategic planning: basics, workflow, goal planning, strategy development, action planning, strategic control
Operative planning: basics, workflow, functional area planning, cross-sectorial planning

**Learning outcomes:**
After having successfully completed the course, the students should
- Identifying and assessing the impact of planning
results on operating costs. Task analysis and application of appropriate methods.

- Skills in using various analytical tools and a basic knowledge of how these can be transferred to other subject areas. It is important to understand the complexity of management tasks and also to understand holistic approaches.

Work placements: n/a

Recommended reading:


Handout Facility Management
GEFMA Richtlinien 100, 190, 200, 300, 400, 700, 900
DIN 276, DIN 277
DIN 31 051
DIN 18 960
VDMA 24 186
**BMB5P4 Internship Preparation: Production Processes II, Building Site Facilities**

**Lecturers:** Prof. Dr.-Ing. Harich
Assistant Lecturers

**Type of course unit:** Compulsory; for students of the specialization in Construction Engineering only

**Level of course unit:** First-cycle

**Year of study:** Third

**Semester when the course is delivered:** Fifth / winter semester, summer semester

**ECTS credits:** 3 cp

**Attendance:** 3 hours/week

**Workload:** 45 contact hours, 45 hours of independent study

**Prerequisite:** Successful completion of foundation courses.
Recommended: Foundation and Soil Engineering, Road Construction, Calculation

**Language of instruction:** German

**Teaching method/learning activities:** Lectures, practical exercises, group work, project assignment, laboratory, presentation

**Mode of delivery:** Face-to-face

**Assessment methods and criteria:** Written exam

**Recommended optional programme components:** Student can choose courses from the General Studies’ program

**Course content:**
Earthwork with the 5 partial procedures of excavation, release and loading, transport, installation and consolidation; Boring and ramming; Production processes in the construction of water channels and pipes; Regulations and guidelines; Examples

Design of the construction site; Dimensioning, space allocation and mounting of construction elements; Logistics and disposal of construction elements; Draft techniques; Costs of the construction site facilities; Examples

**Learning outcomes:**
After having successfully completed the course, the students should have gained a basic technical and operational knowledge of work procedures in soil and civil engineering, of construction with preparatory and ancillary work, applied mathematics, measuring building machines according to number and size.
Functional setup of a construction site with the sizing and positioning of facilities and equipment for an on-site construction project, with particular regard to the optimal
arrangement of cranes and an optimized material flow.

Work placements: n/a

Recommended reading:

Production Processes II:
Drees, Krauß: Baumaschinen und Bauverfahren: Einsatzgebiete und Einsatzplanung, Renningen: Expert-Verlag
Girmscheid: Leistungsermittlungshandbuch für Baumaschinen und Bauprozesse, Berlin: Springer-Verlag
Gerster, Kohl: Baubetrieb in Beispielen, Neuwied: Werner-Verlag
Hoffmann (Hrsg.): Zahlentafeln für den Baubetrieb, Wiesbaden: Teubner-Verlag
Hoffmann (Hrsg.): Beispiele für die Baubetriebspraxis, Wiesbaden: Teubner-Verlag
Hüster: Leistungsberechnung der Baumaschinen, Düsseldorf: Werner-Verlag
Richter/Heindel: Straßen- und Tiefbau mit lernfeldorientierten Projekten, Stuttgart/Leipzig/Wiesbaden: Teubner-Verlag
Scheffler (Hrsg.): Baumaschinen: Erd- und Tagebaumaschinen, Braunschweig, Vieweg-Verlag
Schneider (Hrsg.): Bautabellen für Ingenieure, Neuwied: Werner-Verlag
Wetzell (Hrsg.): Wendehorst Bautechnische Zahlentafeln, Stuttgart: Teubner-Verlag
Wetzell (Hrsg.): Wendehorst Beispiele aus der Baupraxis, Stuttgart: Teubner-Verlag

Building Site Facilities:
Aust, Nagel: Baustellenorganisation, Berlin: Cornelsen-Verlag
Biermann: Der Bauleiter im Bauunternehmen: Baubetriebliche Grundlagen und Bauabwicklung, Köln: Müller-Verlag
Nagel: Baustellenmanagement, Berlin: Verlag für Bauwesen
Rybczyk: Bauausführung und Bauüberwachung: Recht - Technik - Praxis, Handbuch für die Baustelle, Düsseldorf: Werner-Verlag
**BMB5P2 Internship**

**BMB5P5**

<table>
<thead>
<tr>
<th>Lecturers:</th>
<th>Prof. Dr. rer. nat. Schubert</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of course unit:</strong></td>
<td>Compulsory</td>
</tr>
<tr>
<td><strong>Level of course unit:</strong></td>
<td>First-cycle</td>
</tr>
<tr>
<td><strong>Year of study:</strong></td>
<td>Third</td>
</tr>
<tr>
<td><strong>Semester when the course is delivered:</strong></td>
<td>Fifth / winter semester, summer semester</td>
</tr>
<tr>
<td><strong>ECTS credits:</strong></td>
<td>24 cp</td>
</tr>
<tr>
<td><strong>Attendance:</strong></td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Workload:</strong></td>
<td>5 contact hours, 715 hours of independent study</td>
</tr>
<tr>
<td><strong>Prerequisite:</strong></td>
<td>Recommended: Business English B1/B2 proficiency level</td>
</tr>
<tr>
<td><strong>Language of instruction:</strong></td>
<td>German</td>
</tr>
<tr>
<td><strong>Teaching method/learning activities:</strong></td>
<td>Practical Internship, project work</td>
</tr>
<tr>
<td><strong>Mode of delivery:</strong></td>
<td>Face-to-face</td>
</tr>
<tr>
<td><strong>Assessment methods and criteria:</strong></td>
<td>Written report, oral exam, presentation</td>
</tr>
<tr>
<td><strong>Recommended optional programme components:</strong></td>
<td>n/a</td>
</tr>
</tbody>
</table>

**Course content:**
- Practical work
  - in a building company, a planning office or a building authority, e.g. in the department of controlling, logistics or management,
  - in the construction supervision on a larger building site,
  - in an engineering or technical office of a building company,
  - in special project development enterprises,
  - in special project control enterprises,
  - in special facility management enterprises,
  - in a bank or for an insurance.

