

Part I Compulsory modules

Part I.1 Interdisciplinary compulsory modules

Module no./Code	7TM-MATH1-TM
Module name	Engineering Mathematics and Numerical Mathematics
Module contents	Engineering Mathematics <ul style="list-style-type: none">• Numerical ranges and operations (real, complex)• Numerical sequences and series (arithmetic, geometric)• equations and systems of equations (linear, non-linear), inequalities• Functions of a variable (presentation, characteristics, classes)• Differential calculus• Extreme value tasks• Integral calculus (indefinite, definite, improper integral, physical-technical applications)• Differential equations• functions with several variables (partial derivatives, extreme values)• Vectors and matrices• Numerical Mathematics <ul style="list-style-type: none">• Numerical solution of equations and systems of equations• Approximation (including Taylor expansion)• Numerical integration• Numerical solution of differential equations
Semester / ECTS credits	Semester 1 / 7 ECTS

Module no./Code	7TM-TMEC1-TM
Module name	Foundations of Engineering Mechanics
Module contents	<ul style="list-style-type: none"> • Tasks and subareas of engineering mechanics • Forces and moments: fragmentation into components and determination of resultants • Force systems • centroids of areas and lines • Kinematics • Kinetics • Stereostatics
Semester / ECTS credits	Semester 1 / 5 ECTS

Module no./Code	7TM-CHWE1-TM
Module name	Foundations of Chemistry and Materials Science
Module contents	<p>Chemistry</p> <ul style="list-style-type: none"> • Chemical bonds • Chemical reactions • Acid-base reactions • Introduction to organic chemistry • Introduction to electrochemistry <p>Material Science</p> <ul style="list-style-type: none"> • Foundations of material science • Composition of materials • Metallic and non-metallic composite materials • Laboratory exercises for materials testing
Semester / ECTS credits	Semester 1 / 5 ECTS

Module no./Code	7TM-BWL12-TM
Module name	Business Administration and Scientific Work
Module contents	<p>Business Administration</p> <ul style="list-style-type: none"> • Scientific derivation of the economic sciences • Macroeconomics and Business Administration in the system of sciences • Fundamental facts and basic concepts of business and economics • Economies, economic entities, production factors, performance process (business standards and operational accounting, economic cycle, national accounts) • Cost and performance accounting • Assessments, employee motivation <p>Scientific Work</p> <ul style="list-style-type: none"> • Subject and methodology of sciences • Findings and procedures for knowledge production, principles for the production of scientific works • Scientific writing
Semester / ECTS credits	Semester 1 und 2 / 7 ECTS

Module no./Code	7TM-ENG12-TM
Module name	English
Module contents	<p>Topics</p> <ul style="list-style-type: none"> • Vocabulary of natural sciences, statistics, logistics, automation technology, engineering and construction • Sectors of economy and company organization, company presentations, product presentations, writing a paper, making contact in a business context <p>Skills</p> <ul style="list-style-type: none"> • oral and written reports, reminders and complaints, describing graphs and statistics, describing manufacturing processes as well as engineering and construction items, discussions • business communication, business correspondence, enquiries, quotation, orders, presenting <p>Grammar</p> <ul style="list-style-type: none"> • review of relevant grammar topics (tenses, passive, question tags, reported speech, conditional clauses, modal verbs, gerund and infinitive etc.)
Semester / ECTS	Semester 1 and 2 / 6 ECTS

Module no./Code	7TM-STOC2-TM
Module name	Stochastics
Module contents	<ul style="list-style-type: none"> • Frequency distributions, statistical measures • Correlation and regression analysis • Random events and probabilities • Discrete and continuous distributions • Point and confidence estimations • Statistical tests
Semester / ECTS credits	Semester 2 / 4 ECTS

