

Module code	Module title	Module description	Semester	ECTS
<b>Compulsory modules - Fundamental Studies „Industrial Production“</b>				
4IP-MA1-10	<b>Mathematics 1</b>	Students are enabled to formulate technical problems in mathematical terms and select and apply suitable methods for solving these problems. For this purpose, they are able to effectively use theoretical knowledge combined with standard software and mathematical software. Students acquire fundamental knowledge in the field of business mathematics and statistics.	1	5
4IP-KONS1-10	<b>Design 1</b>	Upon completion of the module, students are able to understand the importance of design within a business and throughout the product life cycle, and to apply the acquired strategies to the development, use and disposal of new products/services. This is based on the development of spatial imagination as well as fundamental skills for the preparation of technical drawings.	1	5
4IP-GWA-10	<b>Fundamentals of Academic Work/ Project Management</b>	Upon completion of the elective module, students are able to prepare written presentations or project reports in their field of study on schedule and in accordance with the formal requirements for a conceptual academic approach. To this end, students gain competence in self and time management, which enables them to plan, coordinate and critically analyze their working style and time efficiency. Students are able to shape, manage and successfully complete their own projects and use computer-aided project management systems to complete their tasks.	1	4
4IP-TM-12	<b>Engineering Mechanics</b>	Upon completion of the module, students have acquired fundamental knowledge in the field of engineering mechanics. They are able to practically apply the concepts and methods of the subject.	1 and 2	6
4IP-WFT-12	<b>Materials and Production Engineering</b>	The module provides students with an understanding of the fundamental properties, treatment options and use of different materials, as well as materials testing techniques, and enables them to select and use suitable manufacturing processes for company-specific applications.	1 and 2	7
4IP-CAD-12	<b>Computer Aided Design</b>	Upon completion of the module, students have gained a fundamental understanding of the use of EDP/CAD applications, basic knowledge of hardware and software, and the main functions of standard programs. They are proficient in the problems of information retrieval and	1 and 2	8

		<p>processing from various systems, as well as their processing and interpretation of results.</p> <p>Students acquire knowledge of general methods and working techniques of 3D CAD assisted design. Upon completion of the module, students are able to understand technical drawings and create, manipulate and visualize three-dimensional CAD models and generate technical drawings on this basis.</p>		
4IP-MA2-20	<b>Mathematics 2</b>	The module enables students to formulate technical problems in mathematical terms and to select and apply suitable methods for solving these problems. Students are able to effectively use theoretical knowledge linked to standard software and mathematical software for this purpose.	2	5
4IP-AVBO1-23	<b>Operations Scheduling and Operational Organization 1</b>	Upon completion of the module, students have acquired competences for the effective and efficient organization of operational processes. Students are familiarized with the fundamentals of operational organization as well as work and process data management. Practical exercises qualify the students to implement fundamental skills in the methods of operations scheduling and operational organization.	2 and 3	6
4IP-BWL-23	<b>Business Administration</b>	<p>Upon completion of the module, students are able to apply business management knowledge to solve business problems. They are familiarized with the goals of companies and the contents of their constitutive decision-making processes as well as corporate management and are thus enabled to think and act in a business-oriented manner. Students are able to develop their soft skills in order to lead and motivate employees.</p> <p>Furthermore, they acquire skills that contribute to the achievement of the company's economic and social objectives.</p>	2 and 3	8
4IP-ETPH-30	<b>Electrical Engineering/Physics</b>	<p>Upon completion of the module, students are able to apply electrical laws and physical relationships in connection with technical systems and their assemblies or plants, to determine interrelationships, and to assess and, if necessary, optimize processes.</p> <p>This is based on the integration of components, electrical and electronic circuits and measuring devices into a complex overall system, as well as the understanding of signal acquisition and signal processing as part of</p>	3	8

		control technology issues. Focus is placed on the application and interaction of electrical engineering/physics for the processes and procedures in production engineering.		
4IP-KONS2-30	<b>Design 2</b>	Upon completion of the module, students are able to create a simple design in accordance with the specifications of the task and to lay out, design and calculate selected machine elements. To this end, they acquire spatial imagination and the basic skills required to produce technical drawings as well as an understanding of the design elements.	3	5
4IP-FKL-34	<b>Strength of Materials/ Structural Steel Engineering</b>	The module enables students to become familiar with the fundamentals of strength of materials theory. Students are able to apply this knowledge together with the knowledge of engineering mechanics to the functional and economical design of machine parts. They are enabled to practically apply concepts and methods in the field of strength of materials. Furthermore, students develop a fundamental understanding of steel structures according to national and European standards in civil engineering (Eurocode 3).	3 and 4	8
4IP-BENG-40	<b>Business English</b>	Upon completion of the module, students are able to describe themselves and their professional and academic context in the foreign language and to deal with everyday communication situations in the professional environment. They are enabled to communicate in English in written and oral form within the company and between different companies. Students are able to present their company with its principal processes and essential facts in written and oral form.	4	5
4IP-AVBO2-40	<b>Operations Scheduling and Operational Organization 2</b>	Upon successful completion of the module, students possess planning and design skills for the effective and efficient organization and evaluation of work systems. Students acquire fundamental skills in work design, time management and remuneration structures. They acquire fundamental knowledge of process-oriented operational design and the simulation of process flows in the company.	4	5
4IP-QMFMT-45	<b>Quality Management and Production Metrology</b>	Students are familiarized with metrology for product-related tasks. They apply their knowledge of metrology to solve tasks in production and quality assurance. Based on this knowledge, students are able to interpret drawing details and select suitable measuring and testing	4 and 5	7

