Module Guide
Building Products and Processes

Faculty European Campus Rottal-Inn
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BPP-01 ENGINEERING MATHEMATICS

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<td>Ibrahim Bader</td>
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<td>BPP-01 Engineering Mathematics</td>
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Module Objective

Students cover basic mathematical terminology as the foundation of all technical modules during the course. This includes mastering methods for preparing and handling mathematical models of processes in both the natural sciences and in technology.

Exercises help consolidate the knowledge acquired, improving the ability to work systematically as well as an algorithmic method of thinking as methodological expertise.

Applicability in this and other Programs

none

Entrance Requirements

Successful completion of the following modules is recommended

General entrance qualification for universities of applied sciences (German: Fachhochschulreife) in mathematics
Learning Content

Content
- Set theory
- Complex numbers
- Vector calculus and analytic geometry
- Calculating determinants and matrices with applications
- Systems of linear equations
- Sequences and series (of real numbers)
- Functions of a real variable
- (Plane) curves and their mathematical description
- Functions of several variables (introduction)

Teaching Methods
Blackboard, study materials, script, slides, textbooks and the Internet
Lecture with integrated examples, homework

Recommended Literature
- W. Mückenheim, Mathematik für die ersten Semester, Oldenbourg Verlag, 3rd edition, 2011
- Papula: Mathematik für Ingenieure und Naturwissenschaftler, Band 1 and 2. Springer
- Vieweg 2014
- Papula: Mathematische Formelsammlung für Ingenieure und Naturwissenschaftler
- Springer Vieweg 2014
- Meyberg; Vachenauer: Höhere Mathematik Band 1 and 2. Springer 2003 and 2005
BPP-02 FUNDAMENTALS OF BUILDING PHYSICS 1 (THERMAL PROTECTION)

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Module Objective

Knowledge:

Students will acquire

- basic knowledge about the following:
  - heat and moisture transport
  - heat and moisture storage
  - measurement technology in the fields of heat, humidity and air tightness
  - knowledge of thermal insulation and technical thermal insulation requirements
  - the evaluation basis for assessing the room climate

Skills:

With the acquired knowledge, students should be able to

- analyse structures in terms of thermal and moisture protection
plan measures to save energy in existing and new buildings
analyse measurement results: thermal images, airtightness
analyse damage to buildings in the area around thermal and moisture protection

Competences:
After successful completion, students will be able to:

fully understand evidence in the area around thermal protection, check for feasibility and to carry it out effectively
develop and analyse functional construction designs

Applicability in this and other Programs
none

Entrance Requirements
Successful completion of the following modules is recommended

Learning Content
Principles of Construction Physics I
Thermal insulation
Principles of energy and consumption
Principles of storing energy
Principles of heat transport
Steady-state and transient heat transfer
Thermal bridges (in new buildings and in renovation work)
Airtightness of the building envelope
Principles of building ventilation
Structural evidence (summer and winter thermal protection)
Evaluation bases for the room climate
Moisture protection
Fundamentals of moisture
Moisture transport in components / sealing technology (new buildings and renovations)
Evidence of condensation on/in components

Room air humidity and ventilation

**Recommended Literature**

**Standards:**
DIN 4108, DIN 18599, ISO 7730, ISO 10211, ISO 10077, ISO 12631

**Laws:**
Gesetz zur Einsparung von Energie und zur Nutzung erneuerbarer Energien zur Wärme- und Kälteerzeugung in Gebäuden (German Building Energy Act - GEG 2020),
Energieeinsparverordnung (German Energy Saving Ordinance - EnEV) 2014/2016

**References:**
Lehrbuch der Bauphysik, Springer Vieweg, Hrsg. Willems
Bauphysikalische Formeln und Tabellen, Werner Verlag, Hrsg. Hohmann, Setzer, Wehling

Course handouts
Module Objective

Students learn about the basics of chemistry to understand the material composition of matter and to derive basic properties and behaviours.

**Professional competence:**

**Knowledge**

- Students know the structure of matter at element and molecular level.
- They are able to understand the language of general chemistry (symbols, formula, equations, solution, concentrations).
- They are able to understand the language of cement chemist notation (CCN).
- Students understand the fundamental properties of elements and molecules and are able to establish simple reaction equations.
- They are able to describe simple chemical reactions (Acid-Base Reactions, Redox reactions).
Based on their knowledge of the state and reaction possibilities of matter, students know the essential properties of exemplary construction materials and external influences on them (e.g. corrosion).

**Skills**

- Ability to understand chemical problems and translate them into equations and apply the principles of chemistry to solve the problems.
- Ability to analyse the context of material based technical problems and to apply this to the design and development of technical systems and processes.
- Ability to perform basic chemistry-related calculations, including quantities, units and chemical symbols.

**Method competences:**

After participating in this module, students will be able to understand and analyse material-based and substance-related aspects of some construction materials. They understand possible material-dependent challenges that arise at certain construction processes or over the lifetime of constructs and how to prevent/minimize them.

**Social competence:**

- Ability to work in intercultural mixed teams and communicate their progress and results.
- Ability to communicate with peers about a complex topic and find a joint approach to solving it.

**Applicability in this and other Programs**

none

**Entrance Requirements**

Successful completion of the following modules is recommended:

Knowledge of basic mathematics, at least at high school-level is recommended.

**Learning Content**

- Introduction to chemistry
- The periodic table of elements
- Atomic and molecular structure
- Condition of substances, aggregate states, phase transformations, modification
- Chemical bonding
- Chemical reactions
- Principles of physical chemistry
- Principles of organic chemistry
- Composition and properties of important materials (metals, polymers, cement, concrete)
- Cement Chemist Notation
- Corrosion processes

Teaching Methods

Seminaristic teaching, exercises, demonstration experiments.

Recommended Literature

**Module Objective**

Students will acquire

- basic knowledge about the following:
  - the importance, structure and objectives in statics, the concept of security
  - structure of a static calculation
  - load determination
  - compilation and analysis of forces and momentum
  - equilibrium of forces and momentum in the level
  - knowledge of the backgrounds behind load assumptions and knowledge with the relevant national German annex for net weight, payloads, wind loads, and snow loads

Skills:

With the acquired knowledge, students should be able to

- recognise the most important elements and support structures in statics
handle support structures

confidently apply the cutting principle and equilibrium conditions
determine supporting loads and cutting force lines on statically determined systems

know the principles for determining loads

Competences:

After successful completion, students will be able to:

prepare statics-related tasks
recognise and apply mechanical contexts
ask technical questions
answer technical questions appropriately
realistically appraise their own knowledge regarding the specialist area

Applicability in this and other Programs

none

Entrance Requirements

Successful completion of the following modules is recommended

Learning Content

Principles of statics

Fundamentals of effects (area loads, line loads, individual loads, idealisation, load flow)

Development of load models as a result of the effects

Explanations and notes regarding the effects on support structures according to:

Design situations and action combinations according to DIN EN 1990: Principles of structure planning, safety concept and design rules

Exercise based on practical examples

Insight into determining effects via computer programs
Recommended Literature

References:
Leicher, Kasper, Kasper: Tragwerkslehre in Beispielen und Zeichnungen, Reguvis, 5th edition, 2022
Widjaja, Baustatik ? einfach und anschaulich, Bauwerk BBB Beuth, 5th edition 2020

Course handouts
BPP-05 BUILDING INFORMATICS

<table>
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**Module Objective**

**Knowledge:**

Students will acquire

- basic knowledge about the following:
  - computer science for engineers (applied computer science)
  - implementation of engineering tasks in a table calculation
  - noting standards and guidelines in programme sequence controls
  - programming and controlling microcontrollers
  - use of microcontrollers in measurement technology and automation

**Skills:**

With the acquired knowledge, students should be able to

- establish the fundamentals in a table calculation
- carry out calculations and analyses
Competences:
After successful completion, students will be able to:

- carry out data analyses and process series of measurements
- prepare dynamic reports
- understand standardised programming / programme sequence controls
- understand controlling via actuators and sensors
- measurement data acquisition via sensors

Applicability in this and other Programs
none

Entrance Requirements
Successful completion of the following modules is recommended

Learning Content
Basics of building informatics
- Basics in a table calculation
- Import and adjust data series (e.g. measurement data)
- Reporting with diagrams and tables
- Standardised programming (programme sequence control)
- Automation with macros / VBA
- Programming microcontrollers (e.g. Arduino, SPS)
- Controlling and switching via actuators, sensors, humidity protection

Recommended Literature
References:
Course handouts
### Module Objective

**Module Objective**

Students learn about challenges and complexities of architecture on international, national and regional level. They learn the historical development of architecture, its current state and possible future scenarios. Furthermore, they understand the role of architects in the construction sector.

Based on case studies, the students understand the concepts of architecture and the role of architects from start to end.

**Professional Competence**

**Knowledge**

After successfully finishing the module, students will get to:

- Understand architecture in its international, national, and regional context
- Understand the role of architects and the design process
- Understand vernacular architecture and its concepts in the context of different climate zones and possible transfers to modern architecture
Skills

Upon completion of the module the students will be able to:

- Describe basic concepts of architecture and its relevance on international, national and regional level and use technical terms adequately
- Describe the role of architects and the design process
- Describe concepts of vernacular architecture in different climate zones
- Transfer adequate concepts of vernacular architecture to contemporary architecture

Social competence

Students are demonstrating working individually or in small groups to solve problems that aim at enhancing their team-working skills as well as their problem-solving capabilities. Further, students also know how to work with different groups of stakeholders, understand their perspectives, learn to consider these perspectives in their line of argumentation and act accordingly.

Methodological competence:

The students improve the knowledge in the field of architecture based on real case studies. The students should be enabled to apply the acquired knowledge and to critically evaluate and inter-present subject-specific information on the basis of criteria of architecture. Students develop an analytical system-oriented way of thinking and are able to structure the approach for building projects.

Applicability in this and other Programs

none

Entrance Requirements

Successful completion of the following modules is recommended

Learning Content

- Basics of architecture: historical development, current situation and future projection
- Analysis of vernacular architecture in different climate zones
- Different stakeholder - different perspectives: how to deal with it
- Building and neighborhood
Teaching Methods
Seminaristic teaching / Exercises / Case studies / Moderated discussions / Lab-work & LivingLab / Field trips / Guest lectures

Remarks
Excursions to landmark projects

Recommended Literature
# BPP-07 TECHNICAL ENGLISH / TECHNICAL GERMAN

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<td>Tanja Mertadana</td>
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| Course number and name | Technical German  
                        | Technical English  
                        | BPP-07 Technical English / Technical German |
| Lecturer             | Dozierende für AWP und Sprachen |
| Semester             | 1               |
| Duration of the module | 1 semester   |
| Module frequency     | annually        |
| Course type          | required course |
| Level                | Bachelor        |
| Semester periods per week (SWS) | 6 |
| ECTS                 | 2               |
| Workload             | Time of attendance: 30 hours  
                        | self-study: 30 hours  
                        | Total: 60 hours |
| Type of Examination  | See examination schedule AWP and languages, written ex. 60 min. |
| Duration of Examination | 60 min.       |
| Weight               | 2/210           |
| Language of Instruction | English, German |

## Module Objective

The module Technical English/Technical German (B2/C1) aims to equip students with specialised language skills necessary for independent performance in a globalised field of building products and processes. In doing so, it strives to deepen the students' relationship with the English and/or German language in technical fields so that they can effectively and efficiently implement the respective language as a practical means of communication.

The module covers the four basic language skills - listening, reading, speaking and writing. Students expand their subject-specific vocabulary and deepen their knowledge of the language structures.

The main focus of the module is to optimise fluency and improve the ability to communicate in English/German in order to better understand texts and conversations. Through task-based speaking, listening, reading and writing activities, students enhance their communicative skills and develop their ability to express themselves. This enables them to participate in technical discussions, to work in a
team, to create relevant documents independently, and to successfully present in English/German.