**Learning outcomes:**
After having successfully completed the course, the students should
- be able to independently prepare, co-ordinate and perform projects

**Work placements:**
- n/a

**Recommended reading:**
- Drees/Paul: Kalkulation von Baupreisen, Bauwerk Verlag
- Wirth: Controlling in der Baupraxis, Werner Verlag
- Hauptverband der deutschen Bauindustrie, KLR Bau, Werner Verlag
- Helbig: Kosten und Vergütung von Bauleistungen, Verlagsgesellschaft Müller
- Mantscheff/Helbig: Baubetriebslehre I/II, Werner Verlag
Keil: Kostenrechnung für Bauingenieure, Neuwied: Werner Verlag
Hoffmann: Zahlentafeln für den Baubetrieb, Teubner Verlag
Plümecke: Preisermittlung für Bauarbeiten, Verlagsgesellschaft Rudolf Müller
Fleischmann/Hemmerich: Angebotskalkulation mit Richtwerten, Werner Verlag
Internship Follow-up: Cost Estimation

<table>
<thead>
<tr>
<th>Lecturers:</th>
<th>Prof. Dr.-Ing. Bergweiler</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of course unit:</td>
<td>Compulsory</td>
</tr>
<tr>
<td>Level of course unit:</td>
<td>First-cycle</td>
</tr>
<tr>
<td>Year of study:</td>
<td>Third</td>
</tr>
<tr>
<td>Semester when the course is delivered:</td>
<td>Fifth / winter semester, summer semester</td>
</tr>
<tr>
<td>ECTS credits:</td>
<td>3 cp</td>
</tr>
<tr>
<td>Attendance:</td>
<td>2 hours/week</td>
</tr>
<tr>
<td>Workload:</td>
<td>30 contact hours, 60 hours of independent study</td>
</tr>
<tr>
<td>Prerequisite:</td>
<td>Recommended: Cost Accounting</td>
</tr>
<tr>
<td>Language of instruction:</td>
<td>German</td>
</tr>
<tr>
<td>Teaching method/learning activities:</td>
<td>Lectures, practical exercises</td>
</tr>
<tr>
<td>Mode of delivery:</td>
<td>Face-to-face</td>
</tr>
<tr>
<td>Assessment methods and criteria:</td>
<td>Written exam, project assignment</td>
</tr>
<tr>
<td>Recommended optional programme components:</td>
<td>Student can choose courses from the General Studies’ program</td>
</tr>
<tr>
<td>Course content:</td>
<td>Calculation of construction-site equipment and of site overheads, job-order costing, structure and application of project costing, progress reporting, comparison of target and actual costs, comparison of target and actual hours, recalculation of costs, hours and average wage, incentive pay</td>
</tr>
<tr>
<td>Learning outcomes:</td>
<td>Planning, management and control of costs, especially of labour costs, progress measurements, analysis of target and actual costs and of hours</td>
</tr>
<tr>
<td></td>
<td>Understanding the interrelationships of cost data in projects and in the company</td>
</tr>
<tr>
<td>Work placements:</td>
<td>n/a</td>
</tr>
<tr>
<td>Recommended reading:</td>
<td>Drees/Paul: Kalkulation von Baupreisen, Bauwerk Verlag</td>
</tr>
<tr>
<td></td>
<td>Wirth: Controlling in der Baupraxis, Werner Verlag</td>
</tr>
<tr>
<td></td>
<td>Hauptverband der deutschen Bauindustrie, KLR Bau, Werner Verlag 2001</td>
</tr>
<tr>
<td></td>
<td>Helbig: Kosten und Vergütung von Bauleistungen, Verlagsgesellschaft Müller,</td>
</tr>
<tr>
<td></td>
<td>Mantscheff/Helbig: Baubetriebslehre I/II, Werner Verlag</td>
</tr>
<tr>
<td></td>
<td>Keil: Kostenrechnung für Bauingenieure, Werner Verlag, Hoffmann: Zahlentafeln für den Baubetrieb, Teubner Verlag,</td>
</tr>
<tr>
<td></td>
<td>Plümecke: Preisermittlung für Bauarbeiten,</td>
</tr>
</tbody>
</table>
Verlagsgesellschaft Rudolf Müller, 
Fleischmann/Hemmerich: Angebotskalkulation mit 
Richtwerten, Werner Verlag
**BMB610 Cost Planning, Financing**

**Lecturers:**  
Prof. Dr. Urmersbach  
Prof. Dr.-Ing. Hütter

**Type of course unit:**  
Compulsory

**Level of course unit:**  
First-cycle

**Year of study:**  
Third

**Semester when the course is delivered:**  
Sixth / winter semester, summer semester

**ECTS credits:**  
5 cp

**Language of instruction:**  
German

**Attendance:**  
4 hours/week

**Workload:**  
60 contact hours, 90 hours of independent study

**Prerequisites:**  
Recommended: basics cost accounting

**Teaching method/learning activities:**  
Lectures, practical exercises, group work, presentation

**Mode of delivery:**  
Face-to-face

**Assessment methods and criteria:**  
Written exam, study assignment

**Recommended optional programme components:**  
Student can choose courses from the General Studies’ program

**Course content:**  
Terms: active and passive accounts; investment and financing; liability and cost effectiveness  
Preparation of a balance sheet and analysis of an actual balance of a construction company in consideration of BASEL II capital requirements  
Investment and financing in a construction company; calculation of capital demands; evaluation of investment alternatives; internal and external financing; the Ruchti effect; optimisation of the capital structure; leverage effect; Calculation of the "common value" of real estate; financing of building contracts; calculation of economic rents  
Cost estimation based on DIN 276, alternatively on DIN 277, methods of cost planning and cost control, risk analysis and risk management, basics of project development methods, net present value methods, exercises

**Learning outcomes:**  
After having successfully completed the course, the students should

- know how to prepare and analyse balance sheets and how to finance investments and contracts in consideration of BASEL II capital requirements.
- have learned how to estimate target costs for building projects,
- know how to manage cost risks and price increases,
- understand the basics of project development and development calculation,
- have done exercises and be able to transfer the knowledge to other projects.