Module no./Code	7TM-INGW2-TM
Module name	Foundations of Engineering Sciences
Module contents	<p>Construction Systems</p> <ul style="list-style-type: none"> • Tasks of construction • Construction types • Construction methods (conventional methods, intuitive methods, discursive methods) • Construction rules • Constructive development process (tasks, contents, possible applications) • Functional, effective, structural and systemic connections • Functional and requirement specifications • Constructive equity • Variant comparisons and construction catalogs • Responsibility of the constructor • <p>Introduction to Machine Elements</p> <ul style="list-style-type: none"> • Terms, definitions • Construction methods (differential construction, integrating construction, integral construction) • Fundamentals of the design and dimensioning of axles/shafts, connections, shaft-hub connections, bearings, springs, couplings, brakes, traction equipment, frames, seals, lubrication devices • <p>Technical Drawing</p> <ul style="list-style-type: none"> • Terms, definitions • Importance of technical drawings as documents • Types of technical drawings • Information content of technical drawings • Normative regulations of technical drawing, including sketching • Graphic and drawing principles of technical drawing, including sketching • Sketching exercises • Rules for reading technical drawings • Exercises for reading technical drawings
Semester / ECTS credits	Semester 2 / 5 ECTS

Module no./Code	7TM-INFO2-TM
Module name	Computer Science and Information Processing
Module contents	<ul style="list-style-type: none"> • History of Computer Science • Physical foundations • Propositional logic • Number and character representation • Information Theory • Interfaces to the operating system • Data modelling • Database models and database systems • Data security • Data types and operations • Introduction to high-level programming languages • Data structures
Semester / ECTS credits	Semester 2 / 4 ECTS

Module no./Code	7TM-PHYS3-TM
Module name	Selected Fields of Physics
Module contents	<p>Optics</p> <ul style="list-style-type: none"> •Foundations and terms •Interference, diffraction and polarization •Wave optics at the slit, pinhole and line grating •Rays of light and ray optics • Reflection and refraction of rays of light • Mirrors, lenses and lens systems, optical devices <p>Acoustics</p> <ul style="list-style-type: none"> •Foundations and terms •Sound field sizes •Tone, sound, noise, sound level, volume •Airborne and structure-borne sound •Wave propagation in the sound field •Sound insulation •Doppler effect <p>Thermodynamics</p> <ul style="list-style-type: none"> •Foundations and terms •Heat transfer •First and second law of thermodynamics •State variables •Changes of state •Cycles •Thermodynamics of steam systems and refrigeration technology
Semester / ECTS credits	Semester 3 / 6 ECTS

Module no./Code	7TM-FERT3-TM
Module name	Production Engineering
Module contents	<ul style="list-style-type: none"> • Operation and work step • Process stages and process chains • Normative bases for manufacturing processes • Selected manufacturing processes of the main groups of manufacturing processes (casting, forming, cutting, joining, coating, and material property changes) • Experimental work on selected manufacturing processes in the form of classroom exercises
Semester / ECTS credits	Semester 3 / 6 ECTS

Module no./Code	7TM-FERM4-TM
Module name	Mechanical Engineering and Manufacturing Equipment
Module contents	<p>Mechanical Engineering</p> <ul style="list-style-type: none"> • Machine elements: construction forms, dimensioning and design, applications for axles, shafts, bearings, shaft-hub connections, gears • Influence during construction in mechanical engineering: lifetime estimation, failure probability and damage accumulation • Stresses and strains • Safety and reliability • Load spectra and operational stability • Notch effect and corresponding constructions <p>Manufacturing Equipment</p> <ul style="list-style-type: none"> • Machine tools (cutting and forming machine tools, assemblies and their function, rigidity, kinematic principles) • Movements on machine tools and surface generation on the workpiece • Control systems and automation of machine tools • Tools (tools for forming and machining, tool life quantities, service life) • Fixtures (functions, structure, fixture components, areas of application) • Fixture construction by means of modular fixture systems
Semester / ECTS credits	Semester 4 / 7 ECTS

Module no./Code	7TM-RCHT4-TM
Module name	Law
Module contents	<ul style="list-style-type: none">• Legal foundations• Contractual law and employment contract law (individual and collective labor law)• Industrial safety legislation• Industrial property rights
Semester / ECTS credits	Semester 4 / 5 ECTS