On completion of the module, the students will have achieved the following learning objectives:

Professional skills

- The students will be proficient in English/German at a confident language level (B2/C1, CEFR) and will also be able to understand technical discussions in the field of building products and processes
- They will have the skills to understand specialised literature and to write texts independently at a B2/C1 level
- Students will have acquired the skills to express themselves at B2/C1 level in formal and professional contexts
- They will be able to understand discussions and more complex content in their field of specialisation
- They will develop the ability to functionally apply grammatical structures in their future professional fields
- They will be able to give comprehensible and detailed presentations on relevant topics related to building products and processes They are able to present their own opinions and also different points of view in a comprehensible way

Methodological skills

- Students will have expanded their language acquisition skills by reflecting on their individual styles of learning
- They will be able to filter information from different English/German sources and use it for their presentations

Social skills

- Students will have developed their social skills of teamwork, reliability, and negotiation skills
- They will have the communication skills necessary to collaborate with others to find solutions
- They will reflect on their learning experiences from independent projects and teamwork

Personal skills

- Students will have developed sound language skills and social skills, which are of fundamental importance for personal development and the future work
**Applicability in this and other Programs**

No applicability in other degree programmes.

**Entrance Requirements**

Successful completion of the following modules is recommended

The prerequisite for successful participation in the module is a command of the chosen language (English/German) at B2 level, based on the Common European Framework of Reference for Languages (CEFR).

**Learning Content**

**Technical English**

1. Introduction to building products and processes
2. Communication with engineers
3. Project plans and project management
4. Processing data
5. Measurements and units
6. Geometry and design
7. Describing forces
8. Materials and their properties
9. Eco-efficiency
10. Safety and risk
11. Functionality and optics
12. Overview of grammar and language skills
13. Writing skills in English

**Technical German**

1. Building materials
   1.1 Technical vocabulary for describing and naming building materials
   1.2 Word order when linking sentences
   1.3 Description of building materials in terms of their chemical composition
2. Building products
   2.1 Technical vocabulary for describing and naming different building products
   2.2 Use of suffixes with adjectives
   2.3 Describing building products in terms of their function and structure
3. Building components/ Trades
3.1 Technical vocabulary for describing and naming various building components and trades in building construction and finishing
3.2 Use of word combinations relating to the different trades (e.g. HVAC, energy, finishing, building shell, roof)

4. Building processes
4.1 Technical vocabulary for describing and naming processes in product development and project execution
4.2 Repetition of the procedural passive voice for describing construction processes
4.3 Use of word and sentence combinations for product management and marketing

5. Communication with customers
5.1 Addressing people in everyday business life
5.2 Gender-sensitive language forms
5.3 Writing e-mails
5.4 Use of the du/Sie form in German
5.5 Writing business letters

Teaching Methods

Teaching and learning methods focus on improving the four main language skills (listening, speaking, reading and writing) and on enhancing professional and social skills. Examples of teaching methods used include various forms of group and individual work, mini-presentations, intensive reading and listening exercises, role-play and grammar games, loci method, dictation exercises, translations, peer feedback, work with learning stations, and various writing activities to strengthen the knowledge gained.

Students will be given weekly assignments for self study.

Remarks

All language courses require a compulsory attendance rate of 75% in order to be allowed to take the examination.

Recommended Literature

Technical English


**Technical German**


**Module Objective**

**Professional Competence**

*Knowledge*

Students are able to explain and reproduce basic theories, principles, and methods related to:

- Fundamental relations between electrical quantities
- Basic components: sources, resistance, capacitor and inductor
- Electrical circuits and fundamental effects that may occur within electrical circuits and networks
- Network theorems and network analysis methods
- Transient analysis of electrical circuits and application of the Laplace transform for transient analysis
- Steady dc and ac analysis, complex representations and phasor diagrams
- Fundamental elements and parameters of electrical power supply
**Skills**

Students are capable of:

- Applying theoretical concepts to practical applications
- Applying general methods for the analysis of electrical networks
- Calculating parameters of simple electrical networks
- Calculating networks with sinusoidal excitations applying the complex calculation methods
- Using the Laplace transform to compute transients with initial conditions and work with correspondence tables
- Applying simulation tool SPICE for the simulation of simple stationary and unsteady problems
- Dimensioning circuit elements by means of a design
- Analysing and building simple circuits on experimental boards
- Implementing simple measurements, working with instruments: multimeters, signal generators and oscilloscope

**Personal Competence**

**Social competence**

Students can analyse and solve problems in small groups, can compare theoretical results with experiments and discuss it within the group. Present the related topics to professionals and discuss and argue for the obtained results.

**Autonomy**

The students are able to acquire skills outside their lectures form literature as well as and can solve problems by their own. They are able to relate their acquired knowledge to other lectures.

**Applicability in this and other Programs**

The module provides basic competences for other courses of different study programs that require electrical engineering fundamentals

**Entrance Requirements**

Successful completion of the following modules is recommended

Knowledge of elementary mathematics and physics is recommended.
Learning Content

The module provides introduction to the fundamentals of electrical engineering addressing:

- Physical electrical quantities, dc and ac signals
- Circuit components: sources, resistors, capacitors and inductors
- Circuits: series, parallel, star and delta connections
- Ohm's law, electrical dc power and energy
- Kirchhoff's laws
- Network theorems: Thévenin, Norton, Superposition
- Network analysis: mesh current and nodal voltage methods
- Transient analysis using Laplace transform
- AC circuits and components with sinusoidal excitation
- Apparent, reactive and active ac power, power factor
- Phasors and phasor diagrams
- Complex representations and calculation of ac circuits
- Transfer functions, logarithmic scales, Decibels and Bode-plot
- Simple filters

Practical laboratory experimental sessions are enabling the students to consolidate the theoretical knowledge as well as to develop practical skills in addressing and handling electrical circuits and equipment.

Teaching Methods

Seminaristic teaching / exercises / home work

Whiteboard, PowerPoint presentation, document camera (visualiser) and additional lecture materials in iLearn

Experiments in small groups using training material that relays on professional computer-based experimentation system where multimedia combines cognitive and hands-on training units into a comprehensive unified concept enabling students to consolidate theoretical building blocks and practical skills for a maximum learning effectiveness.

Recommended Literature
Module Objective

**Knowledge:**

- Uniform temperature curve in accordance with DIN 4102, ISO 843, EN 1363-1
- Building classes 1-5 and special structures
- Material classes and test procedures in accordance with DIN 4102 and EN 13501
- Fire resistance classes and test procedures in accordance with DIN 4102 and EN 13501
- Evidence of suitability of components and materials in accordance with domestic and European rules
- DIN 4102-4, sample tubing system guidelines, sample ventilating system guidelines, Eurocode, BayBo, MBO
- System knowledge of fire-resistant designs for the building structure, interior construction, building envelope and fire safety bulkheads for in-house facilities

**Skills:**
After successful completion, students will be able to recognise and safely apply structural and planning tasks for various uses of building (such as residential, office buildings, meeting rooms, hospitals, hotels, commercial use) as well as measures relevant from a fire safety perspective. In this case, students will be able to communicate, using the correct parlance (in German and English) with building contractors, general planners, specialist planners or building authorities.

**Competences:**

- Will be able to recognise which measures are necessary for fire safety in a building so that legal stipulations are followed.
- Will be aware of the calculation process for bearing and non-bearing components, and can apply these confidently.
- Will be able to set out components such as materials as part of building planning regarding fire behaviour, to monitor this when construction work is carried out, and to confidently apply the corresponding evidence of suitability.

**Applicability in this and other Programs**

none

**Entrance Requirements**

Successful completion of the following modules is recommended

**Learning Content**

- Legal principles of fire safety: current MBO, LBO, technical building regulations, administrative provision of building regulations, DIN 4102-4, special building regulations (high-rise buildings, accommodation, places of assembly, etc.) fire safety guidelines introduced by building authorities, EUROCODE
- Structural fire safety of the escape route (necessary corridor / staircase)
- Components with fire resistance along with bearing and non-bearing construction elements for the structure of the building & interior construction & façade along with their evidence of suitability.
- Fire behaviour of materials and components, along with their national and European test processes or classification systems.
- Measurement of fire safety retrofitting measures for load-bearing steel and timber supports and carriers.

Fire safety partitions for technical building equipment such as electrical, pipeline and ventilation systems.
Recommended Literature

Vfdb-Leitfaden Ingenieurmethoden des Brandschutzes

BayBo, MBO, DIN 4102-4, Brandschutzatlas, current script of the lecture
**Module Objective**

Knowledge:

Students will acquire

- basic knowledge about the following:
  - sound waves, vibrations, variables
  - calculations with sound levels, calculation of sound propagation
  - sound insulation of components
  - calculation of reverberation times
  - room and architectural acoustics requirements, minimum requirements and more stringent requirements
  - an overview of measurement technology in architectural acoustics

Skills:
With the acquired knowledge, students should be able to

- analyse construction designs regarding sound insulation
- evaluate and appraise material properties
- analyse requirements for residential and non-residential buildings, particularly with mixed use

Competences:

After successful completion, students will be able to:

- plan and evaluate room and architectural acoustics requirements for existing and new building stock
- recognise execution errors in the construction phase
- develop concepts for room acoustics

Applicability in this and other Programs

Der erfolgreiche Abschluss der folgenden Module wird empfohlen:

Engineering Mathematics BPP-01

Entrance Requirements

Successful completion of the following modules is recommended.

Construction Chemistry BPP-03

Learning Content

Basics of Building Physics III

General

- sound insulation, general principles of acoustics

Immission control

- Principles of immission control, technical rules and requirements
- Immission control, rating level, outdoor sound propagation

Architectural acoustics

- Requirements of architectural acoustics
- Principles of sound and footfall insulation
- Design and measurement of single and multiple-shell components
- Planning and measurement of in-house facilities
- Measurement of solid and skeletal construction
- Metrological evidence

Room acoustics:
- Principles of room acoustics
- Acoustic planning of a room: Reverberation time, room geometry
- Requirements of room acoustics

Metrological test

**Recommended Literature**

**Standards:**
DIN 4109, DIN 18005, DIN 18041, VDI 2569, ASR A3.7

**Laws / by-laws:**
Technische Anleitung zum Schutz gegen Lärm (TA-Lärm) (Technical Instructions on Noise)
Bundes-Immissionsschutzgesetz (BImSchG) (Federal Immission Control Act)

**References:**
Lehrbuch der Bauphysik, Springer Vieweg, Hrsg. Willems
Fasold / Veres, Schallschutz und Raumakustik in der Praxis
Bauphysikalische Formeln und Tabellen, Werner Verlag, Hrsg. Hohmann, Setzer, Wehling

Course handouts
## BPP-11 BUILDING MATERIAL CHARACTERISTICS

<table>
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### Module Objective

**Knowledge:**

Introduction, general:
Building material characteristics focus on the materials used for constructing buildings. The physical, chemical and mechanical properties of materials are introduced: Strength, specific masses, malleability, ageing behaviour, thermal conductivity and storage capacity, fire resistance, water permeability

Orientation:
Can evaluate the materials in terms of structural and mechanical properties, and use it expediently both in shell construction as well as in interior construction. The focus equally lies in application of materials / material combinations in both new buildings as well as renovation projects.

**Skills:**

With the acquired knowledge, students should be able to

- recognise the physical, chemical and mechanical properties of the most important materials
- have an understanding of the manufacturing and acquisition of building materials
determine physical and technical properties

Competences:

After successful completion, students will be able to:

- select a material based on the requirements profile (mechanical and physical features, aspects of sustainability and durability)
- evaluate materials that are in stock (ageing behaviour / upgrading)
- select materials while also taking cost-effectiveness and sustainability into account (resource-friendly material composition)

Applicability in this and other Programs

Building Informatics BPP-05

Entrance Requirements

Successful completion of the following modules is recommended

Learning Content

Principles of building materials
- General basic terms and classification
- Wood and wood materials
- Metals and non-ferrous metals
- Mineral building materials (natural stone, glass, masonry, and mortar)
- Concrete / reinforced concrete
- Bitumen and asphalt
- Heating insulating materials
- Plastics
- Recycling materials

Recommended Literature

References:

Course handouts
**BPP-12 CAD 2D / 3D (BIM)**

<table>
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<tr>
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**Module Objective**

**Knowledge:**

Students will know at least 2 CAD software applications, such as Autocad, Revit and can use these confidently. Knows the usual data exchange formats in the CAD sector for both graphic geometrical data as well as for metadata.