Work placements

n/a

Recommended reading:

Olfert, Klaus: „Investition“, aktualisierte Aufl., Ludwigshafen am Rhein 2009.
Olfert, Klaus: „Finanzierung“, Herne 2011.
DIN 276, DIN 277, aktuelle Ausgabe
Kyrein: Immobilien Projektmanagement, Projektentwicklung und –steuerung, Köln: Müller, 2002
**BMB 620  Project Management**

**Lecturers:** Prof. Dr.-Ing. Hütter  
**Type of course unit:** Compulsory; for students of the specialization in Construction Management only  
**Level of course unit:** First-cycle  
**Year of study:** Third  
**Semester when the course is delivered:** Sixth / winter semester, summer semester  
**ECTS credits:** 5 cp  
**Attendance:** 5 hours/week  
**Workload:** 60 contact hours, 90 hours of independent study  
**Prerequisites:** Recommended: basics of construction, scheduling, use of standard software, knowledge of relevant regulations (VOB, HOAI, DIN)  
**Language of instruction:** German  
**Teaching method/learning activities:** Lectures, laboratory, group work, presentation  
**Mode of delivery:** Face-to-face  
**Assessment methods and criteria:** Written exam, study assignment  
**Recommended optional programme components:** Student can choose courses from the General Studies’ program  
**Course content:** Activities and methods of a project manager, e.g. organisation, coordination, information, documentation; quality and quantity, cost and finance; time, capacities and logistics, contracts and insurances. Case studies and exercises, usage of software systems for project management.  
**Learning outcomes:** After having successfully completed the course, the students should  
- be able to plan and manage a real estate project,  
- know how to organise a project,  
- how to realise the cost management, the time management and the quality management of a real estate project,  
- be able to use a project platform and special project management software.  
**Work placements:** n/a  
**Recommended reading:**  
Innovatives Bauen im Focus, Expert, 1999  
Fiedler: Controlling von Projekten, 5. Aufl., Wiesbaden: Vieweg, 2010  
Fröhlich: Hochbaukosten – Flächen – Rauminhalte,
Ahrens: Handbuch Projektsteuerung- Baumanagement,
Volkmann: Projektabwicklung, 2. Aufl., Essen:Wingen,
2003
Normen, Regelwerke, Vorschriften:
Untersuchungen zum Leistungsbild, zur Honorierung und
durch Beauftragung von Projektmanagementleistungen in
der Bau- und Immobilienwirtschaft. Nr. 9 der
DIN 69901 Projektmanagement.
HOAI, aktuelle Ausgabe.
VOB, VOL, VOF jeweils aktuelle Ausgabe.
DIN 276, DIN 277, jeweils aktuelle Ausgabe.
BMB 630  Communication

Lecturers: Prof. Dr. rer. nat. Schubert

Type of course unit: Compulsory

Level of course unit: First-cycle

Year of study: Third

Semester when the course is delivered: Sixth / winter semester, summer semester

ECTS credits: 5 cp

Language of instruction: German, English

Attendance:

Workload: 60 contact hours, 90 hours of independent study

Prerequisites: None

Teaching method/learning activities: Lectures, practical exercises, seminar, presentation

Mode of delivery: Face-to-face

Assessment methods and criteria: Written exam

Recommended optional programme components: Student can choose courses from the General Studies’ program

Course content:

Academic research and writing:
- Objectives, varieties and types of academic research and writing in construction management and construction engineering. Methods and requirements for academic subjects. Academic research, sources, search and evaluation. Academic writing, language and citation. Presentation of results.

Business English:
- Students will learn to conduct themselves in English in various business and private situations on a comfortable communicative level. Furthermore they will learn to hold discussions in English and be able to convey their points of view understandably. Students will learn to express themselves using correct basic grammar. Students will learn to be aware of some of the cultural differences in business dealings in some countries (i.e. Germany and USA). Students will learn to write short business letters and emails on various subjects, and give short presentations in English.

Technical English:
- Translation of technical texts, stylistics, the apt expression.

Learning outcomes:

After having successfully completed the course, the students should
- be able to structure a task
- be able to schedule and monitor dates
be able to ascertain data and carry out research in literature,
be able to formulate thesis and antithesis as a basis for discussion
be able to apply the rules of academic research and writing
be able to present results
be able to use business English grammar: Present simple, Present Continuous, continuous, definite and indefinite article, four future forms, present perfect, past simple. modal verbs of likelihood;
be able to use business English Vocabulary: Strategies, pay and benefits, leadership and hierarchies, development and the environment, Companies and careers
be able to use business English word construction: Synonyms and collocations, suffixes, multipart verbs, wordforms.
be able to carry out technical translations

Work placements:

n/a

Recommended reading:

Voss, Rödiger; "Wissenschaftliches Arbeiten,…leicht verständlich"; Stuttgart 2010; Lucius Lucis Verlagsgesellschaft mbH
Hermann Hütter i.A. d. Fakultät für Architektur und Bauwesen der Hochschule Karlsruhe (Hrsg.); "Empfehlungen für die Bearbeitung der Bachelor-Thesis"; Karlsruhe 2009
Intelligent Business Intermediate: Unit 1 - 5, Coursebook, The Economist, 2006
Intelligent Business Intermediate: Unit 1 - 5, Workbook, The Economist, 2006
Göpferich: Interkulturelles Technical Writing., Fachliches adressatengerecht vermitteln. Ein Lehr- und Arbeitsbuch (Forum für Fachsprachenforschung 40), Tübingen: Gunter Narr
**BMB 640  Controlling**