		equipment. Upon completion of the module, students can determine product characteristics for quality assurance purposes. Furthermore, the module provides students with an understanding of the fundamental purpose and structure of a quality management system. This is based on the ISO 9000 family of standards for structuring a QMS.		
4IP-TENG-50	<b>Technical English</b>	Students are enabled to communicate professionally in the technical field on an international level. Parallel to the degree program of Industrial Production, this seminar provides students with a detailed insight into this field and imparts relevant and fundamental foreign language skills. Upon completion of the module, students are able to describe products, work processes and systems in the company in the foreign language and present their company to an international audience. Furthermore, they are sensitized to intercultural differences that may arise in the course of their professional activities in an international environment. Students are able to communicate in an intercultural competent manner with foreign business partners on general and job-related topics.	5	6
4IP-RECHT-60	<b>Law</b>	Upon completion of the module, students have obtained a general overview of the legal system and, in particular, of business law (German Civil Code ("BGB"), German Commercial Code ("HGB"), labor law, and environmental law). They are enabled to deal with legal issues and to independently apply the imparted fundamental knowledge in practice.	6	6
<b>Specialization "Production Engineering"</b>				
4IP-PRO-45	<b>Production / Production Techniques</b>	Students gain an understanding of the interrelationships between the product, the production process, and the macro and micro environment. They are enabled to see the interrelationships between factory planning and corporate management and to integrate them into the solution of complex tasks. The teaching content is consolidated and applied by work placements.	4 and 5	9
4IP-PPS-45	<b>Production Planning and Control</b>	The module imparts the principles and methods of process-oriented planning, design and control of production and business processes. Students are enabled to practically apply acquired theoretical skills, including computer-aided PPS/ERP systems.	4 and 5	6

		Furthermore, students become proficient in the broad field of production data acquisition and evaluation and are able to apply this knowledge in a targeted manner. With this module, students acquire fundamental knowledge for understanding the entire process chain in a company, which is consolidated through business games (simulations).		
4IP-QMPT-60	<b>Quality Management PT</b>	Students are familiarized with the prerequisites, methods and the goal of quality management. The application of quality and management techniques specifically for the area of production are linked to the issue of risk management. Students determine and evaluate quality-related key figures. Furthermore, the module covers typical quality techniques and their application in the preparation of an audit. Core tools are applied to the special areas of manufacturing and production in quality management.	6	6
4IP-FAT-56	<b>Manufacturing Automation</b>	Upon completion of the module, students are able to analyze and co-design an automated production process as a complex system in which typical automation components (e.g. PLC technology, robot systems) are used. Based on their knowledge of modern production structures, students are able to set up or organize flexible production structures. Students can select industrial control technology and robot systems for use in production and apply appropriate programs to implement simple solutions.	5 and 6	7
4IP-STPT-56	<b>Systems Engineering</b>	Upon completion of the module, students have developed a comprehensive understanding of the physical interrelationships of systems engineering. They are able to assess modules and systems in terms of durability and probability of failure. Students understand interrelationships, assess sequences of effects and derive appropriate paths of action.	5 and 6	9
<b>Specialization "Production Management"</b>				
4IP-PRO-45	<b>Production/Production Techniques</b>	Students gain an understanding of the interrelationships between the product, the production process, and the macro and micro environment. They are enabled to see the interrelationships between factory planning and corporate management and to integrate them into the solution of complex tasks. The teaching content is consolidated and applied by work placements.	4 and 5	9

4IP-PPS-45	<b>Production Planning and Control</b>	<p>The module imparts the principles and methods of process-oriented planning, design and control of production and business processes. Students are enabled to practically apply acquired theoretical skills, including computer-aided PPS/ERP systems.</p> <p>Furthermore, students become proficient in the broad field of production data acquisition and evaluation and are able to apply this knowledge in a targeted manner. With this module, students acquire fundamental knowledge for understanding the entire process chain in a company, which is consolidated through business games (simulations).</p>	4 and 5	6
4IP-QMPM-60	<b>Quality Management PM</b>	<p>Students are familiarized with the prerequisites, methods and the goal of quality management. The application of quality and management techniques specifically for the area of production are linked to the issue of risk management. Students gain an overall view of a quality, environmental, and energy management system. Focus is placed on the typical quality techniques and their application in preparation of an audit. The core tools are applied from a management perspective.</p>	6	6
4IP-GFMP-56	<b>Design of Production and Assembly Processes</b>	<p>Upon completion of the module, students are able to work independently on problems in the field of operations scheduling and process design in production and assembly and to find an optimal solution by methodically thinking ahead. The module provides students with knowledge of process planning, which is necessary for the successful handling of special engineering problems, taking into account managerial criteria. Students acquire fundamental knowledge in the field of process design in the areas of parts manufacturing and assembly.</p>	5 and 6	5
4IP-PM-56	<b>Production Management</b>	<p>Upon completion of the module, students have gained an understanding of effective human resource management as a fundamental means of achieving sustainable business success. They learn to practically apply the theoretical components of human resources management from the identification of personnel requirements to procurement, management and further development of human resources. Furthermore, the module provides students with profound knowledge of controlling, e.g. how to set up and apply a system of performance measurement system. Upon completion of the module, students also possess fundamental knowledge of technical sales.</p>	5 and 6	6