**Skills:**

Will be able to apply the relevant guidelines or standards for preparing construction plans whilst being able to use CAD technologies to create practical and appropriate drawings.

**Competences:**

After successfully completing the sub-module, students will be able to prepare simple building plans in both 2D and 3D with the aid of a computer. In this case, the relevant floor levels as well as the building views are shown to scale and necessary detailed constructions of the components are carried out.

**Applicability in this and other Programs**

none
Entrance Requirements

Successful completion of the following modules is recommended

Learning Content

Principles of 2D/3D-CAD - Planning:

- Preparation of building drawings (labelling, line types, dimensioning) in line with standards
- Area, wire, volume models
- Creation of layouts, perspectives, dimensioning, round view, hatches, layer structures
- Preparation of components such as masonry, reinforced concrete, timber walls, windows, doors, roof, staircases, etc.
- Implementation planning (detailed construction designs)
- Simple bills of equipment

Principles of parametric planning

Model-based stocktaking

- From the point cloud (scan data) to geometry (vector data)
- 3D building modelling and plan generation
- Model-based collaboration & communication (BCF workflow)

Recommended Literature

Manuals from CAD software manufacturers such as Autodesk

Scripts and documents from the lecture
Module Objective

Acting across cultures and the necessary capabilities to do so is an important part of social skills that are required to act in a global world. These skills are also an important component for managers who focus on international matters within their companies, whether it's the management of international teams, customer support, or other processes within the company.

Cross-cultural differences can have an impact on effective collaboration, and these differences are often not recognised until misunderstandings have taken place. Recognising or countering such situations before they arise, and then resolving them, is a key part of cross-cultural skills and effective management. This ability to recognise cultural differences and to react appropriately to them can lead to more successful working relationships. Cross-cultural awareness is the ability to see your own cultural pattern and to understand the cultural patterns of other people, as well as to find ways of reducing misunderstandings and conflicts for future cultural interactions.

Upon completing the course, students should have the following capabilities and skills:
**Technical competences and skills:**

- Knowledge and understanding of the most important theories, concepts, and models in intercultural communication and management.
- The ability to collaborate with other cultures to achieve a shared level of understanding, based on analysis of similarities and differences.
- Being effective in international environments, particularly the international realm of the construction industry.
- Understand, resolve, and recognise cultural issues and how these can have an impact on a working and management level.
- Recognise how stereotypes and prejudices can arise in interactions between cultures.
- The ability to distinguish between the different types of culture and leadership styles.

**Methodological skills:**

Students will be able to understand how cultures develop and change over time. They can consider and recognise specific types of behaviour and recognise which cultural standards drive such behaviour, and can adapt their own conduct so that they can react appropriately. They are able to analyse the effectiveness of collaboration with others on different levels, which go beyond mere capabilities, and to look for cultural patterns that fit well with their own.

- Students will have developed oral and written presentation skills. They demonstrate teamwork, the ability to ask questions and to listen.
- They show understanding of how cultural factors can have an impact on certain situations within the international realm of the construction industry.

The module explores intercultural skills, cultural identity and cultural diversity from a strategic, organisational and business perspective, as well as how these are visible in various sectors.

**Personal and social skills:**

- The ability to understand your own cultural patterns and attitudes.
- The ability to improve your own tolerance of cultural differences.
- Increased cultural and emotional intelligence.
Applicability in this and other Programs

none

Entrance Requirements

Successful completion of the following modules is recommended

Learning Content

Students will be able to work more effectively in international environments, and also to communicate more effectively with colleagues from cultures that are different to their own. This is a skill that is useful for all aspects of the construction industry.

Application of intercultural theory to management attitudes. The students are better equipped to successfully resolve cross-cultural issues and conflicts as well as potential misunderstandings. The students can recognise and apply the most common management methods for intercultural and international situations. This can be applied on various management courses.

Teaching Methods

- Group discussion
- Interactive discussion
- Interactive exercises
- Presentations
- Case studies
- Independent research and analysis

Recommended Literature

Recommended reading (if possible in the most current edition):


BPP-14 LAW 1 (CONSTRUCTION LAW / CONSTRUCTION CONTRACT / VOB)

<table>
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<tr>
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<tr>
<td>Module coordination</td>
<td>Prof. Josef Steretzeder</td>
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<tr>
<td>Course number and name</td>
<td>BPP-14 Law 1 (Construction Law / Construction Contract / VOB)</td>
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Module Objective

Knowledge:

The course provides the participants with knowledge about:

- Rights and obligations of the contracting parties relating to the award of construction contracts according to VOB
  - Part A (VOB/A): General conditions of contract relating to the award of construction work
  - Part B (VOB/B): General conditions of contract for the execution of construction contracts
  - Part C (VOB/C): General technical specifications (ATV DIN) in construction contracts (ATV DIN)

- German Civil Code (BGB) in relation to contracts for work and services

- Legal framework for construction contracts abroad according to FIDIC (Fédération Internationale des Ingénieurs Conseils) and its model contracts (Red Book, Yellow Book, Silver Book, White Book)

- Model letters for the business processes in construction management
Skills:

Upon successful completion of the sub-module, students will be able to:

- Correctly assess the tasks and responsibilities in construction management
- Reflect different perspectives and interests of the contractual partners involved in national and international construction projects
- Distinguish between contractually owed, changed and additional services (VOB/B)
- Distinguish between additional services and special services (VOB/C)
- Apply the correct consequences under building law depending on the existing situations
- Identify, notify, document and enforce supplementary claims with legal basis in simple cases
- Verify additional requirements from partner companies in terms of entitlement and plausibility

Competences:

Upon successful completion of the sub-module, students will have competences in the following:

- Importance and application of VOB Parts A, B and C as a basis for the correct description of the building work and the building execution in national construction projects
- Significance, application and differences between VOB/B and German Civil Code in relation to contracts for work and services
- Significance and application of the FIDIC contract types in international construction projects, depending on which services the contractor takes on and which tasks remain with the principal
- Significance and use of model letters for correspondence ranging from acceptance requests, notices of objections, extensions of deadlines, obstruction notices to final payment declarations and repayment of the security deposit

Applicability in this and other Programs

BPP-15 Construction Calculation
BPP-16 Project Management 1
BPP-17 Project Management 2
BPP-21 Commercial Management
BPP-31 Building in existing structures
All similar courses in civil engineering

**Entrance Requirements**

Successful completion of the following modules is recommended

**Learning Content**

- Building contracts and building contract law
- Acceptance of work performance
- Construction period - execution and contract deadlines
- Disruption of the construction process and premature termination of the contract
- Model letters
- Building defects
- Invoicing and payment as well as subsequent claims
- Securities
- Modifications and commissioning modifications

**Teaching Methods**

Lectures / exercises / tutorials / home work

PowerPoint presentation, whiteboard, document camera (visualiser) and additional lecture materials in iLearn

Lectures / exercises / tutorials / home work

PowerPoint presentation, whiteboard, document camera (visualiser) and additional lecture materials in iLearn

**Recommended Literature**

- Lecture script
- VOB/A, VOB/B and VOB/C
- BGB (German Civil Code)
- FIDIC
Module Objective

Knowledge:

The course provides the participants with knowledge about:

- The basics of the different costing methods (calculation of overheads, final totals, contribution margins and fixed prices)
- The basics of the different stages of construction costing (tender, job and labour costing)

Skills:

Upon successful completion of the sub-module, students will be able to:

- Approach a tender calculation in a structured way, to calculate the individual costs of the partial services, to systematically record and calculate the overhead costs of the construction site and to determine the unit prices with the help of the tender documents.
o Decide between different construction methods with the help of cost comparisons, both for tender costing and for labour costing.

o Deduce costing consequences from the building contract and during construction and evaluate them financially.

**Competences:**

Upon successful completion of the sub-module, students will have competence in the following:

o Application of the correct costing procedures depending on the time at which the costing is carried out (tender phase, before or during the execution of the building contract)

o Efficient preparation of a tender costing, which is the basis for successful negotiation and contract award

o Design and evaluation of tender text for recyclable building products for sustainable buildings

o Keeping active labour costings according to the project progress for effective construction site and project monitoring

**Applicability in this and other Programs**

BPP-16 Project Management 1
BPP-17 Project Management 2
BPP-21 Commercial Management

BPP-26 Seminar on Project Management
BPP-31 Building in existing structures

All similar courses in civil engineering

**Entrance Requirements**

Successful completion of the following modules is recommended.

No prerequisites besides school level math.

**Learning Content**

Content

o Types of tenders

o Performance specification

o Types of costings
o Quantity take-off and cost determination (model-based)
o Pricing of partial services
o Dealing with preliminary comments
o Submission/ Negotiation
o Adapting cost structure to changes construction site situation
o Target times for building costs monitoring
o Guideline values for the award of partial services
o Monitoring of construction site and project

**Teaching Methods**

Lectures / exercises / tutorials / home work

PowerPoint presentation, whiteboard, document camera (visualiser) and additional lecture materials in iLearn

**Recommended Literature**

o Lecture script

o Egon Leimböck, Ulf Rüdiger Klaus, Oliver Hölkermann, Baukalkulation und Projektcontrolling, SpringerVieweg-Verlag

o Drees, Krauß, Berhold, Kalkulation von Baupreisen ? Hochbau, Tiefbau Schlüsselfertiges Bauen, Beuth Verlag
BPP-16 PROJECT MANAGEMENT 1 (PLANNING CONTROL)

<table>
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Module Objective

Knowledge:
The course provides the participants with knowledge about:
- Procedures, instruments and documents in project preparation
- Contractual, ancillary and special services according to VOB
- HOAI - Planning phases
- Differentiation of partner companies between supplier, subcontractor, installation partner and service provider
- Assessment, selection, commissioning and evaluation of partner companies and the necessary certificates and approvals
- Costing types - from tender costing, original costing, job costing, labour costing;

Skills:
Upon successful completion of the sub-module, students will be able to:
o Determine the required materials by means of quantity take-offs from execution plans or 3D models

o Distinguish between the required products with regard to principal, supplementary or special performance in order to generate possible supplementary potential.

o Identify ecologically better and economically more favourable alternatives

o Prepare and evaluate price enquiries and price comparison lists

o Request and/or order materials and installation services correctly

o Know and evaluate required verifications for products/services/companies regarding quality, environmental aspects and approvals

o Prepare the work costing on the basis of the tender calculation/job costing with the results of the project preparation

**Technical competences:**

Upon successful completion of the sub-module, students will have competences in the following:

- Projects of simple to medium complexity in the areas of action: To prepare quality, quantity, costs, deadlines, capacities, logistics, contracts, evidence and documentation

- To assess, select, commission and evaluate suppliers, subcontractors, installation partners and service providers for building products and projects with regard to price, quality, sustainability and approvals

- To plan projects correctly so as to limit risks, exploit opportunities and achieve specifications regarding product and execution in terms of quality, on time and within budget

**Applicability in this and other Programs**

- BPP-17 Project Management 2
- BPP-21 Commercial Management

- BPP-26 Seminar on Project Management
- BPP-31 Building in existing structures

All similar courses in civil engineering

**Entrance Requirements**

Successful completion of the following modules is recommended

**Learning Content**
- Project preparation
- Quantity take-off
- Scheduling
- Procurement
- Work costing
- Supplementary work
- Project file
- Verifications, approvals

**Teaching Methods**

Lectures / exercises / tutorials / home work

PowerPoint presentation, whiteboard, document camera (visualiser) and additional lecture materials in iLearn

**Recommended Literature**

- Lecture script
- Bernd Kochendörfer, Jens H. Liebchen, Markus G. Viering, Bau-Projekt-Management, Grundlagen und Vorgehensweisen
Module Objective

Knowledge:
The course provides the participants with knowledge about:

