

Result 4.6

Trainings Vocational Master and Technician

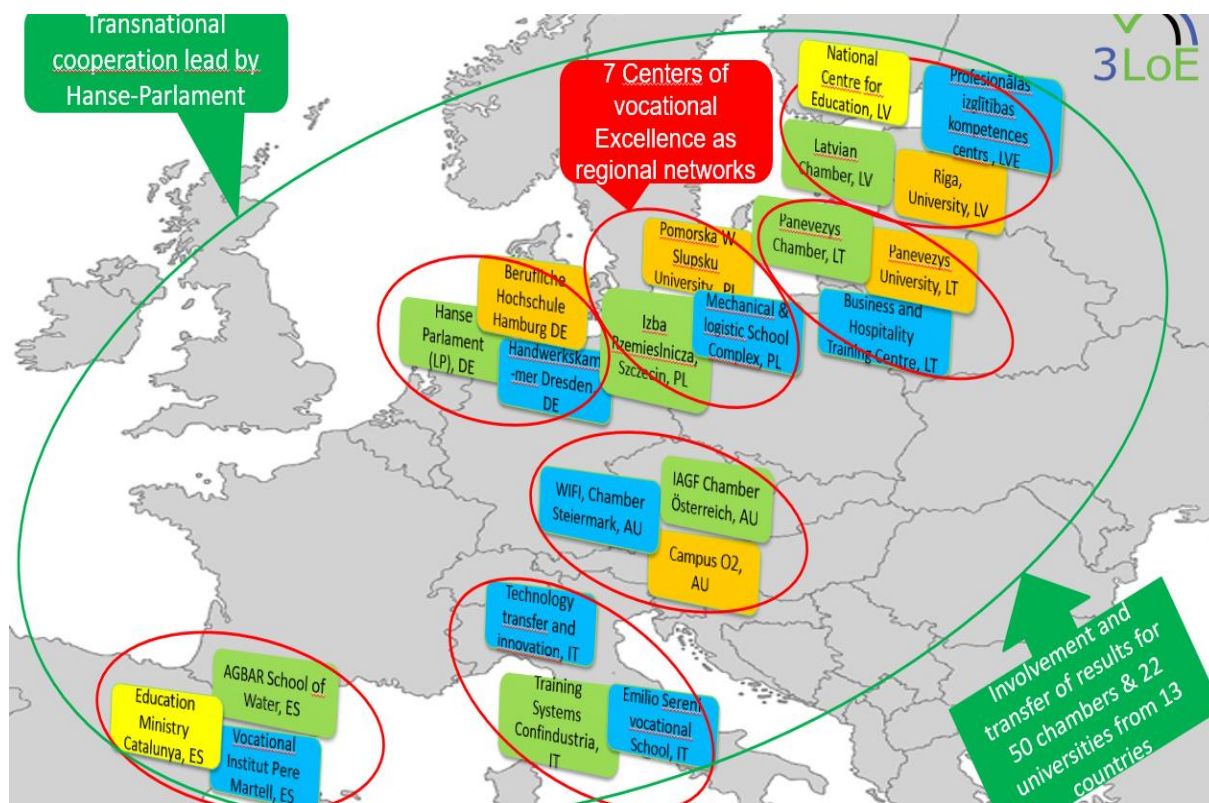
Part A Curricula



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Partner



Language

English

Content

- Summary of the Project and Introduction
- Curriculum Vocational Master Electric
- Curriculum Vocational Master Carpenter
- Curriculum Technician Training Construction
- Curriculum Service Technician

Summary of the Project and Introduction

About the 3LOE Project

Around 99% of all EU businesses are SMEs, creating up to 70% of all jobs. In general, SMEs have good growth prospects for the future and are particularly well equipped to solve environmental problems and to enhance the green economy. However, in most of the project countries, SMEs are confronted with a shortage of skilled workers and young entrepreneurs. This shortage of skilled workers is even more alarming taking into account that due to aging of current entrepreneurs, a large and growing number of companies will have to be handed over to the next generation. Furthermore, young specialists and entrepreneurs often lack the qualifications and skills needed in order to respond to contemporary developments in the fields of energy, climate and environmental protection. The following problems have been identified in SMEs working in the fields of green economy, energy and environmental protection:

- Blatant and growing shortage of skilled workers.
- Large qualification deficits, especially in the Green Economy.
- Loss of attractiveness and low qualification of school-based VET.
- Low rates of further training and insufficient orientation of offers to SME needs.
- Ageing of entrepreneurs and increasing shortage of young people (demographic change).
- Failure of business transfers and low rates of business start-ups.
- Low innovation rates and insufficient productivity.
- Not enough cooperation between universities and SMEs and a lack of teaching geared to SME needs.
- Comparably low internationalization of SMEs and vocational training providers.
- Lack of national level support for SMEs”.

To meet these challenges, work-based learning and new paths in vocational training must be provided through cooperation between educational institutions, economic chambers and SMEs. University graduates are often well-qualified in theory, but lack practical knowledge, skills and abilities that are crucial for SMEs. For this reason, VET reforms must also involve higher education, and should implement dual bachelor's degree programs that combine a bachelor's degree with vocational training and on-site work in companies.

In the 3LOE project, an innovative and complex project structure with 22 project partners from 7 countries as well as 60 associated partners from 13 countries was designed. In each country, centers of vocational excellence (COVEs) in Green Economy will be established, managed and their permanent continuation ensured. A transnational cooperation of the centers will be developed, extended to 60 education stakeholders from 13 countries and operated permanently in an institutionalized form. The centers will offer a wide range of dual education measures in vocational training, further education and higher education, that are being developed, tested and evaluated in the project. These educational measures on EQF levels 3-7 focus on Green Economy, Digitalization and Entrepreneurship. Furthermore, vocational and educational consulting and innovation support for SMEs will be developed and implemented. In total, seven Train-the-Trainer programs will be developed and implemented permanently by the project partners. All results will be transferred to the 60 associated partners together with implementation advice.

The objectives and aimed outcomes of the 3LOE project can be summarized as following:

1. Foundation of a three-level Center in each project country

1.1 Building the "Green Economy" skills alliance for qualifications in SMEs with educational and economic actors from the 7 project countries; development of information and cooperation tools.

1.2 Expansion of the skills alliance to the 60 associated partners from 13 countries, comprising chambers of commerce, SME associations, as well as universities of applied sciences/colleges.

1.3 Development, testing and evaluation of a curriculum and teaching materials for Train the Trainer courses for personnel and center management (vocational school-teachers, trainers in SMEs and lecturers in further and higher education institutions).

1.4 Evaluation of the construction and operation of the seven centers of Excellence and of the transnational cooperation.

1.5 Development of business and financing plans and ensuring the long-term continuation of the seven centres and transnational cooperation.

1.6 Development, consulting and introduction of political strategy program.

2. Implementation and realization vocational training

2.1 Development and implementation of a tool for vocational and qualification counselling as well as a training for consultants and teachers to use the tool.

2.2 Implementation of the dual system, so that work-based learning is put into practice in the project countries.

Preparation and transfer of curricula and examination regulations for dual vocational training for different professions and implementations in Poland, Lithuania, Latvia and Spain.

Development, test and implementation Trainings for teachers to conduct dual vocational training as well as Training of trainers in SMEs.

2.3 Development political concept for the training and integration of young people with learning difficulties for young people with learning difficulties (EQF level 3).

Development, test and implementation of a dual vocational training "Specialist for Building Insulation".

2.4 Development, testing and evaluation of education programme, teaching materials and examination regulations for the provision of sector-specific qualifications already during the initial vocational training for stronger learners. Implementation in the dual system, so that work-based learning is put into practice in the project countries.

2.5 Development and implementation five-year technician training „Ecologic Solutions in Logistics”.

3. Implementation and realization of further vocational training

3.1 Development and implementation of concepts and instruments for the management of continuing vocational training.

3.2 Development, test and implementation of a Train-the-Trainer program for teachers to conduct further training.

3.3 Development and implementation of a concept "SME-fair digitalization" as well as development, test and implementation of two train the trainer programs “Basic and advanced digital skills”.

3.4 Transfer and implementation of four further trainings Energy Saving and Renewable Energies.

3.5 Preparation, transfer and implementation of six further trainings in the Green Economy.

3.6 Development, testing and evaluation of different training programs and teaching material for owners, managers and qualified workers of SMEs (EQF level 5 and 6). The trainings are specifically tailored to SME needs and different qualification levels and combine the transfer of technical, professional and management know-how.

- Training Enterprise and Entrepreneurship in Green Economy
- Training Energy Service Manager
- Trainings vocational Master Carpenter and Electric
- Training Construction Technician
- Training Service Technician
- Training Sustainability in foodservice industry

3.7 Development of regulations for new continuing education occupational profiles with a focus on the green economy.

3.8 Development of an integration programme for the unemployed (EQF level 4) in order to be able to place the unemployed in permanent jobs through further training seminars and a further training qualification.

4. Implementation and realization of higher education

4.1 Preparation and transfer of curricula, evaluation and examination regulations for two existing dual Bachelor degree programmes "Management of Renewable Building Energy Technology" and "Business Administration for SMEs”.

4.2 Development and beginning of implementation of new dual Bachelor degree programs

- Business Administration & Sustainable Management of SMEs
- Entrepreneurship and Innovation in Green Economy
- Logistics - Green Supply Chains
- Service technician
- Tutorial “Sustainable management Climate neutrality for companies”

4.3 Development, test and implementation of four study modules (EQF level 6) on SME management in the Green Economy sector, which will be carried out in the dual study system and integrated into existing Bachelor degree programmes.

4.4 Development and implementation of concept for innovation promotion Solutions for manageable R&D tasks of SMEs and conducting manageable R&D projects for SMEs-

4.5 Development, testing and implementation of Training program for university lecturers and SME advisors.

5. Dissemination, transfer and use of the project results

5.1 Development of a concept and summary evaluation of the dissemination results of all partners

5.2 Transfer of all educational measures to 60 educational institutions in 13 countries and needs-oriented implementation consultations as well as realization of a bundle of measures for further dissemination of the project results.

5.3 Further dissemination activities such as presentations online, at third-party events, press releases and conferences.

5.4 Book with all results of the project and distribution via book trade.

For each of the three levels of educational measures there will be:

- Target-group-specific educational programs.
- Curricula, teaching materials, etc. developed in a leading role by the educational institutions of the respective level, whereby the educational institutions of the other levels (in particular universities) participate in an advisory and supportive manner.
- Representatives of the participant target groups involved in the development work.

All educational measures will be tested with the respective target groups under different national conditions in the countries, evaluated and completed on the basis of the evaluation results with application notes.

About the Trainings Vocational Master and Technician

One aim of the 3LOE project is to develop two comprehensive vocational master training programs, test them practically under different national conditions, evaluate them, finalize them on the basis of the evaluation results and implement them in the seven Centres of Vocational Excellence.

- Vocational Master Electric
- Vocational Master Carpenter

The two professions were chosen because there was a particularly great need for them among the implementation partners. On the basis of these two master training programs, the Centres of Vocational Excellence can easily develop and implement demand-oriented master training programs for other professions after the end of the project.

The 3LOE project is aimed to train company successors, entrepreneurs and managers, based on a relatively high-level master qualification system. The curricula and examination regulations were developed on the basis of master craftsman training programmes in Germany, which were geared to national conditions and the needs of the

seven Centres of Vocational Excellence and to a very high level of quality. All seven centres have received both training courses and implementation consultations. During the project period, practical tests will be carried out under different national conditions in two countries, evaluations, revisions and completions based on the evaluation results and transfers to all seven centres, which will in future provide this high-quality entrepreneurship training.

One aim of the 3LOE project is to develop two comprehensive technician training programs, test them practically under different national conditions, evaluate them, finalize them on the basis of the evaluation results and implement them in the seven Centres of Vocational Excellence.

- Construction Technician
- Service Technician

The two professions were chosen because there was a particularly great need for them among the implementation partners. On the basis of these two technician training programs, the Centres of Vocational Excellence can easily develop and implement demand-oriented technician training programs for other professions after the end of the project.

Like the technician's training, the master craftsman training is directly connected to the first level when a journeyman's or skilled worker's qualification is obtained. The master craftsman training comprises four parts as well:

Part I: Subject-related practice

Part II: Subject-related theory

Part III: Business Administration and Management

Part IV: Vocational and occupational education

Each part of the master craftsman training concludes with an independent examination; upon successful completion of all four examinations, the master craftsman's title is awarded in the chosen profession. At the same time, in Germany the graduates are entitled to study at a university. The master craftsman training is like the technician's training also located at EQF level 6.

The curriculum for the technician training includes all contents of the professional master qualification, so that it can be used directly for the master training. This means that participants in the technician training course can either obtain the technician's or master's degree or both degrees at the same time.

Curriculum Vocational Master Electric

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1. Overview and concept¹

Master craftsman training is widely different in the Baltic Sea Region countries, showing varying levels of quality. The project is aimed to train company successors, entrepreneurs and managers in the Baltic Sea Region, based on a relatively high-level master qualification system. Another aim is to increase the efficiency and the competitiveness of SMEs by promoting the realisation of the dual vocational training.

On the basis of the German master craftsman training and the experience of further Baltic Sea Region countries, a concept for unified master training for the entire Baltic Sea Region has been developed.

As part of the project, uniform master craftsman training has been developed and implemented using the electrical engineering profession as an example. The following curriculum applies to the master craftsman training in electrical engineering, for use in other occupations, the curriculum for Parts A1 and A2 must be created specific to each profession.

Given the existing large differences in the current master craftsman training in the various Baltic Sea countries, a uniform high level of qualification throughout the Baltic Sea region can only be achieved through an intensive development process of at least six years. In this respect, the present curriculum in sections 1 and 2 contains objectives that are aimed in all Baltic countries in the medium term. In section 3, implementation notes, development paths and basic rules for transition are presented in order to achieve goals.

The concept of unified master training in the Baltic Sea region for the profession of electrician is based on the structure and the high qualification level of the German master craftsman training. The content and the hours of the master's training are different depending on the profession. The following information only applies to the master training in Electrician.

Preconditions for the master training and passing of the master craftsman examination

- Successful completion of at least three-year vocational training in the corresponding and related occupation. In case of shorter duration of studies, proof of professional activity so that at least three years in total could be proven.
- Or: At least five-year professional activity in the corresponding and a related occupation.
- Or: Bachelor studies in the specialty with relevance for the corresponding occupation of the master training.

Structure of the master training

The master training consists of four parts:

A: Practical training and specialised theory with occupation-specific training contents

- Part A1: Practical training including a masterpiece or a demanding master project.²

¹ See the product developed in Project O1 Basics, qualification requirements and concepts. Deviations are based on the fact that Product O1 concerns master craftsmanship in general and the current concept of master craftsmanship in electrical engineering.

² A demanding master's project should contain special demands for a complicated customer order. Within the scope of a demanding customer order technical plant or parts of the plant should be at least drafted, calculated, planned and calculated. The plant or parts of it should also be produced. The achievements should be documented and be calculated again at the end of the master's project.

- Part A2: Specialised theory

B: Business administration and pedagogy with unified training contents for all occupations

- Part B1: Business administration, law and management
- Part B2: Vocational and occupational education knowledge

Every part of the master training is examined separately, and it is completed with an independent, recognised further training graduation. If all four examinations are successfully passed within the period of ten years, the grade of the master in the corresponding occupation is assigned.

Grouping in qualifications framework and evaluations according to the European Credit system for Vocational Education and Training (ECVET)

- Grouping in Level 5 “Higher vocational education” or Level 6 “Bachelor and other comparable education and competences” of the qualification framework.
- Evaluation of acquired competences and skills with Credit Points (CPs); for all four parts of the master craftsman training maximum 180 CPs can be acquired.
- Of 180 CPs maximum 90 CPs can be acquired within the framework of professional activity.
- Acquired CPs can be transferred on the transnational level.
- The completion of further training according to every part of the master craftsman examination as well as master certification is recognised in the whole Baltic Sea region.

Part A1 of the master training: occupation-related practical training including the manufacture of a masterpiece

The competences and skills can be acquired alternatively during

- 400 class hours
- or at least one-year professional activity.
- During studies and professional activity maximum 40 CPs can be acquired.
- The successful passing of the examination of Part A1 leads to the recognised further training certification “Recognised Technician”.

Part A2 of the master craftsman training: occupation-specific theory

The competences and capabilities can be acquired alternatively

- 950 class hours
- or during 200 class hours and at least two-year professional activity.
- During studies or professional activity maximum 90 CPs can be acquired.
- The successful passing of the examination of Part A2 leads to the recognised further training certification “Technical Specialist”.

Part B1 of the master training: Business administration, law and management

- To acquire required competences and skills at least 330 class hours have to be completed.
- Maximum 35 CPs can be acquired.

- The successful passing of the examination of Part B1 leads to the recognised further training certification “Business Administrator”.

Part B2 of the master training: Profession and working-educational knowledge

- To acquire required competences and skills one should complete 120 class hours.
- Maximum 15 CPs can be acquired.
- The successful passing of the examination of Part B2 leads to the recognised further training certification “Instructor”.

Recognition of already acquired competences, knowledge and skills

Competences, knowledge and skills which have already been acquired within other qualification measures and correspond to the master training are recognised for the master training and can lead to the exemption from separate parts of examination, for example:

- Training for Business Administrator with complete recognition in Part B1 of the master training and exemption from this part of examination.
- Passing of the pedagogic qualifying examination with complete recognition in Part B2 of the master training and exemption from this part of examination.
- Full credit of contextual corresponding university degree courses to Parts A2, B1 or B2 of the master training.

The studies can be alternatively conducted in:

- The full-time form with the total duration of about 10 – 12 months.
- The extra-occupational form in the evenings and at weekends with the total duration of 24 to 30 months.

Hours Recommendation Master Training Electrician

Hours Recommendation Master Training Electrician	
Part A1: Practical training	400 hours
Part A2: Specialised theory	950 hours
Part B1: Business administration, law and management	330 hours
Part B2: Profession and working-educational knowledge	120 hours
Total Master Training Electrician	1,800 hours

2. Curriculum

2.1 Part A1 Practical Training and part A2 Specialised Theory³

Separation of Practical Training (part A1) and Specialised Theory (part A2) is not advisable as they are very closely linked. Complex and often closely connected subject content can be taught in parallel. Experience shows that this will further increase the engagement of the participants. There is also content overlap between the subject areas; a purely linear array of subjects can have a negative impact on learning success.

2.11 Learning objectives Parts A1 and A2

The aim of master craftsman training in the field of electrical engineering is to be able to run a company independently, to perform leadership tasks in the fields of technology, business management, personnel management and development, carry out vocational training and independently implement professional competence adapting to new requirements in these areas.

For all main tasks of the electrical engineering master craftsman training, competences for the following joint activities, knowledge and skills will be acquired in the context of a holistic qualification:

- Determine customer requirements, advise customers, calculate services and create offers, negotiate contracts and set order targets.
- Perform technical and commercial management tasks, company organisation, personnel planning and personnel deployment, in particular taking into account company training and continuing education, quality management, liability and occupational safety, work safety, data protection and environmental protection; Use information systems.
- Execute orders taking into account system engineering, maintenance alternatives, topographical conditions, job-related laws, standards, rules and regulations, personnel requirements and training; Organise, plan and monitor order processing and order control.
- Create documentation using computerised systems.
- Consider material properties during planning, construction and execution.
- Develop, plan, manufacture, program, parameterise, construct and maintain electrical equipment, taking into account health and safety-related precautionary measures; Consider and apply techniques for the rational use of energy.
- Apply measuring and testing techniques, assess and document results.
- Design contracts; Develop and maintain standard contracts, especially service contracts.

³ The following curriculum is based on:

a) Curriculum developed by Handwerkskammer Dresden (Dresden Chamber of Skilled Crafts).
b) Ordinance on the examination of master craftsmen in parts III and IV in craft and craft-like trades (General Master Examination Regulations - AMVO), Date of issue: 26/10/2011.
c) Curriculum framework for the preparation for the master craftsman examination for electrical engineering trades, Central Office for Further Training in the Craft Trades Sector (Zentralstelle für die Weiterbildung im Handwerk, ZWH).

- Carry out fault and troubleshooting, take measures to eliminate faults and errors, evaluate and document results.
- Accept and keep records of services, hand them over to the customer, settle accounts and carry out final costing.

Competences for the following specific activities, knowledge and skills in the context of a holistic qualification are to be acquired for the individual main tasks of the electrical engineering master craftsman training:

- Focus on energy and building technology
Planning, calculating, constructing, programming, parameterising, setting up and testing of systems and plant components for energy and building services engineering, in particular for the generation, transmission, conversion and supply of electrical energy, earthing, lightning protection, surge protection and antenna systems, lighting, heating, cooling and air-conditioning systems, building automation, bus technology, signal transmission technology, techniques for the rational use of energy as well as their electrical and electronic operating resources.
- Focus on communication and safety technology systems
Plan, calculate, construct, program, program, parameterise, erect, test, commission and install plant and system components for communications and security technology, in particular telecommunications technology, electro-acoustics, data transmission and processing technology, telecontrol technology, call and signalling technology, alarm signalling technology, emergency warning system technology, video technology, hospital communications technology, access control technology and time management systems.
- Focus on system electronics
Develop, design, plan, calculate, construct, program, program, parameterise, erect, test, test and maintain systems and plant components for system electronics, in particular for measurement, control and drive technology, testing and counting technology, medical and laboratory technology, as well as methods of system integration and software integration.

Recommended hours Part A1 Practical training and Part A2 Specialised theory

Hours Recommendation Part A1 Practical training and Part A2 Specialised theory	
Module A1/A2-1 General principles and Introduction	120 hours
Module A1/A2-2 Specialised training I	136 hours
Module A1/A2-3 Specialised training II	224 hours
Module A1/A2-4 Specialised training III	160 hours
Module A1/A2-5 Specialised training IV	140 hours
Module A1/A2-6 Specialised training V	142 hours
Module A1/A2-7 Specialised training VI	88 hours
Module A1/A2-8 Specialised training VII	176 hours
Module A1/A2-9 Specialised training VIII	152 hours
Total Part A1 Practical training and Part A2 Specialised theory	1,388 hours

2.12 Curriculum framework part A1 and A2

Module A1/A2-1 General principles and Introduction	
Time recommendation: 120 hours	
Technical Mathematics and Physics	16 hours
<p>Learning objectives:</p> <ul style="list-style-type: none"> • Tasks and methods of physics • Physical values and units • Basics of mechanics of solid bodies • Sub-areas of mechanics • Kinematics of linear motion • Force and effect • Work, output, efficiency rate <p>Competencies:</p> <p>The master of electrical engineering...</p> <ul style="list-style-type: none"> • differentiates between types and forms of energy for technical-physical use and takes this into account in planning • is aware of relevant physical units and quantities in the field of mechanics, electrical engineering and heat and assigns them logically • assigns terms such as force, path, mass, weight, acceleration, energy, work, performance, efficiency and their importance to the occasion and applies them to solve problems • describes different number spaces (natural numbers, integral numbers, rational numbers, and irrational numbers) and highlights their significance on an ad-hoc basis • masters relevant types of calculations for rational numbers (addition, subtraction, multiplication, division, power calculation) • is conversant in number systems and masters the conversion to other number systems (e.g. binary, hexadecimal) • creates truth and value tables for binary numbers • masters trigonometric calculation functions <p>Course contents:</p> <ul style="list-style-type: none"> • Energy types and forms for technical-physical use • Physical units and sizes in the field of mechanics, electrical engineering and heat • Terms such as force, distance, mass, weight, acceleration, energy, work, power, efficiency • Number spaces (natural numbers, integral numbers, rational numbers and irrational numbers) • Arithmetic of rational numbers (addition, subtraction, multiplication, division, power calculation) • Other number systems (e.g. binary, hexadecimal) • Truth and value tables for binary numbers • Trigonometric calculation functions 	
Material science	8 hours
<p>Learning objectives:</p> <ul style="list-style-type: none"> • Structure and properties of matter • Metallic materials • Corrosion • Isolation materials • Magnetic materials • Environmental protection and waste disposal regulations <p>Competencies:</p>	

The master of electrical engineering...

- is aware of and distinguishes electrically conductive and electrically non-conductive materials and indicates their properties
- presents special features of electrically conductive and electrically non-conductive materials and their effects relevant for electro-technical planning, depending on the occasion
- distinguishes metals and their properties as electrical conductors (e.g. copper, aluminium, steel, gold)
- knows the meaning and consequences of corrosion (surface) and contact corrosion
- compares different insulation materials and shows their significance (e.g. plastics, rubber)
- distinguishes magnetic and magnetisable materials and shows their importance
- describes different insulating materials (thermal insulation) and their mode of action

Course contents:

- Electrically conductive and electrically non-conductive materials and their properties
- Special properties and their effects, which are relevant for electro-technical planning,
- Metals as electrical conductors (e.g. copper, aluminium, steel, gold)
- Corrosion (surface), contact corrosion
- Insulation materials (e.g. plastics, rubber)
- Magnetic and magnetisable materials
- Insulating materials (thermal insulation)

Electrical engineering

96 hours

Learning objectives:

- Flow field
- Electrical field
- Magnetic field
- Principles of A/C power technology
- Principles of three-phase current technology

Competencies:

The master of electrical engineering...

- distinguishes field types and describes their effects
- is familiar in particular with the effect of voltage and current on electric fields and magnetic fields around electrical conductors
- masters the principles of alternating current
- takes into account the principles of three-phase AC
- shows the advantages and disadvantages of the technical use of the types of electricity

Course contents:

- Field types and their effects
- In particular, the effect of voltage and current on electric fields and magnetic fields around electrical conductors
- Principles of alternating current
- Principles of three-phase AC
- Advantages and disadvantages of the technical use of the types of electricity

Total Module A1/A2-1 General principles and Introduction

120 hours

Module A1/A2-2 Specialised training I

Time recommendation: 136 hours

Tendering and contract regulations and Fire loads

24 hours

Learning objectives:

<ul style="list-style-type: none"> • Determining fire loads • Tendering and contract regulations (VOB (German Construction Contract Procedures)) (country-specific modification) <p>Competencies:</p> <p>The master of electrical engineering...</p> <ul style="list-style-type: none"> • determines fire loads based on manufacturer information • understands general legal requirements for cable and cable laying and pays attention to these in planning • is also aware of country-specific installation guidelines and guidelines and pays attention to these when planning⁴ <p>Course contents:</p> <ul style="list-style-type: none"> • Fire loads based on manufacturer information • Legal requirements for cable and cable routing • Country-specific installation guidelines and directives⁵ 	
Technical drawing in CAD	36 hours
<p>Learning objectives: General principles of technical drawing / standards Execution of drawings in metals technology Technical drawing in electrical engineering (installation plan, circuit diagram, overview circuit diagram) Introduction into electrical-related CAD</p> <p>Competencies:</p> <p>The master of electrical engineering...</p> <ul style="list-style-type: none"> • represents technical relationships in tables, overviews and graphics • masters the principles of equipment designations • understands the basics for creating technical drawings and applies them on an event-specific basis • draws simple and composite geometric figures • applies additional functions such as marking, copying, moving and rotating objects • draws three-dimensional objects • knows the basics of layer functions and applies them <p>Course contents:</p> <ul style="list-style-type: none"> • Representation of technical relationships in tables, overviews and graphics • Principles of resource labelling • Understands and is able to apply the basics of technical drawings • Draw simple and compound geometric figures • Use other functions such as marking, copying, moving, rotating, etc. • Apply three-dimensional drawing • knows and apply the basics of layer function 	
Basics of calculation	24 hours
<p>Learning objectives: Principles of cost accounting and calculation Calculating in electrical trades Tasks and types Cost calculation methods</p>	

⁴ Model Directive on fire protection requirements for piping systems (Model Conduit Systems Directive (MLAR))

⁵ Model Directive on fire protection requirements for piping systems (Model Conduit Systems Directive (MLAR))

Overhead calculation
Contribution margin accounting

Competencies:

The master of electrical engineering...

