

Qualification Goals

Bachelor Building Products and Processes (BPP) / Bauprodukte und -prozesse

**Faculty European Campus Rottal-Inn
at the Deggendorf Institute of Technology**

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Gender neutrality

The use of double forms or other designations of female, male and other genders have been largely avoided in order to maintain legibility and clarity. All designations given to the various groups of university staff apply equally to all genders of the relevant groups.

Current as of: 19th April 2025

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1 Aims of the degree programme

The degree program is designed to address the evolving landscape of building construction services by equipping students with expertise and qualifications in digital building processes and the development of internationally competitive building products. The main aim is to prepare students for responsible roles in addressing future challenges in building modernizations and structural engineering, with a focus on meeting societal and human needs within the working environment.

To enhance professional capabilities, students will develop academic proficiency in English, enabling them to effectively communicate their skills and knowledge on a global platform. Additionally, international students will acquire practical German language skills, facilitating their integration and employment within German companies.

This comprehensive approach ensures that graduates are well-prepared to contribute to the advancement of the construction industry, both locally and internationally.

2 Learning outcomes of degree programme

The *Building Products and Processes* (BPP) degree program provides a practical, diverse, and internationally oriented education, equipping graduates with the expertise needed for the planning and execution of medium to large-scale civil engineering projects, as well as for managing the lifecycle of building products.

Graduates possess in-depth knowledge of key concepts and methods in various fields of building construction and building products. They are proficient in complex building systems, covering a wide range of construction methods, including concrete, masonry, steel, timber, and hybrid structures. Their expertise extends to building envelopes (roofing and façades), interior construction (floors, ceilings, walls), and technical finishing trades such as building automation, heating, ventilation, and plumbing.

They can apply theoretical knowledge in a practical and solution-oriented manner. Additionally, they understand technological advancements, contribute to the development of technical designs and solutions, and assess their feasibility. Their ability to evaluate technology concepts economically and apply business principles

benefits companies and projects alike. Graduates also recognize the impact of decisions on business operations, employees, and the environment, ensuring responsible and sustainable actions.

These competencies enable BPP engineers to integrate and manage all aspects of building systems effectively in their professional practice.

Building products expertise

The program encompasses the building trades defined by DIN 276, covering cost groups 330 to 430 and 480, seamlessly integrating these elements into the curriculum. It focuses not only on new construction projects but also on retrofitting existing structures into intelligent, lightweight systems for innovative building applications.

Building structures require high-performance components and materials that meet increasingly stringent demands – architectural, ecological, and sustainable – while complying with national building regulations. Graduates gain comprehensive expertise in building product development, from initial concept to market launch, addressing both national and international target markets.

Building processes expertise

The construction industry is undergoing a profound transformation driven by the digitalization of building processes. Future-oriented training in Building Information Modeling (BIM) prepares students to develop comprehensive digital models of building structures, integrating all architectural and technical aspects while centralizing project data and knowledge.

This digital shift connects the entire building process chain to a dynamic, data-driven environment. As a result, digitalization impacts not only the planning of structures but also the execution of building processes as well as the building product lifecycle.

The curriculum emphasizes managing the complete digital building lifecycle – from initial project proposals to final invoicing – while aligning with evolving BIM standards (from BIM 4D to BIM 6D) as well as considering also Artificial Intelligence. This holistic approach ensures that students can effectively navigate and optimize modern construction workflows.

Language expertise

The international nature of building construction and project work in the German civil building construction and building products market requires both strong German and English language skills.

To account for these requirements and to succeed in the national and international civil building market, the study program has implemented German courses for international students as well as English lectures to understand both English and German language literature, building regulations, DIN and EN standards.

At the beginning of the program, coursework is conducted in English, whereas in higher semesters it is gradually transitioning to German as students' improve their German skills. This structured language integration ensures that students can confidently navigate both English and German technical terminology. By engaging with English-language building descriptions and technical documents early on, students develop the skills needed to coordinate and manage construction projects in an international context.

Simultaneously, the increasing use of German throughout the program lowers the barriers to entering the German construction industry, equipping graduates for successful careers in both national and international markets.