- Building organisation and building processes
- Occupational safety and environmental protection regulations on the construction site
- Legal requirements for the use of installation partners and subcontractors
- Lean construction management – detailed scheduling / timing
- Digitalisation of building processes and building operations
- Inspection of products and building trades during construction
- New business models for circular construction

Skills:
Upon successful completion of the sub-module, students will be able to:

- Develop necessary site-specific, technical solutions
o Use installation partners and subcontractors in accordance with the legal requirements

o Create concepts for recyclable materials

o Realise a synchronised work organisation throughout the entire construction process - to plan detailed deadlines

o Carry out product and trade-specific inspections

o Prepare general and project-specific proofs and documentation

**Technical competences:**

Upon successful completion of the sub-module, students will have the competences to:

o Identify and implement the performance target from contracts, bills of quantities and plans

o Carry out projects of small and medium size, taking into account all occupational safety and environmental requirements

o Take a holistic view of planning and execution processes

o Identify and avoid waste in the sense of Lean construction

o Promote the digitalisation of construction processes

o Implement new business models for circular construction

**Applicability in this and other Programs**

- BPP-16 Project Management 1
- BPP-21 Commercial Management
- BPP-26 Seminar on Project Management
- BPP-31 Building in existing structures

All similar courses in civil engineering

**Entrance Requirements**

Successful completion of the following modules is recommended

**Learning Content**

o Building organisation/ building processes

o Project execution
Deployment of installation partners and subcontractors
Instruction of staff
Inspections during construction
Keeping evidence
Occupational safety and environmental protection regulations
Lean construction management - detailed scheduling
Circular construction
Digitalisation

**Teaching Methods**

Lectures / exercises / tutorials / home work

PowerPoint presentation, whiteboard, document camera (visualiser) and additional lecture materials in iLearn

**Recommended Literature**

- Lecture script
- Sven Schirmer, Bau-Projektmanagement für Einsteiger, Aufgaben ? Projektorganisation ? Projektablauf, Springer Verlag
- Christian Hofstadler, Christoph Motzko, Agile Digitalisierung im Baubetrieb ? Grundlagen, Innovationen, Disruptionen und Best Practices, Springer Verlag
- Baldwin, Mark, Der BIM-Manager, Praktische Anleitung für das BIM-Projektmanagement (The BIM Manager: A Practical Guide for BIM Project Management) buildingsmart, Mensch&Maschine, Springer Verlag
- Institut für Konstruktives Entwerfen der ZHAW, Bauteile wiederverwenden. Ein Kompendium zum zirkulären Bauen, Park Books
Module Objective

Knowledge:

- Basic knowledge of BIM dimensions
  - 3D: Three-dimensional modelling | Difference between CAD software and BIM authoring systems
  - 4D: Time management | Preparing schedules for monitoring and managing of construction phases (target / actual comparisons)
  - 5D: Cost planning | Cost control, verifiable scale, billing etc.
  - 6D: Sustainability and efficiency | ecological, economic and social sustainability

- Basic knowledge of employer information requirements (EIR) and BIM execution planning (BEP)

- Basic knowledge of roles and responsibilities in a BIM project
- Basic knowledge of change management (human factor)
- Basic knowledge of the most important BIM case studies (see annex)
- **Basic knowledge of openBIM** and the buildingSMART standards
  - IFC ? Industry Foundation Classes
  - MVD ? Model View Definition
  - IDM ? Information Delivery Manual
  - BCF- BIM Collaboration Format

- **Basic knowledge of model types, coordination and collaboration platforms | DALUX, BIM360**

- **Basic knowledge of lean management (last planner system, cycle planning, short-cycle communication)**

- **Basic knowledge of 3D calculation, DIN276 cost categories and model-based tenders**

- **Basic knowledge of sustainability (recycling management, buildings as future dumping grounds for raw materials, etc.)**

**Skills:**

After successful completion, students will be able to determine and confidently apply the necessary BIM project objectives such as *collision-free planning, improved determination of quantities, improved comparison between target and actual figures or optimisation of documentation and revision files.*

In this case will be are able to decide between the various tools (*which are not always compatible with each other*) to decide on the case studies in which software tools can be used to achieve the best outcome.

**Competences:**

- Recognises what measures are required to provide 4D, 5D, 6D requirements with the relevant BIM case studies. Can formulate and illustrate this together with other trades / companies in a BIM execution plan (BEP).

- will be able to counter the loss of information when transferring data from, for example, the draft (planning) for the construction company (execution) with the (partner) BIM method.

- will be able to evaluate BIM tools and to use the correct tools for the construction project.

- will be able to remedy a lack of communication between construction management and the supplier using CDE and regular discussions.

- will be able to work in a collaborative team that works in line with BIM methods.
Applicability in this and other Programs

Building Informatics BPP-05
CAD 2D / 3D (BIM) BPP-12

Entrance Requirements
Successful completion of the following modules is recommended

Learning Content

Technical terminology, information models, model structure, LODs (degree of detail)

Standards:
- DIN EN ISO 19650
- VDI Series 2552
- DIN EN 17412
- DIN 276
- DIN EN ISO 29481

Certification programme "Professional Certification - Foundation" by buildingSMART and the VDI Guidelines

LOIN information at the desired depth
LOD (degree of development) + LOG (geometric detailing) + LOI (Completion of alphanumerics / attribution)

Planning phases
LOD 100 Concept Design,
LOD 200 Schematic Design,
LOD 300 Detailed Design AS-PLANNED
LOD 350 Construction Documentation,
LOD 400 Fabrication and Assembly,
LOD 450 Workshop Planning ? Release for Execution ?
LOD 500 Stock planning AS-BUILT
LOD 600 Building Operations
**Process Management**

BPMN 2.0 ? Business Process Model and Notation (http://bpmb.de/poster)

**Basic knowledge of databases**

**Basic knowledge of IOT**

**Recommended Literature**

- **Der BIM Manager** - Praktische Anleitung für das BIM-Projektmanagement ? Beuth
- **Digitales Bauen mit BIM Use Case Management im Hochbau** ? Beuth
- **IFC image comments according to DIN 276** ? BKI
- **BIM und Lean Management in der Praxis** ? bSD Verlag
- **Basiswissen zu Auftraggeber-Informationsanforderungen (AIA)** ? bSD Verlag
- **BIM Das digitale Miteinander Planen, Bauen und Betreiben in neuen Dimensionen** ? Beuth
- **Integrierte Projektabwicklung** Ein Leitfaden für Führungskräfte ? GLSI
- **BIM und Recht Grundlagen für die Digitalisierung im Bauwesen** ? Wolters Kluwer
- **BIM-Leistungsschnittstellen** ? DVP Deutscher Verband für Projektmanagement in der Bau- und Immobilienwirtschaft e.V
BPP-19 SCIENTIFIC METHODS

<table>
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<th>Module code</th>
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<tr>
<td>Module coordination</td>
<td>Prof. Dr. Tobias Bader</td>
</tr>
<tr>
<td>Course number and name</td>
<td>BPP-19 Scientific Methods</td>
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<tr>
<td>Lecturer</td>
<td>Prof. Dr. Tobias Bader</td>
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</table>

**Module Objective**

**Professional Competence**

**Knowledge**

Students are able to:

- Assess interdisciplinary scientific research topics and applications
- Discuss underlying theories of research models
- Explain strategies of research problem analysis
- Describe structure of scientific and technical publications

**Skills**

Students are capable to:

- Address theoretical and/or experimental work for solving practice-oriented problems
- Plan and structure project work and evaluate work in progress
- Address research questions with quantitative research methods
- Analyse data and critically evaluate and interpret the results
o Document scientific work and results, present and discuss them

o Apply citation and referencing standards

o Structure and conceptualize reports and scientific papers

Personal competence

Social competence
The students will be able to:

o Apply concepts and models of intercultural communication for higher effectiveness in international environments

o Communicate and collaborate successfully and respectfully with others in a team

o Have constructive professional discussions

o Do collaborative work on a small research project and deliver results

o Present and defend the results of their work

Autonomy
The students will be able to:

o Apply theoretical concepts to practical applications

o Acquire knowledge in a specific context independently and to map this knowledge onto other research fields

Applicability in this and other Programs

Project Work, Bachelor Thesis

Entrance Requirements
Successful completion of the following modules is recommended

Learning Content
The module provides the basics for developing skills and competences in applying scientific and research methods in both individual and collaborative working contexts focusing on:

o Introduction to methods in scientific work

o Code of ethics of engineers, plagiarism
Working in collaboration with others in a multicultural international environment

Planning research work efficiently: planning and scheduling

Risk analysis and management

Methodical and systematic approach to the handling of complex tasks

Introduction to quantitative research methods

Processing and presenting scientific data and results

Dissemination of results, written and oral communication

Practicing in teams addressing simple research questions under the form of small research projects

Writing technical reports and scientific papers

Oral presentation of the work and discussion of the results

Teaching Methods

Students are closely cooperating to carry out a small research project as a team work which they document as a first written paper. Applying the taught content into a practical work the students are training their competences acquired during their studies, and in the first part of the course, in a self-responsible and self-guided manner, fulfilling to specific tasks of the small projects. Team work also includes promoting intercultural competence development by reflecting on personal identities and differences, principles of collective strength and advantages of being supported by a team. The module addresses language used depending on the context, what favours and inhibits communication, how to deal with critical situations as well as on attributions, responsibilities within a collaborative team working, among others

Remarks

none

Recommended Literature

Kate L. Turabian, A Manual for Writers of Research Papers, Theses, and Dissertations, 8th Ed., Chicago Press 2013


# BPP-20 COMPULSORY ELECTIVE OF A GENERAL ACADEMIC NATURE (AWP)

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<tr>
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<td>BPP-20 Compulsory Elective of a General Academic Nature (AWP)</td>
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<tr>
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</table>

## Module Objective

This AWP (compulsory elective subject of a general academic nature) elective module enables students to acquire knowledge and skills in subject areas beyond the scope of their chosen degree programme.

Students can choose both face-to-face courses and courses offered by the Virtuelle Hochschule Bayern (VHB). Students acquire knowledge and skills in the following areas:

- in a foreign language (language skills)
- in the didactic-pedagogical area (methodological skills)
- in the social sciences (social skills)
- in the psychological-sociological field (social skills)
- in the technical and scientific field (professional skills)
in the philosophical-social-ethical area (personal skills)

Students are free to choose their courses from the list of elective (AWP) courses offered to expand their knowledge according to their own preferences.

**Applicability in this and other Programs**

Applicable in other degree programmes.

**Entrance Requirements**

Successful completion of the following modules is recommended.

In order to attend advanced language courses, students need to present the required language skills (e.g. by successfully completing of the previous level).

Elective (AWP) courses may not have any overlapping content with the student's current degree programme.

**Learning Content**

The course content can be found in the corresponding course description on the Language and Electives Centre homepage:
https://www.th-deg.de/en/students/language-electives#languages

**Teaching Methods**

The teaching and learning methods can be found in the corresponding course description on the Language and Electives Centre homepage:
https://www.th-deg.de/en/students/language-electives#languagesFormularende

**Remarks**

For course-specific details, please refer to the corresponding course description on the Language and Electives Centre homepage:
https://www.th-deg.de/en/students/language-electives#languages

All language courses require a compulsory attendance rate of 75% in order to be allowed to take the examination.