- understands essential basics of cost and activity accounting
- determines surcharge rates from cost and activity accounting (e.g. company billing sheet)
- applies aggregate rates to determine unit prices with salary and material content
- calculates trade-related unit prices (e.g. price determination based on current metal prices)

Course contents:

- Cost and performance accounting
- Supplementary rates from the cost and activity accounting (e.g. operating statement sheet)
- Aggregate rates for determining unit prices with salary and material content
- Trade-related calculation of unit prices (e.g. price determination based on current metal prices)

Home appliance technics

20 hours

Learning objectives:

- Principles
- Control devices
- Cooking appliances
- Hot-water devices
- Cooling units
- Overview

Competencies:

The master of electrical engineering...

- is aware of different control systems for application in residential areas
- describes the operation of household appliances such as cooking and hot water and refrigeration appliances
- determines the dimensions and connection types of all household appliances using connection diagrams (ladder diagrams) and nameplates

Course contents:

- Control systems for residential applications
- Functioning of household appliances such as cooking appliances, hot water appliances, refrigerators
- Dimensions and connection types of all devices based on connection diagrams (ladder diagrams) and nameplates

Lighting systems

32 hours

Learning objectives:

- Lighting systems
- Definition of visual tasks
- Lighting to maintain safety
- Safety lighting systems
- Outdoor lighting
- Lighting control systems
- Fluorescent tube systems

Competencies:

The master of electrical engineering...

- describes the differences between light colour and colour temperature
- based on information on the light colour and colour temperature, determines suitable solutions for different requirements
- analyses different light sources for different applications
- describes the technical use of light
- distinguishes different possibilities of light generation by heat, discharge and light emission
- understands discharge lamps (low pressure) with different ballasts and determines the advantages of the different techniques
- plans the reactive current compensation in lighting systems
- calculates the influence of daylight within the scope of DIN 18599 Part 4 or similar guidelines
- explains reflection types for determining spatial efficiencies
- calculates the number of lamps according to DIN 12464 considering the criteria for artificial light (including Minimum illuminance, light colour and colour temperature)
- describes the influence of different illuminances, light colours and colour temperatures on the organism and takes these into account when defining requirements
- knows and determines the required quality features of lighting systems and defines them according to requirements
- can carry out light planning in accordance with DIN 12464, taking into account the applicable occupational safety
- takes into account the special features of VDU workplaces during planning
- uses planning and simulation software such as Dialux or similar applications
- develops solutions for the use of self-contained luminaires and central battery systems
- selects safety lights and pictograms according to the occasion and determines their arrangement
- plans the lighting of offices, workshops and outdoor facilities and grounds
- determines the minimum illuminance for different types of use
- sets the distances and the height of the light points as the basis for the determination of the number of luminaires
- describes the structure and operation of the DALI lighting control system and their circuit concepts or similar lighting controls
- explains the mode of operation and applications of fluorescent tubes with high voltages and their normative references

Course contents:

- Light colour, colour temperature
- Light sources
- Technical use of light
- Light generation by heat, discharge and light emission
- Discharge lamps (low pressure) with different ballasts and advantages of different techniques
- Reactive current compensation in lighting systems
- Daylight influence within the scope of DIN 18599 Part 4
- Reflection factors for determining spatial efficiencies
- Adaptation to premises and users
- Calculation of the number of lamps according to DIN 12464- artificial light minimum illuminance, light colour and colour temperature, influence on organism
- Quality features of lighting systems
- Light planning in accordance with DIN 12464, taking into account occupational safety
- Special features of computer workstations
- Planning and simulation software such as Dialux
- Single-battery lights and central battery systems
- Selection and arrangement of safety lights and pictograms
- Lighting of offices, workshops and outdoor lighting
- Minimum illuminance for different uses
- Distances and height of the light point as the basis for determining the number of lights

<ul style="list-style-type: none"> • DALI Lighting control systems and their circuit concepts • Fluorescent tubes with high voltages and normative references 	
Total Module A1/A2-2 Specialised training I	136 hours

Module A1/A2-3 Specialised training II Time recommendation: 224 hours	
Switch / Gear boards	24 hours
Learning objectives: <ul style="list-style-type: none"> • Power supply connection • Switching devices • Circuit documentation Competencies: The master of electrical engineering... <ul style="list-style-type: none"> • understands the basics of distribution boards and switch cabinets and can scale quantities taking into account reserves • explains the basics and operation of wiring and conductor rail systems • calculates the heat in distribution cabinets • selects distributor and control cabinet components based on external influencing factors (for example, TAB (technical connection conditions of the distribution system operators)) • plans the construction of control cabinets with the help of planning tools • is aware of safety systems for safe operation (e.g. extinguishing systems, short-circuit systems) Course contents: <ul style="list-style-type: none"> • Distributors and control cabinets, attention to reserves • Wiring and conductor rail systems • Heat in distribution cabinets • Selection of distribution and control cabinet components based on external influencing factors (for example TAB (technical connection conditions of the distribution system operators)) • Switch cabinets and appropriate planning tools • Safety systems for safe operation (e.g. extinguishing systems, short-circuit systems) 	
Measurement technology	56 hours
Learning objectives: <ul style="list-style-type: none"> • Basics • Electrical characteristic values and data • Direct-reading measuring instruments • Measurement schemes in practical use • Transducers Competencies: The master of electrical engineering... <ul style="list-style-type: none"> • is conversant in key concepts of measurement technology according to DIN 1319 or comparable guidelines (e.g. measured variable, measured value, measurement deviation) and applies the know-how on an ad hoc basis • learns and assigns the physical quantities of the International System of Units (SI unit system) 	

- defines the measuring sequence according to the criteria to be selected (e.g. measuring principle, measuring procedure, measuring method, measuring instrument)
- describes the calibration, adjustment and certification of measuring instruments and observes them in the preparation and use of measuring instruments
- has knowledge of methods to determine uncertainties and calculates measurement uncertainties by statistical evaluations (e.g. Gaussian distribution)
- recognises measurement deviations and measurement accuracies and observes these on an ad hoc basis
- describes measurements of non-electrical quantities (e.g. length change, temperature)
- explains different sensor types (e.g. NTC, PTC, strain gauges, capacitive probes)
- detects effects of measuring chains and measuring chain uncertainties
- takes measurements of electrical quantities
- measures voltage and stroke in simple circuits
- masters analogue measuring methods (e.g. rotary coil)
- understands digital measuring methods and their mode of operation and observes their accuracy
- takes bridge measurements
- performs measurements of voltage and current in low voltage network installations

Course contents:

- Terms of measurement technology (DIN 1319, e.g. measured variable, measured value, measurement deviation)
- Measurement units (SI unit system)
- Measuring procedure according to criteria (e.g. measuring principle, measuring procedure, measuring method, measuring instrument)
- Calibration, adjustment, certification of measuring instruments
- Measurement uncertainty and statistical evaluation (e.g. Gaussian distribution) and exemplary
- measurement deviations and measurement accuracies
- Measurement of non-electrical quantities (e.g. length change, temperature)
- Sensor types (e.g. NTC, PTC, strain gauges, capacitive sensors)
- Effect of measuring chain and measuring chain uncertainty
- Measurement of electrical quantities
- Voltage measurement, current measurement in a simple circuit
- Analogue measuring methods (e.g. rotary coil)
- Digital measuring methods, mode of operation, accuracy
- Bridge measurement
- Measurements of voltage and current in low voltage network installations

CAD applied in an installation project⁶

104 hours

Learning objectives:

- Planning with CAD
- Execution of Installation plans and overview circuit diagrams
- Software-assisted calculation

Competencies:

The master of electrical engineering...

- represents the electro-technical building design
- exports and imports drawings
- draws block diagrams
- learns functions for electrical planning in layouts and creates software-supported circuit diagrams
- knows the basics of circuit management and applies it on a case-by-case basis

- records cable routing systems, switching and plug-in devices, lighting, circuit diagrams
- generates part lists
- calculates costs based on suitable existing or created drawings

Course contents:

- Drawing buildings
- Import and export of drawings
- Draw block diagrams
- Understand and apply the functions of the “Electro” module
- Get to know and apply circuit management
- Draw wiring systems
- Draw switch and plug-in devices
- Draw lighting
- Draw schematics
- Generate component lists
- Calculate on the basis of the drawings

Measurement, control and regulation systems⁷

40 hours

Learning objectives:

- Metrological basics
- Basics of sensor technology
- Measuring value transformation
- Digital measurement instruments and transducers
- Electrical measurement of nonelectric values
- Control systems
- Process control technology
- EIB/KNX
- Other control and automation systems

Competencies:

The master of electrical engineering...

- understands the basic terms of measurement and control technology and applies them on an event-specific basis
- masters the measurement of electrical and non-electrical quantities
- differentiates sensors for measurement, determines their properties and observes them during measurements
- applies basic concepts of measurement on a case-by-case basis
- recognises and determines measurement accuracies and deviations, evaluates errors and tolerances
- describes the signal transmission behaviour of elements of technical systems (step responses)
- is aware of sensors and describes their potential application
- knows the basics of acquiring measured quantities using sensors, sensors and transducers
- is aware of measuring signals and their applications (e.g. current signal 4-20 mA, voltage signal 0-10 V, pneumatic signals, pulse signal) standard reference
- performs measuring transformations (e.g. temperature measurement with PT 100 and transformation into current signal)
- applies measured value storage types
- understands the basics of control engineering
- knows different types of rules and takes them into account
- calculates controller settings
- is aware of the basic terms of automation technology and applies them on an event-related basis
- applies the pyramid model of automation technology

- knows different switching sensors and considers them on an event-related basis
- describes the functionality of conventional and newer actuators and shows their application areas
- understands various transmission systems in connection with automation technology and applies the know-how for the solution of automation-technical tasks
- has knowledge of various programmable control systems as well as control system languages
- masters a selected control system language and applies it on an ad hoc basis

Course contents:

- Basic concepts of measurement and control technology
- Measuring electrical and non-electrical quantities
- Get to know and recognise measuring sensors and their properties
- Terms of measurement technology
- Measurement accuracies, measurement deviations, evaluation of errors and tolerances
- Signal transmission behaviour (step responses)
- Sensors and their applications
- Acquisition of measured quantities by means of sensors, probes, measuring transducers
- Measuring signals (e.g. current signal 4-20 mA, voltage signal 0-10 V, pneumatic signals, pulse signal) reference standard
- Measuring transformations (e.g. temperature measurement with PT100 and transformation into current signal)
- Measurement storage types
- Basics of control engineering
- Rule types
- Adjustment of controllers
- Basic concepts of automation technology
- Pyramid model of automation technology
- Switch sensors
- Actuators
- Transmission systems in connection with automation technology
- programmable control systems
- Control system languages⁸

Total Module A1/A2-3 Specialised training II

224 hours

Module A1/A2-4 Specialised training III

Time recommendation: 160 hours

Electrical machinery

80 hours

Learning objectives:

- Rotating electrical machinery (general)
- DC machines
- Transformers
- Three phase asynchronous motors
- Switching types, speed adjustment
- Three phase synchronous motors

Competencies:

The master of electrical engineering...

- observes the basics of magnetic fields and describes different fields of application
- understands the mode of operation of electric motors based on the magnetic field for alternating and three-phase current and can connect them (synchronous and asynchronous motors)

⁸ Complete project examples of programming in module 8

- is aware of the mode of action of DC motors and can connect them
- describes the mode of action of rotating generators based on different technologies
- can connect the start-up control in conjunction with the familiar motors
- represents the speed controls and connects them according to the occasion
- undertakes a frequency-controlled control of motors and connects them
- describes the mode of action of transformers for use in the low-voltage grid
- masters the basics of transformers for supplying low voltage equipment
- different types of transformers (e.g. toroidal core)
- describes the various components of power supplies
- has knowledge of different rectifier circuits (e.g. one-way, bridge rectification) and their applications in the power supply and calculates component dimensions
- explains the effects of rectification on the shape of the output voltage
- distinguishes different circuits of switching power supplies
- understands electronic components and their properties in rectifier circuits and switching power supplies and can explain their operation and note the occasion

Course contents:

- magnetic fields
- electric motors based on the magnetic field for alternating and three-phase current and connecting (synchronous and asynchronous motors)
- Motors for direct current
- Rotating generators based on different technologies
- Start-up controls in conjunction with motors
- Speed control
- Frequency-controlled control of motors⁹
- Transformers for use in the low-voltage network
- Transformers for supplying low voltage equipment
- different transformer types (e.g. toroidal core)
- Components of power supplies
- Rectifier circuits (e.g. one-way, bridge rectification) and their application in the power supply and component dimensions
- Rectification on the shape of the output voltage
- various circuits of switching power supplies
- electronic components and their properties in rectifier circuits and switching power supplies

Antenna technology

20 hours

Learning objectives:

- Basics of data transmission and receive
- General planning procedures for antenna signal distribution mains
- DVB-S, DVB-C, DVB-T – components
- Calculation tasks
- Wind load calculation, grounding, lightning protection of antenna systems

Competencies:

The master of electrical engineering...

- describes the mode of action of broadcast transmission paths and analyses the effects on the necessary reception technology
- distinguishes different modulation methods and modes of action
- describes different transmission systems DVB-C, -S, -T and selects those suitable considering the local conditions
- defines cabling topologies and plans them according to standards
- calculates amplifier sizes to ensure reception quality
- determines wind loads in outdoor antennae

⁹ Operation of frequency controls is in module 7

- represents an application-specific consideration of lightning protection and equipotential bonding

Course contents:

- Effect of radio transmission paths and effects on necessary reception technology
- Modulation methods and modes of action
- Digital transmission systems DVB-C, -S, -T and consideration of local conditions
- Cabling topologies
- Amplifier sizes to ensure the quality of reception
- Wind loads in outdoor antennae
- Lightning protection and equipotential bonding

Telecommunications / CAD

60 hours

Learning objectives:

- Introduction into telecommunications
- Analogue connection technology
- Switching technology
- ISDN¹⁰
- Telecom systems
- Transmission technology
- Wireless systems¹¹

Competencies:

The master of electrical engineering...

- knows the essential electrical engineering basics of communication technology
- applies the OSI model and defines the layers according to the model
- explains the relationship between bandwidth, symbol rate, and data rate, and analyses transmission channel related issues
- describes the structure and structuring of cable systems for analogue telephony and ISDN (especially for in-house applications) and plans various possible applications
- is aware of the specifications for Ethernet protocol as the most common protocol in Internet communication
- represents the peculiarities of the TCP/IP protocol
- compares the layer model TCP/IP with the OSI model and can show the respective advantages and disadvantages
- shows the address spaces and special features of IP addresses (v4, v6)
- knows different notations and applies them on an order basis
- represents various applications in the IP network (e.g. services, port numbers)
- understands various services that are communicated via the IP network (e.g. VoIP)
- distinguishes the peculiarities of NGN applications and shows advantages and disadvantages

Course contents:

- Communication technology
- OSI model and assignment of layers
- Relationship between bandwidth, symbol rate, data transfer rate¹²
- Applications in the field of telephony
- Construction and structuring of cable systems for analogue telephony and ISDN (in particular for in-house applications)¹³

¹⁰ In Germany the Integrated Services Digital Network (ISDN) and analogue telephone network are expected to be shut down in 2018

¹¹ e.g. Long Term Evolution (LTE) as a worldwide mobile standard

¹² As a basis for various types of communication (such as Internet, telephone, cable TV)

¹³ see How Frequency Controls Work in Module 7

<ul style="list-style-type: none"> • Specifications for the Ethernet protocol as the most common protocol in Internet communication • Protocol of TCP/IP • Layer model TCP/IP compared to the OSI mode • IP addresses (v4, v6) and their address spaces and special features • Notations • Applications in the IP network (e.g. services, port numbers) • Get to know services via the IP network (e.g. VoIP) • Understand and apply NGN applications • Radio services • Local wireless (radio-based) telephony (e.g. DECT) and individual or area-wide applications (illumination of buildings) • Mobile radio standards • Mobile radio in connection with data transmission components 	
Total Module A1/A2-4 Specialised training III	160 hours

Module A1/A2-5 Specialised training IV	
Time recommendation: 140 hours	
Electronics / Digital technology	80 hours
<p>Learning objectives:</p> <ul style="list-style-type: none"> • Semiconductor diode • Bipolar transistor • Field-effect transistor • Operational amplifier • Thyristor • Supply circuit • Digital technology: • + Number systems • + Logical status and level • + Logical link • + Principles of Boolean algebra • + Latches and flip-flops • + Counting circuit • + Shift register • + Code converter • + Calculation circuit <p>Competencies:</p> <p>The master of electrical engineering...</p> <ul style="list-style-type: none"> • describes and explains microelectronic components • masters the interconnection of electronic components e.g. diode, transistor, field-effect transistor, thyristor and understands their mode of action individually and considers them in modules • describes the structure and operation of an interconnection in integrated circuits • applies basics of Boolean algebra using circuits with switching circuits (e.g. AND-, OR- operations with different gates such as NAND or NOR) <p>Course contents:</p> <ul style="list-style-type: none"> • Microelectronic components • Interconnection of electronic components and their mode of action • Components (e.g. Diode, transistor, field effect transistor, thyristor) • Interconnection in integrated circuits • Boolean algebra using circuits with switching circuits (e.g. AND-, OR- with different gates, such as NAND or NOR) 	

Circuit / Wiring systems	28 hours
<p>Learning objectives: Definitions Line calculation for balanced loads and non-inductive loads for AC installations</p> <p>Competencies:</p> <p>The master of electrical engineering...</p> <ul style="list-style-type: none"> describes electrical installation systems for the supply of electrical consumers or for the connection of electric generators and sizes them according to specified criteria knows the criteria for the supply of electrical consumers or the connection of electric generators and explains the need to comply with them calculates cable cross sections to comply with the maximum permissible voltage drop determines the line dimensions according to further criteria such as mechanical strength, after selected protective measure for automatic shutdown in case of indirect contact, according to current carrying capacity after the overload protection and short-circuit protection Sizes cable routing systems made of different materials (e.g. plastic, metal) based on pre-planned cables and lines <p>Course contents:</p> <ul style="list-style-type: none"> Electrical installation systems for the supply of electrical consumers or connection of electrical generators and rating Criteria and derivation of the need for compliance Cable cross sections for compliance with the maximum permissible voltage drop¹⁴ Line dimensions according to further criteria such as mechanical strength, after selected protective measures for automatic shutdown in case of indirect contact, for current carrying capacity, after overload protection and short-circuit protection¹⁵ Dimension cable routing systems made of different materials (e.g. plastic, metal) on the basis of pre-planned cables and lines 	
Compensations systems	32 hours
<p>Learning objectives:</p> <ul style="list-style-type: none"> Definitions Reactance Power compensation in AC installations Power compensation in three-phase installations Types of power compensation <p>Competencies:</p> <p>The master of electrical engineering...</p> <ul style="list-style-type: none"> calculated (capacitive and inductive) reactance of equipment in the AC circuit determines the reactive power based on billing or consumption data determines arithmetically in the AC and three-phase network, the reactive power compensation is aware of different sizes of compensation systems sizes complete reactive current compensation systems <p>Course contents:</p> <ul style="list-style-type: none"> Reactive resistance (capacitive and inductive) of equipment in the AC circuit 	

¹⁴ according to regulations and standards DIN 18015-1, DIN VDE 0100-520, TAB, StromGVV

¹⁵ according to regulations and standards DIN VDE 0100-410, DIN VDE 0298-4, DIN VDE 0276-603, DIN VDE 0276-1000, DIN VDE 0100-430

<ul style="list-style-type: none"> • Reactive power based on billing or consumption data • Reactive power compensation (size of capacitors) in the AC and three-phase network • Sizes of compensation systems • Power factor correction systems 	
Total Module A1/A2-5 Specialised training IV	140 hours

Module A1/A2-6 Specialised training V Time recommendation: 142 hours	
VDE-regulations / accident-prevention regulations	104 hours
<p>Learning objectives: Legal bases and legal duties (country-specific modification!)</p> <p>Competencies:</p> <p>The master of electrical engineering...</p> <ul style="list-style-type: none"> • understands the technical and legal requirements, and guidelines for the erection of electro-technical systems (in particular the low-voltage network) and takes them into account in planning • takes into account VDE regulations for building installations, stationary and portable electrical equipment or similar regulations • is aware of special provisions for installations in damp and wet areas, explosion-proof areas, sensitive areas and takes this into account in planning • plans standards-compliant connections to the supply network • considers accident prevention regulations • analyses and avoids potential dangers when working with electricity <p>Course contents:</p> <ul style="list-style-type: none"> • Technical and legal requirements and guidelines ¹⁶for the construction of electrical equipment (in particular on the low-voltage network) • VDE regulations for building installations, stationary and mobile electrical equipment • Special provisions for installations in damp and wet areas, explosion-proof areas, sensitive areas • Standard compliant connections to the supply network • Accident prevention regulations¹⁷ • Hazard potential when working with electricity 	
Trade-specific regulations and technical connection conditions	38 hours
<p>Learning objectives: Legal foundations Low voltage connection regulation Technical connection requirements – structure and contents (country-specific modification!)</p> <p>Competencies:</p> <p>The master of electrical engineering...</p> <ul style="list-style-type: none"> • recognises trade-related technical connection conditions and takes into account their effects on the planning of electrical installation systems • understands and follows the disposal regulations for waste 	

¹⁶ according to DIN VDE

¹⁷ Specifications by the German Social Accident Insurance (DGUV)

<ul style="list-style-type: none"> takes particular account of the disposal of building materials, cable and cable residues, electrical equipment, electronic components, batteries and accumulators, polluted materials (e.g. fluorescent lamps) <p>Course contents:</p> <ul style="list-style-type: none"> Learn about trade-related technical connection conditions and their effects on the planning of electrical installation systems.¹⁸ Understands and follows the disposal regulations for waste¹⁹ In particular, disposal of construction materials, cable and cable residues, electrical equipment, electronic components, batteries and accumulators, materials contaminated with harmful substances (e. g. fluorescent lamps) 	
Total Module A1/A2-6 Specialised training V	142 hours

Module A1/A2-7 Specialised training VI Time recommendation: 88 hours	
Work planning and order processing	44 hours
<p>Learning objectives: Job planning Order processing Testing and commissioning Training in a sample project</p> <p>Competencies:</p> <p>The master of electrical engineering...</p> <ul style="list-style-type: none"> evaluates order documents and plans order processing processes taking into account the use of materials, equipment, personnel and quality-assured aspects develops, evaluates and corrects (if necessary) technical working plans, in particular sketches, drawings, also using electronic data processing systems. analyses and evaluates approval requirements. allocates and controls subcontracts. plans technical tests, collects relevant data and evaluates and documents test results carries out order-related preliminary and final costing. <p>Course contents:</p> <p>1.1 Order documents Service description; special and additional contractual conditions; technical contractual conditions (VOB (German Construction Contract Procedures) Part C)</p> <p>1.2 Project management Timetables of construction schedules; organisation of workflows; functional sub-steps; graphical presentation of the project progress; procurement and ordering of materials; personnel planning; use of equipment; checklists; preparation, execution and follow-up of work.</p> <p>1.3 Evaluation and correction of project documentation</p> <p>1.4 Release of planning documents and documentation</p> <p>1.5 Conditions of the building permit</p> <p>1.6 Application procedure for power supply and communication connections</p> <p>1.7 VOB (German Construction Contract Procedures) Part B</p> <p>1.8 Performance control of subcontractors</p> <p>1.9 Construction contracts</p> <p>1.10 Testing of protective measures</p> <p>1.11 Documenting audit results</p>	

¹⁸ If necessary replace national technical connection requirements

¹⁹ If necessary Ordinance on the Directive on Proof of Recycling and Disposal (NachwV)

1.12	Application of professional, safety-related laws, standards, rules and regulations
1.13	Calculation based on the given bill of quantities
1.14	Order evaluation
1.15	Final costing of the service rendered
Business management and business organisation	
44 hours	
Learning objectives: <ul style="list-style-type: none"> • Legal types of businesses • Business segment planning • Marketing measures • HR development • Hourly wage rates • Controlling • Training in a sample project 	
Competencies:	
The master of electrical engineering... <ul style="list-style-type: none"> • combines work items into quotation packages and calculates prices; calculates hourly rates based on a predefined cost structure, • determines and uses operational key figures based on predefined schemas, • plans business development based on technical development and the market, • develops and implements personnel development and management concepts, • plans and presents a well-founded operational quality management system, • assigns employees to tasks and guides them, • develops marketing measures for customer care and the acquisition of new customers, • describes and assesses information and communication systems in terms of their operational applications • applies job-related laws, standards, rules and regulations on a job-related basis. • reviews liability risks involved in production, maintenance and services based on suitable criteria • sets out the requirements of occupational safety, health, data protection and environmental protection; assesses hazards and defines security measures. • plans the operation, storage and construction site equipment as well as logistics and presents this planning. 	
Course contents: <ul style="list-style-type: none"> • Operating accounting sheet, cost distribution key, wage and non-wage labour costs; material costs; personnel costs, overhead surcharges, e. g. employer's wages; helping family members; return on equity; rent; depreciation; risks, calculation aids. • Balance sheet, income statement, current year Accounting, operational statistics, company comparisons • Key figures for the skilled trades, in particular. Return on equity; return on total capital; liquidity; cash flow; debt repayment period; return on sales • Business area development: market exploration, market observation and analysis; customer and target group analysis; market segmentation; strategic business areas; evaluation of the business areas; strategy development; introduction of new offers • Determination of personnel requirements: Recruitment and personnel selection, evaluation of application documents; interview • Personnel development: requirements profile; appraisal interview; qualification measures; succession planning • Personnel management: leadership styles; motivation; delegation; teamwork; working atmosphere 	

<ul style="list-style-type: none"> • Self-management: goal setting, target agreement; self-control; telephoning; information management • Quality management and quality assurance: measures; customer orientation; product orientation; employee orientation, process description, checklists, manual, documentation, office organisation, correspondence and mail processing; forms; filing organisation • Instructing employees • Marketing basics: influencing factors. strategic triangle, marketing concept (market analysis; target definition; strategic development; marketing instruments; implementation, sales, control) • IT-usage in the enterprise: Office applications; commercial software; order processing programs; telecommunication, fax, internet, own internet presence, e-commerce • VOB (German Construction Contract Procedures) Part A-C: Obligations Principals/contractors, VOB Part B/BGB Contract for work and services, warranty periods, guarantee, purchase contract, construction contract, acceptance, defect • Fundamentals of occupational safety: Economic effects of occupational health and safety, trade association, social security, service providers, management responsibility, basics of occupational health and safety, basics of the psychology of occupational safety and health protection. • Requirements for operating equipment and warehouse: material logistics; just-in-time delivery; types of storage; stock control and management; logistics; procurement planning; wholesalers; tool hire. 	
Total Module A1/A2-7 Specialised training VI	88 hours

Module A1/A2-8 Specialised training VII Time recommendation: 176 hours	
Heating, air conditioning and climate systems	48 hours
Learning objectives: <ul style="list-style-type: none"> • Introduction • Electrical heating types • Electrical heating devices • Specific thermal calculation/requirements of heat consumption • Air-conditioning • Room ventilation Competencies: The master of electrical engineering... <ul style="list-style-type: none"> • distinguishes between different heat transfer paths between solids and the environment • takes into account different orders of magnitude of heat transfer coefficients in the form of heat flow and evaluates the results determined for this purpose • knows the basics and special features of thermodynamic processes and recognises their effects on heating systems to be planned (in particular, electrical heating systems) • is aware of different electrical heating systems for room heating and hot water production, describes and takes into account their advantages and disadvantages and determines the required sizes • determines the heat output based on building or system data • calculates the cooling capacity on the basis of heat data Course contents:	

- Heat transfer paths between solids and environment
- Orders of magnitude of heat transfer coefficients in the form of heat flow
- Thermodynamic processes and effects on heating systems to be planned (in particular electrical heating systems)
- Electrical heating systems for room heating and hot water production, advantages and disadvantages, sizes
- Heating capacity based on building data or system data
- Cooling capacity based on heat data

Lightning and overvoltage protection

24 hours

Learning objectives:

- Basics
- Laws and standards
- Setup of an external lightning protection system
- Overvoltage protection – overview

Competencies:

The master of electrical engineering...