<table>
<thead>
<tr>
<th>Lecturers:</th>
<th>Prof. Dr.-Ing. Bergweiler</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of course unit:</strong></td>
<td>Compulsory; for students of the specialization in Construction Management only</td>
</tr>
<tr>
<td><strong>Level of course unit:</strong></td>
<td>First-cycle</td>
</tr>
<tr>
<td><strong>Year of study:</strong></td>
<td>Third</td>
</tr>
<tr>
<td><strong>Semester when the course is delivered:</strong></td>
<td>Sixth / winter semester, summer semester</td>
</tr>
<tr>
<td><strong>ECTS credits:</strong></td>
<td>5 cp</td>
</tr>
<tr>
<td><strong>Language of instruction:</strong></td>
<td>German</td>
</tr>
<tr>
<td><strong>Attendance:</strong></td>
<td>4 hours/week</td>
</tr>
<tr>
<td><strong>Workload:</strong></td>
<td>60 contact hours, 90 hours of independent study</td>
</tr>
<tr>
<td><strong>Prerequisites:</strong></td>
<td>None</td>
</tr>
<tr>
<td><strong>Teaching method/learning activities:</strong></td>
<td>Lectures, practical exercises</td>
</tr>
<tr>
<td><strong>Mode of delivery:</strong></td>
<td>Face-to-face</td>
</tr>
<tr>
<td><strong>Assessment methods and criteria:</strong></td>
<td>Written exam</td>
</tr>
<tr>
<td><strong>Recommended optional programme components:</strong></td>
<td>Student can choose courses from the General Studies’ program</td>
</tr>
<tr>
<td><strong>Course content:</strong></td>
<td>Factors of success in construction; building site controlling; presentation; controlling in the company; examples; controlling in construction companies Risk management in construction companies, consultant companies and real estate companies; definitions and models; risk analysis and risk management; operative and strategic risk management; realization of risk management in the company; project risks on construction sites abroad; internal auditing</td>
</tr>
<tr>
<td><strong>Learning outcomes:</strong></td>
<td>After having successfully completed the course, the students should</td>
</tr>
<tr>
<td></td>
<td>- be able to use the most important methods and tools for controlling;</td>
</tr>
<tr>
<td></td>
<td>- be able to carry out controlling in the area of construction site controlling, especially with regard to quality, deadlines, construction, and net current assets;</td>
</tr>
<tr>
<td></td>
<td>- be familiar with cost estimation, scheduling, and construction projects;</td>
</tr>
<tr>
<td></td>
<td>- be able to identify risks when estimating an offer, drawing up contracts, or in planning</td>
</tr>
<tr>
<td></td>
<td>- be able to carry out measures to minimize risk</td>
</tr>
<tr>
<td></td>
<td>- be able to design a risk management system</td>
</tr>
<tr>
<td><strong>Work placements:</strong></td>
<td>n/a</td>
</tr>
</tbody>
</table>
**Recommended reading:**

- Wirth: Controlling in der Baupraxis, Werner Verlag,
- Horvath: Controlling, Vahlens Handbücher
- Seyfferth: Praktisches Baustellen-Controlling, vieweg,
- Göcke: Risikomanagement für Angebots- und Auftragsrisiken von Bauprojekten, DVP Verlag
- Grupp: Professionelles Revisionsmanagement, expert Verlag,
- Klinger: Das Interne Kontrollsystem im Unternehmen, Vahlen,
- Girmscheid, Busch: Projektrisikomanagement in der Bauwirtschaft,
- Girmscheid, Busch: Unternehmensrisikomanagement in der Bauwirtschaft,
<table>
<thead>
<tr>
<th>BMB 650</th>
<th>Construction Contract Law</th>
</tr>
</thead>
</table>
| Lecturers: | Prof. Dr.-Ing. G. Bergweiler  
Prof. Dr. iur. A. Luckey |
| Type of course unit: | Compulsory; for students of the specialization in Construction Management only |
| Level of course unit: | First-cycle |
| Year of study: | Third |
| Semester when the course is delivered: | Sixth / winter semester, summer semester |
| ECTS credits: | 5 cp |
| Language of instruction: | German |
| Attendance: | 4 hours/week |
| Workload: | 60 contact hours, 90 hours of independent study |
| Prerequisites: | Recommended: calculation |
| Teaching method/learning activities: | Lectures, practical exercises, presentation |
| Mode of delivery: | Face-to-face |
| Assessment methods and criteria: | Written exam |
| Recommended optional programme components: | Student can choose courses from the General Studies’ program |
| Course content: | Disturbed Construction Progress:  
The importance of cost accounting; impacts on the construction period; construction regulation; critical path method, network diagram; Gantt charts; network Gantt chart; distance-time graph; capacity planning; construction work and construction time; customer demands; contractor demands; compiling a schedule; provision for delays in the schedule; influence of quantity changes on construction time and costs; influence of changed services on construction time and costs; actual and target schedule comparison; documentation.  
Construction Law:  
BGB-work contract; VOB / B work contract; general contractor agreement, general co-ordinating contractor agreement, subcontractor agreement, property development contract, consortium contract, project management contract; PPP-contracts/projects, architects and planners contract (architects contract, general contractor contract) CM contract; GMP contract, FIDIC - contracts/FIDIC-standard conditions; additional terms and documents (arbitration clauses, mediation clauses arbitrator clauses, collateral). |
| Learning outcomes: | The lecture "Disturbed construction progress" teaches students to detect faulty processes by using the critical... |
path method and cost accounting. Included too are the use of control measures and the calculation of additional costs. The individual topics are supplemented with exercises. In the lecture "Building contract law" students widen their ability to handle real-life issues accurately and completely and arrive at practically orientated solutions via the correct and precise choice of contract and contract design. Students learn to cope adequately with risk and liability-prone structural areas. Students learn the important interplay and tension between the reality of life and coping with regard to the use of legal options in a market marked by globalization. In this context, conflict management options are also included in the lecture program. After an introduction, students are given individual topics which they will prepare for a lecture as homework. This will train their capacity for independent project work, their independent acquisition of knowledge and skills and their skills in information gathering, processing and presentation.