Module no./Code	7TM-PROJ5-TM
Module name	Project Management
Module contents	<ul style="list-style-type: none"> • Planning, control and monitoring of projects • Methods and instruments of project management • Project schedule analysis • Error analysis • FMEA • Network Analysis • Methods and tools for process optimization • Continuous improvement process • Lean Management • Kaizen • Project management case studies
Semester / ECTS credits	Semester 5 / 6 ECTS

Module no./Code	7TM-ERP5-TM
Module name	ERP/PPS
Module contents	<ul style="list-style-type: none"> • Tasks of ERP • Tasks of PPS • Production planning concepts: material, time and capacity planning • Material Requirement Planning • Production control concepts: order release and machine allocation planning, production data acquisition • Novel PPS concepts • Solution approaches and industrial environment • Bus systems and process control engineering • Structure and handling of ERP software
Semester / ECTS credits	Semester 5 / 6 ECTS

Module no./Code	7TM-QMAN6-TM
Module name	Quality Management
Module contents	<ul style="list-style-type: none"> • Quality management systems – foundations and essential terms • Auditing, certification, accreditation • Requirements for a QM system • Auditing of QM systems • Conformity assessment - Requirements for bodies providing audit and certification of management systems • Quality Engineering • DIN EN ISO 9000ff, DIN EN ISO 19011 • Foundations of Six Sigma
Semester / ECTS credits	Semester 6 / 6 ECTS

Part I.2 Compulsory modules
Field of study: Technical Management

Module no./Code	7TM-TMEC2-TB
Module name	Applied Engineering Mechanics
Module contents	<ul style="list-style-type: none">• Selected problems of structural engineering in flat and spatial cases• Friction• Mechanical tension• Second moments of area• Tension/compression• Bending• Thrust• Buckling• Principles of virtual work• Solution of statically indeterminate problems with energy methods
Semester / ECTS credits	Semester 2 / 5 ECTS

Module no./Code	7TM-ARPL3-TB
Module name	Work Scheduling and Work Safety
Module contents	<p>Work Scheduling</p> <ul style="list-style-type: none"> • Methods • Work studies • Work design and workplace design • Work evaluation and time observation • Work sequence planning and work plan creation <p>Work Safety</p> <ul style="list-style-type: none"> • Health and safety legislation, regulations and codes • Machinery directives • Work safety as a management task • Potential hazards, work safety measures and prevention • Emergencies and calamities
Semester / ECTS credits	Semester 3 / 6 ECTS

Module no./Code	7TM-ETMT3-TB
Module name	Electrical Engineering and Measurement Engineering
Module contents	<p>Lectures/exercises</p> <ul style="list-style-type: none"> • Structure of electronic components and circuits • Structure and characteristic curves of electronic components • Mode of operation, types, characteristic curves and calculations of characteristic values of electric motors and generators • Transformers • Structure of oscillating circuits for the generation of signal forms that can be metrologically evaluated • Foundations and basic terms of measurement engineering • Standards, regulations • Signal types and signal characteristics, signal parameters • Measurement deviations, uncertainties, measurement errors, error analysis • Electrical and electronic aids • Electrical measuring methods • Electronic measuring devices • Electrical measurement of electrical and non-electrical quantities – measurement transducers • Sampling theorems • Different bridge circuits in direct and alternating circuits • Application of sensors and their wiring <p>Laboratory exercises</p> <ul style="list-style-type: none"> • Measurements with measuring instruments used as teaching aids and industrial measuring instruments • Exercises on measuring tolerances, positional tolerances and measurability on 3D measuring machines
Semester / ECTS credits	Semester 3 / 6 ECTS

Module no./Code	7TM-UMEN4-TB
Module name	Environmental and Energy Management
Module contents	<p>Environmental Management</p> <ul style="list-style-type: none"> • Principles of environmental policy • Hazardous substances, pollutants and contaminated sites • Immobilization, stabilization, mobilization of pollutants • Laws, ordinances, sets of rules, normative foundations • Emission and immission control - Particulate emissions and measurement methods • Sound and vibration protection • Radiation protection • Sampling, laboratory and on-site testing • Water/waste water treatment • Waste treatment <p>Energy Management</p> <ul style="list-style-type: none"> • Principles of energy policy • Energy flow • Conventional energy sources • Alternative energy sources • Energy efficiency and optimization methods • Electric and non-electric power transmission • Strategies and sustainability
Semester / ECTS credits	Semester 4 / 6 ECTS