3 Study objectives and qualification goals

Knowledge

Upon concluding the *Building Products and Processes* (BPP) degree programme, students will have acquired comprehensive knowledge and expertise that spans both theoretical fundamentals and practical applications in building construction and building product development. In particular, graduates will be able to:

- Students will acquire essential knowledge in building construction, enabling them to analyze and assess both product-specific and process-specific issues, develop solutions, and justify these using sound arguments.
- Students will possess extensive knowledge of standard building components and products, including their production, processing, usage, and methods for sustainable demolition and recycling, by that allowing a comprehensive understanding of building components and products.

Students will have in-depth knowledge of the trades involved in creating building structures as defined by DIN 276, encompassing cost groups 330 to 430 and 480. They will understand the interconnections and dependencies in project planning and management for new constructions, re-developments,

renovations, and demolitions that is built on a proficiency in German Construction Standards.

- Via familiarity with legal and regulatory frameworks, students will be well-versed in the specifications and procedures for developing, marketing, distributing or utilizing building products. This includes knowledge of relevant national and international laws, standards, regulations and guidelines. Also, they will be aware of the specifications and procedures involved in developing, bringing to market, distributing or utilizing building products.
- Students will recognize the requirements and possibilities of implementing and advancing digitalization in building and product lifecycle processes. They will be adept at comprehending, designing and implementing digital process models, with a particular emphasis on Building Information Modeling (BIM), which is mandated for all new federal construction projects in Germany from 2023.
- Students will understand the importance of sustainability in building construction and building products, including life cycle assessment and circularity principles. They will be capable of evaluating the environmental impact of building products and processes, promoting sustainable practices throughout the project lifecycle and apply sustainability principles. They will be familiar with production, processing and usage methods as well as methods relating to recyclable demolition
- Graduates will recognize the necessity of continuous improvement in their evolving work and learning environments due to the constantly changing work and learning content. They will be prepared to independently identify areas for further training and development.
- Since building constructions as well as building product development is a global and international teamwork, effective collaboration and communication are required. Students will be able to assess their scope of services, recognize the need for further training measures, and collaborate effectively in international and multidisciplinary teams, including large groups. Furthermore, graduates will acquire the ability to work independently and act responsibly and sustainably in their respective fields of competencies.
- Students are trained in analytical and problem-solving skills such that they will be capable of analyzing and assessing product-specific and process-specific issues, developing practical solutions, and justifying their approaches with well-founded arguments.

Skills

Graduates will acquire the following skills:

- Conducting in-depth research and interpreting project-specific, legal, normative, and other specialist texts, applying them effectively to building processes and building product development.
- Solving real world problems by applying practical knowledge and scientific methods while continuously refining and adapting these approaches.
- Understanding, utilizing, and professionally analyzing new digital problem-solving methods like Artificial Intelligence relevant to modern building constructions, projects and product development.
- Structuring and presenting work outcomes confidently, engaging in discussions with an international audience of professionals, including architects, project planners, controllers, testing and standardization bodies, suppliers, and client representatives.
- Developing sound judgment to formulate practical solutions and innovative concepts, even in response to new, complex or unforeseen challenges.
- Assessing personal strengths and weaknesses and understanding their impact on professional interactions.
- Managing conflicts effectively and handling constructive criticism in a professional manner.
- Recognizing the necessity of lifelong learning and acquiring the ability to continuously expand their expertise.
- Integrating and synthesizing knowledge from diverse fields to develop holistic solutions for complex problems in building construction and product lifecycle management.

Competencies

Upon completing the degree program, graduates will be equipped with the following competencies:

- Applying theoretical knowledge in a practical, outcome-oriented manner to real-world challenges, including the development, marketing, planning and execution of building construction projects and product lifecycle management.