- is familiar with electrotechnically relevant properties of cloud earth flashes, such as characteristic current values, propagation properties
- detects possible effects and especially dangers of cloud earth flashes on buildings and facilities
- represents the importance of lightning protection systems and conveys them in relation to specific events
- masters the basics of risk management on the basis of DIN EN 62305-2 or a comparable guideline and carries out a risk assessment on a case-by-case basis.
- distinguishes between different sources of damage, causes of damage and types of damage and takes them into account in the context of lightning protection planning for specific events
- determines lightning protection classes to be complied based on a risk analysis
- plans suitable lightning protection systems taking into account the relevant lightning protection class
- plans to erect lightning protection systems
- assembles components and concepts for internal lightning protection and selects them functionally reliable
- represents the connection between lightning protection systems, earthing systems and equipotential bonding and takes this into account in planning
- shows the effects of different design and planning qualities of lightning protection systems on buildings.

Course contents:

- Properties of cloud-earth flashing (such as characteristic current values, propagation properties), effects on buildings and facilities, hazard detection
- Recognizing and communicating the importance of lightning protection systems
- Carry out ²⁰risk management and risk assessment
- Understand the connections between the terms sources of damage, cause of damage and type of damage and observe them in the context of lightning protection planning.
- Determination of the lightning protection classes to be complied with based on the risk analysis
- Plan a suitable lightning protection system taking into account the lightning protection class
- Planning the erection of lightning protection systems
- Assemble components and concepts for internal lightning protection and select them in a functionally safe manner

²⁰ according to DIN EN 62305-2 (VDE 0185-305)

<ul style="list-style-type: none"> • Understand and take into account the interrelationship of lightning protection systems, earthing systems and equipotential bonding in planning. • Effects of different design and planning qualities of lightning protection systems on buildings 	
Renewable energies	16 hours
<p>Learning objectives:</p> <ul style="list-style-type: none"> • General principles of renewable energy use, statistics, trends • Use potentials of various renewable energy resources • Calculation base for mains-powered photovoltaic installations <p>Competencies:</p> <p>The master of electrical engineering...</p> <ul style="list-style-type: none"> • is aware of the essential types of energy such as primary energy, final energy and useful energy and allocates them according to the occasion • describes and determines primary energy factors • distinguishes between forms of use of renewable energies in the field of renewable energy technology • describes the transformation of the term and the consideration of sustainability (from forestry) to technical applications. • is familiar with the operation of technical systems for renewable energies and combined power and heat generation (bulk, fuel cell, photovoltaic) • understands the operation and characteristics of heat pump systems and shows the effects on compliance with efficiency efforts • Determines possible savings potential on the basis of consumption data (from energy service providers) • knows and uses technologies and components of photovoltaic systems • sizing and calculating grid-parallel photovoltaic systems and associated components such as solar modules and inverters • shows economic interrelationships and effects on plant configurations in compliance with national regulations and funding conditions <p>Course contents:</p> <ul style="list-style-type: none"> • Renewable energies and combined power and heat generation (CHP, fuel cell, photovoltaics) • Functioning and characteristics of heat pump systems, effects on compliance with efficiency efforts • Savings potential based on consumption data (from energy service providers) • Technologies and components of photovoltaic systems • Grid-parallel photovoltaic systems and associated components such as solar modules and inverters • Economic interrelationships and effects on plant configurations in compliance with national regulations and funding conditions 	
Bus systems	56 hours
<p>Learning objectives:</p> <ul style="list-style-type: none"> • Industrial bus systems • + Control hierarchy – overview • + System types - overview • Bus systems for buildings • + Overview • + EIB/KNX (European installation / fieldbus protocol for building automation) <p>Competencies:</p> <p>The master of electrical engineering...</p>	

<ul style="list-style-type: none"> • is aware of the special features of Industrial Ethernet and takes them into account in planning • explains the functionality and possible applications of components of building automation systems and industrial automation systems and selects them on a case-by-case basis • determines suitable topologies of building and industrial bus systems and takes them into account in planning • knows EIB/KNX components and configures them with the help of software • configures human-machine interface (HMI = Human Machine Interface) using selected examples <p>Course contents:</p> <ul style="list-style-type: none"> • Special features of Industrial Ethernet • Functionality and application possibilities of components of building automation systems and industrial automation systems • Topologies of Building and Industrial Bus Systems • EIB/KNX components and software • Human-machine interface (HMI) 	
Power electronics	32 hours
<p>Learning objectives:</p> <ul style="list-style-type: none"> • Rectifier and inverter station • Frequency inverter • Switching power supplies • UPS-installations (uninterruptible power supply) <p>Competencies:</p> <p>The master of electrical engineering...</p> <ul style="list-style-type: none"> • explains and takes into account the functionality of rectifiers and inverters • understands different types of wiring of power electronic components and calculates the nominal sizes (dimensioning) e.g. one-way, reusable and bridge direction) • shows significant differences between power electronic components and microelectronic components and takes these into account in planning. • draws up thermal management concepts for power electronic components and takes these into account in the planning process • knows how power electronics can be used for various purposes and explains the functions of controls and systems, e.g. in the field of electrical engineering Frequency controls, switching power supplies, uninterrupted power supply systems and their essential components <p>Course contents:</p> <ul style="list-style-type: none"> • Functionality of rectifiers and inverters • Types of wiring of power electronic components and dimensions (e.g. One-way, reusable, bridge direction) • Differences between power electronic components and microelectronic components, and • Thermal management concepts for power electronic components • Use of power electronics for various purposes; functionality of e.g. power electronics Frequency controls, switching power supplies, uninterrupted power supply systems and their essential components 	
Total Module A1/A2-8 Specialised training VII	176 hours

Module A1/A2-9 Specialised training VIII	
Time recommendation: 152 hours	
Programmable logic control systems (SPS)	88 hours
<p>Learning objectives:</p> <ul style="list-style-type: none"> • Basics • Hardware, outdoor technology • Control technology with PLC • Control types • PLC • Programming with SPS/S7²¹ <p>Competencies:</p> <p>The master of electrical engineering...</p> <ul style="list-style-type: none"> • is aware of different topologies and application examples of central and decentralised control systems • describes the functionality of programmable logic controllers, recognises their functionality, has the basics of a suitable programming language and can program controllers. • programs linkage of a few digital inputs based on classical circuit technology • has mastered further functions of PLC (PLC), e. g flags, analogue-to-digital converters, current and voltage signal converters, arithmetic modules, timers) and applies them in sample programming. • creates complex control tasks and visualization on demonstration devices (or simulation software) <p>Course contents:</p> <ul style="list-style-type: none"> • Topologies and application examples of central and decentralised control systems • Functioning of programmable logic controllers, programming language and programming of controls • Linking of a few digital inputs based on classical circuit technology • Further functions of PLC (PLC) (e.g. flags, analogue-to-digital converters, current and voltage signal converters, arithmetic modules, time switches) and appropriate sample programming. • Complex control tasks and visualization on demonstration devices (or simulation software) 	
Data technical principles	32 hours
<p>Learning objectives:</p> <ul style="list-style-type: none"> • Basics • Structured wiring • Active network technology • WLAN <p>Competencies:</p> <p>The master of electrical engineering...</p> <ul style="list-style-type: none"> • creates a uniform layout plan for application-neutral communication cable systems (structured cabling) • distinguishes between different types of cables and lines and explains their installation rules and connection techniques • distinguishes connections of copper and fibre optic cables • describes various topologies of cabling systems • distinguishes between topologies of cabling systems (e.g. star, tree, ring, line, bus) • has different effects on the cabling systems to be planned (e.g. viewing width, connectivity, diameter) 	

²¹ Information is supplied by the manufacturer (Siemens). The use of any Mini-PLC fulfills the educational purpose and product neutrality as a rule also.

- describes the functionality of switching technology based on the Ethernet protocol, such as switch, router, and gateway, configures and applies it.
- knows the special features of wireless connections (WLAN, WiFi)
- selects components for individual applications and takes them into account when planning and ensures their use in complete buildings and sites

Course contents:

- Application-neutral communication cable systems (structured cabling)
- Types of cables and conductors and their installation rules and connection techniques
- Differentiation of copper and fibre optic cable connections
- Topologies of cabling systems (e.g. star, tree, ring, line, bus)²²
- Terms referring to topologies and effects on systems to be planned (e. g. viewing width, connectivity, diameter)
- Functioning of switching technology based on Ethernet protocol such as switch, router and gateway
- Special features of wireless connections (WLAN, WiFi)
- Selection and planning of components for individual applications as well as use in complete buildings or sites

Hazard alarm technology / CAD

32 hours

Learning objectives:

- Burglar alarm systems
- + Basics
- + Mechanical safety
- + Digital safety
- + CAD applications
- Fire alarm systems
- + Basics
- + Guidelines
- + Planning guidelines
- + CAD applications
- Signalling technology
- + Call systems

Competencies:

The master of electrical engineering...

- is aware of hazard detection systems and their essential components and possesses specialised knowledge in the areas of fire alarm systems, intrusion detection systems, hold-up alarm systems and patient call systems.
- defines components such as detectors, signal transmitters, control panels, topologies in the field of fire detection technology on the basis of defined protective ranges.
- understands technical connection conditions for fire brigades and takes these into account when planning the system
- is aware of the special properties for the use of individual components and takes this into account in the selection and planning of systems (e.g. security against vandalism)
- knows other systems related to fire alarm systems and their functions and components and takes this into account in planning (e.g. smoke and heat extraction systems, door locking systems)
- distinguishes between individual smoke alarms for single operation or networked operation and applies the know-how on a case-by-case basis
- distinguishes monitoring areas of burglary and hold-up reporting systems (such as outer skin monitoring, trap monitoring)

²² Types of cables and wires for communication technology in module A1/A2-5 (Circuit / Wiring systems)

- is aware of different alarm types for the monitoring areas and assigns them according to their functionality
- understands the topologies of burglar alarm systems, analyses their properties and selects them according to the intended use in the planning stage
- describes the size and functional scope of control panels, signal transmitters and other components and takes this into account in planning.
- knows different call systems, their components and topologies and takes this into account when planning
- recognises special features when used in the barrier-free area and takes this into account when selecting components
- configures burglar alarm systems, fire alarm systems and call systems based on small sample projects, locates and resolves errors if necessary
- is aware of the relevant technical and legal requirements for connecting the alarm systems to the facilities of the assistance agencies
- has substantial knowledge of the respective technical connection conditions, the specialist knowledge and certificates of the contractors
- plans and calculates small-scale alarm systems (e.g. small commercial enterprise or residential building)

Course contents:

- Hazard alarm systems and their essential components
- In the area of Hazard alarm systems, in particular recesses for fire alarm systems,
- Burglar alarm systems, hold-up alarm systems, patient call systems
- In the area of fire alarm technology, based on defined protective ²³components such as detectors, signallers, control panels, topologies
- Technical connection conditions for fire brigades and system planning
- Special properties for the use of individual components and systems (e.g. vandalism protection)
- Other systems related to fire alarm systems and their functions and components (e.g. smoke and heat extraction systems, door locking systems)
- Single smoke detector for single operation or networked operation
- Surveillance areas of burglary and hold-up reporting systems (such as outer skin monitoring, trap monitoring)
- Alarm types for the monitoring areas and their functionality
- Topologies of intrusion detection systems and their properties
- Size and functional range of control panels, signal transmitters and other components
- Call systems and their components and topologies
- Special features for use in barrier-free areas
- Configuration of burglar alarm systems, fire alarm systems, call systems
- Technical and legal requirements for connecting the alarm systems to the facilities of the assistance agencies
- Technical conditions of connection, technical knowledge and certificates of the contractors
- Planning and calculation of small-scale alarm systems (e.g. small commercial enterprise or residential building)

Total Module A1/A2-9 Specialised training VIII

152 hours

²³ according to DIN 14675

2.2 Part B1 Business administration, law and management²⁴

2.21 Objectives Part B1

In Part B, the aim of the master craftsman training is to impart the business, commercial and legal competences necessary for independent establishment and running of a company or working as a manager in a company.

As far as business management training is concerned, the main aim is to promote professional decision-making skills, which will help to better cope with increasingly complex and variable tasks.

Competences encompass professionally relevant skills such as targeted use of specialist knowledge, systematic approach to tasks handling, communication skills or learning competence. In addition, the holistic nature of this training also takes into account personality-relevant aspects such as social or human competence.

Teaching of professional competence plays a particularly important role in the master craftsman training. Comprehensive entrepreneurial competence - in particular with regard to business management, commercial and legal matters - is crucial for the success of business activities.

The main objective of this training course is to ensure that masters can use the skills they have acquired in their professional practice. For example, they can make use of business management tools to evaluate alternative courses of action and to make decisions, as well as being aware of legal regulations and their effects. The focus of the training is not on the subject matter taught, but rather on the outcome of the learning process with the crucial question: what competence (s) does the trained master have? The master craftsman should be able to assess the competitiveness of companies, prepare, carry out and evaluate start-up and acquisition activities and finally develop corporate management strategies.

The training in Part B1 aims to pass on professional decision-making skills in order to be able to analyse and evaluate business, commercial and legal problems as an employee, business owner or manager and to identify and document possible solutions and incorporate current developments.

The competences to be acquired are:

Evaluating the competitiveness of companies

²⁴ The curriculum below is based on:

- a) Curriculum developed by Handwerkskammer Dresden (Dresden Chamber of Skilled Crafts).
- b) Markus Glasl, Andrea Greilinger: Curriculum framework for preparation for Part III of the Master Craftsman's Examination, 2011, Ludwig-Fröhler-Institut, Research Institute at the German Institute of Crafts (DHI).
- c) Ordinance on the Masters Examination in Parts III and IV in Crafts and Craft-Related Industries (Allgemeine Meisterprüfungsverordnung - AMVO), Date of issue: 26.10.2011.
- d) Ordinance on the Examination for a Recognised Continuing Education Certified specialist for commercial management in accordance with the Handwerksordnung and a certified specialist for commercial management according to the Handwerksordnung (Examination Ordinance for the Further Education of the Commercial Operational management HwO - PrüVOFortkfmBf), date of issue: 11.11.2014.

The knowledge and skills needed to assess the economic, commercial and legal prerequisites for a company's competitiveness and professional development potential as well as to be able to present decision-making requirements. In particular:

- Analysing company objectives and classifying them in a company target system.
- The importance of corporate culture and corporate image for operational performance and competitiveness.
- Analysing a company's market situation and establishing potential for success.
- Use accounting information, in particular from the balance sheet and income statement, to analyse the strengths and weaknesses of a company.
- Use information from internal and external accounting to prepare decisions,
- Apply legal provisions, in particular trade and craft law as well as commercial and competition law, in the analysis of business objectives and concepts.

Preparing, implementing and evaluating start-up and acquisition activities

The knowledge and skills required to prepare, carry out and evaluate tasks within the framework of the foundation and takeover of a company, taking into account personal, legal and business conditions and goals, as well as to justify their significance for a business concept. In particular:

- The importance of personal skills for the success of self-employment.
- To present and evaluate the economic, social and cultural significance of the craft and the benefits of membership in craft organisations.
- Demonstrate and evaluate the possibilities of using consulting services as well as promotional and support services for the foundation and acquisition of a company.
- Make and substantiate decisions on the location, size of the company, staffing requirements and the establishment and equipment of a company.
- Development and evaluation of marketing concepts for market introduction.
- Drawing up and substantiating the investment plan and financing concept; preparing profitability forecasts and carrying out liquidity planning.
- Take a business concept and establish it legally.
- Apply legal provisions, in particular those of civil law and corporate and tax law, in connection with the establishment or acquisition of craft enterprises.
- Establish the need for private risk and retirement provision, point out possibilities.
- To present and justify the significance of personal aspects as well as business and legal components of a corporate concept in context;

Developing management strategies

The aim is to acquire the knowledge and skills, taking into account company-related strengths and weaknesses as well as market-related opportunities and risks, to manage a company, to identify operational growth potential and to develop corporate strategies. In particular:

- Assessing the importance of the organisational structure and process organisation for the development of a company; making adjustments.
- Evaluate developments in product and service innovations as well as market conditions, also in an international context, and derive growth strategies from them.

- Establish opportunities for the use of marketing instruments for sales and procurement of products and services.
- Derive changes in capital requirements from investment, financial and liquidity planning; present alternatives to raising capital.
- Developing and evaluating concepts for personnel planning, recruitment and qualification as well as presenting instruments of personnel management and development,
- Consider the provisions of employment and social security law when developing a corporate strategy.
- Opportunities and risks of inter-company cooperation.
- Controlling for the development, pursuit, implementation and modification of corporate goals.
- Present instruments for the enforcement of claims and justify their use.
- Describe and justify the necessity of planning business succession, also taking into account inheritance and family law as well as tax regulations.
- Examine the necessity of initiating insolvency proceedings on the basis of company data; identify the legal consequences for the continuation or liquidation of a company.

Recommended Lessons Part B1 Business administration, law and management

Hours Recommendation Part B1 Business administration, law and management	
Module B1/1: Action field “Determining corporate competitiveness”	84 hours
Module B1/2: Action field “Preparing, completing and evaluating start-up and takeover activities”	86 hours
Module B1/3: Action field “Developing corporate government strategies”	98 hours
Module B1/4: Action field “Basic computer skills, bookkeeping using commercial software”	60 hours
Total Part B1 Business administration, law and management	328 hours

2.22 Curriculum Part B1

Module B1/1: Action field “Determining corporate competitiveness” Time recommendation: 84 hours	
Corporate goal system - analysing corporate goals - knowing your goals and goal relationships - establishing a target system	2 hours
Learning objectives: Analysing company objectives and classifying them in a company target system Competencies: <ul style="list-style-type: none"> • Knowing important goals and target relationships • Setting up a target system Course contents: <ul style="list-style-type: none"> • Corporate targets <ul style="list-style-type: none"> - Performance targets - Financial targets - Social goals • Target Relationships <ul style="list-style-type: none"> - Complementary Objectives - Conflicting Objectives - Indifferent Objectives 	
Corporate culture and image - characteristics of corporate culture - motivating significance of corporate culture - communicating corporate social responsibility in the corporate image	2 hours
Learning objectives: Establish the importance of corporate culture and corporate image for operational performance and competitiveness Competencies: <ul style="list-style-type: none"> • Describe characteristics of the corporate culture • Establish the importance of corporate culture through personal or social objectives • Communicating corporate social responsibility in a company's corporate image Course contents: <ul style="list-style-type: none"> • Corporate Culture <ul style="list-style-type: none"> - Symbols and Rituals - Norms and Values 	
Market analysis - significance, procedure, areas of corporate planning - strengths and weaknesses analysis - estimating market opportunities and risks - motivating profit potential	8 hours

Learning objectives:

Analysing a company's market situation and establishing potential for success

Competencies:

- Know the meaning, procedure and areas of corporate planning
- Describe the strengths and weaknesses of a company in the market with regard to the target system
- Assessing market opportunities and risks
- Assessing entrepreneurial risks

Course contents:

- Analysis of past and future developments
- Planning
 - Planning areas and their coordination
 - Planning phases
- Risk assessment

Subsystems of corporate accounting

- financial statements
- cost and performance accounting
- cash-flow statement

2 hours

Bookkeeping

- tasks in view of legal regulations
- double-entry method
- inventory and completion methods (e.g. IT)

22 hours

Annual accounts/period-end closing and business assessment

- balance sheet structure and profit & loss statement
- methods for rating scores, balance sheet figures, performance indicators

15 hours

Learning objectives:

Use accounting information, in particular from the balance sheet and profit and loss account, to analyse the strengths and weaknesses of a company

Competencies:

- Differentiate between subsystems of operational accounting, understand their interrelationships and allocate invoice sizes
- Display structural effects of typical business transactions in the subsystems
- Understand basic principles and concepts of double-entry accounting
- Explain accounting and balance sheet tasks
- Explain the possibilities and advantages and disadvantages of outsourcing accounting tasks on the basis of quality criteria
- Explain the structure and meaningfulness of annual financial statements and business evaluations (BWA) as well as other typical documents.
- Recording and evaluating important types of business assets and liabilities
- Take account of valuation margins, value adjustments, provisions and hidden reserves in the analysis of key figures from external accounting
- Describe the types of depreciation and take them into account in the accounting subsystems
- Carry out sector, time and target/actual comparisons and explain their results
- Determine the profit or loss of a company also during the year
- Perform simple periodic financial planning and know the criteria for critical liquidity situations

Course contents:

- Subsystems of corporate accounting
 - Balance sheet account
 - Cost and revenue accounting
 - Financial accounting
 - Social and potential accounting
- Accounting
 - Tasks and legal regulations
 - Double entry accounting system
 - Inventory and closing
 - Process engineering (e.g. EDP)
- Annual financial statements/period-end closing
 - Structure of balance sheet and income statement
 - Scope for recognition and measurement
 - + accounting principles
 - + valuation of inventories
 - + depreciation
 - + provisions
- Principles of the evaluation of the annual financial statements
 - Balance sheet ratios
 - Profit figures
 - Forms of control
 - + Sector comparisons
 - + Time comparisons
 - + Target/actual comparisons

Cost and performance calculation

- tasks and structuring of cost-type accounting, cost centre accounting, cost unit accounting, profit and loss account, cost accounting systems

17 hours

Learning objectives:

Information from internal and external accounting for decision preparation

Competencies:

- Describe the objectives and tasks of cost element, cost centre and cost object controlling
- Present the effects of cost and revenue changes on financial statements and balance sheet accounts and take them into account when making decisions
- Make decisions about new investments based on budgeted cost accounting
- Reason for the decision to accept (additional) orders using planned cost accounting
- Determine price lower limits using cost object retroactive accounting on a partial cost basis
- Calculate break-even points and derive pricing and conditions policy from them
- Justify decisions on the production program

Course contents:

- Cost and Revenue Accounting
 - Accounting Tasks and Structuring
 - Cost Element Accounting
 - Cost Centre Accounting
 - Cost Object Accounting
 - + Divisional Costing
 - + Surcharge Calculation

<ul style="list-style-type: none"> - Income Statement <ul style="list-style-type: none"> + Profit and Loss Account + Period Profit and Loss Account - Cost Accounting Systems <ul style="list-style-type: none"> + Actual and Planned Cost Accounting + Full and Partial Cost Accounting + Contribution Margin Accounting - Application of Cost Accounting <ul style="list-style-type: none"> + Cost Planning and Control + Decision Support + Profit Threshold Analysis 	
<p>Crafts law and trade law</p> <p>Crafts as a special type of industry</p> <ul style="list-style-type: none"> - entry in the Roll of Craftsmen - unauthorised exercise of a craft and black labour <p>Commercial and corporate law</p> <ul style="list-style-type: none"> - definition of a merchant - company name - commercial register <p>Competition law</p> <ul style="list-style-type: none"> - law against restraints on competition - law against unfair practices - quotation of prices act - store closing law - copyright law 	<p>5 hours</p> <p>4 hours</p> <p>5 hours</p>
<p>Learning objectives:</p> <p>Apply legal regulations, in particular trade and craft law as well as commercial and competition law, in the analysis of business objectives and concepts.</p> <p>Competencies:</p> <ul style="list-style-type: none"> • Check legal requirements for the independent exercise of a craft trade • Is aware of the legal consequences of unauthorised exercise and undeclared work • Know the important points of contact when founding, changing or taking over a craftsman's business and initiate and handle administrative procedures • Take into account the rules on company name, commercial character, registration obligation and the resulting commercial law consequences in the development of concepts • Impact of special duties of merchants on the design of business processes • Examine feasibility/permissibility of market strategies against the backdrop of competition law provisions <p>Course contents:</p> <ul style="list-style-type: none"> • Handicraft and trade law <ul style="list-style-type: none"> - handicraft as a special form of trade - registration in the handicraft register - unauthorised exercise of handicraft and undeclared work • Commercial and Corporate Law <ul style="list-style-type: none"> - Commercial Property - Company Register of Companies • Unfair Competition Law <ul style="list-style-type: none"> - Law against Restraints of Competition 	

<ul style="list-style-type: none"> - Law against Unfair Competition - Pricing Ordinance - Closing Date Law - Copyright 	
Total Module B1/1: Action field “Determining corporate competitiveness”	84 hours

Module B1/2: Action field “Preparing, completing and evaluating start-up and takeover activities” Time recommendation: 86 hours	
Requirements to be met by the entrepreneur <ul style="list-style-type: none"> - personality profile - family profile - subject-specific requirements 	2 hours
Learning objectives: Establish the importance of personal prerequisites for the success of self-employment Competencies: <ul style="list-style-type: none"> • Identifying requirements relevant to successful entrepreneurial activity • Recognizing and assessing one's own ability to run a craft business independently Course contents: <ul style="list-style-type: none"> • Requirements for an entrepreneur <ul style="list-style-type: none"> - Personal requirements - Family requirements - Technical requirements 	
Role of craft trades in the business world and in society <ul style="list-style-type: none"> - role of craft trades in national economy - economic, social and cultural relevance - craft trades organisation 	2 hours
Learning objectives: To present and evaluate the economic, social and cultural significance of the craft and the benefits of membership in craft organisations Competencies: <ul style="list-style-type: none"> • Research craft and sector-specific information on the development of the economy as a whole, present relevant data and compare it with other sources • Being able to explain the macroeconomic context in which a craftsman's business operates • Establish self-image and personal affiliation to the trade • Know the structure of the craft organisation as well as the tasks and services of the individual organisations 	