Module no./Code	7TM-MOSI4-TB
Module name	Modelling in Production Engineering and Mechanical Engineering
Module contents	<ul style="list-style-type: none"> • Principles of modelling • Idealizing and discretizing • Linear and non-linear optimization • Principles of computer-aided design (CAD) • Principles of the finite elements method (FEM) • Simulation of mechanical deformations by means of FEM • Simulation of material flows and temperature gradients by means of FEM • Application of CAD in mechanical engineering • The exercises cover the contents for CAD and CAE and are intended to impart knowledge, skills and abilities in handling FEM software.
Semester / ECTS credits	Semester 4 / 6 ECTS

Module no./Code	7TM-BWL5-TB
Module name	Services
Module contents	<ul style="list-style-type: none"> • Service industries • Terms, classifications and boundaries • Services as product component and economic good • Overall economic position of the tertiary sector • Optimization of service processes by employers and employees • Service marketing and branding of services • Complaint management • Invitation to tender and award of services • Service strategies in the B2B relationship • Use of management instruments and management techniques • Target agreements, performance reviews, appraisals, employee motivation • Transport • Transshipment • Storage
Semester / ECTS credits	Semester 5 / 6 ECTS

Part I.3 Compulsory modules

Field of study: Metal and Steel Engineering

Module no./Code	7TM-BSGB2-MS
Module name	Structural Design and Principles of Construction
Module contents	<ul style="list-style-type: none">• Load assumptions in civil engineering• Load combinations• Load distribution on components in static systems• Mechanical stresses (types of mechanical stresses, fundamentals of calculation, distribution over cross-sections)• Designs of joints and bearings• Designs of girders (single span girders, articulated girders, continuous girders) and trusses• Design of beams, bars, discs, joints, bearings and connections
Semester / ECTS credits	Semester 2 / 5 ECTS

Module no./Code	7TM-SBST3-MS
Module name	Structural Engineering and Welding Technology
Module contents	<ul style="list-style-type: none"> • Fundamentals of manufacturing processes in structural engineering • Structure of processes, process sequence, field of application and application limits, means of production/manufacturing plants, technological calculations • Manufacturers' qualification and requirements for the manufacture of steel constructions (DIN EN 1090-1, DIN EN 1090-2) • Welding processes in general: classification of processes, joint and build-up welding, welding capabilities • Base materials and welding consumables • Electric arc as a tool: physics of the arc, technological arc types, power densities • Arc welding processes: manual metal arc welding, gas-shielded welding, submerged arc welding • Gas welding • High-performance welding processes • Welding power sources and further welding equipment (torches, clamping devices, fixtures) • Automation of welding processes • Warpings in welding: types, causes, avoidance/minimization • Adjacent procedures: heat treatment, straightening, testing • Occupational safety
Semester / ECTS credits	Semester 3 / 6 ECTS

Module no./Code	7TM-WUS3-MS
Module name	Materials and Welding
Module contents	<ul style="list-style-type: none"> • Metallic materials: crystal lattices and elementary cells • Iron-based materials: classification, alloys, iron-carbon diagram • General structural steels: properties, processing • Suitability for welding in general: importance of alloying elements, microstructure formation and technological-mechanical properties, phase transformations, t_{8/5} cooling time • Carbon equivalents • Imbalance diagrams: TTT diagrams and their interpretation • Steel embrittlement • Introduction to higher strength steels, especially higher strength fine grain steels: metallurgy, special requirements for welding technology • - Introduction to stainless, acid and heat resistant steels: metallurgy, passive layer formation, requirements for welding technology, Schaeffler diagram
Semester / ECTS credits	Semester 3 / 6 ECTS