**Recommended Literature**

Recommended reading can be found in the corresponding course description on the Language and Electives Centre homepage:
https://www.th-deg.de/en/students/language-electives#languages
BPP-21 COMMERCIAL MANAGEMENT (METHOD OF MEASUREMENT, INVOICING)

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<tr>
<td>Module coordination</td>
<td>Prof. Josef Steretzeder</td>
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<tr>
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<td>BPP-21 Commercial Management (Method of Measurement, Invoicing)</td>
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</table>

**Module Objective**

**Knowledge:**

The course provides the participants with knowledge about:

- VOB (German construction contract procedures) Part B and Part C
- Types of building contracts
- Types of invoices
- Invoicing in the building industry and invoice components
- Performance assessment on site
- Insight into the basics of cost and performance accounting
- Securities (e.g. guarantees) in construction depending on the contract phase
- Project monitoring

**Skills:**
Upon successful completion of the sub-module, students will be able to:

- Carry out building work reviews promptly and systematically in the form agreed in the contract
- Arrange for invoices to be issued with evidence of the type and scope of the work, the required quantity calculations, drawings and other supporting documents
- Identify invoicing provisions in the technical terms of contract and other contractual documents, e.g. bill of quantities
- Carry out technical checks on invoices from partner companies
- Manage supplemental services
- Track operations
- Monitor default risk (client and supply chain)

**Technical competences:**

Upon successful completion of the sub-module, students will have competences in the following:

- Digital quantity determination and construction invoicing
- Correct application of VOB Part B and Part C
- Types of invoice, auditable invoice and its components
- Evidence of the type and scope of performance for invoicing purposes
- Overview of the various securities (e.g. construction guarantees) and the impact and application of these depending on the contract phase
- Accounts receivable and accounts payable as well as project monitoring

**Applicability in this and other Programs**

BPP-16 Project Management 1
BPP-17 Project Management 2
BPP-26 Seminar on Project Management
BPP-31 Building in existing structures
BPP-23 Product Management 1
BPP-35 Produkt Management 2
All similar courses in civil engineering

**Entrance Requirements**
Successful completion of the following modules is recommended.

No prerequisites besides school level math.

**Learning Content**

- Fundamentals of construction management and construction business management
- Types of building contracts
- Accounts receivable and accounts payable
- Accounting, payment of security deposits
- Certificates (e.g. exemption certificate, UST 1 TG)
- Partial invoices, supervision invoices, final invoices and counter-invoices
- Administration (hourly wage work)
- Securities (e.g. guarantees)
- Management of supplemental services

**Teaching Methods**

Lectures / exercises / tutorials / home work

PowerPoint presentation, whiteboard, document camera (visualiser) and additional lecture materials in iLearn

**Recommended Literature**

- Lecture script
- VOB (German construction contract procedures)
- Ralf Schöwer, Das Baustellenhandbuch ? Aufmaß und Mengenermittlung, Forum Verlag Herket
Module Objective

Knowledge:
The course provides the participants with knowledge about:

- The amendment to building regulations and its impact on practice
- The organisation and structure of the Construction Products Regulation (EU) No. 305/2011
- The organisation and structure of the Model Administrative Regulation on Technical Building Regulations (MVV TB) and the Model Building Code (MBO)
- The correct planning and tendering of construction products
- Safe handling of European harmonised construction products
- The necessity and significance of declarations of performance

Skills:
Upon successful completion of the sub-module, students will be able to:
Identify and evaluate the required building product specifications from tendering, contracting and the use of building products

Derive the required building product specifications with the help of the MVV TB

Prepare the building documentation for the approval authority or inspectors in the context of building supervision

Submit a declaration of performance to assume responsibility for compliance with the essential performance characteristics of the building product

**Competences:**

Upon successful completion of the sub-module, students will have competences in the following:

- Knowledge of the conditions for the provision of harmonised building products on the European internal market with regard to the basic requirements for construction works
- Concrete application of building regulations (MBO and MVV TB)
- Proof of proper building execution by means of correct and comprehensive building documentation

**Applicability in this and other Programs**

BPP-23 Product Management 1
BPP-24 Product Development/ testing
BPP-33 Project Seminar Product Development
BPP-35 Product Management 2
All similar courses in civil engineering

**Entrance Requirements**

Successful completion of the following modules is recommended.

**Learning Content**

- Fundamentals of building products law
- Amendment of building products law
- Usability and applicability of building products and types of construction
- Building documentation
Concretisation of building requirements

Liability risks and responsibility of planners and contractors

Practical examples of product-related building execution

**Teaching Methods**

Lectures / exercises / tutorials / home work

PowerPoint presentation, whiteboard, document camera (visualiser) and additional lecture materials in iLearn

**Recommended Literature**

**Recommended reading:**

- Lecture script
- Regulation (EU) No. 305/ 2011 (Building Products Regulation)
- Model Building Code (MBO)
- Model Administrative Regulation on Technical Building Regulations (MVV TB) from the Deutsches Institut für Bautechnik (DiBt)
BPP-23 PRODUCT MANAGEMENT 1
(INTernational PRODUCT STRATEGY)

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<td>Prof. Josef Steretzeder</td>
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<td>BPP-23 Product Management 1 (International Product Strategy)</td>
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**Module Objective**

**Knowledge:**

The course provides the participants with knowledge about:

- Process steps from the product idea to the market launch (product roadmap)
- Product distribution channels such as trade and specialised product lines, processors, building industry and online trade
- Product management at national level
- Additional factors such as "foreign" market environments, company and product-related elements for international markets
- Market observation, requirements gathering, market introduction and product controlling

**Skills:**

Upon successful completion of the sub-module, students will be able to:
Define product target figures such as technical features, pricing policy and design

Coordinate and control the product development process

Identify standardisation and/or differentiation in corporate and product strategy relating to product, brand, packaging and range

Achieve country-specific product architecture through configuration rather than through the creation of technical variants

**Competences:**

Upon successful completion of the sub-module, students will have competences in the following:

- Specific product/industry and marketing knowledge as well as management skills
- Cross-national ways of thinking and acting with regard to raw materials, product, location and industry
- Alignment of alternative actions in the areas of international product management based on the framework conditions a company is confronted with
- Development, control and organisational integration of market services offered in the international marketplace

**Applicability in this and other Programs**

BPP-24 Product Development/-testing
BPP-33 Seminar on Product Development
BPP-35 Product Management 2
BPP-36 Green Building
All similar courses in civil engineering

**Entrance Requirements**

Successful completion of the following modules is recommended.

**Learning Content**

- International marketing, management and international forms of organisation
- Market research
- Branding
- Marketing controlling
New product development
Inter-cultural communication
Business presentation

**Teaching Methods**

Lectures / exercises / tutorials / home work

PowerPoint presentation, whiteboard, document camera (visualiser) and additional lecture materials in iLearn

**Recommended Literature**

- Lecture script
- Erwin Matys, Praxishandbuch
### BPP-24 PRODUCT DEVELOPMENT AND TESTS

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### Module Objective

#### Knowledge:

Students will acquire

- basic knowledge about component and material properties:
  - strength (tension/pressure/bending/shearing)
  - reaction to fire
  - thermal and hygric properties
  - VOCs and pollutants

- Overview of laboratory test processes to determine properties

#### Skills:

With the acquired knowledge, students should be able to

- analyse necessary material properties for the intended purpose
- develop measures in order to adapt material properties
Competences:

After successful completion, students will be able to:

- develop product ideas
- use SWOT analysis for strategic planning and implementation
- handle and analyse recycling materials, particularly safety aspects and quality assurance

**Applicability in this and other Programs**

none

**Entrance Requirements**

Successful completion of the following modules is recommended.

**Learning Content**

Construction and product development processes

- Preparation of product requirement profiles
- Preparation of the product specification
- Determination and carrying out required product testing

Determination of quality controls and monitoring product safety

**Recommended Literature**

Standards:
relevant testing standards, requirements from standard building regulations

References:

Course handouts
## Module Objective

**Knowledge:**

Students will acquire

- basic knowledge about the following:
  - mechanical, technological test processes
  - destructive and non-destructive tests
  - structural tests
  - laboratory awareness and handling test equipment
  - principles of measurement uncertainty and monitoring test equipment

**Skills:**

With the acquired knowledge, students should be able to

- establish decision-making criteria for selecting tests
- determine selection criteria for the choice of test specimens
- evaluation and illustration of measurement results
Competences:
After successful completion, students will be able to:
- understand the principles of material testing
- determine monitoring plans for material and quality inspections
- handle measurement uncertainties in classification

**Applicability in this and other Programs**
Fundamentals of Building Physics 1 (Thermal Protection) BPP-02
Fundamentals of Building Physics 2 (Fire Protection) BPP-09
Fundamentals of Building Physics 3 (Building and Room Acoustics) BPP-10

**Entrance Requirements**
Successful completion of the following modules is recommended:
Building Material Characteristics BPP-11

**Learning Content**
Construction material tests
- Principles of mechanical, technological test processes
- principles of structural tests
- destructive and non-destructive tests
- selection and handling of test samples
- handling laboratory equipment
- determining measurement uncertainty

Laboratory management according to DIN EN ISO 17025

**Recommended Literature**
Standards:
DIN EN ISO 17025 measurement and testing standards

Course handouts
BPP-26 SEMINAR ON PROJECT MANAGEMENT

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<td>Prof. Josef Steretzeder</td>
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Module Objective

The project seminar is committed to the practice-oriented teaching concept of the BPP degree programme by enabling students to consolidate the theoretical knowledge acquired in the modules focusing on building processes, as well as to test the further development of practical skills in the field of project management.

The project seminar is intended to give students the opportunity to put what they have learned from theory into practice while they are still in training.

Knowledge:

The project seminar provides the participants with knowledge about:

- Targeted application of theoretical knowledge in practice
- Principles, processes and tools of project management
- Independent familiarisation with a new field of work

Skills:

Upon successful completion of the project seminar, students will be able to:

- Apply systematic approaches in practical work
Manage a project or part of a project independently

Present and communicate results of work verbally or digitally

Document the course and results of the project in the form of a report

**Competences:**

After successful completion of the project seminar, students will have the competences to:

- Work in a task-oriented manner in small mixed groups, using different skills
- Prioritise tasks
- Escalate problematic issues
- Reflect on knowledge
- Share their own applications and sustainable ideas
- Structure, plan and execute tasks around a new project
- Be willing to compromise in teamwork
- Re-plan when problems cannot be solved

**Applicability in this and other Programs**

BPP-33 Seminar on Product Development

**Entrance Requirements**

Successful completion of the following modules is recommended.

- BPP-14 Law 1
- BPP-15 Construction Calculation
- BPP-16 Technical Execution 1
- BPP-17 Technical Execution 2
- BPP-18 Digital Building Process
- BPP-21 Commercial Management

**Learning Content**

- Students work in teams on real building projects
- The team size varies (depending on the project) between 2 and 8 students
o A predefined task must be structured and executed
o The results must be presented and documented
o The task may consist of and/or combine content from the modules:
o BPP-14 Law 1 (Building law, building contracts VOB)
o BPP-15 Construction Costing (Tender, labour costing)
o BPP-16 Technical Execution 1 (Project management)
o BPP-17 Technical Execution 2 (Building organisation, Lean)
o BPP-18 Digital Building Process (BIM 4-D to 6-D)
o BPP-21 Commercial Management (Measurement, billing)

**Teaching Methods**

Lectures / exercises / tutorials / home work/ group in work

PowerPoint presentation, whiteboard, document camera (visualiser) and additional lecture materials in iLearn

**Recommended Literature**

Depending on the individual project
BPP-27 INTERNSHIP INCLUDING PLV SEMINARS

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<td>Module coordination</td>
<td>Prof. Markus Hainthaler</td>
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BPP-27B PLV Seminar 1  
BPP-27C PLV Seminar 2 |
| Semester | 5 |
| Duration of the module | 1 semester |
| Module frequency | annually |
| Course type | required course |
| Level | Undergraduate |
| Semester periods per week (SWS) | 4 |
| ECTS | 30 |
| Workload | Time of attendance: 0 hours  
self-study: 780 hours  
Total: 780 hours |
| Type of Examination | practical experience report |
| Weight | 30/210 |
| Language of Instruction | German |

Module Objective

Professional Competence

Knowledge

- Understand the processes and procedures of a company.
- Understand the requirements in the professional live.
- Understand basic techniques around application preparation, presentation and communication.

Skills

- Ability to apply gained knowledge in a professional/commercial setting.
- Ability to access new work areas.
- Ability to evaluate real-life problems and to design and apply solution approaches.
- Ability to evaluate and explain the achievements and learnings.

Personal Competence
Social competence

- Ability to integrate into teams with more experienced professionals.