- Thinking and acting entrepreneurially, formulating strategic approaches, and evaluating business opportunities in the building construction and building product sectors.
- Communicating fluently in written and spoken English, German and – where applicable – an additional foreign language, enabling effective negotiations and professional exchanges in multilingual environments.
- Organizing themselves effectively, working independently, and demonstrating teamwork and leadership skills in interdisciplinary settings.
- Researching, interpreting, and applying scientific, specialist₇ and standardization texts to real-world professional situations in building construction and product development.
- Comprehending, designing and implementing digital process models, integrating them into building construction and business workflows throughout the building product lifecycle.
- Identifying corporate stakeholders, evaluating their relevance to building product development and building construction planning as well as execution₇ and incorporating their objectives into strategic decision-making.
- Solving problems in an application-oriented manner, using fundamental methods to drive transformation and innovation in building construction and product development.
- Structuring and delivering presentations or written reports, engaging in professional discussions with expert audiences.
- Recognizing interdependencies within complex systems and responding flexibly to dynamic challenges in building construction projects and product innovation.
- Evaluating technological concepts from an economic perspective and applying business principles to optimize company operations while considering the impact on employees, the environment and business sustainability.
- Aligning professional actions with ethical, ecological, social and economic responsibilities.
- Assessing their personal and professional impact within an organization and making informed decisions accordingly.
- Facilitating conflict resolution and responding constructively to criticism in a professional setting.

- Embracing lifelong learning as an essential component of career development, ensuring continuous growth in knowledge and expertise.

4 Learning outcomes of modules / module objectives / objectives matrix

The individual modules, their detailed goals, and the skills and competencies to be acquired by the graduates are outlined in the module handbooks for the Bachelor degree programme.

The table below establishes the links between the individual modules and the Bachelor degree objectives outlined in the text above.

Matrix of module objectives in the Bachelor's program BPP												
Module	Aims											
	Knowledge				Skills				Competences			
	Scientific and Technical Fundamentals	Engineering Science Methodology	Engineering Experience and Product Development	Interdisciplinary	Scientific and Technical Fundamentals	Engineering Science Methodology	Engineering Experience and Product Development	Interdisciplinary	Scientific and Technical Fundamentals	Engineering Science Methodology	Engineering Experience and Product Development	Interdisciplinary
1. Semester												
Engineering Mathematics		xx				xx				x		
Chemistry of Building Materials	xx				xx				x			
Building Materials Characteristics		xx				xx				xx		
Building Informatics and AI		xx				xx				x		
German A1				xx				xx				xx
2. Semester												
Building Physics: Thermal and Moisture Protection	xx				xx				x			
Building Physics: Building and Room Acoustics	xx				xx				x			
CAD 2D / 3D (BIM)		xx				xx					xx	
Intercultural Competences and Self-Organization				x				x				x
German A2				xx				xx				xx
3. Semester												
Building Physics: Fire Protection	xx				xx				x			
Building Constructions		xx				xx				x		
Testing of Building Materials		xx			xx				x			
Digital Building Process (BIM 4D to 6D)		xx				xx					xx	
Scientific Work				xx				xx				xx
English: Negotiations				xx				xx				xx
German B1/ Part 1+2				xx				xx				xx
4. Semester												
Structural Engineering		xx				xx				x		
Completion of the Interior, Technical Building Equipment and Smart Home												
Construction Calculation		xx										
Product Management: Strategy and Marketing			xx			xx				xx		
Law: Building Law / Construction Contract / VOB			x					x			x	
German B1/Part 3+4				xx				xx				xx
5. Semester												
Fundamentals of Project Management and Planning			xx			xx				xx		
Project Execution and Controlling			xx			xx				xx		
Commercial Management		xx				xx				xx		
Compulsory Elective 1 (FWP-1)			xx				xx			xx		
German B2				xx				xx				xx

6. Semester											
Sustainable Building			xx				xx				x
Building Envelope and Supporting Constructions			xx				xx				x
Product Development and Testing		xx			xx				xx		
Seminar on Product Development			xx				xx			xx	
Project Seminar			xx				xx			xx	
Law: Building Product Regulations			x				x				x
7. Semester											
Internship including PLV Seminars			xx				xx			xx	
8. Semester											
Building in Existing Structures and Deconstruction			xx				xx				x
Management Systems			xx								
Workshop Architecture					x						
Compulsory Elective 2 (FWP-2)			xx				xx				x
Bachelor Module (Thesis including Thesis Defense)			xx				xx			xx	

Legend: xx strong relation; x medium relation