Work placements: n/a

Recommended reading:

Kapellmann/Schiffers; Vergütung, Nachträge und Behinderungsfolgen beim Bauvertrag
Vygen/Schubert/Lang; Bauverzögerung und Leistungsänderung
Reister; Nachträge beim Bauvertrag
Würfele/Gralla; Nachtragsmanagement,
Elwert/Flassak; Nachtragsmanagement in der Baupraxis
Ingenstau, Korbion; VOB Teile A und B
Kapellmann/Langen: Einführung in die VOB/B,
Basiswissen für die Praxis
Kimmich/Bach: VOB für Bauleiter
Werner/Pastor: Der Bauprozess
Ingenstau/Korbion: VOB Teile A und B
Heiermann/Riedl/Rusam: Handkommentar zur VOB
Kapellmann/Messerschmidt: VOB Teile A und B
Locher: Das private Baurecht
Kniffka/Koebie: Kompendium des Baurechts
Roquette/Otto: Vertragsbuch Privates Baurecht
Hök: Handbuch des internationalen und ausländischen Baurechts
### BMB 660 Quality Management

| Lecturers: | Prof. Dr.-Ing. Hütter  
|           | Prof. Dr. rer. nat. Schubert |
| Type of course unit: | Compulsory |
| Level of course unit: | First-cycle |
| Year of study: | Third |
| Semester when the course is delivered: | Sixth / winter semester, summer semester |
| ECTS credits: | 5 cp |
| Language of instruction: | German |
| Attendance: | 4 hours/week |
| Workload: | 60 contact hours, 90 hours of independent study |
| Prerequisites: | Recommended: Building Materials I and II |
| Teaching method/learning activities: | Lectures, practical exercises, project work, laboratory, group work |
| Mode of delivery: | Face-to-face |
| Assessment methods and criteria: | Written exam |

**Recommended optional programme components:**
Student can choose courses from the General Studies’ program

**Course content:**
- QM-Systems: Principles, objectives and content of the standard DIN EN ISO 9001. Ways of implementing the requirements of a norm into a QM manual (with procedural instructions and work instructions) in the different areas of a quality management system: management responsibility, management of resources, product realization and measurement, analysis and improvement. Processing examples for engineering offices. Along with process orientation and continuous improvement process (CIP), the focus is also on customer orientation and measurement of customer satisfaction.

Material Management Quality Assurance:
- Quality assurance systems, raw materials for the production of building materials, building material production, production control, non-destructive testing methods; normative requirements; economically determined necessities, market acceptance, integration into the company’s cost and performance considerations; comparison of the requirements for different trades; European and national considerations.

**Learning outcomes:**
- Improving the ability to solve problems throughout an entire company by being familiar with various methods, especially for customer and process orientation and the
methodology of the Continuous Improvement Process (CIP).

Quality Assurance Materials Management:
Students are provided with a comprehensive understanding of quality: from extraction of raw materials, building material manufacture up to its installation in a building, testing of buildings and building components. Normative requirements are discussed in detail and viewed as part of an overall plan for the selection, use and testing of building materials.

Work placements:

n/a

Recommended reading:

DIN EN ISO 9001.
Dehn/König/Marzhan: Konstruktionswerkstoffe im Bauwesen, Berlin: Verlag Ernst & Sohn, 2003
Härig/Günther/Klausen: Technologie der Baustoffe, 14 Aufl., Heidelberg: C.F. Müller Verlag 2003
Schwarz/Ebeling: Kunststoffkunde, 8. Aufl., Würzburg: Vogel-Fachbuch, 2005
BMB 670  Structural Engineering

Lecturers:  Prof. Dr. rer. nat. Schubert  
Assistant Lecturers

Type of course unit:  Compulsory; for students of the specialization in Construction Engineering only

Level of course unit:  First-cycle

Year of study:  Third

Semester when the course is delivered:  Sixth / winter semester, summer semester

ECTS credits:  5 cp

Language of instruction:  German

Attendance:  5 hours/week

Workload:  75 contact hours, 75 hours of independent study

Prerequisites:  Recommended: Structural Mechanics, Structural Analysis, Reinforced Concrete Design, Building Materials, basics in building physics and construction law, Masonry Construction

Teaching method/learning activities:  Lectures, practical exercises, project work, laboratory, group work, presentation

Mode of delivery:  Face-to-face

Assessment methods and criteria:  Written exam

Recommended optional programme components:  Student can choose courses from the General Studies’ program

Course content:  Formwork and scaffolding:  
Introduction to formwork and scaffolding; work preparation in formwork / cycle planning; the individual parts of the wall and slab formwork; formwork types / standard and special formwork; formwork manufacturers and their products; electronic formwork programs; formwork for in situ concrete (construction site formwork); formwork for precast parts; dimensional tolerances (DIN 18 202); chemical products for formwork; work and safety scaffolding; safety at the building site (UVV); rules and guidelines; examples.