Autonomy

- Succeed professionally in a new environment.
- Learn how to autonomously achieve results.
- Learn how to gain a position in industry.

Applicability in this Program

BPP-34 Bachelormodul

Applicability in this and other Programs

Applicable in all technical programs with practical semester.

Building Material Characteristics BPP-11

Entrance Requirements

For internship: 90 ECTS and PLV1 finalized.

For PLV2: Internship finalized.

Successful completion of the following modules is recommended:

- Fundamentals of Building Physics 1 (Thermal Protection) BPP-02
- Fundamentals of Building Physics 2 (Fire Protection) BPP-09
- Fundamentals of Building Physics 3 (Building and Room Acoustics) BPP-10

Learning Content

PLV 1 seminars: Seven workshops, thereof four in the personal competence area and three in the professional competence area (to be selected from the overall course offering of the International Office and Career Services).

Workshops include:

- Application skills
- Interview training
- Communication training
- Presentation trainings
- MS-Office trainings
- Intercultural training
- Job skills
- Pyramidal communication

**PLV 2 seminar:** One week of training in advanced presentation techniques and communication. Each student has to give a 20 minute presentation on the content of his/her internship.

**Internship:** 18 week full time internship in a field which is related to Building Products and Processes. The internship can be planned with any German company or a research institute. Student's who want to do the internship in an international context need to get approval by the Practical Responsible Professor. The Practical Responsible Professor decides on whether a job is accepted for the internship.

**Teaching Methods**

Seminaristic workshops.

Practical work.

**Recommended Literature**

Depends on subject of internship.
Module Objective

Knowledge:

Students will acquire

- basic knowledge about the following:
  - solid, timber, and steel constructions
  - dimensions and legal / structural requirements
  - heating and ventilation technology
  - energy concepts and the use of renewable energies
  - monitoring and automation (Smart Building)

Skills:

With the acquired knowledge, students should be able to
select from and apply the various construction designs

develop energy concepts for existing and new stock

save energy whilst enhancing safety and comfort by using Smart Building principles

Competences:

After successful completion, students will be able to:

select and plan safe structural designs

evaluate and analyse the planning of building services

exploit the benefits and opportunities of Smart Building in a targeted manner

Applicability in this and other Programs

Building Material Characteristics BPP-11

Entrance Requirements

Successful completion of the following modules is recommended.

Fundamentals of Building Physics 1 (Thermal Protection) BPP-02

Fundamentals of Building Physics 2 (Fire Protection) BPP-09

Fundamentals of Building Physics 3 (Building and Room Acoustics) BPP-10

Learning Content

Building trades 1 (shell and core construction/steel construction/HVAC/energy)

Principles of solid, timber, and steel constructions

Principles of energy supply

Principles of heating distribution and ventilation

Smart Building (energy, adaptation to users)

Recommended Literature

References:

Baukonstruktion ? vom Prinzip zum Detail: Band 1 Grundlagen; José Luis Moro

Course handouts
# BPP-29 BUILDING TRADES 2 (INTERIOR FIT-OUT)

<table>
<thead>
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<td>Alexander Siebel</td>
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<tr>
<td>Course number and name</td>
<td>BPP-29 Building Trades 2 (Interior Fit-out)</td>
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<td>Semester</td>
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</table>

## Module Objective

### Knowledge:

Students will acquire

- basics knowledge about the following:
  - bearing and non-bearing walls
  - dry-lining wall systems
  - floor systems (screed systems, raised floors, compound screeds)
  - floor and wall coverings
  - doors and window systems
- selection criteria for planning

### Skills:

With the acquired knowledge, students should be able to

- analyse designs and the choice of products
prepare and analyse detailed plans
monitor construction and the installation situation during the construction phase

Competences:
After successful completion, students will be able to:
develop cost-effective, sustainable systems based on the construction project
draw up requirements for the designs
plan and monitor safer structural designs

Applicability in this and other Programs
Building Material Characteristics BPP-11

Entrance Requirements
Successful completion of the following modules is recommended.
Fundamentals of Building Physics 1 (Thermal Protection) BPP-02
Fundamentals of Building Physics 2 (Fire Protection) BPP-09
Fundamentals of Building Physics 3 (Building and Room Acoustics) BPP-10

Learning Content
Building Trades 2 (Interior Fit-out)
non-bearing partition systems (lightweight construction: wood, metal, glass, plasterboard, masonry)
suspended ceilings (metal, timber, mineral fibre, plasterboard, hybrid designs, plastic, textiles)
door / gate systems and flap systems (materials as above)
floor systems (screed systems (brick wall and dry lining, cavity floor, raised floors) as well as the installation methods/interfaces for using integrated cavities for technical matters such as electricity, ventilation, water and wastewater.

Recommended Literature
References:
Current lecture script, Trockenbauhandbuch from VOB-Verlag Ernst Vögel, system notes from relevant product manufacturers
Course handouts
BPP-30 BUILDING TRADES 3 (BUILDING ENVELOPE / ROOF)

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<tr>
<td>Course number and name</td>
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Module Objective

Knowledge:

Knowledge of construction principles as well as physical and static requirements of windows, façades, ETICS and roof structures, even regarding professional planning of details alongside the design.

Knowledge of national and European test processes and classification systems for elements as well as post and beam façades.

Will know the technical regulations for professional planning and design of glazing in façades and roof constructions.

Skills:

Skills such as designing the construction for the façade, ETICS and roofs, such as:

1. Connection details to the building
2. Accurate measurement of the water shedding level / resistance to driving rain
3. Prevention of condensation
4. Air and diffusion density
5. Thermal bridge analysis (pre-measurement)
6. Wind, dead water pre-measurement
7. Site and assembly plans
8. Accurate measurement of glass

**Competences:**

The will students acquire the ability to safely plan the building envelope (façade + roof) in detail along with all requirements, to prepare a performance specification, and to coordinate or monitor assembly, such that the end result is an outcome that is ready for acceptance. In this case the focus is on designs for new buildings as well as energy-related renovation of residential and non-residential units. Improper execution will be recognised and corresponding measures will be taken.

**Applicability in this and other Programs**

Building Material Characteristics BPP-11

**Entrance Requirements**

Successful completion of the following modules is recommended.

Fundamentals of Building Physics 1 (Thermal Protection) BPP-02
Fundamentals of Building Physics 2 (Fire Protection) BPP-09
Fundamentals of Building Physics 3 (Building and Room Acoustics) BPP-10

**Learning Content**

Will have acquired knowledge of typical façades - and roof systems in detail and will be able to confidently evaluate thermal insulation performance, diffusion density or openness, resistance to driving rain, prevention of condensation with

1. Rear-ventilated façade designs
2. ETICS (flammable/non-flammable)
3. Post and beam façades
4. Wood, aluminium and plastic windows
5. Double façades
6. Modular element façades, pre-fabricated ex-works (steel, aluminium, timber, glass designs)

7. Cold/warm roofs (hard and soft roofing), with and without a gradient (including green roofs)

8. Roof sealing systems with appropriate rainwater drainage systems

**Recommended Literature**

Lecture notes and recommended literature from the lecture, specialist information from the WDVS and VhF associations, DiBt regulations/notes
Module Objective

Knowledge:

The course provides the participants with knowledge about:

- The controlled demolition of buildings
- taking into account waste and hazardous materials legislation
- and the recognised rules of technology.
- Materials containing hazardous substances, exploration, removal, separation, disposal Possibilities of recycling construction waste into pure and high-quality recyclable materials.

Skills:

Upon successful completion of the sub-module, students will be able to:
have a practical overview of the proper and safe removal of materials containing pollutants prior to demolition and the highest possible recycling of construction waste by type

apply the technological steps in exploration, assessment and disposal. The focus is on controlled deconstruction

use knowledge of methods to assess and evaluate the analysis of contaminated sites. This and the acquired understanding of the chemistry of contaminated sites make it possible to objectify hazard potentials

**Competences:**

Upon successful completion of the sub-module, students will be able to:

- classify general analytical and contamination-specific publications
- describe the obligation to recycle usable waste according to the basic sequence of action?avoid-recycle-dispose?
- use basic terms and parameters of analytical chemistry and site contamination issues that are independent of the profession

**Applicability in this and other Programs**

Construction Chemistry BPP-03
Structural Engineering BPP-04
Building Material Characteristics BPP-11
All similar courses in civil engineering

**Entrance Requirements**

Successful completion of the following modules is recommended.

BPP-03 Construction Chemistry
BPP-11 Building Material Science
BPP-25 Construction Material Tests

**Learning Content**

- Contaminated sites in Bavaria / Germany
- Important pollutants/pollutant groups
- Protected resources and impact pathways
- Investigation of contaminated sites, risk assessment
- Disposal/recycling
- Occupational safety
- Pollutants in the building fabric
- Exploration of the building
- Evaluation of the exploration results
- Disposal
- Recycling management

**Teaching Methods**

Lectures / exercises / tutorials / home work

PowerPoint presentation, whiteboard, document camera (visualiser) and additional lecture materials in iLearn

**Recommended Literature**

- Lecture script
- Kreislaufwirtschaftsgesetz (German Closed Substance Cycle & Waste Management Act (KrWG)/ Verordnung zur Vereinfachung des Deponierechts - Deponieverordnung DepV (Ordinance on the Simplification of Landfill Law - Landfill Ordinance)
- Verordnung über das Europäische Abfallverzeichnis - Abfallverzeichnis-Verordnung ? AVV (Ordinance on the European list of wastes)
  Nachweisverordnung - NachwV (Ordinance on waste recovery and disposal records)
- Länderarbeitsgemeinschaft Abfall (LAGA) (Working group of the federal states on waste)
- Hazardous Substances Ordinance ? (GefStoffV)
- Chemicals Prohibition Ordinance ? ChemVerbotsV
- TRGS 524 ? Protective measures for activities in contaminated areas
# BPP-32 COMPULSORY ELECTIVE 1 (FWP-1)

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<tr>
<th>Module code</th>
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<tr>
<td>Module coordination</td>
<td>Prof. Markus Hainthaler</td>
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| Course number and name | BPP-32 Compulsory Elective 1 (FWP-1)  
BPP-39 Architectural History and Theory  
BPP-40 Entrepreneurship  
BPP-41 Strategic Planning and Project Management  
BPP-42 Financing and Accounting  
BPP-43 Workplace Innovation  
BPP-44 Management Systems according DIN EN ISO  
BPP-45 Health Safety Environment  
BPP-46 Energy and Ressource Efficiency  
BPP-47 Operational Business  
BPP-48 Technology and Intellectual Property Rights Management |
| Semester          | 6 |
| Duration of the module | 1 semester |
| Module frequency  | annually |
| Course type       | compulsory course, required course |
| Level             | Undergraduate |
| Semester periods per week (SWS) | 44 |
| ECTS              | 5 |
| Workload          | Time of attendance: 660 hours  
self-study: 990 hours  
Total: 1,650 hours |
| Type of Examination| oral examination, report/presentation, written examination |
| Weight            | 5/210 |
| Language of Instruction | English, German |

## Module Objective

The Compulsory Elective I and II modules provide the students with the opportunity to address specialized topics, other than the mandatory courses of the main field of study, topics that are broadening by that their field of knowledge and skills in these areas.

Several courses will be offered for each Compulsory Elective module upon availability and attendance interest of students from the following pool:

- Architectural History and Theory
Entrepreneurship
Strategic Planning and Project Management
Finance and Accounting
Workplace Innovation
Management Systems according to ISO
Health Safety Environment
Technology and Intellectual Property Rights Management
Energy and Resource Efficiency
Operational Processes

**Applicability in this and other Programs**

BPP-27 Internship including PLV seminars
BPP-34 Bachelor thesis

The module is primarily intended for the Bachelor of Building Products and Processes but it can also be chosen by students of other fields of study.

**Entrance Requirements**

Please see the respective course descriptions for specific information on prerequisites.

**Learning Content**

Please see the respective course descriptions for specific information on content.

**Teaching Methods**

Please see the respective course descriptions for specific information on didactic methods employed.