<ul style="list-style-type: none"> Research craft and sector-specific information on the development of the economy as a whole, present relevant data and compare it with other sources <p>Course contents:</p> <ul style="list-style-type: none"> Positions of handicrafts in the economy <ul style="list-style-type: none"> Economic importance Social significance Cultural significance Handicraft organisations <ul style="list-style-type: none"> Tasks Structures Services 	
<p>Start-up preparation</p> <ul style="list-style-type: none"> start-up consulting- financial and further support services special offerings for craft trades and SMEs market and location analysis start-up planning 	8 hours
<p>Learning objective A:</p> <p>Identify and evaluate possibilities for the use of consulting services as well as promotional and support services for the foundation and takeover of a company.</p> <p>Competencies:</p> <ul style="list-style-type: none"> Know contact points for start-up consulting and evaluate their range of services know and reasonably select public funding and support programs as well as important prerequisites and contact points <p>Course contents:</p> <ul style="list-style-type: none"> Foundation consulting <ul style="list-style-type: none"> Legal aspects Conceptual aspects Financial aspects Financing and support services <ul style="list-style-type: none"> Offers for start-ups Special offers for craft trades and SMEs 	
<p>Learning objective B:</p> <p>Make and substantiate decisions on the location, size of the company, staffing requirements and the establishment and equipment of a company</p> <p>Competencies:</p> <ul style="list-style-type: none"> Know the importance of important location factors Assessing the suitability of sites for operational purposes Know the factors influencing the size of the company in terms of personnel and location Determining personnel requirements Determining the need for fixed and current assets <p>Course contents:</p> <ul style="list-style-type: none"> Market and location analysis <ul style="list-style-type: none"> sales areas and opportunities customer structure location assessment (factors and comparison) Planning of the foundation <ul style="list-style-type: none"> equipment company size (sales, personnel) 	

Marketing - developing and evaluating a marketing scheme - estimating market potential, client groups and needs, figures for incoming orders and sales - market entry and marketing mix	12 hours
Learning objectives: Development and evaluation of marketing concepts for market introduction Competencies: <ul style="list-style-type: none"> • Estimate the type and size of possible customer groups and needs, potential orders and sales figures • Proposals for the design of products, prices, means of communication and distribution channels for market entry • Formulate the business model on the basis of customer benefit and unique selling propositions Course contents: <ul style="list-style-type: none"> • Marketing concept • Sources of information to assess market potential • Market entry-marketing mix 	
Need for private provision for old age - social security systems - private personal and property insurance - pension/retirement provision	6 hours
Learning objectives: Justify the need for private risk and retirement provision, point out possibilities Competencies: <ul style="list-style-type: none"> • Estimate the gap in retirement provision and compare and evaluate alternative private pension instruments • Planning protection against the economic consequences of business problems • Planning social security in the event of accidents, illness and disability Course contents: <ul style="list-style-type: none"> • Social security systems • Personal, property and damage insurance • Retirement provision for the self-employed craftsman 	
Entrepreneurship / company start-up - purchase price calculation - conditions of the takeover agreement - corporate concept (corporate mission, product range)	12 hours
Learning objectives: To present and substantiate the significance of personal aspects as well as business and legal components in the corporate context. Competencies: <ul style="list-style-type: none"> • Check and adjust the consistency of analysis and planning to prepare a business concept • Summarise and present results in a business plan • Develop concepts for foundation and take-over taking into account the framework conditions • Understanding the purpose and structure of a corporate mission statement • Weighing up the possibilities of a takeover contract • Know legal obligations in the event of a takeover • Know important factors influencing purchase price 	

Course contents: <ul style="list-style-type: none"> Corporate Concept <ul style="list-style-type: none"> - Guiding Principles - Product and Service Program - Target Groups Takeover or participation in a company <ul style="list-style-type: none"> - operational inventory protection - criteria for determining the purchase price - drafting of the takeover or company agreement (purchase, lease, pension, etc.) 	
Financing / funding <ul style="list-style-type: none"> - quantifying capital requirements - investment plan and finance concept - financing rules - revenue model, liquidity planning 	10 hours
Learning objectives: <p>Drawing up and substantiating an investment plan and financing concept; preparing profitability forecasts and carrying out liquidity planning</p>	
Competencies: <ul style="list-style-type: none"> Identifying the capital needs of start-ups and larger investments Drawing up and substantiating liquidity plans for the first 5 years for possible scenarios Use forecasting and monitoring tools to avoid liquidity problems Create and justify sales and profitability forecasts Establishing a financing structure Preparing financial negotiations 	
Course contents: <ul style="list-style-type: none"> Financing <ul style="list-style-type: none"> - Determination of capital requirements - Investment plan and financing concept - Financing rules Revenue plan Liquidity planning <ul style="list-style-type: none"> - Liquidity plan - Critical events affecting liquidity in the start-up phase (loss of receivables, tax payments) Profitability forecast 	
Legal forms <ul style="list-style-type: none"> - stock corporations, partnerships/unincorporated firms, individual companies - selection criteria - company agreement 	10 hours
Learning objectives: <p>Derive legal form from a business concept and justify it</p>	
Competencies: <ul style="list-style-type: none"> Knowledge of common legal forms and their consequences for corporate management Selecting a legal form Check the rules in the articles of association and, if necessary, adapt them to the business concept 	
Course contents: <ul style="list-style-type: none"> Legal forms <ul style="list-style-type: none"> - Corporations 	

<ul style="list-style-type: none"> - Partnerships - Sole proprietorships • Choice of legal form criteria • Articles of partnership 	
Classification of the legal system <ul style="list-style-type: none"> - civil and public law - contract law (general contract law, purchase agreement) - property law (property, ownership) - start-up relevant regulations - tax law 	12 hours
Tax law <ul style="list-style-type: none"> - VAT, trade tax - assessed income tax - corporate tax, taxation procedure 	12 hours
Learning objectives: <p>Apply legal provisions, in particular those of civil law and corporate and tax law, in connection with the establishment or acquisition of craft enterprises</p> Competencies: <ul style="list-style-type: none"> • Explain the fundamentals of the German legal system • Differentiate between legal, business and criminal capacity • Declare the legal significance of the declaration of intent, representation and power of attorney as well as consent and approval • Conclude contracts and assess their legal validity • Examine the possibility of rescinding contracts • Be aware of service obligations and liability consequences (also for vicarious agents) • Create legal documents in business transactions • Assessing rights and obligations arising from general terms and conditions of business and checking the use of general terms and conditions in relation to a corporate concept • Legal representation of the management in legal matters • Know the basic concepts of property law and security rights • Setting up permanent establishments in compliance with legal regulations • Understanding the main principles of taxation • Preliminary VAT return and income tax return completed on time Course contents: <ul style="list-style-type: none"> • Classification of the legal system <ul style="list-style-type: none"> - Private and public law - Classification of the Civil Code • General part of the Civil Code <ul style="list-style-type: none"> - Rights and legal capacity - Legal transactions • Contract Law <ul style="list-style-type: none"> - General Contract Law - Purchase Contract - Works and Works Supply Contract - Lease and Lease Contract - Guarantee • Property law (property, ownership, security rights) • Legislation relevant to the formation of a company <ul style="list-style-type: none"> - Building, environmental protection and waste regulations - Handicraft, trade and tax law - Work place regulations • Tax law <ul style="list-style-type: none"> - Value added tax 	

<ul style="list-style-type: none"> - Trade tax - Assessment of income tax - Corporation tax - Taxation procedure 	
Total Module B1/2: Action field “Preparing, completing and evaluating start-up and takeover activities”	86 hours

Module B1/3: Action field “Developing corporate government strategies” Time recommendation: 98 hours	
Organisation <ul style="list-style-type: none"> - organisational structure - types of organisation, organisational development - workflow organisation, process analysis - use of modern communication tools 	4 hours
Learning objectives: Assessing the importance of the organisational structure and process organisation for company development; making adjustments Competencies: <ul style="list-style-type: none"> • Knowing the areas, instruments and principles of an organisation • Document business processes taking into account organisational structure and process organisation • Create organisational charts and job descriptions • Suggestions for adapting the organisational structure of business processes • Recognizing the effects of planned company development on an organisation Course contents: <ul style="list-style-type: none"> • Organisational structure <ul style="list-style-type: none"> - Task analysis and synthesis - Job creation - Organisational forms (functional, divisional, project) - Organisational development • Process Organisation <ul style="list-style-type: none"> - Process Analysis and Design - Logistics - Quality Management - Working Time Models - Group Organisation • Administration and office organisation <ul style="list-style-type: none"> - Document management - Use of modern information and communication technologies - Organisation of accounting systems 	
Product development <ul style="list-style-type: none"> - sales and purchase market analysis - market research and market analysis techniques - clients, general public, suppliers - products, preparing decisions 	8 hours

Learning objectives:

Evaluate developments in product and service innovations as well as market conditions, also in an international context, and derive growth strategies from them

Competencies:

- Systematically explore, evaluate and document sources of information on product and service trends, taking into account company and market conditions
- Weighing up and selecting methods of market research with regard to their possible applications
- Evaluating customer data
- Prepare and conduct customer surveys
- Carry out strength-weaknesses and opportunity-risk analyses (SWOT analyses) and derive strategies
- Perform pro-contra analysis and value analyses and derive decisions from them

Course contents:

- Analysis of the sales and procurement market
 - Methods of market analysis and market research
 - Objects of market analysis and market research
 - + Customers
 - + Public
 - + Suppliers
 - + Competitor (benchmarking)
 - + Products
- Methods for decision preparation and determination

Understanding and use of marketing instruments

- Marketing functions and instruments
- client orientation and client attention
- communication and promotion policies
- pricing and conditions policies
- procurement planning (supplier selection)

8 hours

Learning objectives:

Establish opportunities for the use of marketing instruments for sales and procurement of products and services

Competencies:

- Providing an overview of marketing areas and instruments and explaining common features as well as differences in marketing in procurement and sales markets
- Identify the consequences of sales policy decisions and justify decisions for a marketing mix
- Explain the sequence of procurement processes and analyse weak points

Course contents:

- Marketing functions and instruments on the sales side
 - Customer orientation and customer care
 - Communication and advertising policy
 - + Advertising
 - + Public relations
 - + Sales promotion
- Price and conditions policy
 - Procurement
 - Procurement planning (supplier selection and relationship)
 - Terms of delivery and payment
 - Material and invoice control
 - Stock keeping and warehouse disposition

Capital requirements and financing <ul style="list-style-type: none"> - planning of investments, financial and liquidity planning - types of financing - alternative forms of financing - money transfer 	8 hours
Learning objectives: Derive changes in capital requirements from investment, finance and liquidity planning; present alternatives for raising capital Competencies: <ul style="list-style-type: none"> • Differentiate between forms of payment transactions • Derive opportunities for raising capital from the company's financial situation • Differentiate between types of loan collateral and understand its significance Course contents: <ul style="list-style-type: none"> • Investment, financial and liquidity planning • Types of financing <ul style="list-style-type: none"> - Equity-financing - Self-financing - Debt financing (loan types and collateral) - Alternative forms of financing • Payment transactions 	
Human resources <ul style="list-style-type: none"> - personnel planning, staffing demand - recruitment and selection - personnel placement, staffing - work time models, human resources development, wages 	8 hours
Learning objectives: Developing and evaluating concepts for personnel planning, recruitment and qualification as well as presenting instruments for personnel management and development Competencies: <ul style="list-style-type: none"> • Determine personnel requirements on the basis of corporate planning and specify them in job descriptions • Evaluate recruitment opportunities, advertise vacancies and conduct interviews • Determine further training needs of employees and draw up concepts for qualification in line with requirements • Know measures for employee motivation and retention • Evaluate the possible applications of different working time and remuneration models • Conduct feedback meetings with employees • Understand the importance of the working climate • Understand company pension schemes • Aware of strategies to prevent bullying • Know the basics of operational reintegration management (BEM) • Reflect on one's own management behaviour and understand the effects on employees and the working atmosphere Course contents: <ul style="list-style-type: none"> • Personnel planning <ul style="list-style-type: none"> - Personnel requirements assessment - Recruitment and selection - Staff deployment and staffing - Working time models - Personnel development 	

<ul style="list-style-type: none"> • Personnel administration <ul style="list-style-type: none"> - Personnel file - Archiving, data protection • Remuneration <ul style="list-style-type: none"> - Time recording - Work evaluation - Wages - Company pension scheme • Employee leadership <ul style="list-style-type: none"> - Leadership styles and resources - Work climate - Social relations - Welfare (work, accident and health protection) 	
Inter-company co-operation <ul style="list-style-type: none"> - value chains - co-operation schemes 	6 hours
Learning objectives: Presenting opportunities and risks of inter-company cooperation Competencies: <ul style="list-style-type: none"> • Analysing value chains for opportunities for cooperation and weighing up opportunities and risks • Selecting and addressing suitable cooperation partners taking into account common goals Course contents: <ul style="list-style-type: none"> • Inter-company cooperation • Value chains • Forms of cooperation 	
Controlling <ul style="list-style-type: none"> - mission and objectives - weak point analysis - operating figures and performance indicator systems - costs and revenues management and control 	16 hours
Learning objectives: Development, pursuit, implementation and modification of corporate goals. Competencies: <ul style="list-style-type: none"> • Present controlling tools and use them to analyse the situation, detect undesirable developments and identify future potential. • Use controlling tools to maintain liquidity and ensure profitability • Monitor the achievement of corporate goals, adjust company targets if necessary and justify measures to achieve the goals Course contents: <ul style="list-style-type: none"> • Controlling <ul style="list-style-type: none"> - Tasks and Objectives - Analysis of Weaknesses - Key Figures and Indicator Target Systems - Budgeting - Scenario Technique • Managing and controlling costs and revenues 	

Labour law and social legislation <ul style="list-style-type: none"> - labour law (employment contract, types of contracts) - dismissal protection (collective agreement, parties) - health and safety of workers in work - social insurance law - freedom to choose insurance providers, insurance fees/payments - reporting requirements 	24 hours
Learning objectives: <p>Consider the provisions of employment and social security law when developing a corporate strategy</p> Competencies: <ul style="list-style-type: none"> • Establishing and terminating employment relationships • Adhere to employment rights and obligations • Take account of regulations on collective bargaining agreements, co-determination and occupational safety relevant to SMEs when drawing up contracts and working conditions. • Analyse basic elements of the social security system with regard to company obligations and options for structuring the system and describe important regulations on compulsory insurance, contributions, benefits and reporting requirements. • Investigate and assess tax levels, payment of income tax and the employer's liability as well as possibilities of benefits and reimbursement of expenses for payroll accounting. Course contents: <ul style="list-style-type: none"> • Labour law <ul style="list-style-type: none"> - Employment contract <ul style="list-style-type: none"> + Contract types + Contractual obligations of the employer and employee + Termination of employment relationship - Protection against dismissal <ul style="list-style-type: none"> + Collective agreement <ul style="list-style-type: none"> + Parties to a collective agreement + Collective agreement - Works constitution <ul style="list-style-type: none"> + Works Councils + Works agreement - Occupational health and safety at work <ul style="list-style-type: none"> - Occupational Safety and Health Ordinance <ul style="list-style-type: none"> + Maternity leave - Protection for severely handicapped persons - Labour jurisdiction • Social security law (insurance provider, obligation, freedom, contributions, benefits, obligations to register) <ul style="list-style-type: none"> - Health and nursing care insurance - unemployment insurance, work promotion - pension insurance - statutory accident insurance • Income Tax <ul style="list-style-type: none"> - Determination and Payment - Wage Tax Liability 	
Claims management <ul style="list-style-type: none"> - accounts receivable management - dunning and legal actions - debt collection and compulsory execution 	6 hours
Learning objectives: <p>Present instruments for the enforcement of claims and justify their use</p>	

Competencies: <ul style="list-style-type: none"> Assessing risks of non-payment defaults and presenting possibilities for monitoring incoming payments Assessing measures to enforce claims and accelerate payments Know the procedure and costs of legal proceedings (especially reminders and enforcement) Course contents: <ul style="list-style-type: none"> Account receivables management and payment terms Warning and legal action proceedings Debt collection and enforcement 	
Corporate succession - family law, inheritance law, marital property regime - legal succession, inheritance tax and gift tax Insolvency proceedings - leading indicators of insolvency - insolvency act, reorganisation and winding-up	10 hours
Learning objectives: Describe and justify the necessity of planning business succession, also taking into account inheritance and family law as well as tax regulations Competencies: <ul style="list-style-type: none"> Know and understand the rules of legal succession Weighing up the possibilities of structuring by means of inheritance contracts and wills Know the basic tax-free amounts and tax classes of inheritance and gift tax as well as the possibilities for structuring inheritance and gift tax Know the differences between profit sharing and property separation Course contents: <ul style="list-style-type: none"> Family and inheritance law Matrimonial property law Succession Inheritance and gift tax 	
Learning objectives: Evaluate the necessity of initiating insolvency proceedings on the basis of company data; identify the legal consequences of insolvency for the continuation or liquidation of a company Competencies: <ul style="list-style-type: none"> Recognizing the obligation to file for insolvency depending on the legal form and presenting the consequences of corporate and private insolvency Describe the course of insolvency proceedings and assess possibilities for continuation and liquidation Knowing the possibilities and prerequisites for residual debt relief Course contents: <ul style="list-style-type: none"> Insolvency Proceedings <ul style="list-style-type: none"> Early Insolvency Indicators Insolvency Regulations Restructuring and Liquidation 	
Total Module B1/3: Action field “Developing corporate government strategies”	98 hours

Module B1/4: Action field “Basic computer skills, bookkeeping using commercial software” Time recommendation: 60 hours	
Basic computer skills - basics of operating systems - file architecture - data security and protection	3 hours
Learning objectives: To learn about operating systems, data organisation, data security and protection as well as to use information and communication technologies Competencies: <ul style="list-style-type: none"> • Master operating systems, data organisation, data security and protection • Be able to use information and communication technologies for business purposes • Be able to carry out systematic searches Course contents: <ul style="list-style-type: none"> • Performing important basic tasks in the IT system • Get to know operating systems • Learn about data organisation, security and protection • Gain and test an overview of information and communication technologies 	
Creating, checking and posting vouchers - assets accounting, accounts payable - cash accounting - payroll accounting - account assignment and posting	28 hours
Learning objectives: Accounting in a craftsman's business using industry-standard software Competencies: <ul style="list-style-type: none"> • Capabilities to record and check business transactions manually and electronically for accounting purposes Course contents: <ul style="list-style-type: none"> • Account system, chart of accounts, account classes, company codes • Entering company data and accounting documents in the EDP system • Create, check and assign documents, • Create, manage and check the cash book, • Prepare payroll, • Posting balance sheet and profit and loss accounts • Post business transactions 	
Creating and checking the cash ledger - cash ledger structure - recording of cash operations, cheque transactions - cash book control, differences - document control and record keeping	7 hours

<p>Learning objectives:</p> <p>Use an electronic cash journal to enter all of a company's cash transactions and enter and check business transactions with date, document number, tax rate, amount of revenue or expenditure, sales tax and current cash balance.</p> <p>Competencies:</p> <ul style="list-style-type: none"> • Know the structure of the cash book, make all entries and carry out controls • Know basic legal requirements • Master relevant software and be able to keep cash books directly online <p>Course contents:</p> <ul style="list-style-type: none"> • Get to know cash book structure and create a cash book • Get to know relevant software and test alternative software • Make all entries • Keeping the cash book online • Carry out inspections 	
<p>Payroll procedures</p> <ul style="list-style-type: none"> - entering employee information - recording of working times - payroll structure and elements - dates and deadlines 	10 hours
<p>Learning objectives:</p> <p>Carry out computer-aided payroll accounting and payroll accounting in accordance with the requirements of social insurance law and income tax law, carry out regular monthly payroll accounting by means of EDP as well as annual financial statement work in the area of payroll accounting.</p> <p>Competencies:</p> <ul style="list-style-type: none"> • Be able to carry out computer-aided payroll accounting and payroll accounting • Be able to assess the advantages and disadvantages of alternative solutions and systems <p>Course contents:</p> <ul style="list-style-type: none"> • Data maintenance of employees • Recording of working hours • Create gross and net payroll • Creating health insurance plans create income tax filing • Data medium exchange for salaries, asset accumulations, other transfers • Registrations and cancellations of employees • Simple Wage Posting <ul style="list-style-type: none"> - Payroll Account - Entering Wages and Salaries 	
<p>Preparation of financial statements</p> <ul style="list-style-type: none"> - inventory - recognition and valuation principles - asset accounting 	12 hours
<p>Learning objectives:</p> <p>Prepare an annual financial statement, carry out closing entries, carry out evaluations and submit reports as well as a business analysis of the annual financial statements</p> <p>Competencies:</p> <ul style="list-style-type: none"> • To be able to fully prepare an annual financial statement and make final entries • Master all regulations and submit required reports 	

- Carry out well-founded business analysis, derive consequences and develop conclusions for entrepreneurial strategies

Course contents:

- Annual financial statements postings
 - Creation of the reservation list annual financial statements
 - Correction by general reversal
 - Creation of fixed mirror - Depreciation
 - Bookings ARAP and provisions
 - Bad debt, general allowance
- Evaluations:
 - Primanota Sales Tax Advance Notification
 - Summary Notification
 - Further evaluations (movement balance sheet, etc.)
- Preparation fix annual accounts
 - Fix lead time - Update balance sheet values
 - Official depreciation - Table
- Evaluations for year-end closing
 - Business management evaluations (BWA)
 - Evaluations (balance sheet, profit and loss statement)

Total Module B1/4: Action field “Basic computer skills, bookkeeping using commercial software”

60 hours

2.3 Part B2 Vocational and occupational education knowledge²⁵

2.31 Objectives Part B2

The trained master craftsman should have vocational and work pedagogical knowledge, so that he has the necessary competence for proper training of apprentices (trainees) to plan, carry out and control the vocational training independently. The competencies relate to the following fields of action:

Examine training requirements and plan training

The master craftsman must be able to examine and assess training prerequisites on the basis of company, occupation-related and legal provisions and to plan training, also taking into account extra-company training periods. This is linked to the qualifications required to carry out the following tasks.

- To present and justify the advantages and benefits of in-company vocational training.
- Planning, preparing and making decisions on the basis of legal, collective bargaining agreements and company framework conditions.
- Present structures of the vocational education and training system and its interfaces.
- Select training occupations for the company and justify selection.

²⁵ The curriculum below is based on:

a) Curriculum developed by Handwerkskammer Dresden (Dresden Chamber of Skilled Crafts).

b) Ordinance on the examination of master craftsmen in parts III and IV in craft and craft-like trades (General Master Examination Regulations - AMVO), Date of issue: 26.10.2011.

c) Curriculum framework for the preparation for the master craftsman's examination for electrical engineering trades, Central Office for Further Training in the Craft Trades Sector (Zentralstelle für die Weiterbildung im Handwerk, ZWH).

- Examine the company's suitability for training in the target occupations to be trained, in particular taking into account training within the network, inter-company and extra-company training.
- Examine and evaluate the possibilities of using preparatory measures for vocational training.
- Coordinate internal distribution of responsibilities for training within the company, taking into account the functions and qualifications of those involved in training.

Preparing training and hiring trainees

The master craftsman must have the necessary knowledge and skills to perform preparatory training tasks, define selection criteria for recruitment and carry out recruitment procedures, including taking into account company work and business processes as well as legal aspects. This is linked to the qualifications required to carry out the following tasks.

- Drawing up an in-company training plan on the basis of training regulations, which is oriented in particular towards work and business processes typical of the occupation.
- To present and justify opportunities for participation and co-determination of company interest groups in vocational education and training.
- Determining the need for cooperation and coordinating its content and organisation with cooperation partners, in particular the vocational school.
- Apply criteria and procedures for the selection of trainees also taking into account their diversity.
- Prepare and conclude the vocational training contract and arrange for its registration with the competent authority.
- Check if parts of the vocational training can be carried out abroad.

Perform training

The master must be able to plan and control learning processes in an action-oriented manner and to promote independent learning. In doing so, work and business processes typical for the profession as well as the trainees' job opportunities and learning requirements must be taken into account. This is linked to the qualifications required to carry out the following tasks.

- Creating learning conditions and motivating learning culture, giving and receiving feedback.
- Organise, design and evaluate probationary periods.
- Develop and design learning and work assignments based on the company's training plan and the work and business processes typical of the occupation.
- Selecting training methods and media appropriate to the target group and using them in specific situations.
- Support apprentices in the event of learning difficulties through individual training arrangements and training guidance, use training support aids and examine possibilities for extending the training period.
- Examine and propose additional training opportunities for trainees, in particular additional qualifications; examine possibilities of shortening the duration of training and early admission to the final examination or apprenticeship examination.
- Promoting the social and personal development of trainees; identifying problems and conflicts in good time and working towards solutions.

- Develop learning and working in a team.
- Determine and evaluate the performance of trainees, evaluate performance assessments of third parties and examination results, conduct appraisal interviews, draw conclusions for further course of training.
- Promoting intercultural competences in the company.

Finish training

The master must possess the ability to lead the training to a successful conclusion and to point out opportunities for further learning and qualification paths. This is linked to the qualifications required to carry out the following tasks.

- Prepare trainees for the final examination or apprenticeship examination taking into account the examination dates and lead the training to a successful conclusion.
- Ensure that the trainees register for examinations with the competent body and draw their attention to any special features relevant for implementation.
- Create written certificates based on performance appraisals.
- Inform and advise trainees on company development paths and vocational training opportunities.