4IP-PLL-60	<b>Production and Warehouse Logistics</b>	Upon completion of the module, students have gained competencies for the effective and sustainable design of production and logistics. They acquire fundamental knowledge of the analysis and optimization of material flows and the design of logistical processes. Upon completion of the module, students possess fundamental theoretical know-how for planning, designing and optimizing processes along the value chain.	6	5
<b>Specialization "Production Metrology and QM"</b>				
4IP-CAX-45	<b>CAX Technologies</b>	The module imparts the principles of planning and control of business processes and enables students to understand the role of planning and control within the CAx chain as well as their importance for a process-oriented approach in a company. Students gain interdisciplinary skills in the planning, design and control of business processes. The growing interconnection of industrial production processes has led to an increased integration of production metrology in the computer-aided exchange of data with other areas. Students acquire knowledge of the different interfaces and data transfer possibilities.	4 and 5	5
4IP-QSFMT-45	<b>Quality Assurance and Production Metrology</b>	Students are familiarized with the assurance of quality requirements (quality characteristics) in connection with the measuring devices and equipment. The module also covers the extended application of quality and management techniques specifically for the area of measuring and control processes. Students learn how to implement a quality management system according to the requirements of DIN EN ISO 9001 and IATF 16949. Further focus is placed on the expanded use of special production metrology.	4 and 5	7
4IP-PPA-56	<b>Test Process Automation</b>	Upon completion of the module, students are able to analyze or co-design an automated measuring or testing process as a complex system. This involves the use of modern automation components, programmable logic controllers (PLC technology), handling or robot systems. Students have gained knowledge of current test structures and automatic test equipment. They are able to select industrial control technology and robot systems for the testing process and to implement simple solutions programmatically.	5 and 6	7
4IP-SPC-56	<b>Statistical Process Control</b>	Upon completion of the module, students are able to adapt models for real-world processes. They understand the distribution types and the	5 und 6	7

		necessary fundamentals of statistics. This is applied to measurement and production processes. Thus, the module also deals with the analysis of measurement processes and the general uncertainty in measurement.		
4IP-STFMQ-56	<b>Systems Engineering FMQ</b>	Upon completion of the module, students have developed a comprehensive understanding of the physical interrelationships of systems engineering. They are able to evaluate assemblies in terms of their applicability. Pneumatic and hydraulic components can be properly selected and planned on the basis of technical specifications. Students can recognize interrelationships of different disciplines of engineering technology and evaluate sequences of effects. The module enables students to evaluate innovations in measurement technology in connection with current requirements for practical use.	5 and 6	6
4IP-MECH-60	<b>Mechatronics</b>	Upon completion of the module, students have developed a basic understanding of the elements of mechatronic systems and their application in metrology / FMT and mechanical engineering. Furthermore, the module familiarizes students with mechatronic control circuits using sensors and actuators.	6	5
<b>Practical modules</b>				
4IP-PRAX1-12	<b>Practical Module 1: Getting to Know the Company</b>	In this practical module, students become familiar with the organization of their partner company. They understand principal operational processes in selected functional areas and gain an overview of the production and communication relationships within the company. Students internalize the operational and organizational structure of the department. This practical module outlines the assignment during the first and second practical phases.	1 and 2	12
4IP-PRAX2-34	<b>Practical Module 2: Introduction to Engineering Work</b>	In this practical module, students gain insight into the technical interrelationships of their partner company. They know how to familiarize themselves with the operational processes of the preparation and production areas. Students develop an understanding of the organization of the company as a whole.	3 and 4	12
4IP-PRAX3-50	<b>Practical module 4: Autonomous Engineering Work</b>	In this practical module, students learn to work independently on a task and to present the results. Focus is placed on the assumption of innovative tasks that are of primary interest to the partner company.	5	6



		Students are prepared for their integration into a department. The understanding of the value-added and process chain of the company is expanded.		
<b>Bachelor's Thesis</b>				
4IP-THESI-60	<b>Bachelor' Thesis</b>	With their bachelor's thesis, students demonstrate their ability to independently work on a practical problem within a specified period of time, taking into account academic and economic aspects. The reviewer from the company evaluates the benefit for the company. Students work on a problem using academic methods, from the interpretation of the task to proposed solutions to the documented result which is supposed to contain a contribution of new knowledge. The bachelor's thesis applies the technical and methodological competencies gained during the studies and, depending on the degree program, specifically acquired experimental, theoretical, planning or constructive skills. It may therefore consist of a combination of these options.	6	9