**Remarks**

Please see the respective course descriptions for course-specific remarks.

**Recommended Literature**

Please see the respective course descriptions for literature references.

- **BPP-32 COMPULSORY ELECTIVE 1 (FWP-1)**
Type of Examination
oral examination, report/presentation, written examination

BPP-39 ARCHITECTURAL HISTORY AND THEORY

Type of Examination
written ex. 90 min.

BPP-40 ENTREPRENEURSHIP

Objectives

Module objectives
The students should learn an efficient and goal-oriented entrepreneurship management. Efficient and goal-oriented entrepreneurship management makes it necessary to implement structured business processes and use up-to-date, demand-oriented start-up methodologies. Entrepreneurial Management understands how to identify, analyze and seize opportunities, turn big/smart data into business opportunities and take full advantage of the digital transformation, manage stakeholders and communication, surf on diversity and do business in emerging markets, manage growth and understand the fundamentals of business rules. The students learn a systematic process of envisioning a desired future, and translating this vision into broadly defined goals or objectives and a sequence of steps to achieve them.

Learning Content

The module considers business start-ups as a process from the identification and evaluation of opportunities, the procurement of relevant human and monetary resources, the establishment of an organization, to the management of a start-up. In addition to theories and concepts, relevant practical methods to build a start-up team and procedures are taught to support this process.

Entrance Requirements
no

Type of Examination
report/presentation

Methods
Seminaristic teaching / exercises / team work / home work
Recommended Literature


**BPP-41 STRATEGIC PLANNING AND PROJECT MANAGEMENT**

**Objectives**

Students will learn about the processes involved in planning and implementation of project in project management. Beginning with the process of building and leading project team, to project management theory and steps, to finally looking at the implementation of successful project management, this course aims to provide a complete picture of project management in practice. Additionally, different types of project management will be compared, so that the students will be able to apply the most effective method, based on the type of project and/or team that they are dealing with. A special focus will be placed on the elements of planning, leadership and implementation.
Professional Competence

Knowledge

After successfully finishing the module, students should:

- Understand project management theory and its application
- Understand all the steps involved in project management, with a focus on planning
- Understand the different roles involved with project management
- Understand how project management teams work together or are put together in different environments
- Understand how to choose the correct type of project management method for different types of projects
- Understand what successful leadership in and of project management looks like
- Understand the challenges and typical project fails in planning and implementation of project management

Skills

Upon completion of the module the students will be able to:

- Transfer theoretical knowledge of project management real world projects
- Be able to determine which project planning management method is most effective in different situations
- Be able to determine which project management implementation method is most effective in different situations
- Be able to recognize the most effective leadership technique for various project teams
- Be able to recognize the signs when a project is not working or failing
- Be able to work on different projects in various environments

Personal Competence

Social competence

Students will work together on an in-class projects in small groups, in order to learn how to work efficiently with each other on solve problems and on implementing their knowledge together. This aims at enhancing their team-working skills as well as their problem-solving capabilities. Further, these groups are lined-up in a way to be mixed
multi-cultural in order to foster and fine-tune students? intercultural interaction capabilities.

**Methodological competence**

The students will learn how to transfer theoretical knowledge into a project, and hence, will be able to apply their learned skills. This leads to greater retention of the learned theory, and enables transference skills. Further, the students will be provided with an overview of different sets of skills and theory, and will be able to choose the most efficient approach to applying these. Students will develop an analytical system-oriented way of thinking and should able to structure the most effective approach to project management from different aspects, beginning with planning, selection, to implementation.

**Learning Content**

The course will be taught with a focus specifically planning, leadership and implementation:

- Project management theories
- Project management planning
- Project roles and stakeholders
- Project management theories
- Project management steps
- Project management leadership
- Project management teams
- Project management implementation
- Project management fails

**Entrance Requirements**

English skills

**Type of Examination**

report/presentation

**Methods**

Interactive lecture, case studies, in class project, group work, discussions and presentations of work in progress.

**Recommended Literature**
Recommended reading (if possible in the most current edition):


- Project Management Institute (Hrsg.) *A guide to the project management body of knowledge. PMBOK(R) Guide.* Newtown Square, PA: Project Management Institute, 2013


### BPP-42 FINANCING AND ACCOUNTING

#### Objectives

**Professional and methodological Competence**

Students develop a thorough understanding of basic accounting principles, can classify the functions of investment and financing into the operational sequences and apply their instruments.

**Knowledge**

- Students know and understand the essential features of financial and management accounting as well as the legal foundations and components of bookkeeping and accounting.

- Students have a deep understanding of financial reports as a basic skill for business studies.

- Students are familiar with central methodological foundations and instruments of investment and financing, can explain them and apply them to typical operational problems.

**Skills**
Students are able to evaluate the impact of business transactions on financial accounting. In particular, students have a deep understanding of the effectiveness/neutrality of business transactions on financial statements, and execute accounting transactions independently.

Students are able to prepare and analyze financial statements and management reports.

In their professional practice, students can identify problem situations that require investment and financing solutions. They are able to independently find adequate solutions for these situations, to evaluate them and to question them critically.

**Personal Competence**

**Social competence**

Students develop communication skills that are supported by tasks and case studies. They are familiar with the essential terminology of financial accounting and communicate about basic problems with other participants using the appropriate technical terms.

Students are encouraged to discuss critical/controversial topics in an objective atmosphere.

Students can present their analyses in a goal-oriented and application-oriented manner matching the target audience.

Students are able to work problem/solution-oriented in small mixed groups, learning and broadening teamwork abilities.

**Autonomy**

Students will be able to solve complex problems independently with application-related, fundamental knowledge of bookkeeping and accounting.

Students know and understand the limitations, assumptions and problems of methods and instruments of investment and financing in a specific context. Students can independently choose and employ suitable valuation approaches for the respective task.

Students are able to relate their acquired knowledge to other lectures and topics.

**Learning Content**

1. Accounting: information for decision making
2. Basic financial statements
3. The accounting cycle
4. Understanding financial statements and cash flow
5. Time value of money
6. Valuing stocks and bonds
7. Capital Budgeting

**Type of Examination**

report/presentation

**Methods**

Seminaristic teaching combining topic-oriented lectures, exercises, group work, group presentations, and classroom discussions. Students are encouraged to actively participate in course by choosing appropriate didactical methods. They are strongly invited to discuss real-life problems and applications interactively throughout the lecture. The seminar is accompanied by tutorials where calculation examples from the course are repeated for better understanding and examples similar to those used during course sessions are calculated.

**Remarks**

Teaching is supported by iLearn platform: Relevant course materials are made available online.

**Recommended Literature**

**Basic literature**


**Supplementary literature**


**BPP-43 WORKPLACE INNOVATION**

**Type of Examination**

report/presentation
BPP-44 MANAGEMENT SYSTEMS ACCORDING DIN EN ISO

Type of Examination
written ex. 90 min.

BPP-45 HEALTH SAFETY ENVIRONMENT

Type of Examination
report/presentation, written ex. 90 min.

BPP-46 ENERGY AND RESOURCE EFFICIENCY

Type of Examination
written ex. 90 min.

BPP-47 OPERATIONAL BUSINESS

Objectives

With focusing on organization, the students will be equipped with a thorough understanding by organization theory and together with management information systems.

Professional Competence

- Understand the principles of organizational arrangements
- Explain and demonstrate the organization structure, design, competitive strategies
- Assess the outside environments and how organizations can respond to them
- How to handle the operational information processing: fundamental management information systems concepts
- Applications of information systems in business practice
- Apply theoretical concepts to practical applications (case study)
- Understand the direct and indirect connection between information systems and business performance

Personal Competence

Methodological competence
The students will be able to use the organizational theory by knowing concepts, structures and strategies. Students are allowed to have in-depth look at how today’s business firms use information technologies and systems to achieve corporate objectives.

**Personal and social competences**
- Students are able to develop analytical thinking, attention to details
- Students are able to consider and analyze different strategies to solve problems from the organization point of view
- Students are able to solve and discuss business problems in the field of information systems by applying systematic approaches and by identify alternative solutions in teams

**Learning Content**
- Nature of organizations and organization theory
- How strategies affect organization design
- Basic concepts of organization structure
- Major environmental forces on the organization
- Information systems in global business
- Information systems, organizations, and strategy
- IT infrastructure and emerging technologies
- Securing information systems

**Entrance Requirements**
no prerequisites

**Type of Examination**
written ex. 90 min.

**Methods**
seminaristic teaching / exercises / tutorials (case study) / home work

**Recommended Literature**
BPP-48 TECHNOLOGY AND INTELLECTUAL PROPERTY RIGHTS MANAGEMENT

Objectives

Professional Competence

Knowledge

- Understanding what intellectual property rights are
- Understanding the significance of intellectual property and technological innovation in society
- Knowledge of basic principles and methods for intellectual property management
- Knowledge of basic principles in technology transfer

Skills

- Students are able to apply theories and methods to:
  - Identify intellectual assets
  - Identify main types of intellectual property
  - Prepare and evaluate an IP exploitation strategy
  - Managing Intellectual property rights
  - Technology transfer from University to Industry

Personal Competence

Social competence

- Students are able to work goal-oriented in small mixed groups, learning and broadening teamwork abilities.
Autonomy

o Develop analytical thinking, attention to details and ability to consider different strategies to solve individually problems related to this lecture.

Learning Content

o Introduction to Intellectual Property Rights
o Intellectual property rights management national and international environment
o World wide IPR management system, World Intellectual Property Organization (WIPO)
o International Treaties and Conventions on Intellectual Property
o The Impact of Technological Innovation on Society
o Protecting technical innovation: patents and trade secrets
o Intellectual property management in technology transfer

Type of Examination

report/presentation

Methods

Seminaristic teaching / exercises / team work / home work

Recommended Literature

o Melissa A. Schilling, Strategic management of technological innovation, 6th Ed., McGraw-Hill Education 2020
o Keith Goffin Palgrave, Innovation management : effective strategy and implementation, 3rd Ed., Macmillan Education 2017
BPP-33 SEMINAR ON PRODUCT DEVELOPMENT

<table>
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<td>Alexander Siebel</td>
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<td>Language of Instruction</td>
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**Module Objective**

**Qualification goals:**

The project seminar Product Development is committed to the practice-oriented teaching concept of the BPP study programme by enabling students to consolidate the theoretical knowledge acquired in the modules focusing on building processes, as well as to test the further development of practical skills in the field of building product development. The project seminar is intended to give students the opportunity to put what they have learned from theory into practice while they are still in training.