Module no./Code	7TM-KGBG4-MS
Module name	Construction of Welded Assemblies
Module contents	<ul style="list-style-type: none"> • Requirements for the structural design • Principles of design and dimensioning • Constructive design of selected assemblies • General verification • Mathematical proofs (structural integrity proof, ultimate limit state proof, serviceability proof, stability proof) on the basis of EC3 • Foundations of the FEM for determining stresses and deformations • Notch effect: geometric and metallurgical notches, causes, avoidance of notches • Failure of welded joints (forcible fracture, fatigue fracture, brittle fracture, terrace fracture), prevention of failure, including DAST009 and DAST014 • Overview of further strength concepts (FKM, IIW)
Semester / ECTS credits	Semester 4 / 6 ECTS

Module no./Code	7TM-KORO4-MS
Module name	Corrosion and Corrosion Protection
Module contents	<ul style="list-style-type: none"> • Types and causes of corrosion • Electrochemical reactions and behavior of metals • Active and passive corrosion protection • Selected technologies of corrosion protection: thermal spraying, coating with organic substances, coating by dipping (hot-dip galvanizing) • Constructive corrosion protection • Technological calculations and service life estimation
Semester / ECTS credits	Semester 4 / 6 ECTS

Module no./Code	7TM-MARB5-MS
Module name	Mechanisms, Installations and Pipeline Construction
Module contents	<ul style="list-style-type: none"> • Mechanisms and moving assemblies as products of steel construction • Components and assemblies for pipeline construction • Design of pipelines (dimensions, flow resistance) • Introduction to the AD2000 regulations • Connections, joints, bearings • Overview of plant and pipeline construction technologies • Proof of material and component properties • Commissioning and monitoring
Semester / ECTS credits	Semester 5 / 6 ECTS

Part II. Compulsory elective modules

Part II.1 Interdisciplinary compulsory elective modules

Module no./Code	7TM-WPT61-TM
Module name	Lightweight Construction and Lightweight Materials
Module contents	<p>Lectures/exercises</p> <ul style="list-style-type: none">• Tasks and types of lightweight construction (material, structural, conditional lightweight construction)• Construction methods (differential construction, integrating construction, integral construction)• Related parameters• Materials of lightweight construction (metallic and polymer materials, ceramic and wood materials, composite materials, material composites)• Constructive solutions for components, assemblies and connections• Notch effect and service life estimation on lightweight constructions• Evaluation of lightweight construction potentials of completed constructions• Efficiency of the use of lightweight constructions and lightweight materials <p>Laboratory exercises</p> <ul style="list-style-type: none">• Experimental determination of deformations• Determination of stiffnesses• Evaluation of adhesive joints
Semester / ECTS credits	Semester 6 / 6 ECTS

Module no./Code	7TM-WPT62-TM
Module name	Facility Management
Module contents	<p>Technical Building Services</p> <ul style="list-style-type: none"> • Building services and technical building engineering • Automation systems for complex technical building systems • Services with building automation systems/management centers • Development trends in energy management • Integration of energy management in building services engineering <p>Operation and optimization of technical building systems</p> <ul style="list-style-type: none"> • Operation via management centers • Specific web-based management functions • Operation with building technology visualization software • Example installations for optimized renewable energy systems <p>Construction-related Services</p> <ul style="list-style-type: none"> • Planning and energy optimization of selected plant technology • System integration and measures to increase energy efficiency • Specific construction services for the energetic refurbishment of buildings • Example installations for the use of renewable energy systems • Integration of management accounting and contract processing in management systems <p>Regenerative Energy Systems</p> <ul style="list-style-type: none"> • Planning and energy optimization of selected plant technology • System integration and measures to increase energy efficiency • Use of solar energy for heat and power generation in buildings • Planning examples for plant configurations with high energy efficiency • Use of bivalent renewable energy systems in building services engineering <p>Thermography (laboratory exercise)</p> <ul style="list-style-type: none"> • Infrared temperature measurement • Measurement errors • Evaluation of the building condition
Semester / ECTS credits	Semester 6 / 6 ECTS