Refurbishment and building maintenance:  
Learning the necessary basics: building damage, structural damage, poor performance, sustainability, standards and guidelines. Working out the activities necessary for the inventory and preparing a restructuring plan. Overview of the main processes and methods: repairing cracks in ceilings and walls, masonry restoration, mould damage: causes, elimination, prevention, energy efficiency of existing buildings, renovation of special structures (timber-framing etc.).
building refurbishment and sustainability and cost-effectiveness, impact on building maintenance. Students apply what they have learned to practical tasks, including independent problem-solving approaches, also with the use of literature.

Sealing in Construction:
Damp-proofing in the soil: sealing according to DIN 18 195, alternative sealing systems, structures made of waterproof concrete, "brown tubs". Sealing of interior rooms; roofs, especially flat roofs, balconies, loggias, terraces; special areas: seals according to § 14 WHG, landfills, tunnels

Learning outcomes:
Formwork and Scaffolding:
Skills for independent and multidisciplinary acquisition of knowledge and skills, the gathering, processing, presentation and interpretation of information, practical application of theoretical principles, knowledge selection, outcome and case analysis and interpretation, applying task-suited work processes and problem solving techniques / strategies, working out problem-solving procedures, visualization, description and presentation of findings and results.

Refurbishment and Building Maintenance:
Cognitive skills to select and apply the available methods and techniques for dealing with current problems and the practical skills to implement them. This includes the procedure for creating a sustainable redevelopment concept. Sound technical knowledge and networking technical knowledge from other disciplines. Analysis of set tasks, selection, adaptation and use of appropriate methods and procedures.

Sealing in Construction:
Skills for independent and multidisciplinary acquisition of knowledge and skills, the gathering, processing, presentation and interpretation of information, practical application of theoretical principles, knowledge selection, outcome and case analysis and interpretation, applying task-suited work processes and problem solving techniques / strategies, working out problem-solving procedures, visualization, description and presentation of findings and results.

Work placements:
n/a

Recommended reading:
Drees, Krauß: Baumaschinen und Bauverfahren: Einsatzgebiete und Einsatzplanung, Renningen: expert-Verlag
Hoffmann (Hrsg.): Zahlentafeln für den Baubetrieb, Wiesbaden: Teubner-Verlag
Hoffmann (Hrsg.): Beispiele für die Baubetriebspraxis, Wiesbaden: Teubner-Verlag
Simons/Kolbe: Verfahrenstechnik im Ortbetonbau: Schalen, Bewehrung, Betonieren, Stuttgart: Teubner-Verlag
Schmitt: Die Schalungstechnik - Syteme, Einsatz und Logistik, Berlin: Ernst&Sohn-Verlag
Schneider (Hrsg.): Bautabellen für Ingenieure, Neuwied: Werner-Verlag
Bundesministerium für Verkehr, Bau und...
Wohnungswesen (BMVBW): Leitfaden „Nachhaltiges Bauen”, Berlin: Bundesministerium für Verkehr, Bau und Wohnungswesen (BMVBW)

Eyerer, Reinhart: Ökologische Bilanzierung von Baustoffen und Gebäuden, Basel/Boston: Birkhäuser-Verlag

Frössel: Schimmelpilze und andere Innenraumbelastungen, Stuttgart: Fraunhofer IRB-Verlag

Gänßmantel/Geburtig/Schau: Sanierung und Facility Management, Wiesbaden: Teubner-Verlag

Institut für Bauforschung e.V. Hannover (Hrsg.): U-Werte alter Bauteile, Stuttgart: Fraunhofer IRB-Verlag

IWU Institut für Wohnen und Umwelt (Hrsg.): Deutsche Gebäudetypologie – Systematik und Datensätze - IWU-Dokumentation, Darmstadt

LBB Landesinstitut für Bauwesen und angewandte Bauschadensforschung NRW/Arendt (Hrsg.): Baufechtigkeit prüfen und beheben – Verfahrenstechniken, Düsseldorf: LBB-Verlag

Lutz, Jenisch, et. al.: Lehrbuch der Bauphysik, Wiesbaden: B. G. Teubner-Verlag

Schubert: Vermeiden von schädlichen Rissen im Mauerwerk aus: Mauerwerkskalender, Berlin: Ernst&Sohn-Verlag

Stahr (Hrsg.): Praxiswissen Bausanierung, Braunschweig/Wiesbaden: Vieweg-Verlag

Venzmer (Hrsg.): Praxishandbuch Mauerwerkssanierung von A-Z, Berlin: Bauwesen-Verlag

Wirtschaftsministerium Baden-Württemberg (Hrsg.): Dämmstoffe im Hochbau, Stuttgart: Wirtschaftsministerium Baden-Württemberg

WTA Wissenschaftlich-Technische Arbeitsgemeinschaft für Bauwerkerhaltung und Denkmalpflege e.V. (Hrsg.): WTA-Merkblätter, München: WTA-Publications-Verlag

DIN-Taschenbuch 129: Bauwerksabdichtungen - Dachabdichtungen - Feuchteschutz, Berlin/West/Köln: Beuth-Verlag

Frössel: Lehrbuch der Kellerabdichtung und -sanierung, Renningen: expert-Verlag

Frössel: Lexikon der Bauwerksabdichtung und Kellersanierung, Waldshut-Tiengen: baulino-Verlag

Hoffmann (Hrsg.): Zahlentafeln für den Baubetrieb, Wiesbaden: Teubner-Verlag

Hoffmann (Hrsg.): Beispiele für die Baubetriebspraxis, Wiesbaden: Teubner-Verlag

Moschig: Bausanierung: Grundlagen - Planung - Durchführung, Stuttgart: Teubner-Verlag

Schneider (Hrsg.): Bautabellen für Ingenieure, Neuwied: Werner-Verlag

Weber/Hafkesbrink (Hrsg.): Bauwerksabdichtung in der Altbausanierung: Verfahren und juristische Betrachtungsweise, Wiesbaden: Teubner-Verlag
## BMB 680 Reinforced Concrete Design III