Recommended hours Part B2: Vocational and occupational education knowledge

Hours Recommendation Part B2: Vocational and occupational education knowledge	
Module B2/1: Action field “Review of training requirements and training planning”	25 hours
Module B2/2: Action field “Training preparation and assisting in recruiting prospective trainees”	23 hours
Module B2/3: Action field “Conducting training”	52 hours
Module B2/4: Action field “Completion of training”	15 hours
Total Part B2: Profession and working-educational knowledge	115 hours

2.32 Curriculum framework part B2

Module B2/1: Action field “Review of training requirements and training planning”	
Time recommendation: 25 hours	
Presenting and motivating the benefits and use of in-company training	2 hours
<p>Learning objectives: Presenting and substantiating the advantages and benefits of in-company vocational training</p> <p>Competencies:</p> <ul style="list-style-type: none"> a) Emphasise the aims and tasks of vocational training, in particular the importance of professional competence for the sector and the company. b) Describe the advantages and benefits of training for young people, business and society. c) Justify the benefits of training also taking into account the costs for the own company <p>Course contents:</p> <ul style="list-style-type: none"> 1. Advantages and benefits of in-company training 1.1 Objectives and tasks of vocational training 1.2 Importance of training for young people, the economy and society 1.3 Benefits and costs of training for the company 	
Participating in planning and decision-making with regards to specific training needs, to legal and operational conditions, and to the collective agreement	3 hours
<p>Learning objectives: Planning, preparing and making decisions on the basis of legal, collective bargaining agreements and company framework conditions.</p> <p>Competencies:</p> <ul style="list-style-type: none"> a) Determine training needs on the basis of the company's development and operating environment. b) Emphasize the importance of training in personnel development. c) Draw on the legal and collective bargaining framework for training decisions. <p>Course contents:</p> <ul style="list-style-type: none"> 2. Occupational training needs and framework conditions of training 2.1 Personnel planning and training requirements 2.2 Legal framework conditions of training - in particular the Vocational Training Act, Handicrafts regulations, youth employment protection law 	
Presenting the vocational training system structures and its liaising areas	2 hours
<p>Learning objectives: Present structures of the vocational education and training system and its interfaces.</p> <p>Competencies:</p> <ul style="list-style-type: none"> a) Describe the integration of the vocational training system into the structure of the education system. b) Demands on the education system for vocational education and training. c) Describe the dual system of vocational training in terms of structure, responsibilities, tasks and control. <p>Course contents:</p> <ul style="list-style-type: none"> 3. Structures and interfaces of the vocation training system 3.1 Classification of the vocational training system in the national education system 3.2 Essential requirements for the education system: in particular equal opportunities, permeability, transparency and equivalence 3.3 The dual system of vocational training: structure, responsibilities, areas of responsibility, supervision 	

Selecting training professions for a company and specifying their purpose	2 hours
<p>Learning objectives: Select training occupations for the company and justify selection.</p> <p>Competencies:</p> <ol style="list-style-type: none"> Describe the emergence of state-approved training occupations. Observe and represent the structure and binding nature of training regulations. Describe the functions and objectives of training regulations. Determine training occupations for the company on the basis of training regulations and make use of opportunities for flexibility. <p>Course contents:</p> <ol style="list-style-type: none"> Selection of training occupations <ol style="list-style-type: none"> Formation and list of state-approved training occupations Structure, functions, objectives of training regulations Training opportunities in the company 	
Examining qualification of a company with regards to training in a desired vocational training field and whether and to what extent training contents shall be conveyed outside the company, in particular by a combination of interplant and external vocational training	8 hours
<p>Learning objectives: Examine the company's suitability for providing training in the target occupations to be trained, in particular taking into account training within the network, inter-company and inter-company vocational training. External vocational training.</p> <p>Competencies:</p> <ol style="list-style-type: none"> Clarify personal and professional suitability for hiring and training and present possibilities for removing obstacles to training. Examine the training facility's suitability for carrying out the training and, if necessary, present any necessary measures for establishing the suitability. Identify the need for training outside the training centre and identify appropriate opportunities. Describe how chambers and guilds can support enterprises with training. Explain the tasks of the competent authority to monitor suitability, review the consequences of violations and know the reasons for withdrawing training entitlement. <p>Course contents:</p> <ol style="list-style-type: none"> Suitability for training <ol style="list-style-type: none"> Personal and professional aptitude in accordance with BBiG and HwO, obstacles to training Selection criteria of the training centre External and joint training Tasks of the craft organisations (chamber, guild) to support training Administrative offences and withdrawal of training entitlement 	
Assessing chances for applying preparatory measures in vocational training	2 hours
<p>Learning objectives: Examine and evaluate the possibilities of using preparatory measures for vocational training.</p> <p>Competencies:</p> <ol style="list-style-type: none"> Present target group-specific vocational preparation measures for training planning and justify selection. Evaluate the importance of vocational preparation measures for recruiting junior staff and indicate funding opportunities. Clarify the possibilities of implementing job preparation measures in the company. <p>Course contents:</p> <ol style="list-style-type: none"> Vocational preparation measures 	

6.1 Target groups, prerequisites and legal foundations for preparatory measures for the profession 6.2 Importance of vocational preparation measures and funding opportunities 6.3 Structuring the content of vocational preparation measures (qualification modules)	
In a company – co-ordinating tasks of personnel involved in the training, in due consideration of their functions and qualifications	6 hours
Learning objectives: Coordinate internal distribution of responsibilities for training within the company, taking into account the functions and qualifications of those involved in training.	
Competencies: <ol style="list-style-type: none"> Determine the tasks and responsibilities of those involved in training. To illustrate the function and tasks of the trainer in the field of conflicting expectations. Clarify tasks of participating specialists and coordinate their involvement in the training. 	
Course contents: 7. Tasks and responsibilities of those involved in training 7.1 Delimitation: trainers, instructors, training officers 7.2 Role and tasks of the instructor 7.3 Role, tasks and prerequisites of the participating training officers	
Total Module B2/1: Action field “Review of training requirements and training planning”	25 hours

Module B2/2: Action field “Training preparation and assisting in recruiting prospective trainees” Time recommendation: 23 hours	
Drawing up an operational training plan based on training regulations, in due consideration of job-specific work and business processes	5 hours
Learning objectives: An in-company training plan based on training regulations which is geared in particular to work and business processes typical of the profession.	
Competencies: <ol style="list-style-type: none"> Justify the importance, objective and content of an in-company training plan for regular training. Highlight the contents of the training regulations relevant for training planning. Establish a link between the objective and temporal structure of the training framework plan and the company's work and business processes. Drawing up an in-company training plan taking into account specific company requirements and individual learning prerequisites; take into account the time and organisational framework conditions of the different places of learning. Monitor the implementation of training plans and adjust them if necessary. 	
Course contents: 1. In-company training plan 1.1 Legal basis, planning requirements and limits of training planning 1.2 Training regulations as a basis for the in-company training plan 1.3 Importance of typical occupational work and business processes and individual learning prerequisites for achieving the training objectives 1.4 Criteria for drawing up and adapting an in-company training plan	
Taking into account prospective participation and co-participation in vocational training of involved occupational interest groups	2 hours
Learning objectives: To present and justify opportunities for participation and co-determination of company interest groups in vocational education and training.	
Competencies:	

<p>a) Describe the possibilities of representing interests in vocational education and training within the company.</p> <p>b) Present opportunities for participation by the youth and trainee representatives in the area of vocational education and training.</p> <p>Course contents:</p> <p>2. Rights of co-determination in vocational education and training</p> <p>2.1 Co-determination rights of employee representatives</p> <p>2.2 Possibilities of participation by the youth and trainee representatives</p>	
<p>Determining co-operation needs and co-ordinating with project partners, in particular with the involved vocational school, organisation and contents of the training</p>	<p>4 hours</p>
<p>Learning objectives:</p> <p>Determining the need for cooperation and coordinating its content and organisation with cooperation partners, in particular the vocational school.</p> <p>Competencies:</p> <p>a) Describe the benefits of cooperation networks, in particular vocational schools, inter-company educational institutions, consultants in chambers and guilds as well as employment agencies.</p> <p>b) Clarify possibilities of cooperation with the cooperation partners involved in the training.</p> <p>Course contents:</p> <p>3. Cooperation partners in training</p> <p>3.1 Network of key cooperation partners in training</p> <p>3.2 Possibilities of learning location cooperation</p>	
<p>Applying criteria and procedures for selection of trainees, taking into consideration their diversity</p>	<p>4 hours</p>
<p>Learning objectives:</p> <p>Apply criteria and procedures for the selection of trainees also taking into account their diversity.</p> <p>Competencies:</p> <p>a) Present and evaluate opportunities for recruiting prospective trainees.</p> <p>b) Requirements of the training occupation and suitability requirements as selection criteria.</p> <p>c) Apply appropriate procedures for selecting candidates, taking into account different groups of applicants and observing legal rules.</p> <p>d) Show training applicants the career prospects associated with training.</p> <p>Course contents:</p> <p>4. Planning and carrying out recruitment procedures</p> <p>4.1 Opportunities for recruiting prospective trainees</p> <p>4.2 Criteria for the selection of applicants</p> <p>4.3 Procedure for the selection of candidates</p> <p>4.4 Career path and career opportunities</p>	
<p>Preparing a vocational training contract and its registration with the competent body</p>	<p>6 hours</p>
<p>Learning objectives:</p> <p>Prepare and conclude the vocational training contract and arrange for its registration with the competent authority.</p> <p>Competencies:</p> <p>a) Describe the essential content of an apprenticeship contract; conclude a training contract.</p> <p>b) Represent the rights and obligations of the trainee under the contract.</p> <p>c) Explain the prerequisites for entering the training contract in the apprentice role; submit an application for entry in the training directory.</p> <p>d) Apply to vocational school.</p> <p>e) Describe the possibilities and limits of termination, in particular termination of an apprenticeship.</p>	

Course contents: 5 Conclusion of the training contract 5.1 Legal basis and contents of the training contract 5.2 Rights and duties of the trainee and the apprentice 5.3 Entry in the apprentice role 5.4 Registration with the vocational school 5.5 Legal options for termination and termination of training contracts	
Examining chances of organising the vocational training program partly abroad	2 hours
Learning objectives: Check if parts of the vocational training can be carried out abroad.	
Competencies: a) Weighing up the advantages and possible risks of training periods abroad for trainees and the company. b) Draw on legal bases for decision-making on the implementation of training elements abroad. c) Observe forms of vocational training in other European countries when planning your stay abroad. d) Provide advice and support for the implementation of stays abroad. e) Documentation of stays abroad.	
Course contents: 6. Parts of training abroad 6.1 Advantages, possible risks and legal basis for parts of training abroad 6.2 Vocational training in other European countries 6.3 Advice and support for the realisation of training elements abroad 6.4 Documentation of stays abroad	
Total Module B2/2: Action field “Training preparation and assisting in recruiting prospective trainees”	23 hours

Module B2/3: Action field “Conducting trainings” Time recommendation: 52 hours	
Creating learning-conductive conditions and a motivating learning culture, giving and receiving feedback	8 hours
Learning objectives: Creating learning conditions and motivating learning culture, giving and receiving feedback.	
Competencies: a) Consider the trainees' individual prerequisites for designing learning processes. b) Support the development of a self-directed learning culture and reflect on the role of the trainer as a learning guide. c) Promote learning by observing basic didactic principles. d) Support learning processes by agreeing on goals, strengthening motivation and ensuring transfer. e) Encourage learning through the transfer of learning and working techniques as well as through appropriate framework conditions. f) Determine learning outcomes and show the trainee his or her competence development through appropriate feedback and receive feedback.	
Course contents: 1. Learning requirements, promotion of learning and learning culture 1.1 Learning, learning competence, learning culture of self-directed learning 1.2 The trainer as learning guide 1.3 Didactic principles for promoting learning	

1.4 Phases and ways of promoting the learning process, agreeing on learning goals, increasing motivation, Ensure learning success 1.5 Learning and working techniques, framework conditions 1.6 Feedback possibilities	
Organising, designing and evaluating the probation period	4 hours
Learning objectives: Organise, design and evaluate probationary periods. Competencies: a) Determine the content and organisational structure of the probationary period and observe the legal basis. b) Select learning tasks to determine the trainee's suitability and inclination for the probationary period. c) Planning the introduction of the trainee into the company. d) Evaluating the trainee's development during the probationary period and feedback with the trainee, evaluating the execution and outcome of the probationary period. Course contents: 2. Organisation of the probationary period 2.1 Introduction of the apprentice to the company 2.2 Significance, design and evaluation of the probationary period	
Developing and defining operational learning and work-related tasks, based on the in-company training plan and the typical occupational and business processes	5 hours
Learning objectives: From the in-company training curriculum and the job-specific work and employment conditions of the company. Develop and design business processes for corporate learning and work tasks. Competencies: a) Emphasize the importance of learning in order and business processes. b) Analysing the training plan as well as work and business processes and use this information to design suitable learning and work tasks. c) Integrate trainees into work tasks, taking into account individual requirements. Course contents: 3. Training in typical job and business processes 3.1 Methodological concept of order- and business-oriented training 3.2 Selection of suitable tasks and involvement of the trainees 3.3 Design of learning and work assignments	
Selecting proper training methods and media for target groups, and applying them accordingly, if necessary	8 hours
Learning objectives: Selecting training methods and media appropriate to the target group and using them in specific situations. Competencies: a) Describe essential training methods and their possible applications. b) Describe criteria for selecting methods; justify method selection. c) Plan and evaluate the training discussion and work instruction. d) Methodical design of training content according to target group planning, implementation and evaluation. e) Describe the function of educational media and resources and select them according to the method. f) Evaluate the use of e-learning for training.	

Course contents: 4. Training methods and media 4.1 Overview of training methods and method selection criteria 4.2 Planning and realisation of teaching talks and work instructions 4.3 Presentation of a training situation 4.4 Functions and Selection of Training Media 4.5 E-learning in training	
Assisting trainees with individual training and guidance in case of learning difficulties by applying training aids, if necessary, or by checking the possibility of extending the training period	4 hours
Learning objectives: To support apprentices in the event of learning difficulties through individual training and learning guidance, to use training support aids, and Consider possibilities to extend the training period. Competencies: a) Identify typical learning difficulties in training and identify possible causes, check learning pre-requisites. b) Provide individual assistance in case of learning difficulties and initiate support measures. c) Identifying the need for assistance during training (abH) and organising measures. d) Check the possibility of extending the training period. Course contents: 5. Learning difficulties and learning aids 5.1 Forms of manifestation and causes of learning difficulties and related learning aids and support measures 5.2 Assistance during training (abH) 5.3 Extension of the training period	
Providing trainees with additional training opportunities, in particular in the form of additional qualifications, and by checking the possibility of shortening the training period or chances for an early approval of the final examination	4 hours
Learning objectives: Examine and propose additional training opportunities for trainees, in particular additional qualifications; examine possibilities of shortening the duration of training and early admission to the final examination or apprenticeship examination. Competencies: a) Recognise special requirements and talents of apprentices and make them available through suitable offers such as: additional qualifications. b) Clarify options for shortening the duration of training and for early admission to the final examination/apprenticeship examination for these trainees as well as the remaining training period. Course contents: 6. Promotion of high-performing trainees 6.1 Funding opportunities for high-performing trainees 6.2 Shortening the duration of training and early admission to the final examination/apprenticeship examination	
Promoting social and personal development of trainees, identifying problems and conflicts in good time, solution-oriented approach	8 hours
Learning objectives: Promoting the social and personal development of trainees; identifying problems and conflicts in good time and working towards solutions. Competencies: a) Describe the development tasks of young people in training, take into account the developmental behaviour of trainees and significant environmental influences when designing training.	

- b) Describe the importance of the company for the socialization of trainees.
- c) Designing communication processes during the training, promoting communication skills of the trainees.
- d) Identify conspicuous behaviour and typical conflict situations in training in good time, analyse them and apply strategies for constructive conflict management.
- e) Identifying and avoiding intercultural causes of conflicts.
- f) Reflect on the frequent causes of imminent drop-outs and take measures to avoid them.
- g) Take advantage of dispute resolution opportunities during training.

Course contents:

- 7. Development of young people and dealing with conflicts
 - 7.1 Development tasks in adolescence and development typical trainee behaviour and environmental influences
 - 7.2 Socialization of the trainee in the company
 - 7.3 Communication in training
 - 7.4 Behavioural disorders and conflict situations in training
 - 7.5 Conflict prevention and strategies for constructive conflict management
 - 7.6 Avoiding intercultural conflicts
 - 7.7 Abandonment of training: Causes and solutions for prevention
 - 7.8 Arbitration procedure for apprenticeship disputes

Measuring and evaluating performance and test results of third parties, conducting assessment discussions and drawing conclusions with regard to the further training process

8 hours

Learning objectives:

Determine and evaluate the performance of trainees, evaluate performance assessments of third parties and examination results, conduct appraisal interviews, draw conclusions for further course of training.

Competencies:

- a) Select appropriate forms of performance review to determine and evaluate achievements in training, taking into account fundamental requirements for training performance reviews.
- b) Perform success checks and draw conclusions for further training.
- c) Evaluate the behaviour of trainees regularly on the basis of suitable criteria and lead to appraisal interviews.
- d) Evaluate the results of external performance reviews.
- e) Use evidence of formal qualifications for monitoring, promotion and comparison with the training plan.

Course contents:

- 8. Determining training success
 - 8.1 Forms and functions of performance reviews in training
 - 8.2 Essential requirements for performance reviews
 - 8.3 Execution of internal performance reviews
 - 8.4 Assessment sheet and appraisal interview
 - 8.5 Evaluation of external performance reviews
 - 8.6 Evidence of formal qualifications/report booklet

Learning and working in a team as well as intercultural skills in the company promote.

3 hours

Learning objectives:

Learning and working in a team, developing and promoting intercultural competences in the company.

Competencies:

- a) Form teams based on selected criteria.
- b) Promoting teamwork.
- c) Facing up to other cultures openly and taking up cultural differences positively (intercultural learning).
- d) Specific support for trainees with a migration background.

Course contents:

- 9. Learning and working in a team
 - 9.1 Criteria for the formation of teams
 - 9.2 Teamwork
- 10. Intercultural competences
 - 10.1 Fundamental cultural differences and intercultural competences
 - 10.2 Specific support for trainees with a migration background

Total Module B2/3: Action field “Conducting training”

52 hours

Module B2/4: Action field “Completion of training”

Time recommendation: 15 hours

Preparing trainees for their final or journeyman's examination by taking into account the examination dates, and leading the training to successful completion

6 hours

Learning objectives:

Prepare trainees for the final examination or apprenticeship examination taking into account the examination dates and lead the training to a successful conclusion.

Competencies:

- a) The main requirements of the intermediate and final examinations/apprenticeship examinations are laid down in the training regulations and the particularities of an examination situation are explained.
- b) Describe the meaning and sequence of the extended final examination/apprenticeship examination.
- c) Demonstrate appropriate aids for exam preparation and to avoid examination failures as well as justify the provision of necessary examination equipment.

Course contents:

- 1. Preparation for the final examination/apprenticeship examination
 - 1.1 Examination requirements and examination procedure
 - 1.2 Stretched final examination/apprenticeship examination
 - 1.3 Specific aids and techniques for exam preparation
 - 1.4 Avoidance/reduction of examination anxiety

Ensuring that the trainees register with the competent commission and making sure that the commission will be aware of any specifics that might be relevant with regard to the examination

3 hours

Learning objectives:

Ensure that the trainees register for examinations with the competent body and draw their attention to any special features relevant for implementation.

Competencies:

- a) Observe legal requirements for the registration of trainees for examinations and exemption; carry out registration.
- b) Observe legal conditions for early admission to the examination.
- c) Communicate the examination-relevant particularities of the trainees to the competent body.
- d) If the examination is not passed, take into account legal requirements for a repeat examination or supplementary examination and extension of the training period.

Course contents:

- 2. Registration for the exam
 - 2.1 Registration, exemption and admission to the examination
 - 2.2 Examination-relevant particularities of trainees
 - 2.3 Repeat examination, supplementary examination and extension of the training relationship

Contributing in the issuing of a written certificate, on the basis of performance assessments

3 hours

Learning objectives: Create written certificates based on performance appraisals.	
Competencies: <ol style="list-style-type: none"> Observe legal and company regulations and emphasize the significance of certificates for the trainee in terms of employment law. Differentiate between different types of certificates. Draw up certificates, in particular taking into account previous performance assessments, and take legal consequences into account. 	
Course contents: <ol style="list-style-type: none"> Issuing certificates <ol style="list-style-type: none"> Significance, types and contents of certificates Formulation of certificates Legal consequences of certificates 	
Informing and advising trainees about inter-company development and career opportunities, and about occupational further training options	3 hours
Learning objectives: Inform and advise trainees on company development paths and vocational training opportunities.	
Competencies: <ol style="list-style-type: none"> The importance of continuing vocational education and training. Describe career and company advancement and further training opportunities, especially for the master craftsman's examination. Identify funding opportunities for continuing vocational education and training as well as possibilities for the promotion of gifted students. 	
Course contents: <ol style="list-style-type: none"> Advancement and training opportunities <ol style="list-style-type: none"> Vocational further education and training opportunities, master craftsman's examination Financial support for vocational training measures 	
Total Module B2/4: Action field “Completion of training”	15 hours

3. Course implementation and other documents

3.1 Implementation notes²⁶

The main objective of the training is to enable the master students to use the skills acquired during the training in their professional life. For example, they can make use of business management tools to evaluate alternative courses of action and to make decisions, as well as being aware of legal regulations and their impact. Therefore, the problem that often occurs in connection with school learning that only “slow” short-term knowledge is built up among learners must be addressed. As far as the curriculum is concerned, this can be

²⁶ Recommendations according to

a) Curriculum developed by Handwerkskammer Dresden (Dresden Chamber of Skilled Crafts).
 b) Curriculum framework for the preparation for the master craftsman examination for the electrical engineering trade, Central Office for Further Training in the Craft Trades Sector (Zentralstelle für die Weiterbildung im Handwerk, ZWH).
 c) Markus Glasl, Andrea Greilinger: Curriculum framework for preparation for Part III of the Master Craftsman Examination, 2011, Ludwig-Fröhler-Institute, Research Institute at the German Institute of Crafts (DHI).

ensured by focusing on the teaching of lasting decision-making skills and the choice of an appropriate teaching structure for the learning content.

With the concept of action and competence orientation, the focus is shifted away from abstract knowledge transfer to contextual and job-related learning.

The importance of this for the sustainability of learning processes and the ability of learners to transfer what they have learned to practical problems has been widely confirmed by cognitive psychological research. Furthermore, this approach does not aim to impart specialist knowledge in separate “learning areas”. Rather, it offers the learner the opportunity to acquire complete knowledge, to coordinate and structure individual elements and to build on previous knowledge. In this way, learners do not develop isolated skills that are tailored to specific requirements, but instead acquire extensive competence in dealing with complex situations and contexts.

The learning objectives must be prepared in such a way that the competences outlined in the curriculum can be acquired. What breadth and depth of learning content is necessary for this?

The starting point of the learning process should be complex, realistic and typical real life situations which enable master students to practise planning as well as the execution and control of professional activities. Master students should be given the opportunity to learn by means of self-executed or mentally understood professional actions.

Separation of learning objectives according to individual subject specific learning content should be avoided by teaching across disciplines. If it is not possible to train complete work and business processes, the learner should at least be made aware of the classification of the respective learning content in the larger context of action, e.g. by naming upstream and downstream action steps. This later helps the master craftsmen to better use their acquired individual skills in practice.

Master students should have the willingness and ability to learn on their own, especially when it comes to basics, and to obtain the necessary information themselves, because the course focuses on the processing of tasks relevant to a company. This should be pointed out to the participants at the beginning of the training.

As a rule, it is not enough to impart knowledge via the courses in isolation. Without reference to the practical experience of the participants, i.e. without direct application of the knowledge in practical tasks, the participants may fail to implement the knowledge learnt on the course in the future day-to-day business of the master craftsman. This means, for example, that mathematical tasks should not be taught as a separate subject, but rather should be taken up when they are necessary for the understanding and processing of certain operational tasks.

It is therefore necessary to acquire specialist knowledge in real-life situations as part of the master craftsman's training so that they are transferred into practice and therefore professional objectives can be achieved. For this purpose, it is necessary to orient the training strongly towards action. The main objective of the action-oriented approach is to combine knowledge from theory with the practical experience of the participants. The following basic parameters must be observed in this respect.

Participant orientation and practical relevance:

This means that a bridge has to be built between the core topics of the curriculum framework and the participants. Only in this way will a participant be individually and emotionally engaged and willing to get involved and participate actively. It is often not enough to introduce just one example to promote the willingness of the participants to deal with the situation. Rather, it is necessary to build on the participants' prior knowledge and experiences with the topic. Appropriate action opportunities from the participants' professional experience must be identified, taken up and processed.

Participant activation and promotion of interactivity:

Participants' own actions (thinking, discussing, exploring, determining, calculating, comparing, discovering, testing, creating, etc.) The participant must actively and intensively deal with a situation in order to be able to build up internal structures of action for himself/herself. The lecturer is stronger in the role of learning organiser and learning advisor. However, this does not mean that all tasks are to be solved by the participants independently or in groups. Rather, depending on the prerequisites of the participants, a flexible and versatile methodical approach is required, in which, for example, short introductions to completely new topics, on which the participants have not yet had any experience of their own, alternate with joint development phases and moderated discussions in the entire group. In particular, the interaction and exchange of experience between learners should be enhanced through partner or group work, especially on topics of particular importance for professional practice, which can build on the experiences of the participants.

Comprehensive tasks and results orientation:

It is important to grasp complex situations and to enable as complete an action as possible, i.e. from analysis to planning and execution to control. The participant should think through an activity or situation in all these phases and carry it out independently. The aim is to address all learning areas (cognitive/head, affective/heart and psychomotor/hand) and to have an impact on all areas of competence (self-competence, professional competence, social competence).

At the end of teaching/learning units, there should be concrete results or products e.g. a completed checklist, a prepared business concept, a summary of results, a test report etc., which can be presented and “taken away” by the participants.

Ultimately, it is particularly important for courses in vocational adult education to take particular account of experience orientation, participant orientation and activation as well as action orientation in planning and design through the use of modern media (e.g. e-learning and blended learning).²⁷

Courses that observe these basic values are more interesting for both the participants and the lecturers in the long term, even if they are initially more labour-intensive, since additional documents are often required for phases of group work. From the previous experience of the lecturers, who practice action-oriented instruction, the participants tend to work with greater commitment and interest after a short acclimatisation period.

²⁷ See e.g. Reich-Claassen, J.; von Hippel, A.: Supply planning and design. In: Tippelt, R.; von Hippel, A. (Hrsg.): Manual adult education / training. 4th, revised edition. Wiesbaden 2010. p. 1003-1015

As discussed earlier, the learning objectives and contents of Part A1 (generally speaking: professional practice) and Part A2 (generally speaking: specialist theory) are not clearly separated to illustrate the overlapping character of the strongly action-oriented concept. Therefore, parts A1 and A2 should always be planned and communicated together. Parts B1 and B2 can – to a certain extent - also be taught separately from A1 and A2 as individual courses. However, Part B1 is closely connected to some of the specialist theoretical core contents of Part A2, which is why Part B2 should be taught alongside with Part A2 or with A1/ A2. Part B2 with a special human resources view of the topic “Training of skilled workers” can be taught independently of the other parts. However, it might be useful to teach B2 in the follow-up to part B1, because part B1 already contains basic personnel management contents (without any special reference to training) and thus there are certain points of contact for part B2.

With regard to the possible division of the different parts of the master craftsman's qualification, a strict separation of Specialised Theory (part A2) and Practical Training (part A1) is not appropriate as these two areas are very closely linked. The subject content derived from the learning objectives can be taught by the lecturers in parallel or alongside each other. In this way, the engagement of the participants can be further increased. Courses that pursue a strict separation of theory and practice - without taking into account the respective relationships between them - can have a very negative impact on learning success, especially in adult education.

In part B1, module B1/1: Action field “Determining corporate competitiveness” should be taught first, as content from the other fields of activity is based on it. Ideally, also consider the sequence in which field of action 2 to 3 should be taught in order to maintain the logic of the company life cycle.

In part B2, it is crucial to impart competence for independent planning, execution and monitoring of vocational training in the four fields of activity:

1. Examine training requirements and plan training
2. Prepare training and assist in hiring trainees
3. Carry out training
4. Complete training

When conducting the training in different countries and regions, it is essential that the instructors on site adapt according to the regional legislation and characteristics as well as the previous knowledge of the participants.

3.2 Literature recommendations and other teaching materials

For A1 and A2 the following literature and teaching programs are recommended:

- Framework schedule for Parts I and II of the master craftsman's preparation in the electrical engineering trade
- The master craftsman's examination of electrical engineering and information technology. Commentary with test questions, Volume 1, Electrical Engineering, ed. by the

Zentralverband der Deutschen Elektro- und Informationstechnische Handwerke (German Electrical and Information Technology Trade Association)

For the development of the electrotechnical basics, it is recommended to include more self learning phases or e-learning components in the master craftsman training. The interactive learning programs are particularly suitable for this purpose.