Part II.2 Compulsory elective modules

Field of study: Technical Management

Module no./Code	7TM-WPT51-TB
Module name	Product Management
Module contents	<p>Tasks of Product Managements</p> <ul style="list-style-type: none">• Information tasks• Target group, competition and self-analysis• Planning functions• Product and communication policy• Price and distribution policy• Control tasks• Coordination tasks <p>Types of Organizations</p> <ul style="list-style-type: none">• Factors influencing the choice of organization• Staff-oriented product management• Line-oriented product management• Matrix-oriented product management• Limits of product management• New integrative development of product management• Integration of Category Management• Integration into customer-oriented teams <p>New Challenges for Product Management</p> <ul style="list-style-type: none">• Mass Customization• Economies of scale• Automation• Interpolation curves
Semester / ECTS credits	Semester 5 / 6 ECTS

Module no./Code	7TM-WPT52-TB
Module name	Production Planning and Factory Operation
Module contents	<ul style="list-style-type: none"> • Conception and organization of production plants • Life-cycle-oriented factory layout • Selected methods of systems engineering • Development and adaptability of factories • Production processes and manufacturing systems • Innovation drivers of industrial production • Planning levels, instruments and algorithms • Factory operation and systematic use • Versatile production models and factories • Energy efficiency and sustainability in the company • Internal and external influences on production processes • Developments and trends, especially industry 4.0
Semester / ECTS credits	Semester 5 / 6 ECTS

Module no./Code	7TM-WPT61-TB
Module name	Automation Engineering
Module contents	<ul style="list-style-type: none"> • Foundations of control circuits and control loops • Structure and classification of control systems and control components • Graphical representation of control processes • Signal processing in control systems, switching network treatment • Logic controllers and programmable logic controllers • Graphical representation and terms of control engineering • Behavior of control loop elements • Types and behavior of controlled systems and controllers • Static and dynamic behavior of control loops • Stability criteria for control loops according to Hurwitz and Nyquist • Design and layout of control loops in the time and frequency domain • Bus systems and process control engineering • Design and application fields of industrial robots, manipulators and automation components of process engineering
Semester / ECTS credits	Semester 6 / 6 ECTS

Module no./Code	7TM-WPT62-TB
Module name	Maintenance
Module contents	<p>Damage Theory and Reliability</p> <ul style="list-style-type: none"> • Object, tasks and purpose of maintenance • Definition and structure according to DIN 31 051, DIN EN 13 306, DIN 15 221-1 • Target function of the plant behavior • Damage theory, damage processes, description forms of damage • Damage to selected assemblies • Failure behavior due to damage processes • Parameters for the use and failure behavior of elements • Parameters for the use and failure behavior of systems • Reliability and renewal, redundancy • Reliability theory and renewal theory • Reliability of elements and systems <p>Parameters and Limit Values of Technical Diagnostics</p> <ul style="list-style-type: none"> • Tasks and importance of technical diagnostics • Technical diagnostics as part of condition-oriented maintenance • Structure of the diagnostic process • Procedure for the preparation and implementation of diagnostic measures • Diagnostic objects, status parameters, diagnostic parameters • Diagnostic characteristic curve, determination of the diagnostic characteristic curve • Damage limits, criteria and methods for determining damage limits • Damage - service life – function • Forecast of remaining useful life • Assessment of statements on remaining useful life • Total diagnostic errors, components, procedure • Identification and selection of diagnostic methods and diagnostic facility • Technological documentation for diagnosis • Statistical means of failure prediction
Semester / ECTS credits	Semester 6 / 6 ECTS

Part II.3 Compulsory elective modules

Field of study: Metal and Steel Engineering

Module no./Code	7T7TM-WPT51-MS
Module name	Construction Tendering and Contract Regulations (VOB) and Law on Contracts for Work and Services
Module contents	<ul style="list-style-type: none">• VOB in general: parts A, B, C (contents, scopes)• VOB/A: tendering and award of contracts, types of contracts• VOB/B: discussion of §§, examples of current case law• VOB/C: overview of general technical contract conditions• Contracts for work and services (contents, form of contracts, remuneration for work and services, forms of remuneration, due date of remuneration, warranty, termination)
Semester / ECTS credits	Semester 5 / 6 ECTS