<table>
<thead>
<tr>
<th>Lecturers:</th>
<th>Prof. Dr.-Ing. Harich</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of course unit:</td>
<td>Compulsory; for students of the specialization in Construction Engineering only</td>
</tr>
<tr>
<td>Level of course unit:</td>
<td>First-cycle</td>
</tr>
<tr>
<td>Year of study:</td>
<td>Third</td>
</tr>
<tr>
<td>Semester when the course is delivered:</td>
<td>Sixth / winter semester, summer semester</td>
</tr>
<tr>
<td>ECTS credits:</td>
<td>5 cp</td>
</tr>
<tr>
<td>Language of instruction:</td>
<td>German</td>
</tr>
<tr>
<td>Attendance:</td>
<td>4 hours/week</td>
</tr>
<tr>
<td>Workload:</td>
<td>60 contact hours, 90 hours of independent study</td>
</tr>
<tr>
<td>Prerequisites:</td>
<td>Recommended: Reinforced Concrete Design I and II</td>
</tr>
<tr>
<td>Teaching method/learning activities:</td>
<td>Lectures, practical exercises, laboratory, group work</td>
</tr>
<tr>
<td>Mode of delivery:</td>
<td>Face-to-face</td>
</tr>
<tr>
<td>Assessment methods and criteria:</td>
<td>Written exam</td>
</tr>
<tr>
<td>Recommended optional programme components:</td>
<td>Student can choose courses from the General Studies’ program</td>
</tr>
<tr>
<td>Course content:</td>
<td>The students learn to conceive, analyse and design typical reinforced concrete structures, such as concrete ribbed floors, T-beam slabs, slabs with point bearings, precast beams with cut-away ends, concrete beams with gaps, columns with supporting brackets, framed structures, concrete walls, retaining walls, foundation structures and wall-like beams.</td>
</tr>
</tbody>
</table>
| Learning outcomes:     | After having successfully completed the course, the students should  
  - be able to apply and understand the methods of analysis and design related to difficult reinforced concrete structures,  
  - have learned to review drawings of complex concrete structures. |
| Work placements:       | n/a                            |
| Recommended reading:   | DIN 1045-1: Tragwerke aus Beton, Stahlbeton und Spannbeton - Teil 1: Bemessung und Konstruktion; 2001-07  
Deutscher Beton- und Bautechnikverein (Hrsg.): Beispiele zur Bemessung nach DIN 1045-1, Band 1 - Hochbau, Berlin: Verlag Ernst & Sohn, 2001
### BMB 690 Structural Engineering III

**Lecturers:** Prof. Dr.-Ing. Pawlowski  
Assistant Lecturers

**Type of course unit:** Compulsory; for students of the specialization in Construction Engineering only

**Level of course unit:** First-cycle

**Year of study:** Third

**Semester when the course is delivered:** Sixth / winter semester, summer semester

**ECTS credits:** 5 cp

**Language of instruction:** German

**Attendance:** 4 hours/week

**Workload:** 60 contact hours, 90 hours of independent study

**Prerequisites:** Structural Mechanics, Building Materials, Structural Analysis, Reinforced Concrete Design, Steel Design, Timber Structures, Masonry Construction

**Teaching method/learning activities:** Lectures, practical exercises, project work, group work, presentation, excursions

**Mode of delivery:** Face-to-face

**Assessment methods and criteria:** Written exam

**Recommended optional programme components:** Student can choose courses from the General Studies’ program

**Course content:** Calculation of hyperstatic frameworks and continuous beams according to the rotation angle method and tables. Applied analysis of plates by using tables. Analysis of the distribution of horizontal forces. Planning, manufacturing, transport, installation and costs of precast reinforced concrete structures. After having successfully completed the course, the students should

- be able to determine the support reactions and the internal forces and moments of hyperstatic frameworks, continuous beams and plates for complex loading conditions.
- know the terminology, systems, details, joints, and the advantages and disadvantages of precast structures.

**Learning outcomes:**

**Work placements:** n/a

**Recommended reading:** See handout
BMB 710  Economics

Lecturers:  Prof. Dr. Urmersbach  
           Prof. Dr. Thiele  

Type of course unit:  Compulsory; for students of the specialization in  
                      Construction Management only  

Level of course unit:  First-cycle  

Year of study:  Fourth  

Semester when the course is delivered:  Seventh / winter semester, summer semester  

ECTS credits:  5 cp  

Language of instruction:  German  

Attendance:  4 hours/week  

Workload:  60 contact hours, 90 hours of independent study  

Prerequisites:  None  

Teaching method/learning activities:  Lectures, practical exercises, seminar, presentation  

Mode of delivery:  Face-to-face  

Assessment methods and criteria:  Written exam  

Recommended optional programme components:  Student can choose courses from the General Studies’ program  

Course content:  Economics  
              Thinking in economic terms  
              Interdependence and trade benefits  
              Supply and demand  
              Elasticities and their application  
              Economic policy and taxation  
              International trade  
              Economics - public sector  
              Tax system  
              Corporate behaviour and market forms  
              Companies in markets with competition  
              Monopoly and oligopoly  
              Labour Economics  
              Income and discrimination  
              Income distribution and consumer choice  
              National income and lifestyle  
              Production and growth  
              Financial system and financing  
              Unemployment  
              Monetary systems and money  
              Macroeconomics open VW and macroeconomics and theory  
              Short-term economic fluctuations  
              Stability policy and Phillips curve
EMU

Learning outcomes: Sound technical knowledge (theory and facts) of fundamental economic and business management contexts. Ability to select and apply the methods available for dealing with theoretical and current economic or socio-economic issues.