- CD-ROM “Fundamentals of Electrical Engineering 1” (Version 1.3) - Contents: Basic concepts and basics of electricity teaching
- CD-ROM “Basics of Electrical Engineering 2” (Version 1.3) - Contents: Electrical resistance, voltage sources, loaded voltage divider, Wheatstone bridge circuit
- CD-ROM “Fundamentals of Electrical Engineering 3” (Version 1.3) - Contents: Work, power, energy, efficiency, electrical adjustment, level calculation, heat theory, electric field, capacitor, differentiator, integrator
- CD-ROM “Fundamentals of Electrical Engineering 4” (Version 1.3) - Contents: permanent magnetism, electromagnetism, electric machines, direct current machines, alternating current machines, three-phase machines
- CD-ROM “Control Technology with Circuit Simulator” (Version 1.3) - Contents: In the present tutorial, a circuit simulator can be called up at various points, with which own circuits can be designed on the screen according to a task description. The program tests the design for correctness and, if necessary, provides information on errors.
- CD-ROM “Alternating current technology”

The learning programs on CD-ROM are supplemented by the following books: “Mathematical and electronic basics”, “Tasks and solutions in electrical engineering”, “Formulas and tables in electrical engineering”, “Electrical control and drive technology” and “Electrical machines”.

The individual learning programmes with the books are part of a series of BFE Oldenburg learning programmes on the subject of electrical engineering.²⁸

The following literature and working documents are recommended for the training parts B1 and B2 :

- Sackmann - Das Lehrbuch für die Meisterprüfung: Accounting - Betriebs und Wirtschaft - Recht und Steuern, Verlagsanstalt Handwerk, ISBN 978-3878649076
- Handyman's Primer, Volumes 1 to 3, Holzmann Medien, ISBN 978-3-7783-1153-0
- Field of action: training (workbook to prepare for the instructor suitability test), Feldhaus-Verlag, ISBN 978-3-88264-564-4
- Examination check instructor qualification, Feldhaus-Verlag, ISBN 978-3-88264-563-7
- Handyman's Primer, volume 4 Berufs- und Arbeitspädagogik, Holzmann Medien, ISBN 978-3-7783-1157-8
- Ordinance on the examination for the recognised advanced training qualification Certified specialist for commercial business management in accordance with the Craft Trades Act and certified specialist for commercial business management in accordance with the Craft Trades Act (Test Ordinance for the Completion of Further Training for Commercial Business Management HwO - PrüfVO FortkfmBf), date of issue: 11.11.2014

²⁸ The learning programs and books can be obtained from:

a) SFOE Oldenburg <http://www.bfe-meister.de/>

b) Central Office for Continuing Education in the Crafts (Fax: 0211 - 302009-99, e-mail htrost@zwh.de).

- Recommendation of the main committee of the Federal Institute for Vocational Education and Training on the framework plan for the training of trainers. Reference/publication: Federal Gazette No. 111/2009 of July 30, 2009, BIBB press release: No. 22 of July 3, 2009 (www.bibb.de/de/51843.htm), journal “Vocational Education in Science and Practice”, no 4/2009 (www.bibb.de/bwp/aevo)
- Ausbildereignungsverordnung, Federal Law Gazette Year 2009, Part I, No. 5, 30.01.2009

4. Examination regulations for a Master's certificate in electrical engineering

Within the scope of the “Master BSR” project, a uniform master training for the Baltic Sea Region is currently being developed and implemented, taking the example of the Master's training for electrical engineers. Accordingly, we are also developing the examination rules for the Master's examination in electrical engineering.

The Master's exam consists of the four following independent test parts:

- occupation-specific exam parts
 1. Examination in mastering the usual work
 2. Examination in the relevant theoretical knowledge
- uniform examination parts for all professions
 3. Examination in the relevant business, commercial and legal knowledge
 4. Examination in the relevant occupational and work-pedagogical knowledge.

In order to use the following examination regulations for various related occupations, respective job-specific examination parts – Part 1 and 2 – are to be designed for each respective occupation.

Regulation for a Master's certificate for an electrical engineer

Section I Uniform provisions

Article 1. Admission requirements and exemption from examination parts

- (1) Following are uniform requirements for admission to the Master's examination:
 1. Successful completion of at least three years of professional training in the respective or related profession. In the case of shorter training periods: proof of a professional activity, so that a total of at least three years can be evidenced. Or
 2. Professional activity of at least five years in a relevant or related profession. Or
 3. Successful completion of a degree course in a discipline with relevance to the respective profession of the Master's training.
- (2) Skills, knowledge and abilities already acquired in other qualification measures, equivalent to a Master's training, are recognised for the Master's training and may lead to the exemption from specific test parts, for example:
 - a) training as a specialist (*Fachwirt*) or certified business administration specialist with exemption from test Part III of the Master's examination.
 - b) completion of a recognised pedagogic qualifying examination with exemption from Part IV of the Master's examination.
 - c) content-wise appropriate degree courses with complete or partial exemption from test Parts II, III or IV of the Master's examination.

Article 2. Occupational profile for the electrical engineer in Master's examination

(1) The Master's degree in electrical engineering proves whether the candidate is able to lead a company independently, to carry out managerial tasks in the relevant areas of technology, business management, personnel management and development, to conduct trainings and to implement his/her professional competence independently and to adapt to new needs in the respective areas.

(2) For the Master's certificate for electrical engineers, the focus is on energy and building technologies, communications and safety technologies, as well as on systems electronics. The following joint activities, knowledge and skills are attributed as integral qualifications for the purpose of the Master's examination:

1. Determining customer requirements, advising customers, calculating services and generating offers, conducting order negotiations and setting up contract goals.
2. Assuming responsibility in technical and commercial management, business organisation, personnel planning and personnel deployment, in particular, taking into account occupational training and further training, quality management, liability, occupational safety, data and environmental protection; applying information processing systems.
3. Executing orders, taking into account system engineering technologies, maintenance alternatives, topographical conditions, occupational laws, standards, rules and regulations, personnel requirements and training; order processing and execution, planning and monitoring.
4. Generating documentation, in particular using computer-assisted systems.
5. Considering material properties in planning, designing and during order execution.
6. Developing, planning, manufacturing, programming, parameterising, erecting and maintaining electro-technical systems, in particular taking into account safety and health-relevant precautionary measures; considering and implementing technologies for rational use of energy.
7. Applying measurement and testing techniques, assessing and recording results.
8. Drafting contracts; developing and maintaining standard contracts, in particular service contracts
9. Performing fault and error detection, master measures for the elimination of faults and errors, evaluating and documenting/recording results.
10. Accepting and logging services, delivering them to customers, settling accounts and performing after-sales cost calculation.

(3) The following are specific activities, knowledge and skills attributed as integral qualifications of each respective focus area for purposes of the Master's examination in electrical engineering:

1. Focus on energy and building technologies

Planning, calculating, building, programming, parameterising, erecting, testing, commissioning and maintaining of energy and building technological systems and their components, in particular for generation, transmission, conversion and distribution of electrical energy; earthing, lightning protection, overvoltage protection and antenna systems, lighting, heat, cold and air conditioning systems, building automation, bus technology, signal transmission technology, technologies for rational energy consumption, including relevant electrical and electronic equipment;

2. Focus on communications technologies and safety engineering

Planning, calculating, building, programming, parameterising, erecting, testing, commissioning and maintaining of systems and equipment components of communications and safety engineering, in particular, telecommunications technology, electro-acoustics, data transmission and processing technology, remote control technology, call and signal technology, hazard warning technology, emergency warning system technology, video technology, hospital communications technology, access control technology and time service systems;

3. Emphasis on systems electronics

Planning, calculating, building, programming, parameterising, erecting, testing, commissioning and maintaining of systems electronics equipment and their components, in particular, measurement, control and drive technology, inspecting and metering technology for medical and laboratory applications, as well as methods of system and software integration.

Article 3. Structuring and content of the Master's examination

(1) The Master's examination in electrical engineering trades includes the following independent examination parts:

1. Examination to prove masterly execution of the usual work (Part I),
2. Examination in the relevant theoretical knowledge (Part II),
3. Examination in indispensable business, commercial and legal knowledge (Part III); and
4. Examination in the required occupational and work-pedagogical knowledge (Part IV).

(2) The Master's examination is deemed to have been passed as a whole, if each of the four Parts of the Master's examination were successfully passed. Granted exemption from one of the Parts of the Master's examination is equivalent to passing of the respective Part.

Article 4. Evaluation/Grading system

(1) The following 100-point scale shall be used for the assessment of examination in the examination areas, subjects, and fields of action, further, for practical examination in Part IV, as well as in case of supplementary examinations:

100 – 92 points	for a performance particularly fulfilling the set requirements,
below 92 – 81 points	for a performance fulfilling the set requirements,
below 81 – 67 points	for a performance fulfilling the set requirements in general
below 67 – 50 points	for a performance which has deficiencies yet on the whole still meets the set requirements,
below 50 – 30 points	for a performance which does not meet the set requirements, yet indicates that certain basic knowledge is still available,
below 30 – 0 points	for a performance that does not meet the set requirements and identifying very poor or missing basic knowledge.

The 100-point key shall be also applied in specific evaluation of test achievements gained by their nature within the scope of examination areas, examination subjects and fields of action.

(2) Evaluation for each Part of the Master's examination shall be determined as the weighted average of the test points obtained. Where:

100 – 92 points	mean: very good,
below 92 – 81 points	mean: good
below 81 – 67 points	mean: satisfactory,
below 67– 50 points	mean: sufficient,
below 50– 30 points	mean: insufficient,
below 30 – 0 points	mean: not satisfactory.

(3) Promptly upon examination, the examinee obtains a written notification with legal remarks/remedies about the results of the examination in each Part of the Master's examination and the grade obtained.

(4) A certificate is issued by the Master's examination due board, which has been active last year, stating passage of the Master's examination. The certificate shall include the grades obtained for the Master's examination parts passed, as well as exemptions, indicating their legal basis. The certificate shall be signed by the chairman of the Master's examination board.

Article 5. Re-examination of the Master's examination

(1) Each individual part of the Master's examination may be repeated three times within ten years upon completion of the first exam.

(2) Upon request, the examinee shall be exempted from re-examination in examination areas/subjects, areas of activity or in the practical part of the examination, if in a previous examination, respective achievements were evaluated with at least 50 points. Exemption is only possible, if the examinee registers for the re-examination within ten years from the date of the written notification regarding the failed examination part.

Section II

Provisions for examination in masterly execution of standard works

Article 6. Special admission requirements

Admission to examination in the mastery of usual work (Part I), requires the fulfilment of the following conditions:

1. Completion of the course A1 “Occupation-related practical training” as preparation for the Master's examination, or
2. Proof of at least one year of professional activity in the relevant or a related profession. Admission to Part II of the Master's examination, in accordance with Article 12.2, requires proof of at least three years of professional activity.
- 3.

Article 7. Priority areas

For the Master's examination, Part I, the focus is on energy and building technologies, communications and safety technologies as well as systems electronics; the examinee has to select from one of the respective priorities.

Article 8. Classification, Examination duration and Passage

(1) Part I of the Master's examination covers the following areas:

1. A Master's examination project and a related technical discussion,
2. A situation-based exercise.

(2) Execution of a Master's examination project shall not exceed four working days; duration of the technical discussion shall not exceed 30 minutes. Execution of a situation-based exercise shall not exceed eight hours.

(3) Master examination project, technical discussion and situation-based exercise are subject to separate evaluation. Examinations in the Master's examination project and in the technical discussion are weighted with a ratio of 3:1, thus forming an overall evaluation. Then again, with regard to the outcome of the specialist discussion, this overall evaluation is weighted with a ratio of 2:1.

(4) A minimum requirement for the completion of Part I of the Master's Examination is an overall satisfactory examination performance, if examination was not rated with less than 30 points in all three Parts, namely in the Master's examination project, in the technical discussion and in the situation-based exercise.

(5) Passing of Part I of the Master's examination leads to the recognised advanced training title “Recognised Technician”.

Article 9. Master's examination project

(1) In the selected field, the candidate shall execute a Master's examination project, simulating a client order. A master craftsman's examination board chooses a specific exercise. Examinee's suggestions are to be taken into account. Prior to the Master's examination project, the examinee shall submit to the Master's examination board a draft for approval, including a timetable.

(2) For the Master's examination project, one of the following tasks are to be executed in the selected focal areas:

1. Focus on energy and building technologies

Designing, computing, planning and calculating an energy and building technologies installation or its components, executing these exercises, and creating a test report.

2. Focus on communications technologies and safety engineering

Designing, computing, planning and calculating a communications and safety systems installation or its components, executing these exercises, and creating a test report

3. Focus on systems electronics

Designing, computing, planning and calculating a communications and safety engineering installation or its component, executing the exercises and creating a test report.

(3) Documents concerning the design, computing, planning and cost calculations shall be weighted with 40%, the exercises performed – with 40% and the test report – with 20%.

Article 10. Technical discussion

A technical discussion is to be held on the basis of the examinations results in the Master's examination project, in which the examinee is to prove full understanding of technical subject-related contexts of the Master's examination project; further, that he/she can substantiate the Master's examination project sequence and that he/she is able to demonstrate subject-related professional problems and their respective solutions with regard to the Master's examination project, always considering latest technological trends.

Article 11. Situation-based exercise

(1) The purpose of the situation-based exercise is to test essential basic knowledge and basic skills that could not be demonstrated or that were verified only inadequately in the Master's examination project.

(2) In order to complete the proof of qualifications for the electrical engineer, the following tasks are to be performed as a situation-based exercise:

1. The following are tasks, if energy and building technology were selected as focus:

Narrowing, identifying, and eliminating faults in communications, safety engineering systems or in the systems' components as well as in systems electronics; calculating systems performance, recording measurement tests and documenting results.

2. The following are tasks, if communications and safety systems technologies were selected as focus:

Narrowing, identifying and eliminating faults in plants or in energy and building systems components as well as in systems electronics; calculating systems performance, recording measurement tests and documenting results.

3. The following are tasks, if systems electronics were selected as focus:

Narrowing, identifying, and eliminating faults in energy and building technology systems or their components as well as in communications and safety engineering; calculating systems performance, recording measurement tests and documenting results.

The overall assessment of the situation-based exercise is calculated as the arithmetic mean of the individual evaluations of the tasks executed, pursuant to paragraph 2.

Section III

Provisions for examination in the required subject-related theoretical knowledge

Article 12. Special admission requirements

Admission to examination in the required subject-related theoretical knowledge (Part II) is granted upon fulfilling the following conditions:

1. If the comprehensive training course A2 “Occupation-specific theory” was completed as preparation for the Master's examination, or
2. Proof of at least two years of professional experience in the relevant or a related profession can be produced, plus attendance of relevant preparatory course with a minimum of 200 teaching hours. Proof of at least three years' of professional

experience, if admission to Part I of the Master's Examination was granted, pursuant to Article 6.2.

Article 13. Structuring, Examination Period and Passage

(1) Examination in Part II is intended to demonstrate the ability to analyse and assess problems, and to identify and document appropriate solutions by combining technological, safety, process engineering, materials engineering, mathematical and economic knowledge.

(2) The following are the examination subjects:

1. Electrical and safety engineering,
2. Order processing,
3. Business administration and organisation.

(3) At least one case-oriented exercise in each of the examination subjects.

1. Electrical and safety engineering

The examinee is to demonstrate that he/she is able to handle tasks and problems of electro technical systems in an electrical engineering company, taking into consideration technical, safety, economic and environmental aspects. He/she shall be able to assess and describe technical facts. In the problem definition, several of the following qualifications are to be combined:

- a) customer requirements analysis,
- b) developing, designing and calculating electrical and electronic circuits, according to functional specifications,
- c) evaluating and correcting circuit diagrams, computer-assisted generating of circuit diagrams,
- d) dimensioning, selecting and proper assigning of mechanical design parts, cables, electrical and electronic supplies and materials,
- e) generating, evaluating and correcting of technical solutions, in particular, taking into account safety and health-related precautionary measures;

2. Order processing

The examinee is to demonstrate that in an order processing situation, he/she is able to initiate and conclude customer-oriented, job-related measures that are crucial for the technological and economic success of an electrical engineering company. In the task setting, several of the following qualifications are to be combined:

- a) evaluating order documents and planning of order processing operations, taking into account the use of materials, equipment, personnel and quality assurance aspects,
- b) generating, evaluating and correcting of technical workflows, in particular, sketches and drawings, including the use of electronic data processing systems,
- c) analysing and assessing licensing requirements,
- d) subcontracting and monitoring the subcontracting process
- e) planning of technical inspections, recording and evaluating data, documenting test results,
- f) pre-calculation and post-calculation;

3. Business administration and organisation

The examinee is to demonstrate that he/she is able to perform managerial and organisational tasks in an electrical engineering company. In the task setting, several of the following qualifications are to be combined:

- a) aggregating work positions to bundled offers, including price calculations,
- b) calculating hourly rates, based on a given cost structure,
- c) generating and applying operational key figures, using predefined models,
- d) planning business development, based on technological progress and market trends,
- e) designing and implementing HR development and HR management concepts,
- f) planning and presenting an operational quality management system,
- g) instructing/briefing of employees in their tasks/functions,
- h) developing marketing measures for customer care and for acquisition of new customers,
- i) describing and assessing information and communications systems with regard to their operational possibilities,
- k) applying occupation-specific laws, standards, rules and regulations,
- l) assessing liability in manufacture, during maintenance and of the service package,
- m) identifying requirements of occupational safety, health protection, data protection and environmental protection; assessing threats and defining hazard prevention measures,
- n) planning and presenting operational, warehouse and construction site equipment, logistics.

- (4) Examination in Part II shall be carried out in writing. The duration shall not exceed nine hours. A total examination time of six hours per day shall be observed.
- (5) At the request of the examinee or at the discretion of the Selection Board, the written test shall be complemented in one of the subjects, specified in Article 2, in an oral exam (supplementary examination), if this allows passage of Part II of the Master's Examination. The supplementary exam shall not exceed 20 minutes per one examinee. In the respective examination subject, the results of the written examination and the supplementary examination shall be weighted in a ratio of 2:1.
- (6) A minimum requirement for passage of Part II of the Master's examination is an overall satisfactory performance. Pursuant to Article 2.1, upon positive test performance, the Master's Examination Board shall issue a certificate to the examinee, containing the results of the examination in the examination subject. If a supplementary examination in an examination subject was evaluated with less than 30 points, examination of Part II is deemed to be failed.
- (7) Positive test performance in Part II of the Master's Examination leads to the recognised advanced training title “Technical Specialist”.

Section IV

Provisions for examination in required business, commercial and legal knowledge

Article 14. Special provisions for examination eligibility and examination exemptions

- (1) The admission requirements for examination in required business, commercial and legal knowledge (Part III) is the completion of the course B1 “Business administration, law and management”, as preparation for the Master's examination.
- (2) At the request of the examinee, exemption from Part III of the Master's examination shall be granted, if the examinee can prove successful completion of an equivalent training course, stating a recognised final examination. E.g., in particular:
 - a) relevant university studies, e.g. in business management, SME management.
 - b) relevant recognised advanced qualifications, e.g. “Certified Specialist in Commercial Business Administration”.

Article 15. Objective, structure and content of Part III

- (1) Examination in Part III, shall demonstrate the examinee’s professional competence as business owner or manager in the fields of action referred to in Article 2.1-3, by displaying competence in analysing and assessing business, commercial, and legal problems and in adequately addressing and documenting them, taking into account current market trends.

(2) At least one complex case-related exercise shall be performed in each of the following fields of action:

1. Competitiveness assessment of enterprises

The examinee shall prove the ability to display competence in assessing and in decision-making with regard to business, commercial and legal competitiveness requirements of a company, including assessment and decision making in the area of HR career planning. The exercise shall combine several of the qualifications listed in points (a) to (f):

- a) analysing corporate objectives and classifying them into a business objectives system,
- b) motivating the significance of the corporate culture and of the company image for the company's performance and competitiveness,
- c) analysing the market position of a company, and motivating potential for success,
- d) using accounting data for analysis of a company's strengths and weaknesses, in particular, from the balance sheet and the profit and loss account,
- e) using data for decision making from internal and external accounting,
- f) applying legal provisions in the analysis of corporate objectives and concepts, in particular, commercial and trade law, trade and competition law;

2. Preparing, executing and evaluating start-up and take-over activities

The examinee shall display competence in preparing, executing and evaluating tasks related to a business start-up and business take-over, taking into account personal, legal and business conditions and objectives, as well as competently explain their significance for a business concept. In this exercise, several of the qualifications listed in points (a) to (j) shall be combined:

- a) motivating significance of personal prerequisites for the success of professional self-employment
- b) motivating and evaluating economic, social and cultural importance of the craft sector and the benefits of membership in craft organisations,
- c) exploring and evaluating chances for engaging advisory services, finance and support services for start-ups and business takeovers,
- d) making and motivating decisions regarding the location, size, staffing requirements, setup and equipment of a company,
- e) developing and evaluating a marketing concept for a market launch,
- f) establishing and motivating an investment plan and a finance concept; preparing a profitability forecast and implementing liquidity planning,
- g) deducing and motivating a legal form, depending on the business concept,
- h) applying legal provisions, in particular, civil law and company and tax law, in the context of a craft business set-up or take-over
- i) motivating the need for private risk and pension provision, indicating market possibilities

- j) comprehensively motivating the significance of personal aspects and business and legal components of a business concept;

3. Developing business management strategies

The examinee has to demonstrate the ability to identify operational growth potentials and to develop corporate strategies, taking into account company strengths and weaknesses as well as market-related opportunities and risks of managing a business. For this exercise, several of the qualifications listed in points (a) to (k) shall be combined:

- a) assessing the significance of organisational business structures and workflows; introducing modifications,
- b) evaluating trends in product and service innovation as well as general market conditions, also in the international context, and thus deriving adequate growth strategies,
- c) motivating the use of marketing instruments for sale and procurement of products and services,
- d) identifying changes in capital requirements, depending on investment, financial and liquidity planning; demonstrating alternative forms of capital procurement,
- e) developing and evaluating concepts for personnel planning, recruitment, and qualification measures, as well as presenting tools for HR management and development,
- f) taking into account provisions of labour and social insurance legislation when drafting a business strategy,
- g) presenting chances and risks of inter-company cooperation,
- h) using controlling to develop, pursue, implement and modify corporate objectives,
- i) presenting and motivating tools for legal enforcement of claims,
- j) presenting and motivating the need to plan a business succession, taking into account e.g. inheritance and family law, and tax provisions,
- k) Examining the need to initiate insolvency proceedings, based on company data; indicating insolvency law consequences for the continuation or liquidation of a business.

Article 16. Examination duration and passage of Part III

- (1) The exam in Part III shall be carried out in writing and it shall last two hours in each field of action.
- (2) The overall assessment of Part III is calculated as the arithmetic mean of individual evaluations in the fields of action, pursuant to Article 2.2.
- (3) If in at most two of the fields of activity, stipulated in Article 2.2, at least 30 points, however less than 50 points were reached, an oral supplementary examination may be carried out in one of the respective fields of action, if this allows passage of Part III of the Master's examination.

(4) A minimum requirement for passage of Part III of the Master's examination is an overall satisfactory examination performance. Examination of Part III is deemed to be failed, if:

1. An action field was evaluated with less than 30 points, or;
2. After supplementary examination, two fields of action were evaluated with less than 50 points.

(5) Passage of Part III of the Master's Examination leads to the recognised advanced training title “Business Administrator”.

Section V

Provisions for examination in required occupational and work-related pedagogical knowledge

Article 17. Specific admission provisions and exemptions

(1) Admission provision to examination in the required occupational and work-related pedagogical knowledge (Part IV) is a completion of the preparatory course B2 for the Master's examination “Profession and work-related pedagogical knowledge”.

(2) At the request of the examinee, exemption from Part III of the Master's examination may be granted upon providing evidence of successful completion of an equivalent training course with a recognised final examination, e.g., related recognised advanced trainings certifying qualification to train instructors.

Article 18. Objective, structure and content of Part IV

(1) Examination in Part IV proves the examinee’s professional and work-pedagogical knowledge and competence, required to independently plan, carry out and control proper vocational training of apprentices (trainees).

(2) Examination in Part IV consists of a written and a practical part.

(3) In the written part of the examination, the examinee shall solve case-related exercises in each of the following fields of action:

1. Review of training requirements and drafting of a training plan

The examinee shall demonstrate the ability to assess and evaluate training requirements, on the basis of corporate, occupational and legal provisions, as well as the ability to plan a training, including, e.g. taking into account non-job-related training periods. The exercise shall combine several of the qualifications listed in points (a) to (g):

- a) demonstrating and motivating the benefits of in-company training,
- b) planning of corporate training requirements, taking into account legal and collective agreements and the general corporate framework; preparing and making decisions,
- c) presenting structures of a vocational training system and its interfaces,
- d) selecting training professions for a company and motivating the selection,
- e) exploring suitability of a company for training in the selected training professions, in particular, taking into account cooperative, supra-corporate and external training,
- f) exploring and evaluating chances to use preparatory vocational training measures,
- g) coordinating intra-company allocation of responsibilities during training, taking into account functions and qualifications of the training participants.

2. Training preparation and recruitment of trainees

The examinee has to demonstrate the ability to perform all pre-training tasks, to introduce selection criteria for recruiting candidate, and to execute recruitment procedures, including taking into account corporate organisation and workflows as well as legal aspects. In the exercise, several of the qualifications listed in points (a) to (f) are to be combined:

- a) drawing up a corporate training plan, based on training regulations and, in particular, on occupational and typical work-related corporate processes.
- b) presenting and motivating to occupational corporate interest groups the benefits from participation and co-determination in vocational training,
- c) identifying cooperation requirements and organising the content and organisational coordination with co-operation partners, in particular, with vocational schools,
- d) applying criteria and procedures for the selection of trainees, taking into account their diversity,
- e) preparing and concluding vocational training contracts and initiating registration with the competent body,
- f) exploring chances to perform vocational training partly abroad;

3. Training delivery

The examinee has to demonstrate the ability to plan and control learning processes in a work-oriented manner as well as the ability to promote independent learning. Job-specific work- and business-related processes shall be hereby considered, as well as possible areas of application and learning requirements of the trainees. The exercise shall combine several of the qualifications referred to in points (a) to (j):

- a) creating learning-friendly and motivating conditions, give and receive feedback,
- b) organising, shaping and evaluating a probationary period,

- c) developing and drafting typical corporate learning and work-related tasks, derived from the company's corporate training plan and from occupational and business-related workflows,
- d) selecting training methods and media for the target group and use them accordingly, if required,
- e) assisting trainees with learning difficulties by individual approach during training and by learning guidance; using training-supportive aids and exploring chances to extend the training period,
- f) exploring and proposing additional training opportunities, in particular supplementary qualifications, for trainees; chances to reduce the training period and early admission to the final or journeyman's exam,
- g) promoting social and personal development of trainees; identifying problems and conflicts at an early stage and endeavour to arrive at an amicable solution,
- h) promoting learning and working in teams,
- i) noting and assessing the performance of trainees; evaluating performance assessments and test results of third parties, performing assessment interviews, drawing conclusions for the remaining part of the training course,
- j) promoting corporate intercultural skills.

4. Training completion

The examinee has to prove the ability to lead the training to a successful end and to point out prospects for further learning and qualification courses. This exercise shall combine several of the qualifications listed in points (a) to (d):

- a) preparing trainees for the final or journeyman's examination, taking into account the examination dates and leading the training to a successful end,
- b) ensuring that the trainees are registered with the competent body and ensuring that trainees know about all relevant exam specifics,
- c) preparing a written certificate based on performance assessments,
- d) informing and advising trainees about possibilities of a corporate career and professional advanced learning possibilities.