**Knowledge:**

The project seminar provides the participants with knowledge about:

- Targeted application of theoretical knowledge in practice
- Principles, processes, and tools of project management
- Design thinking process for product development
- Design for X (DFX) approaches to product development
- Independent familiarisation with a new field of work
Skills:
Upon successful completion of the project seminar, students will be able to:
- Apply systematic approaches in practical work
- Manage a project or part of a project independently
- Present and communicate results of work verbally or digitally
- Document the course and results of the project in the form of a report

Competences:
After successful completion of the project seminar, students will have the competences to:
- Work in a task-oriented manner in small mixed groups, using different skills
- Prioritise tasks
- Escalate problematic issues
- Reflect on knowledge
- Share their own applications and sustainable ideas
- Structure, plan and execute tasks around a new project
- Be willing to compromise in teamwork
- Re-plan when problems cannot be solved

Applicability in this and other Programs
Construction Chemistry  BPP-03
Building Material Characteristics BPP-11
Law 2 (EU Construction Product Regulations) BPP-22
Product Development and Tests BPP-24
Construction Material Tests BPP-25

Entrance Requirements
Successful completion of the following modules is recommended.
CAD 2D / 3D (BIM) BPP-12
Digital Building Process (BIM 4D bis 6D) BPP-18
Product Management 1 (International Product Strategy) BPP-23

**Learning Content**

- Students work together in teams to develop new building products or optimise existing building products
- The team size varies (depending on the project) between 2 and 8 students
- A predefined task must be structured and executed
- The results must be presented and documented
- The task may consist of and/or combine content from the modules:
  - BPP-11 Building Materials Science
  - BPP-12 CAD 2D/ 3D (BIM)
  - BPP-22 Law 2 (Building product law)
  - BPP-23 Product Management 1 (International product strategy)
  - BPP-24 Product Development/ testing 1
  - BPP-25 Materials Testing

**Recommended Literature**

Depending on the individual project
**BPP-34 BACHELOR MODULE**

<table>
<thead>
<tr>
<th>Module code</th>
<th>BPP-34</th>
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<tbody>
<tr>
<td>Module coordination</td>
<td>Prof. Markus Hainthaler</td>
</tr>
<tr>
<td>Course number and name</td>
<td>BPP-34A Bachelor Thesis</td>
</tr>
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<td></td>
<td>BPP-34B Thesis Defense</td>
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<td>Semester</td>
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<td>Weight</td>
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<tr>
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**Module Objective**

**Expertise**

Students will have the necessary knowledge of theories and methods to solve complex engineering issues in the field of construction products and processes

Students will be able to explain the relevant approaches and terminology in depth in one or several aspects of their subject

Students will be able to categorise a research task from their specialist field in context, describe it, and critically evaluate it

Students will be able to apply fundamental principles and methods for planning and structuring work in the project

**Skills**

Students will be able to independently handle complex academic questions

Students will be able to select, apply, and further develop methods where necessary that are appropriate for resolving the specialist problem at hand

Students will be able to analyse problems using the methods learned on the course, then arrive at informed decisions and develop solutions.
Students will be able to take a critical stance from a professional perspective regarding the results of their own research.

Students will be able to work on their own or in a team, to plan and structure their work, to communicate appropriately with partners, to present the issue that is being covered and to discuss the results that arose from the research.

**Social skills**

Students will be able to illustrate a scientific problem to an expert audience a precise, comprehensible and structured manner, both orally and in writing, in a specialist discussion whilst competently handling questions and answering them in a manner that is appropriate.

**Autonomy**

Students will be able to apply academic work principles independently and fully so that the necessary knowledge and materials are acquired to handle an engineering problem or a research task.

Students will be able to structure a wide-ranging task independently whilst also being able to handle it within a specified period of time.

Students will be able to independently present their work and results in an academic style whilst using appropriate communication techniques.

**Applicability in this and other Programs**

none

**Entrance Requirements**

Students who have earned at least 150 ETCS points may register for the bachelor's thesis.

**Learning Content**

During the course, students already learn several different communication and management techniques as well as the fundamentals of academic work. The bachelor module grants the opportunity to demonstrate acquired knowledge and skills when handling a larger engineering problem. Specific matters and problems are independently handled using academic research methods and then documented in a written bachelor's thesis.

The bachelor's thesis can be written in English or German.

After the bachelor's thesis is successfully completed, the student should make an oral presentation about their bachelor project and its outcomes.
Teaching Methods

Independent work / seminars / individual and group project

Recommended Literature


**Module Objective**

**Knowledge:**

The course provides the participants with knowledge about:

- Marketing channels and marketing instruments
- Brand identity and brand image
- Methods and variables for product marketing
- Tools for international market and competitor analysis
- Computer-based tracking of market trends and target market analysis
- The phases of a construction product’s life cycle

**Skills:**

Upon successful completion of the sub-module, students will be able:

- To analyse industries and markets in order to market and maintain products in a demand-oriented manner
To design/generate technical product documentation and advertising materials (from the printed medium to websites)

To use in-house and external communication channels for product marketing in a targeted manner

To set up foundations for online shops and web-based product configurations

Competences:
Upon successful completion of the sub-module, students will have competence in the following:

Using the correct product with awareness of the entire product life cycle

Bringing corporate objectives in harmony with the wishes of partners and customers with effective product marketing

Increasing visibility and attractiveness of a product for potential customers with targeted product marketing

Making note of the needs of national and international target groups using marketing methods to distinguish products from rival offerings

Applicability in this and other Programs

BPP-24 Product Development/ -testing
BPP-33 Seminar on Product Development
BPP-35 Product Management 1
BPP-36 Green Building

All similar courses in civil engineering

Entrance Requirements
Successful completion of the following modules is recommended.

BPP-23 Product Management 1

Learning Content

Objectives of product marketing

Approaches to strategy and development

Outbound marketing and inbound marketing

Consumer behaviour
Phases of the product life cycle
Technical product documents and advertising materials
Product marketing variables
Pricing, distribution and communications policy
Brand identity
Brand image

**Teaching Methods**

Lectures / Exercises / Tutorials / Homework
PowerPoint presentation, whiteboard, document camera (visualizer) and others
Lecture materials in iLearn

**Recommended Literature**

- Lecture script
- Werner Pepels, Grundprinzipien des Produktmarketings.: 20 Bausteine zum professionellen Management von Produkten und Programmen, Drucker & Humblot,
Module Objective

Knowledge:
The course provides the participants with knowledge about:

- Principles of sustainability
- Ecological, economic, and sociocultural aspects of sustainability.
- Essential criteria for sustainable construction
- National and international verification processes for organisational systems (e.g. environmental management systems), ecological products (e.g. cradle to cradle) and sustainable construction (e.g. DGNB, BNB, LEED).
- Instruments (ecological balance) and verification documents (environmental product declarations) that provide verified statements about the environmental impact of construction products.

Skills:
Upon successful completion of the sub-module, students will be able:

- To transfer possible approaches to sustainability based on case studies to construction products and buildings.
To request, find, evaluate and select construction products in line with sustainable, ecological and recyclable principles.

To provide the required evidence for construction products used in certified green buildings.

**Competences:**

Upon successful completion of the sub-module, students will be able:

- To recognise the fundamentals of the certification systems for organisations, buildings and products, to distinguish between them and to apply them correctly.

- To independently continue to promote sustainable, recyclable construction in practice.

**Applicability in this and other Programs**

BPP-23 Product Management 1  
BPP-35 Product Management 2  
BPP-26 Seminar on Project Management  
BPP-33 Project Seminar Product Development  
BPP-35 Product Management 2  
All similar courses in civil engineering

**Entrance Requirements**

Successful completion of the following modules is recommended.

**Learning Content**

- Sustainability in construction
- Environmental and energy management systems
- Product labels
- Building certification systems
- Environmental accounting
- Environmental product declarations
- Cradle to cradle
- Recycling management
Teaching Methods

Lectures / exercises / tutorials / home work

PowerPoint presentation, whiteboard, document camera (visualiser) and additional lecture materials in iLearn

Recommended Literature

- Lecture script
- Extracts from the vhb course: Grundlagen Nachhaltigkeit (Basics of sustainability)
- Deutsche Gesellschaft für Nachhaltiges Bauen (German Sustainable Building Council), URL: https://www.dgnb.de
  DIN EN ISO 14001:2015 Environmental management systems - Requirements with guidance for use
- DIN EN ISO 14025 (?Environmental labels and declarations - Type III Environmental declarations?)
- DIN EN 15804 (?Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products?)
- Cradle to cradle, URL: https://www.c2c.ngo
BPP-37 COMPULSORY ELECTIVE 2 (FWP-2)

Module code | BPP-37  
Module coordination | Prof. Markus Hainthaler  
Course number and name | BPP-37 Compulsory Elective 2 (FWP-2)  
Semester | 7  
Duration of the module | 1 semester  
Module frequency | annually  
Course type | required course  
Level | Undergraduate  
Semester periods per week (SWS) | 4  
ECTS | 5  
Workload | Time of attendance: 60 hours  
self-study: 90 hours  
Total: 150 hours  
Type of Examination | oral examination, report/presentation, written examination  
Weight | 5/210  
Language of Instruction | German

Module Objective

The Compulsory Elective I and II modules provide the students with the opportunity to address specialized topics, other than the mandatory courses of the main field of study, topics that are broadening by that their field of knowledge and skills in these areas.

Several courses will be offered for each Compulsory Elective module upon availability and attendance interest of students from the following pool:

- Architectural History and Theory
- Entrepreneurship
- Strategic Planning and Project Management
- Finance and Accounting
- Workplace Innovation
- Management Systems according to ISO
- Health Safety Environment
- Technology and Intellectual Property Rights Management
Applicability in this and other Programs

BPP-34 Bachelor thesis

This module is primarily intended for the Bachelor of Building Products and Processes but it can also be chosen by students of other fields of study.

Entrance Requirements

Please see the respective course descriptions for specific information on prerequisites.

Learning Content

Please see the respective course descriptions for specific information on content.

Teaching Methods

Please see the respective course descriptions for specific information on didactic methods employed.

Recommended Literature

Please see the respective course descriptions for literature references.
**Module Objective**

The module English 2 (Negotiations) at level C1 aims to equip students with specialised language skills necessary for independent performance in a globalised field of building products and processes. The course focuses on negotiating terms and conditions with a variety of people from customers to suppliers as well as with government agencies and employees in the student's own company. The aim here is to deepen the students' relationship with the English language in a professional context so that they can use the language effectively and efficiently as a practical means of communication.

The module covers the four basic language skills - listening, reading, speaking and writing. Students expand their subject-specific vocabulary and deepen their knowledge of the language structures.

One aspect of the module is to optimise fluency and improve the ability to communicate in English in order to better understand texts and discussions. Through task-based speaking, listening, reading and writing activities, students improve their communicative skills and develop their ability to express themselves. This enables them to participate in technical discussions, to work in a team, to create relevant documents independently, and to successfully negotiate in English.
On completion of the module, the students will have achieved the following learning objectives:

Professional skills

- The students will be proficient in English at a confident language level (C1, CEFR) and will also be able to understand technical discussions in the field of building products and processes.
- They will have the skills to understand specialised literature and to write texts independently at C1 level.
- Students will have acquired the skills to express themselves at C1 level in formal and professional contexts.
- They will be able to understand discussions and more complex content in their field of specialisation.
- They will have developed the ability to functionally apply grammatical structures in their future professional fields.
- Students will have the linguistic skill and flexibility to react competently to unexpected changes during a conversation.

Methodological skills

- Students will have expanded their language acquisition skills by reflecting on their individual learning styles.
- They will be able to filter information from different English sources and use it in a purposeful way during a negotiation.
- Students will be able to represent their own position vis-à-vis another party in a negotiation.
- Similarly, students will have learnt to respond to the negotiating partner at the right point in the discussion to ensure that agreement is reached without compromising their own position.
- This course gives students the language skills they need to say the right thing at the right time.

Social skills

- Students will have developed social skills such as teamwork, reliability, and negotiation skills.
- Students will have learnt assertiveness in negotiations and how to deal respectfully with negotiating partners.
Personal skills

- Students will have developed sound language skills and negotiating skills that are of fundamental importance for their personal development and the future work environment.

Applicability in this and other Programs

No applicability in other degree programmes.

Entrance Requirements

Successful completion of the following modules is recommended.

The prerequisite for successful participation in the module is a command of the English language at B2/C1 level, based on the Common European Framework of Reference for Languages (CEFR).

Learning Content

1. What is a negotiation?
2. Goal setting and team preparation
3. Negotiating in different cultures
4. Writing tenders
5. Different types of persuasion and negotiation
6. Dealing with pressure
7. Listening carefully and reading between the lines
8. What does "fair" mean?
9. Short-term vs. long-term results
10. Different types of results
11. Follow-up and measurement of success
12. Paraphrasing and summarising skills
13. Idiomatic expressions

Teaching Methods

Teaching and learning methods focus on improving the four main language skills (listening, speaking, reading and writing) and optimising professional and soft skills.
Examples of teaching methods used include various forms of group and individual work, mini-presentations, intensive reading and listening exercises, role-play and grammar games, loci method, dictation exercises, translations, peer feedback, work with learning stations, and various writing activities to consolidate the knowledge gained.

Students will be given weekly assignments for self-study.

**Remarks**

All language courses require a compulsory attendance rate of 75% in order to be allowed to take the examination.

**Recommended Literature**


Hall, D., Foley, M. *MyGrammarLab Advanced (C1 /C2)*, Harlow: Pearson