Work placements: n/a

Recommended reading:
**BMB 720 Project BM**

<table>
<thead>
<tr>
<th>Lecturers:</th>
<th>Prof. Dr.-Ing. Urmersbach</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of course unit:</strong></td>
<td>Compulsory; for students of the specialization in Construction Management only</td>
</tr>
<tr>
<td><strong>Level of course unit:</strong></td>
<td>First-cycle</td>
</tr>
<tr>
<td><strong>Year of study:</strong></td>
<td>Fourth</td>
</tr>
<tr>
<td><strong>Semester when the course is delivered:</strong></td>
<td>Seventh / winter semester, summer semester</td>
</tr>
<tr>
<td><strong>ECTS credits:</strong></td>
<td>3 cp</td>
</tr>
<tr>
<td><strong>Language of instruction:</strong></td>
<td>German</td>
</tr>
<tr>
<td><strong>Attendance:</strong></td>
<td>2 hours/week</td>
</tr>
<tr>
<td><strong>Workload:</strong></td>
<td>30 contact hours, 60 hours of independent study</td>
</tr>
<tr>
<td><strong>Prerequisites:</strong></td>
<td>Recommended: Calculation, Financing, AVA</td>
</tr>
<tr>
<td><strong>Teaching method/learning activities:</strong></td>
<td>Seminar, project work</td>
</tr>
<tr>
<td><strong>Mode of delivery:</strong></td>
<td>Face-to-face</td>
</tr>
<tr>
<td><strong>Assessment methods and criteria:</strong></td>
<td>Project work, presentation, oral exam</td>
</tr>
<tr>
<td><strong>Recommended optional programme components:</strong></td>
<td>Student can choose courses from the General Studies’ program</td>
</tr>
<tr>
<td><strong>Course content:</strong></td>
<td>Working out a complete construction project, from project development to the completion and acceptance of the construction work. costing based on plans, fixing project and payroll budgets, project reports to the awarding authority checking specifications contract preparation for contracting companies submitting a bid evaluating offers, negotiations confirmation letter supplementary checking, checking invoices coordinating an interdisciplinary team</td>
</tr>
<tr>
<td><strong>Learning outcomes:</strong></td>
<td>In a simulation of a practical project, the students manage a complete project and independently perform project management services.</td>
</tr>
<tr>
<td><strong>Work placements:</strong></td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Recommended reading:</strong></td>
<td>handout</td>
</tr>
</tbody>
</table>
BMB 740 Calculation, Supplemental Management

Lecturers: Prof. Dr.-Ing. Bergweiler

Type of course unit: Compulsory; for students of the specialization in Construction Engineering only

Level of course unit: First-cycle

Year of study: Fourth

Semester when the course is delivered: Seventh / winter semester, summer semester

ECTS credits: 5 cp

Attendance: 4 hours/week

Workload: 60 contact hours, 90 hours of independent study

Prerequisites: None

Language of instruction: German

Teaching method/learning activities: Lectures, practical exercises, project work

Mode of delivery: Face-to-face

Assessment methods and criteria: Presentation

Recommended optional programme components: n/a

Course content: Computerized application of programs for calculation and project management; application by means of a construction project. Supplemental Management Using the original calculation as a basis for supplemental processing; identifying supplements; the importance of tender documents regarding supplements; registering supplements; importance of formalisms; justifying supplements; processing supplements; handling supplements in planning and project management contracts.

Learning outcomes: Calculation: Students will apply their specialist knowledge to user programmes for offer calculation and construction control (planning of costs and hours, control and management) Supplemental Management: The aim of the subject "Supplemental Management" is to identify supplements, to deal with them (based on the original calculation) and to justify them

Work placements: n/a

Recommended reading: Kapellmann, Schiffers: Vergütung, Nachträge und Behinderungsfolgen beim Bauvertrag, Werner Verlag, Reister: Nachträge beim Bauvertrag, Werner-Verlag,
Würfele, Gralla: Nachtragsmanagement, Werner Verlag,
Vygen, Schubert, Lang: Bauverzögerung und
Leistungsänderung, Werner Verlag
### BMB 750  Project BB

<table>
<thead>
<tr>
<th>Lecturers:</th>
<th>Prof. Dr.-Ing. Bergweiler</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of course unit:</strong></td>
<td>Compulsory; for students of the specialization in Construction Engineering only</td>
</tr>
<tr>
<td><strong>Level of course unit:</strong></td>
<td>First-cycle</td>
</tr>
<tr>
<td><strong>Year of study:</strong></td>
<td>Fourth</td>
</tr>
<tr>
<td><strong>Semester when the course is delivered:</strong></td>
<td>Seventh / winter semester, summer semester</td>
</tr>
<tr>
<td><strong>ECTS credits:</strong></td>
<td>3 cp</td>
</tr>
<tr>
<td><strong>Language of instruction:</strong></td>
<td>German</td>
</tr>
<tr>
<td><strong>Attendance:</strong></td>
<td>2 hours/week</td>
</tr>
<tr>
<td><strong>Workload:</strong></td>
<td>20 contact hours, 70 hours of independent study</td>
</tr>
<tr>
<td><strong>Prerequisites:</strong></td>
<td>None</td>
</tr>
<tr>
<td><strong>Teaching method/learning activities:</strong></td>
<td>Seminar</td>
</tr>
<tr>
<td><strong>Mode of delivery:</strong></td>
<td>Face-to-face</td>
</tr>
<tr>
<td><strong>Assessment methods and criteria:</strong></td>
<td>Study assignment, presentation, oral exam</td>
</tr>
<tr>
<td><strong>Recommended optional programme components:</strong></td>
<td>Student can choose courses from the General Studies’ program</td>
</tr>
<tr>
<td><strong>Course content:</strong></td>
<td>Chosen subject from the area of construction engineering</td>
</tr>
<tr>
<td><strong>Learning outcomes:</strong></td>
<td>The student is able to carry out a project from the area of construction engineering, e.g. tunnel construction, special heavy construction, waterproofing.</td>
</tr>
<tr>
<td><strong>Work placements:</strong></td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Recommended reading:</strong></td>
<td>handout</td>
</tr>
</tbody>
</table>