Module no./Code	7TM-WPT52-MS
Module name	CAD Constructions
Module contents	<ul style="list-style-type: none"> • Application of CAD constructions in metal and steel engineering • Construction on the basis of binding regulations, especially the DIN EN 1993 (EC3) group of standards • Standard-compliant presentation • Handling Of component libraries • Handling of parts lists • Derivation of technical drawings and other documents • Fundamentals of FEM • Application of FEM to structural analyses in metal and steel engineering • Limits of FEM
Semester / ECTS credits	Semester 5 / 6 ECTS

Module no./Code	7TM-WPT61-MS
Module name	Hoisting Devices
Module contents	<ul style="list-style-type: none"> • Classification of lifting devices • Mechanical foundations (loads and load combinations, statics of hoisting devices, consideration of time-varying loads) • Constructive design and construction methods • Assemblies (supporting structures, hoists, trolleys, slewing gears, drives, brakes, load suspension devices, slings, carrying devices, overview of electrical equipment, automation and sensor technology) • Design principles (introduction into DIN EN 13 001 and DIN EN 15 011) • Use in workshops and on construction sites • Implementation and monitoring
Semester / ECTS credits	Semester 6 / 6 ECTS

Module no./Code	7TM-WPT62-MS
Module name	Site Management and Assembly
Module contents	<ul style="list-style-type: none"> • Setting up building sites • Tasks and responsibilities • Construction supervision and construction site controlling • Foundations of occupational safety on construction sites • Foundations of assembly technology (terms, types of assembly) • Primary assembly (selected joining methods) and secondary assembly (handling, adjusting, measuring and testing) • Assembly equipment (constructive design, function and use) • Importance of assembly-oriented construction • Assembly technologies (assembly in the workshop and on the construction site)
Semester / ECTS credits	Semester 6 / 6 ECTS

Part III. Practical modules

Part III.1 Practical modules

Field of study: **Technical Management**

Module no./Code	7TM-PRA10-TB
Module name	Corporate Structure (practical module 1 TB)
Module contents	Mandatory contents <ul style="list-style-type: none">• Legal form of the practice partner's company• Company-specific business areas and value-adding operations• Corporate structure and business organization• Sector-specific competitive situation• Company-specific products and services Optional contents <ul style="list-style-type: none">• Development of basic craft skills• Company-specific communication and information channels• Industry-specific standards, technical rules and guidelines• Manual and/or experimental activities in the workshop, test field or laboratory• Participation in assignments at customer sites
Semester / ECTS credits	Semester 1 / 6 ECTS

Module no./Code	7TM-PRA20-TB
Module name	Material and Component Testing (practical module 2 TB)
Module contents	<ul style="list-style-type: none"> • Principles of technical inspection, control and monitoring • Processes of technical inspection, control and monitoring • Evaluation of technical inspection, control and monitoring <p>NB The contents can be related to the fields of substance, material, component, surface and connection testing, incoming goods inspection and the metrological determination of further characteristics.</p>
Semester / ECTS credits	Semester 2 / 6 ECTS

Module no./Code	7TM-PRA30-TB
Module name	Work Planning and Calculation (practical module 3 TB)
Module contents	<ul style="list-style-type: none"> • Determination of business key figures for the calculation of business processes • Calculation in purchasing, production/service provision and sales: methods and practice of calculation • Negotiations • Work planning resource planning
Semester / ECTS credits	Semester 3 / 6 ECTS