(4) The practical Part of the examination consists of:

- 1. Presentation or practical performance of a training situation and
- 2. Technical discussion.

For presentation or for practical execution, the examinee selects a job-specific training situation. The selection and draft of the training situation are explained during the technical discussion.

Article 19. Examination duration and passage of Part IV

(1) The written part of the examination lasts three hours. The practical part of the examination shall not exceed a maximum of 30 minutes, whereby the presentation or the practical execution of a training situation shall not exceed 15 minutes.

(2) The assessment of the written part of the examination is calculated as the arithmetic mean of equally weighted individual evaluations of each field of action. For the overall assessment, the written and practical parts of the examination shall be equally weighted.

(3) If in each of at least two of the fields of action, referred to in Article 16.3, at least 30 points, however less than 50 points, were reached, an oral supplementary examination may be carried out in one of the respective fields of action, if this allows passage of the written Part IV of the Master's examination.

(4) Precondition for passage of Part IV of the Master's Examination is the evaluation of the written and practical part of the examination, each with at least 50 points.

(5) Passage of Part IV of the Master's examination leads to the recognised advanced training title “Instructor”.

Master craftsman training in Carpenter Curriculum

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1. Overview and concept

Master craftsman training is widely different in the EU countries, showing varying levels of quality. The project is aimed to train company successors, entrepreneurs and managers, based on a relatively high-level master qualification system. Another aim is to increase the efficiency and the competitiveness of SMEs by promoting the realisation of the dual vocational training.

On the basis of the German master craftsman training and the experience of further Baltic Sea Region countries, a concept for unified master training for the EU countries has been developed.

As part of the project, uniform master craftsman training has been developed and implemented using the carpenter profession as an example. The following curriculum applies to the master craftsman training in carpenter, for use in other occupations, the curriculum for Parts A1 and A2 must be created specific to each profession.

Given the existing large differences in the current master craftsman training in the various EU countries, a uniform high level of qualification can only be achieved through an intensive development process of at least six years. In this respect, the present curriculum in sections 1 and 2 contains objectives that are aimed in the EU countries in the medium term. In section 3, implementation notes, development paths and basic rules for transition are presented in order to achieve goals.

The concept of unified master training in the Baltic Sea region for the profession of carpenter is based on the structure and the high qualification level of the German master craftsman training. The content and the hours of the master's training are different depending on the profession. The following information only applies to the master training in carpenter.

Preconditions for the master training and passing of the master craftsman examination

- Successful completion of at least three-year vocational training in the corresponding and related occupation. In case of shorter duration of studies, proof of professional activity so that at least three years in total could be proven.
- Or: At least five-year professional activity in the corresponding and a related occupation.
- Or: Bachelor studies in the specialty with relevance for the corresponding occupation of the master training.

Structure of the master training

The master training consists of four parts:

A: Practical training and specialised theory with occupation-specific training contents

- Part A1: Practical training including a masterpiece or a demanding master project.¹
- Part A2: Specialised theory

B: Business administration and pedagogy with unified training contents for all occupations

- Part B1: Business administration, law and management
- Part B2: Vocational and occupational education knowledge

Every part of the master training is examined separately, and it is completed with an independent, recognised further training graduation. If all four examinations are successfully passed within the period of ten years, the grade of the master in the corresponding occupation is assigned.

¹ A demanding master's project should contain special demands for a complicated customer order. Within the scope of a demanding customer order technical plant or parts of the plant should be at least drafted, calculated, planned and calculated. The plant or parts of it should also be produced. The achievements should be documented and be calculated again at the end of the master's project.

Grouping in qualifications framework and evaluations according to the European Credit system for Vocational Education and Training (ECVET)

- Grouping in Level 5 “Higher vocational education” or Level 6 “Bachelor and other comparable education and competences” of the qualification framework.
- Evaluation of acquired competences and skills with Credit Points (CPs); for all four parts of the master craftsman training maximum 180 CPs can be acquired.
- Of 180 CPs maximum 90 CPs can be acquired within the framework of professional activity.
- Acquired CPs can be transferred on the transnational level.
- The completion of further training according to every part of the master craftsman examination as well as master certification is recognised in the whole Baltic Sea region.

Part A1 of the master training: occupation-related practical training including the manufacture of a masterpiece

The competences and skills can be acquired alternatively during

- 210 class hours
- or at least one-year professional activity.
- During studies and professional activity maximum 40 CPs can be acquired.
- The successful passing of the examination of Part A1 leads to the recognised further training certification “Recognised Technician”.

Part A2 of the master craftsman training: occupation-specific theory

The competences and capabilities can be acquired alternatively

- 600 class hours
- or during 300 class hours and at least two-year professional activity.
- During studies or professional activity maximum 90 CPs can be acquired.
- The successful passing of the examination of Part A2 leads to the recognised further training certification “Technical Specialist”.

Part B1 of the master training: Business administration, law and management

To acquire required competences and skills at least 328 class hours have to be completed

- Maximum 35 CPs can be acquired.
- The successful passing of the examination of Part B1 leads to the recognised further training certification “Business Administrator”.

Part B2 of the master training: Profession and working-educational knowledge

- To acquire required competences and skills one should complete 1115 class hours.
- Maximum 15 CPs can be acquired.
- The successful passing of the examination of Part B2 leads to the recognised further training certification “Instructor”.

Recognition of already acquired competences, knowledge and skills

Competences, knowledge and skills which have already been acquired within other qualification measures and correspond to the master training are recognised for the master training and can lead to the exemption from separate parts of examination, for example:

- Training for Business Administrator with complete recognition in Part B1 of the master training and exemption from this part of examination.
- Passing of the pedagogic qualifying examination with complete recognition in Part B2 of the master training and exemption from this part of examination.

- Full credit of contextual corresponding university degree courses to Parts A2, B1 or B2 of the master training.

The studies can be alternatively conducted in:

- The full-time form with the total duration of about 10 months.
- The extra-occupational form in the evenings and at weekends with the total duration of 24 to 30 months.

Hours Recommendation Master Training Carpenter

Hours Recommendation Master Training Carpenter	
Part A1: Practical training	210 hours
Part A2: Specialised theory	800 hours
Part B1: Business administration, law and management	328 hours
Part B2: Profession and working-educational knowledge	115 hours
Total Master Training Carpenter	1.453 hours

2. Curriculum

2.1 Part A1 Practical Training and part A2 Specialised Theory

Separation of Practical Training (part A1) and Specialised Theory (part A2) is not advisable as they are very closely linked. Complex and often closely connected subject content can be taught in parallel. Experience shows that this will further increase the engagement of the participants. There is also content overlap between the subject areas; a purely linear array of subjects can have a negative impact on learning success.

2.11 Learning objectives Parts A1 and A2

The aim of master craftsman training in the field of carpenter is to be able to run a company independently, to perform leadership tasks in the fields of technology, business management, personnel management and development, carry out vocational training and independently implement professional competence adapting to new requirements in these areas.

With the master training "Carpenter" the following skills and knowledge are to be acquired as integrated qualifications:

- determining customer requirements, advising customers, offering services, conducting contract negotiations and setting order goals, calculating services and creating offers, concluding contracts,
- carrying out tasks in technical, commercial and personnel management, in particular taking into account the company organization, company training and further education, quality management, occupational safety law, data protection, environmental protection, as well as information and communication technologies,
- planning, organising, carrying out and monitoring order handling processes,
- carrying out orders, in particular taking into account design aspects, construction manufacturing and assembly techniques, professional legal regulations and technical standards, as well as the generally recognized rules of technology, personnel, material, machines and guarantees, including the opportunities to employ trainees,
- preparing and presenting drafts, sketches, production drawings and plans, also using computer-aided systems,
- recognizing static systems and carrying out plausibility checks; evaluating construction documents for the use of the service to be provided as well as create and evaluating product-related static calculations required for an application in building authority approval procedures,
- recognising style directions as well as historical and contemporary design language in architecture and design in drafting, manufacturing, restoration and reconstruction,
- designing, planning, constructing, manufacturing, assembling and maintaining furniture, interior fittings and extensions, in particular office and shop fittings, kitchens, ceiling linings, floors and trade fair structures,
- designing, planning, constructing, manufacturing, installing, assembling and maintaining façade-closing and construction elements and components, in particular windows, doors and sunrooms, stairs and bodywork,
- planning, carrying out and documenting restoration work,
- determining the use of ready-to-assemble, manufactured products and purchased parts,
- planning, installing, assembling and maintaining locking and security systems to order,
- assembling products and objects including the electrical and water connections, assembly instruction, coordinating trade-specific and comprehensive installation processes,

- considering types and properties of processed materials, in particular wood, woodwork and plastic materials, as well as glass and dry building materials, including the methods of surface treatment,
- in which design, planning, construction, manufacture, assembly and maintenance are taken into account,
- planning and monitoring the use of systems, machines, tools and devices,
- developing and implementing concepts for business premises including factory and warehouse equipment as well as for logistical processes,
- carrying out quality and function tests, evaluating and documenting result,
- approving and documenting services and carrying out post-calculation.

Recommended hours Part A1 Practical training and Part A2 Specialised theory

Module	Qualification focus	Study hours
Teil A1 Practical training		210 h
A1/1	Planning final piece	30
A1/2	Customer order	160
A1/3	Practical preparation situation-based task	20
Teil A2 Specialised theory		800 h
1. Design, construction and manufacturing technology		200 h
A2/1	Manufacturing concepts and implementation options	72
A2/2	Arrangement fundamentals	40
A2/3	Design and drawing technique	40
A2/4	Product development	24
A2/5	Construction requirements	24
2. Assembly and maintenance		200 h
A2/6	Assembly schedule	40
A2/7	Construction site equipment and logistics	40
A2/8	Monitoring and final acceptance, maintenance	40
A2/9	Coordination of assembly services	22
A2/10	Assembly techniques	22
A2/11	Object-related protective measures	20
A2/12	Locking and protection systems	16
3. Order processing		200 h
A2/13	Procurement	14
A2/14	Offer preparation	24
A2/15	Planning work	28
A2/16	Rules and regulations	10
A2/17	Use of materials and resources	30
A2/18	Production documentation	10
A2/19	Subcontracting	10
A2/20	Technology deployment	30
A2/21	Data switching and calculations	20
A2/22	Product treatment	24

4. Company management and company organization		200 h
A2/23	Determination of operating costs	30
A2/24	Operating cost structure and key figures	30
A2/25	Marketing and concepts for dealing with customers	20
A2/26	Quality management	20
A2/27	Human Resources	30
A2/28	Occupational safety, health and environmental protection	20
A2/29	Planning of the business premises and the logistics processes	30
A2/30	Cooperation	20

2.12 Curriculum framework part A1

Modules	Study hours
Teil A1 Fach-Praxis	210
Module 1 planning final piece The final piece consists of planning, implementation and documentation work. A final piece is for <ol style="list-style-type: none"> 1. an interior fittings, 2. an interior design, 3. a component or 4. a façade finish to create a concept including the design and planning documents. From this concept a product or partial product is to be calculated, produced and documented. After the implementation of the final piece project, a technical discussion is to be held.	30
Module 2 Customer order A final piece project corresponding to a customer order is to be carried out. The order-related-customer requirements are determined by the Master Examination Board. On this basis, an implementation plan including time and material requirements is created. This must be done before the preparation of the final piece project is submitted to the Master Craftsman Examination Board for approval. Master Craftsman Examination Board examines whether the concept meets the order-related customer requirements.	160
Module 3 Practical preparation situation task The situation task is order-oriented and completes the proof of qualification for the Master Examination in Carpentry. The task is set by the Master Examination Board. As a situational task, there is special consideration for functional, material-related, production-related and economic requirements to manufacture a product.	20

2.13 Curriculum framework part A2²

Part A2 subject theory	800
<p>Field of action 1: Layout. Design and manufacturing technology</p> <p>The prospective Master should acquire knowledge allowing them to perform design, construction and manufacturing tasks, taking into account economic and ecological aspects in the carpentry industry.</p> <p>They should analyse and evaluate job-related issues. Knowledge and skills for independent work in particular are to be acquired in 12 various modules, and the following tasks are to be taught.</p> <ul style="list-style-type: none"> • conceptual and functional solutions for production, taking into account the working materials including the processes for surface treatment as well as static development, evaluation and corrections, • describing and justifying the importance of styles and art history as well as historical and contemporary form language for the design, production, restoration and reconstruction of furniture, interior design facilities and façade-closing elements, • preparing, evaluating and correcting sketches, designs and construction drawings, • designing furniture and interior fittings, in particular office and shop fittings, kitchens and trade fair structures, also taking into account ergonomics, determining production techniques and justifying the choices, • proposing structural engineering measures, in particular for façade-closing elements and construction components, as well as for wall and ceiling cladding, taking into account the development and justification of different building physical conditions; evaluating and correcting construction-specific guidelines; 	200

² The framework curriculum for the preparation for Part II of the master craftsman's examination was prepared by the German Wood and Plastics Association, Berlin

Quali-fica-tions	Qualification fo-cal points	Competences	Curriculum	Study hours
1. Design, construction and manufacturing technology The trainee is able to carry out design, construction and manufacturing tasks, taking into account economic and ecological aspects in a carpenter's workshop. He should analyse and evaluate job-related issues and solve the respective task holistically.				200h
1 a	Manufacturing concepts and implementation possibilities	The trainee is able to: <ol style="list-style-type: none"> 1. take action and include legal, economic and ecological aspects in their entrepreneurial decisions; 2. to define the customer order as an overarching process of corporate responsibility and, if possible, to cover all controlled conditions without errors in terms of ensuring quality management, process and product quality; 3. develop, evaluate and correct the treated and processed materials in terms of conceptual and functional of risk assessment solutions; 4. compile order-related production targets and derived from them strategies and measures to implement the customer order and to develop alternative solutions; 5. present the information required for the solutions to explain contexts and justifications required for the solutions to weigh in on the opportunities and solutions; 6. draw up timetable and action plan with regard to the selected manufacturing concept to create a functional description of the defined tasks and responsibility areas within the company structure 7. select possible processes for surface treatment with regard to the materials to be processed; 	<ul style="list-style-type: none"> • Decision-making competence: <ul style="list-style-type: none"> ○ Professional competence ○ Personal competence ○ Social competence • Basics of process management across functional areas taking place under • Basics of process planning and control • Planning techniques <ul style="list-style-type: none"> ○ rolling or gliding planning • Information and communication technologies • Analysis methodology • Risk analysis • Feasibility studies and methods • Risk groups • Methods of determining targets • Risk avoidance measures • Problem-solving strategies and methods • Planning and decision-making processes • Decision-making methods • Quality planning and performance standard • Time and resource planning • Production planning • Operational principles • Manufacturing systems <ul style="list-style-type: none"> • Company structures: concepts for the operational production system <ul style="list-style-type: none"> ○ Functional areas 	72h

		<p>8. carry out relevant calculations with regard to the expected static stress on the processing of the used materials showing price alternatives in terms of material costs and assessing the ecological quality of the materials.</p>	<ul style="list-style-type: none"> ○ process-oriented approach ○ Responsibilities and competences ● Manufacturing techniques ● Manufacturing processes ● Production and material flow diagram ● Relevant groups of materials and forms of use: <ul style="list-style-type: none"> ○ Solid wood and wood-based materials ○ Plastics ○ Metals ○ Glass and stone ○ Dry building materials ○ Upholstery and upholstery fabrics ○ Fittings ○ Connecting and fixing methods, ○ Adhesives, insulation and damping materials 	
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1 a			<ul style="list-style-type: none"> • selection criteria for materials: <ul style="list-style-type: none"> ○ technical characteristics ○ strength ○ areas of application ○ performance characteristics ○ workability ○ price comparison of substitutable materials ○ ecological balance sheets • materials management and procurement fundamentals • procurement logistics • procurement strategies • supply chain management <ul style="list-style-type: none"> ○ supplier assessment based on a list of criteria ○ supplier selection ○ supplier development/support ○ requirements specification ○ technical delivery conditionincoming goods inspection • make or buy? • surface treatment: <ul style="list-style-type: none"> ○ preparation ○ surface design techniques ○ paint systems • application process 	
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1 b	Basics of the design	<p>The trainee is able to</p> <ol style="list-style-type: none"> 1. justify that the aesthetic and the technical function, as well as the construction of the products, in the sense that they form a design, form a quality-determining unit and therefore have to be coordinated with each other; 2. describe and justify the importance of styles and art history for the design, manufacture, restoration and reconstruction of furniture, Interior fittings and building components; 3. describe and justify the importance of historical and contemporary design language for the design, production, restoration and reconstruction of furniture, interior fittings and building components; 4. design order-related products in accordance with design principles to construct them in a way suitable for production and selected materials. 	<p>basics of art history:</p> <ul style="list-style-type: none"> ○ characteristics of styles ○ architectural features ○ furniture and interior design ○ decors and construction details ● basics of modern design development: <ul style="list-style-type: none"> ○ intentions and objectives ○ furniture design ○ color theme ○ light design ● arrangement fundamentals : <ul style="list-style-type: none"> ○ shape elements and shape relationships ○ area structure and proportions ○ body and space ○ color as a functional and design element ○ aesthetic effect of the surface finish of ○ materials ○ room design ● product-related constructions: <ul style="list-style-type: none"> ○ furniture construction ○ wall units and closets as well as room dividers ○ kitchen and system furniture ○ wall and ceiling panelling and interior doors ○ floors, walls and ceilings ○ stairs ○ external doors, gates and windows <p>sunrooms</p>	40h
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1 c	Drafting and drawing technique	<p>The trainee is able to,</p> <ol style="list-style-type: none"> 1. implement customer requirements and wishes in construction and graphic design, taking into account technical manufacturing and economic aspects and at the same time ensuring assembly-friendly construction design; 2. use sketching techniques of freehand drawing to develop ideas and concepts as well as order-related information, e.g. during a meeting with a customer or in the development phase - in a timely manner; 3. prepare, maintain and to correct sketches and drawings taking into consideration professional legal regulations, technical standards and the generally recognized technical rules, as well as the order-related construction, material and safety requirements; 4. make design drawings in order to develop, evaluate and correct alternatives to be able to make a decision; 5. be able to use equipment variants as well as the virtual representation possibilities; 	<ul style="list-style-type: none"> • relevant standards regarding: <ul style="list-style-type: none"> ○ drawing standards ○ professional drawing standards ○ physical building issues ○ fire and smoke protection ○ building security ○ wood protection ○ energy saving ordinance • types of drawing: <ul style="list-style-type: none"> ○ design drawings ○ construction drawings ○ production drawings: ○ main drawings ○ sectional drawing ○ dimensioning and annotation ○ detail drawing ○ dimension drawing • basic geometric construction • isometry, dimetric, perspective <ul style="list-style-type: none"> • exploded view drawing 	40h
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		<p>6. also represent visualization of design and execution variants spatially and demonstrate them as a customer-oriented visualization;</p> <p>7. produce, evaluate and correct sketches, drafts, detailed and production drawings, calculations and plans using computer-aided systems; to visualize the design proposals and the prototype presentations</p>	<ul style="list-style-type: none"> • freehand drawing: <ul style="list-style-type: none"> ○ sketching technique ○ construction sketches ○ view sketches ○ spatial sketches • computer-aided design, construction, drawing and presentations: <ul style="list-style-type: none"> ○ CAD, 2D-3D representations ○ CNC-compatible designs and transfer of the design data to production ○ industry software ○ use of parts and detail libraries ○ component procurement via the internet ○ virtual representation and products ○ and room design ○ presentation software 	
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1 d	Product development	<p>The trainee is able to</p> <ol style="list-style-type: none"> 1. design furniture and interiors, in particular office and shop fittings, kitchens, as well as trade fair structures; 2. design components, in particular external doors, windows and stairs as well as gates; 3. take into account ergonomic, structural, material-related, manufacturing, economical and economical aspects during product development, and include customer requirements and wishes, 4. follow the required material properties ones, the influence on the life cycle assessment, the principle of economical use and the interaction with others when selecting the material; 5. determine the conditions of the use of the concepts implementation in manufacturing and justify the choice of the respective technology; 6. if applicable, take into account in the installation conditions and materials selection on the construction sites. 	<ul style="list-style-type: none"> • customer order: <ul style="list-style-type: none"> ○ list of services, requirements, details, specification ○ statutory rules and regulations ○ quality characteristics ○ purpose and place of use of the product as well as functional requirements ○ locking and protection systems ○ where applicable, on-site conditions of the construction site ○ economic, technical and ecological dimensions of a product ○ criteria and goal optimization: ○ use of materials with high recycling rates ○ simple production-ready constructions ○ easy interchangeability of wearing parts ○ simple installation and removal in the building ○ easy maintenance with a long service life ○ easy separation of materials after use • search and select product ideas • creativity techniques 	24h
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1 d			<ul style="list-style-type: none"> • communication and argumentation techniques • material classification: <ul style="list-style-type: none"> o metallic materials o non-metallic materials o ceramic materials o organic materials o composites • material properties: <ul style="list-style-type: none"> o technological o mechanical o physical o chemical o biological o aesthetic o ecological 	
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1 e	Requirements to construction	<p>The trainee is able to</p> <ol style="list-style-type: none"> 1. define and evaluate the special stresses of the the construction elements and in suggest appropriate solutions; 2. design the construction of the wall and ceiling cladding as well as their substructure and reinforcement according to requirements and the safety regulations; 3. design the order-related interior walls, ceilings and floors in conventional construction or to select drywall systems to be installed according to the manufacturer's specifications; 4. observe the construction-specific specifications and static stresses of the physical building at the conception stage and perform the relevant product-related calculations and to develop and justify the conditions of implementation. 	<ul style="list-style-type: none"> • special requirements across products: <ul style="list-style-type: none"> ○ thermal protection ○ soundproofing ○ moisture protection, vapour-retardant layers ○ wood protection ○ fire and smoke protection • special requirements for windows and external doors: <ul style="list-style-type: none"> ○ mechanical strength, resistance to wind, ○ static loads ○ functional security ○ deformation resistance ○ burglar resistance ○ joint tightness / wind tightness / airtightness ○ wind-driven rain tightness ○ weather resistance, durability • special requirements for wall and ceiling panelling: <ul style="list-style-type: none"> ○ professional substructures or supporting structures ○ impacts and strengths ○ connecting and fixing methods ○ officially approved fastening and support systems ○ rear ventilation, airtightness 	24h
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1 e			<ul style="list-style-type: none"> • special requirements for the floors, ceilings as well as walls: <ul style="list-style-type: none"> o professional substructures or supporting structures o static loads • physical foundations <ul style="list-style-type: none"> o basic thermal insulation variables o physical principles of condensation water formation o ventilation heat losses o physical fundamentals of sound o basic soundproofing concepts o basic terms of moisture protection • technical and constructive measures for heat, moisture and noise protection, in particular to avoid thermal bridges and to ensure the heat insulation and wind tightness in building construction, avoidance of moisture pockets and sound bridges; technical and constructive measures for fire and smoke protection 	
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<p>Field of action 2 Assembly and maintenance</p> <p>Knowledge and skills are to be taught in four different modules in order to be able to implement job-related planning conditions and maintenance measures in work orders, taking into account operational and construction conditions, as well as to initiate, coordinate and control the implementation. In particular, the following qualifications are to be acquired</p> <ul style="list-style-type: none"> • designing and justifying assembly work including the tools and machines to be used check, evaluating and verify the given assembly plans, • checking, evaluating and verifying concepts for transport, constructing site equipment, safety and waste disposal, • describing and justifying the necessity of object-related interim and final checks of assembly work and present and justify maintenance measures, • defining and justifying the criteria for the coordination of assembly services with clients and involved parties, • assessing assembly techniques, assigning them to their purposes and justifying such assignments, • developing, justifying and correcting proposals for measures to protect against heat, moisture, noise, smoke, fire and radiation, taking into account the standards, guidelines and regulations, • assigning locking and protection systems to different purposes and justify their selection. 	200
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Qualifications	Qualification focal points	Competences	Curriculum	Study hours
	2. Assembly and maintenance: The trainee is able to carry out installation work and maintenance measures, taking into account operational and site-related planning conditions in work orders and to arrange for and coordinate and control the implementation.			200h
2 a	Assembly sequence plan	The trainee is able to <ol style="list-style-type: none"> 1. plan and preparing the assembly on construction sites or at the customer's site as an integral part of operational order processing; 2. determine job-related information, like installation requirements, dimensions and construction – to be determined at the construction site and prepared for the assembly; 3. specify customer requirements and requests in terms of the assembly services to be provided; 4. define and justify assembly tasks, taking into account the in-house production, schedule, personnel and cost planning; 5. determine implementation criteria for the assembly order, observe specifications, define implementation goals, describe possible implementation and and to analyse their feasibility; 	<ul style="list-style-type: none"> • the importance of assembly on construction sites in the operation of the company • planning and executing documents: <ul style="list-style-type: none"> ○ service specifications/requirement specifications/specification sheet/general specifications ○ specifications of work preparation ○ list of materials/parts list ○ deployment list ○ production drawings ○ technical instructions and specifications of the suppliers ○ construction plans and drawings ○ assembly plans ○ detailed plans ○ road maps • customer requirements from the perspective of <ul style="list-style-type: none"> ○ the assembly order ○ in-house quality standards ○ the recognized rules of technology 	40h