Module no./Code	7TM-PRA40-TB
Module name	Manufacturing Processes and Means of Production (practical module 4 TB)
Module contents	<p>Mandatory contents</p> <ul style="list-style-type: none"> • Importance of manufacturing processes and production means for the value-adding processes in the company • Criteria for the selection of production means and manufacturing processes as well as design of process chains (company-specific: planning/project development/design, manufacturing processes, assembly/disassembly, provision of services) • Plant engineering for the provision of value-adding processes (company-specific: means of production/manufacturing plants, building/house technology, storage systems, vehicles/conveyor technology) • Optimization of manufacturing procedures/process optimization • Technically optimized use of production resources • Profitability of the use of production resources <p>Optional contents</p> <ul style="list-style-type: none"> • Modeling/simulation of operational processes (material, energy, information flows) <p>NB According to the business field of the company, the focus can be directed to:</p> <ul style="list-style-type: none"> • value-adding processes of planning/project development/construction, • manufacturing processes • Assembly/disassembly • Provision of services
Semester / ECTS credits	Semester 4 / 6 ECTS

Module no./Code	7TM-PRA50-TB
Module name	Project Management (practical module 5 TB)
Module contents	<ul style="list-style-type: none"> • Project characteristics • Planning, controlling, monitoring of projects • Working on projects • Documentation and follow-up of projects • Methods and instruments of project management
Semester / ECTS credits	Semester 5 / 6 ECTS

Module no./Code	7TM-PRA60-TB
Module name	Bachelor Thesis TB
Module contents	<ul style="list-style-type: none"> • Coordination of topic with supervisors and practice partners • Investigation and processing of a concrete engineering task • Self-contained topic with strong practical orientation • Written dissertation in bound form • Presentation and defense of the topic dealt with
Semester / ECTS credits	Semester 6 / 12 ECTS

Part III.2 Practical modules

Field of study: Metal and Steel Engineering

Module no./Code	7TM-PRA10-MS
Module name	Corporate Structure in the Metal and Steel Construction Business (practical module 1 MS)
Module contents	Mandatory contents <ul style="list-style-type: none">• Legal form of the practice partner's company• Company-specific business areas and value-adding operations• Corporate structure and business organization• Sector-specific competitive situation• Company-specific products and services Optional contents <ul style="list-style-type: none">• Development of basic craft skills• Company-specific communication and information channels• Industry-specific standards, technical rules and guidelines• Manual and/or experimental activities in the workshop, test field or laboratory• Participation in assignments at customer sites
Semester / ECTS credits	Semester 1 / 6 ECTS

Module no./Code	7TM-PRA20-MS
Module name	Loads and Load Cases (practical module 2 MS)
Module contents	<ul style="list-style-type: none"> • Identification of loads by evaluating the given situation or reading technical drawings • Foundations for the determination of loads • Derivation of load cases • Load combinations
Semester / ECTS credits	Semester 2 / 6 ECTS

Module no./Code	7TM-PRA30-MS
Module name	Technologies of Steel Construction (practical module 3 MS)
Module contents	<ul style="list-style-type: none"> • Methods of manufacturing parts and modules and assembly processes (process sequence and application, plant engineering) • Welding-related production and weldability
Semester / ECTS credits	Semester 3 / 6 ECTS

Module no./Code	7TM-PRA40-MS
Module name	Mechanisms in Metal and Steel Engineering (practical module 4 MS)
Module contents	<ul style="list-style-type: none"> • Types of drives • Transmission links • Joints and bearings • Degrees of freedom, their allowance and binding • Movements and resulting loads • Time-varying loads and influence on service life
Semester / ECTS credits	Semester 4 / 6 ECTS

Module no./Code	7TM-PRA50-MS
Module name	Quality Management in Metal and Steel Engineering (practical module 5 MS)
Module contents	<ul style="list-style-type: none"> • Requirements and methods of quality management • Requirements for companies according to DIN EN 1090-1 • Documentation and archiving • Responsibilities within the company • Certifications and accreditations • Quality management in the relationship with suppliers, subcontractors and customers
Semester / ECTS credits	Semester 5 / 6 ECTS

Module no./Code	7TM-PRA60-MS
Module name	Bachelor Thesis MS
Module contents	<ul style="list-style-type: none"> • Coordination of topic with supervisors and practice partners • Investigation and processing of a concrete engineering task • Self-contained topic with strong practical orientation • Written dissertation in bound form • Presentation and defense of the topic dealt with
Semester / ECTS credits	Semester 6 / 12 ECTS