2a		<ol style="list-style-type: none"> 6. create and evaluate and to correct assembly plans as well as to describe and justify the necessary work processes; 7. plan, organize, steer and control the process-related assignment and availability of machines, tools, equipment and other technical facilities; 8. plan, organize, steer and control the process-related assignment of delivery of ready-to-assemble products purchased parts and materials; 9. plan and apply process-related measures for occupational health and safety protection, environmental protection and quality assurance; execute the assembly tasks, coordinate the work processes, perform administrative tasks and control and evaluate the assembly progress 	<ul style="list-style-type: none"> • order entry and specification • measures to prepare special assembly of <ul style="list-style-type: none"> o interior fittings o structure construction o drywall o installation of components • delivery of products, materials and resources: <ul style="list-style-type: none"> o pick o pack o load and secure o transport o transport vehicles o assembly trolley o road traffic regulations • quality assurance on construction sites • workflow and workplace design in a workday 	
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2 a			<ul style="list-style-type: none"> • assembly planning: <ul style="list-style-type: none"> ○ demand planning ○ scheduling / work sequence planning ○ timetable scheduling ○ cost planning ○ transport and storage planning ○ personnel planning • cost and performance accounting • planning for process-related deployment: <ul style="list-style-type: none"> ○ ready-to-assemble products, purchased parts, materials and auxiliary materials ○ machines, tools, devices and assembly assistance • measurements and dimensional standards in construction • site-related framework and planning conditions • structural conditions on the construction site • taking measurements during construction <ul style="list-style-type: none"> ○ methods and measuring equipment for plumb and level, right measurement and for length, angle and level measurement ○ factors influencing the measurement accuracy ○ tolerances in building construction • EDP-supported measurement systems 	
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2 b	Construction site equipment and construction site logistics	<p>The trainee is able to</p> <ol style="list-style-type: none"> 1. to plan, to organize, to control and monitor the construction site installation in consultation with the customer, taking into account the assembly order, the spatial conditions, the environmental conditions, the climatic conditions and the relevant rules and regulations; 2. ensure the timely granting of permits as well as the provision and supply of electrical energy, compressed air and water; 3. to plan and organize the material flow from plants or the suppliers to the construction site and back according to logistical principles to taking into account the operational capacity; 4. plan, organize and control the unloading, incoming goods inspection, transport and storage at the construction site; 	<ul style="list-style-type: none"> • rules, regulations and installation guidelines • hazardous substances ordinance • workplaces regulation • workplace policies • environmental law fundamentals • traffic regulations • conditions at the construction site and in the assembly • assembly organization: <ul style="list-style-type: none"> ○ working conditions ○ workflow and workplace design ○ utilities ○ permits • potential dangers during assembly work • safety analysis and accident prevention measures during assembly work • hazardous materials at construction sites • work-and health protection • safety engineering measures in the assembly • ergonomics • lighting • infrastructure at the construction site <ul style="list-style-type: none"> ○ electrical power supply connections ○ and water as well as compressed air ○ traffic routes ○ sidewalk security ○ scaffolding and safety systems ○ social areas 	40h
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2 b		<ol style="list-style-type: none"> 5. develop, evaluate, correct and implement security concepts in compliance with all safety regulations, which are required for the operation of a construction site; 6. develop and evaluate and correct site-related waste disposal concepts and to implement them; 7. to ensure that the construction site is properly and professionally dismantled at the end of the installation work. 	<ul style="list-style-type: none"> • conditions regarding product assembly purchase parts and materials at: <ul style="list-style-type: none"> ○ handling ○ commissioning ○ packing ○ loading and unloading ○ transport ○ storage ○ disposal • safety measures with regard to the production specifications, materials, tools and equipment: <ul style="list-style-type: none"> ○ load securing ○ traffic safety ○ anti-theft protection ○ protection against weather impact • assembly aids: <ul style="list-style-type: none"> ○ ladders ○ scaffoldings ○ lifting and carrying aids ○ rope protection devices • geometry, dimensions and mass of the • assembled products • stability/resistance to tipping • load calculation 	
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2 b			<ul style="list-style-type: none"> • delivery and deployment logistics: <ul style="list-style-type: none"> ○ procurement from the construction site ○ order time/delivery times ○ optimal order quantity ○ procurement costs ○ order process and processing ○ route planning • disposal logistics: <ul style="list-style-type: none"> ○ circular economy and product responsibility ○ packaging guidelines • environmental protection measures in the assembly: <ul style="list-style-type: none"> ○ waste prevention and sorting procedure ○ utilization of the residues ○ disposal of waste material ○ permit requirements for the container ○ installation • packaging materials <ul style="list-style-type: none"> ○ types ○ usage properties ○ economy • ecological balances 	
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2 c	Supervision and final maintenance	<p>The trainee is able to</p> <ol style="list-style-type: none"> 1. plan, carry out and monitor assembly work according to economic, ecological, ergonomic and technical criteria; 2. assess the effects of changed frame-work conditions and intervene to correct the assembly order; 3. establish, justify, carry out and document project-related interim and final checks with regard to design, scope and quality based on the service specification; 4. present and describe the need for final acceptance of the assembly work as well as the acceptance at the end of installation with the customer, in compliance with the contractual arrangements; 5. plan, arrange and document process-related quality controls and quality assurance measures; 	<ul style="list-style-type: none"> • identification, evaluation and presentation of relevant project data • methods of data collection, data analysis and data evaluation • actual/target comparison • post calculation • design criteria for the creation of assembly-related documentation and reports as well as logs • forms for recording the use of time and resources • structure and content of the overall documentation and the final report • archiving of documents and order documents • product-related quality assurance through <ul style="list-style-type: none"> ○ procedures and quality standards ○ monitoring ○ documentation • controls and tests • test plans • record forms 	40h
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2 c		<p>6. ensure and monitor the proper functioning and the missing error-free condition of the measuring devices and the test equipment;</p> <p>7. explain order-related operating, application and maintenance instructions to offer services within the scope of the products maintenance; plan and carry out and monitor interior equipment and fittings as well as building elements on an order-related basis</p>	<ul style="list-style-type: none"> • measures of monitoring, correction and improvement of assembly processes • fundamentals of personnel management • acceptance of the assembly work <ul style="list-style-type: none"> ○ legal fundamentals ○ supplementary performance ○ handover, takeover ○ warranty period ○ completion of the assembly order ○ documentation ○ post calculation • services 	
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2 d	Coordination of assembly services	<p>The trainee is able to</p> <ol style="list-style-type: none"> 1. set up, justify and coordinate tasks and responsibilities of the functional areas within the meaning of the assembly order and the assembly process; 2. coordinate customer contacts and reviews of the assembly services and progress as well as the determine and justify time and modalities of the final acceptance of the services with the principal customer; 3. respond to and process change requests and customer complaints and suggest and develop solutions to problems as necessary; 4. determine and justify the criteria for the coordination of the assembly services with the trades involved; 	<ul style="list-style-type: none"> • importance of customer satisfaction • types of customer contact and customer care in the assembly area • information system in the assembly area: <ul style="list-style-type: none"> ○ information flow ○ types of information ○ information carriers and technologies • communication system in the assembly area: <ul style="list-style-type: none"> ○ communication basics ○ communication structures ○ communication forms ○ interviewing techniques and counselling techniques ○ argumentation techniques ○ conflict resolution techniques • complaint management • procedural instructions for handling change and how to deal with complaints in the assembly area 	22h
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2 d		<p>5. include areas of activity, responsibilities, and different functions and work processes of the trades involved in the construction in the to assembly planning and taking this into account when making decisions;</p> <p>6. discuss cross-trade issues and coordinate appointments and processes arrange work to be carried out by other trades and additional services to be carried out on the construction site;</p> <p>ensure communication on the construction site by means of professional regulations and to provide special means and channels of information as well as formalized documentation as assistance to communication.</p>	<ul style="list-style-type: none"> • tasks and services of other construction trades • organization of the flow of information between the work in the assembly area • measures and means for coordination and alignment of the construction work in the assembly area • conflict avoidance and conflict resolution strategies • conditions for a conflict-free coexistence and a productive cooperation in the assembly area • procedural instructions for handling other construction works in the assembly area • measures to avoid disturbances, conflicts as well as of complaints in the assembly area 	
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2 e	Assembly Techniques	<p>The trainee is able to</p> <ol style="list-style-type: none"> 1. optimize the assembly process through the use of qualified staff, appropriate operational resources, rational processes and work techniques; 2. to assess assembly techniques and assign them to given purposes and to plan, justify and assign them to applications on an order basis; 3. consider ergonomic conditions in workplace design and work organization and to ensure occupational safety; 4. assess whether appropriate employee qualification is given for the respective assembly, or whether a corresponding appropriate employee training is provided. 	<ul style="list-style-type: none"> • measuring and marking tools, hand tools, machine tools and machines for manufacturing and assembly technique for carpenters • mounting systems and mounting aids • fixing systems <ul style="list-style-type: none"> ○ dowel systems ○ adhesives • assembly and hardware technology • electrical engineering and sanitary engineering fundamentals • electrical and sanitary connections • qualification requirements and qualification measures with regard to newly developed assembly and materials technologies 	22 h
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2 f	Object-related safeguards	<p>The trainee is able to</p> <ol style="list-style-type: none"> 1. develop, justify and correct proposals for object-related measures of the heat, humidity, sound, smoke, fire and radiation protection; 2. refer to corresponding standards, guidelines and regulations, as well as to the accepted rules of technology when justifying these proposals; 3. to carry out calculations necessary for the protective measures; 4. initiate, control and evaluate the order-related execution of the protective measures. 	<ul style="list-style-type: none"> • legal requirements with regard to thermal, acoustic, moisture, fire and smoke protection • Energy Conservation Ordinance (<i>Energieeinsparverordnung</i>) • physical foundations <ul style="list-style-type: none"> ○ basic thermal insulation variables ○ physical principles of condensation water formation ○ ventilation heat losses ○ physical principles of noise ○ basic soundproofing terms • building material classes and fire resistance classes according to DIN 4102 • technical and constructive measures: <ul style="list-style-type: none"> ○ for heat, moisture and noise protection as well as for fire and smoke protection ○ ensuring thermal insulation and thermal sealing in building construction and protection against the consequences of fire, the avoidance of moisture nests as well as of sound bridges • sealing and insulation systems <ul style="list-style-type: none"> ○ wind proofing ○ thermal insulation ○ diffusion-inhibiting and diffusion-tight layers ○ soundproofing ○ sound absorption ○ airtight layer 	20 h
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2 g	Closing and protection systems	<p>The trainee is able to,</p> <ol style="list-style-type: none"> 1. assign locking and protection systems for different applications and to justify their assignment; 2. select locking and protection systems based on object-related basis and justify the choice; 3. inform and advise the customer about possible object-related protection measures; 4. integrate order-related locking and protection systems, in particular for doors and windows, as well as gates into the construction and to assemble the product properly. 	<ul style="list-style-type: none"> • locking systems: <ul style="list-style-type: none"> ○ lock cylinder ○ locking systems ○ access control systems ○ security fittings • safety glass • composites 	16h
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**Field of action 3 Order processing**

The aim is to impart knowledge and skills relating to plan order processing processes, including the application of industry-standard software to plan in a success-, customer- and quality-oriented manner, to control and complete their implementation. The acquired skills should enable to independently carry out the following tasks in particular.

- representing possibilities of order procurement,
- preparing offer documents and evaluating offers,
- carrying out offer calculation,
- taking into account methods and procedures of work planning and organization,
- evaluating production and assembly as well as the use of personnel, material and equipment, presenting quality assurance aspects as well as interfaces between work areas and trades,
- professional legal regulations and technical standards as well as recognized rules of applying technology, in particular liability during production, assembly, maintenance and attitude and services,
- determining and selecting the order-related use of material, machines and equipment,
- creating, evaluating and correcting drawings and flow charts for production,
- assigning subcontracts and controlling their implementation,
- selecting, evaluating and assigning construction, process, production and surface technologies as well as fittings to intended purposes,
- determining and calculating quantities and times, carrying out preliminary and final calculations,
- identifying and describing the labelling, packaging, storage and transport of products.

200h



Qualifications	Qualification focal points	Competences	Curriculum	Study hours
3. Order processing The trainee is able to plan order processing processes, also using industry-standard software, in a success-, customer- and quality-oriented way, to control their implementation and to complete them.				200h
3 a	Order	The trainee is able to <ol style="list-style-type: none"> 1. Initiate customer management as an expression of customer orientation, to have the possibility to differentiate themselves from their competitors in direct contact to improve its contact and service quality and achieve long-term customer loyalty through customer care, thus keeping acquisition costs down; 2. procure orders and clarify them in coordination with customers and employees; 3. identify product-related customer requirements and wishes provide competent customer advice with regard to material use, design and construction taking into consideration quality-related ecological and economic aspects; 4. provide the customer with professional implementation proposals and design variants as well as ensure transparency regarding the costs, the implementation conditions and the to order-related services. 	<ul style="list-style-type: none"> • the principles of sales and consulting psychology • communication theory <ul style="list-style-type: none"> ○ communication structures ○ conversation techniques • consulting techniques <ul style="list-style-type: none"> ○ argumentation techniques ○ conflict resolution • customer orientation, quality orientation, employee orientation <ul style="list-style-type: none"> ○ staff motivation and satisfaction • meaning and importance of customer satisfaction: <ul style="list-style-type: none"> ○ definition of "customer satisfaction" according to DIN EN ISO 9000 2000 et seqq. ○ criteria for acquiring new customers ○ care of a long-term loyal customer base ○ subjective customer expectations marked by: <ul style="list-style-type: none"> ○ aspiration level of the customer ○ customer experiences ○ image of the provider ○ the provider's performance proposition ○ knowledge of the customer of alternative offers • customer management: <ul style="list-style-type: none"> ○ personal, telephone and written customer contact ○ online presentation ○ customer-oriented organization ○ written customer survey ○ complaint management ○ contact quality requires: 	14h

			<ul style="list-style-type: none"> ○ kindness ○ credibility ○ reliability 	
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3 b	Offer preparation	<p>The trainee is able to</p> <ol style="list-style-type: none"> 1. analyse the customer requirements and wishes, and specify them: with regard to the service to be provided, taking into account legal basis, to draw up a corresponding list of services o specifications to be provided and to define the required work packages; 2. determine the conditions and time required for the fulfilment of the order to shown the costs; 3. prepare and document the order-related allowances and the determined data for the preparation of the preliminary cost calculation and for the preparation of the offer and to use them for the work preparation; 4. take into account the structural conditions of the assembly sites and the site-related transportand storage conditions to be taken into account when preparing the offer; 5. carry out preliminary calculation in knowledge of the cost-relevant operational circumstances and the empirical values from previous orders and to prepare offer. 	<ul style="list-style-type: none"> • the legal basis • performance descriptions <ul style="list-style-type: none"> ○ list of services and specification ○ specifications sheet ○ specifications • methods and procedures required for demand planning • requirements planning: <ul style="list-style-type: none"> ○ use of resources ○ use of materials ○ personnel deployment • cost and performance accounting • time determination by estimation and comparison • standard times • evaluation and post-calculations • possible uses of EDP in calculation and <ul style="list-style-type: none"> ○ word processing ○ spreadsheet ○ presentation programs ○ industry-specific programs • tender procedures • risk assessment methods • methods of the final plausibility check <ul style="list-style-type: none"> ○ rules of tendering procedures ○ processing • processing tender documents • preparing tenders • form and content of order confirmation • procedure for the follow-up of offers • additional and/or supplementary offer, ancillary services 	24 h
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3 c	Work planning	<p>The trainee is able to</p> <ol style="list-style-type: none"> 1. plan and execute the processing of a customer order in a goal-, customer- and quality-oriented manner; 2. assess, select and apply methods and procedures of work planning and work preparation with regard to the order-related manufacturing and assembly; 3. ensure order-related flow of production materials, energy and information; 4. plan, use and control resources, systems, materials and personnel in a process-related manner; 5. plan, evaluate, implement and correct the work organization of work for production and installation, taking into account the deadline and logistical principles; 6. carry out the operational work preparation and ensure a rational assembly by order identification and accompanying order information; 7. use IT support to optimize work preparation and manufacturing activities; 	<ul style="list-style-type: none"> • Production planning <ul style="list-style-type: none"> ○ structure plans and work packages ○ machine arrangement ○ production flow / work sequence ○ workplace design ○ quality planning • internal transport, handling and storage process • delivery types • handling • in-house logistics fundamentals • production planning system (PPS) • material flow logistics • fundamentals of work planning • principles of work planning: <ul style="list-style-type: none"> ○ planning ○ taxes ○ control • work preparation tasks : <ul style="list-style-type: none"> ○ checking and calculation of capacities and resources ○ carrying out the preliminary calculation ○ scheduling and resource planning ○ defining the work sequence ○ machine assignment plans ○ implementation of a permanent target/actual comparison documentation 	28h
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		<p>8. plan, allocate, document and implement process-related measures for work health and safety protection, environmental protection and quality assurance;</p> <p>9. define and point out interdependencies and interactions between to operational work areas, and to consider them in work planning and organization;</p> <p>10. recognise, demonstrate and point out assembly-related interfaces with other plants and consider them when planning work and organization.</p>	<ul style="list-style-type: none"> • network scheduling: <ul style="list-style-type: none"> ○ forward scheduling ○ backward termination ○ "critical path and milestones" ○ ACTUAL/TARGET comparison / controlling function ○ milestone trend analysis • scheduling : <ul style="list-style-type: none"> ○ measures of monitoring, correction and ○ process improvement ○ display methods for processes ○ visualization of processes, interactions and dependencies • preventive measures of occupational health and safety protection and environmental protection: <ul style="list-style-type: none"> ○ security analysis ○ technical occupational safety ○ personal protective equipment ○ accident prevention • first aid kit 	
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3 d	Regulations	<p>The trainee is able to</p> <ol style="list-style-type: none"> 1. learn about laws, ordinances and regulations relevant to the company management and the processing of customer orders, and ensure the observance of these regulations; 2. assess and take into consideration professional legal regulations and technical standards, as well as the recognized rules of the technology with regard to its importance for liability and warranty; 3. select job-related professional legal regulations and technical standards, in relation to the orders and apply to them to production, assembly, maintenance and services. 	<ul style="list-style-type: none"> • legal fundamentals : <ul style="list-style-type: none"> ○ German Construction Contract Procedures (Vergabe- und Vertragsordnung für Bauleistungen; VOB) / German Civil Code (Bürgerliches Gesetzbuch; BGB): <ul style="list-style-type: none"> ○ design and structure ○ scope ○ differences in contract law (BGB/VOB) ○ ATV DIN 18355 – carpentry work ○ standards ○ fundamentals of tender processing ○ according to VOB regulations ○ state building regulations (Landesbauordnung; LBO) ○ equipment and product safety act ○ warranty • legal basis of occupational and health protection as well as environmental protection • contract law fundamentals • works contract law according to the German civil code • principles of warranty and liability and product liability: <ul style="list-style-type: none"> ○ no-fault and fault-based liability <p>proof of warranty and liability</p>	10h
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			<ul style="list-style-type: none"> • basics of Closed Substance Cycle Waste Management Act • waste legislation fundamentals • Hazardous Substances Ordinance • Packaging Ordinance • Road Traffic Act • workplace regulations • workplace policies • Machinery Directive • accident prevention regulations • preventive measures of occupational health and safety protection and environmental protection: <ul style="list-style-type: none"> ○ security analysis ○ technical and occupational safety ○ personal protective equipment ○ accident prevention • first aid equipment 	
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3 e	Materials and used resources	<p>The trainee is able to</p> <ol style="list-style-type: none"> 1. define quality-related, safety-related, ecological and economic criteria for the material and resources to be used; 2. plan and prompt the use of resources, taking into account the company's own catalog of criteria and rational manufacturing and assembly techniques, and after examining possible alternatives; 3. develop, present and justify maintenance concepts; 4. plan, organize, implement, control and document measures for inspection, maintenance and the repair of the equipment; 5. determine and ensure the use of materials, taking into account the company's own criteria catalog and customer requirements and wishes; 6. ensure the environmentally friendly waste disposal. 	<ul style="list-style-type: none"> • hand tools • traditional manufacturing machines and tools: <ul style="list-style-type: none"> ○ stationary machines ○ hand-held machines • key maintenance concepts • maintenance goals • predictive maintenance • inspection and maintenance schedules • computer-aided manufacturing: <ul style="list-style-type: none"> ○ NC-machines ○ machining centers ○ flexible manufacturing cells ○ flexible manufacturing systems • devices for safe and efficient work • materials management tasks • order-independent materials • order-related materials • semi-finished products / subassemblies • material losses: <ul style="list-style-type: none"> ○ losses before processing ○ losses in processing • waste calculations • waste optimization • material detection • material calculations 	30 h
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3 f	Manufacturing documentation	<p>The trainee is able to</p> <ol style="list-style-type: none"> 1. select and apply methods and procedures to create, document and archive manufacturing documents; 2. create, evaluate and correct manufacturing documents, in particular specification drawings and parts lists as well as time schedules; 3. use production documents related to the process during the execution and supervision of production and assembly. 	<ul style="list-style-type: none"> • work preparation documents and execution documents: <ul style="list-style-type: none"> ○ list of services / specifications ○ bills of materials / parts list ○ supply lists ○ manufacturing documentation ○ manufacturing drawings ○ manufacturing sketches ○ construction drawings ○ detailed drawings ○ 2d-3d drawings ○ technical instructions and specifications of the suppliers ○ construction plans / construction drawings ○ work schedule ○ work flow plans ○ cost plans ○ timetables ○ bar chart ○ network plan • archiving of order, planning, production and controlling documents <ul style="list-style-type: none"> ○ text documents, plans, drawings ○ data 	10 h
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3 g	Assignment of subcontracts	<p>The trainee is able to</p> <ol style="list-style-type: none"> 1. determine the company's own program variety weighing the advantages and disadvantages, in particular the economic efficiency, decide on the temporary external procurement or the permanent outsourcing of services; 2. monitor and evaluate suppliers according to the criteria of management as well as to award procurement contracts and monitor compliance; 3. define subcontracts for partial services and award them to subcontractors under contractual protection, and to control, evaluate and invoice the subcontracts. 	<ul style="list-style-type: none"> • breakdown of the customer order into: <ul style="list-style-type: none"> ○ structure plans ○ partial orders ○ work packages • performance programme: <ul style="list-style-type: none"> ○ high or low vertical integration ○ in-house creation or external procurement of services ("make or buy") ○ outsourcing • materials management fundamentals: <ul style="list-style-type: none"> ○ warehousing ○ procurement: <ul style="list-style-type: none"> ○ procurement strategies ○ procurement processing ○ order time ○ optimal order quantity ○ procurement costs ○ business to business procurement (B2B) • supplier management: <ul style="list-style-type: none"> ○ supplier assessment ○ supplier selection ○ supplier build-up ○ carrying out price comparisons • definition of subcontracts: <ul style="list-style-type: none"> ○ tender documents ○ tender process ○ contractual terms of cooperation with subcontractors and specialist companies 	10h
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3 h	Use of technology	<p>The trainee is able to</p> <ol style="list-style-type: none"> 1. choose and apply order-related design, process, manufacturing and surface technologies; 2. select and apply fittings according to function, quality, economy and design criteria; 3. recognize, evaluate and, if necessary, apply relevant developments in technology and use new trends in IT technology. 	<ul style="list-style-type: none"> • process, design and manufacturing techniques, particularly: <ul style="list-style-type: none"> ○ machine and tool technology ○ machining technology ○ NC and CNC technology ○ basics of control and programming ○ data transfer from CAD production drawings ○ fundamentals of CAD/CAM systems ○ testing and measurement technology ○ control technology ○ drying technique ○ connection technology ○ veneer technique ○ surface engineering ○ fitting and assembly technology • IT technology • transport and storage technology • techniques of picking, packing, loading and unloading • suction technology • heating technology • communication technology • information technology • fixture construction: <ul style="list-style-type: none"> ○ types and tasks of devices ○ structure, materials and accessories • mechanical calculations <ul style="list-style-type: none"> ○ pneumatics and hydraulics ○ energy and performance 	30 h
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3 i	Data exchange and calculations	<p>The trainee is able to</p> <ol style="list-style-type: none"> 1. select and define methods and procedures of data collection as well as data evaluation; 2. determine, analyze, evaluate and, where appropriate adapt to new situations order-related quantities and times as well as costs - especially by using relevant industry software; 3. carry out preliminary, interim and final cost estimation; 4. use the results of the data analysis and the calculations to eliminate weak points and to make corrections and improvements; 5. perform ACTUAL-TARGET-comparisons based on the established data and represent and document results in interim reports on the progress of the production and assembly processes; 	<ul style="list-style-type: none"> • methods of data collection, data analysis and data evaluation • data management: <ul style="list-style-type: none"> ○ relevant project data ○ recording of the use of materials ○ time tracking ○ forms for recording the use of time and resources • provision of information and procurement of information <ul style="list-style-type: none"> ○ types of information ○ information technology ○ Intranet ○ Internet ○ expert systems ○ knowledge management • time management: <ul style="list-style-type: none"> ○ basic concepts of time structuring according to REFA ○ time tracking: <ul style="list-style-type: none"> ○ timesheet ○ forms for recording the time and use of funds ○ production data acquisition system and devices ○ time control, comparison of target and actual time 	20 h
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		<p>6. create a complete documentation as a basis for well-founded final report on the order especially with the possibility of preparing verification in liability or warranty cases;</p> <p>7. use the overall documentation as an improved basis for estimation for future, similar orders; compare and analyze the results of the preliminary, interim and final costing as well as to derive consequences for future action.</p>	<ul style="list-style-type: none"> • calculation principles and methods: <ul style="list-style-type: none"> ○ calculation tasks ○ calculation types ○ calculation procedures ○ calculation schemas • actual/target comparison • industry software for: <ul style="list-style-type: none"> ○ work preparation ○ time management ○ materials management ○ calculation ○ project management • reporting system • documentation 	
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3 j	Dealing with products	<p>The trainee is able to</p> <ol style="list-style-type: none"> 1. to create conditions through which the quality and thus the value of the products from beginning of production until hand-over to the customers can be assured; 2. to create the conditions through which the products can be transported and stored safely; 3. arrange product-related services in such a way that they minimise the cause for complaints minimize and thus contribute to customer satisfaction; 4. to determine the conditions under which wrong deliveries, misdirected or incomplete deliveries of the products can be avoided; 5. recognize hazards that may be posed by products, to plan and take preventive measures as well to cover enduring risks by insurance; 6. recognize and evaluate the safety risks products are exposed to at construction sites and take countermeasures to avoid them. 	<ul style="list-style-type: none"> • quality planning: <ul style="list-style-type: none"> ○ process quality ○ product quality ○ quality assurance measures ○ CE marking ○ factory production control (FPC) • site-related safety and protective measures • packaging materials • load securing: <ul style="list-style-type: none"> ○ equipment and construction of suitable transport vehicles ○ security measures against: <ul style="list-style-type: none"> ○ shifting of the load ○ overturning or falling of products ○ humidity and UV rays ○ danger prevention through: <ul style="list-style-type: none"> ○ avoidance of overloading ○ stability and steerability of the vehicle ○ arrangement of the center of gravity of the cargo ○ calculations of: <ul style="list-style-type: none"> ○ total mass of cargo ○ axle loads ○ driving or holding forces ○ tilting moment / stall moment 	24h
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<p>Field of action 4: Company management and organization</p> <p>Knowledge and skills are to be imparted in order to carry out company management tasks and company organization, taking into account the legal regulations, also with the application of information and communication systems. The acquired competences should in particular be used to enable trainees to independently carry out the following tasks:</p> <ul style="list-style-type: none"> • determining operational costs, considering business relationships, • reviewing operational cost structures; determine operational key figures, • developing marketing measures for customer care and for acquiring new customers, against the background of technical and economic developments as well as concepts for dealing with customers; create presentation concepts, • planning and presenting operational quality management, • representing personnel management tasks; show the connection between personnel administration as well as personnel management and development, • developing company-specific measures to comply with the occupational health and safety regulations and environmental protection; assess potential risks and define hazard prevention and elimination, • planning and presenting operational and warehouse equipment as well as logistical processes, • presenting and assessing opportunities and risks of operational cooperation. 	200
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Qualifications	Qualification focal points	Competences	Curriculum	Study hours
4. Company management and organization The trainee is able to carry out operational management and operational organization tasks, taking into account the legal regulations also using information and communication systems.				200h
4 a	Determination of the costs	The trainee is able to 1. independently manage operating costs for carpentry and joinery work according to business criteria and accept the necessary technical, commercial o production structure and personnel management tasks; 2. justify the importance of the operational data for the realization of the corporate goals as well as the need for a company-specific organization and a company information network; 3. define and implement methods and procedures for in-house document management; 4. record and evaluate operational costs, mainly process costs, in real time and to take into account in business relations; 5. plan, initiate and control the determination and processing of operational data, for operating resources, material and personnel deployment as well as for time use; 6. carry out preliminary, interim and post calculations as well as ACTUAL-TARGET analysis; 7. define factors influencing cost development and cost structure and assess their influenceability.	<ul style="list-style-type: none"> • companies in the carpentry and joinery work: <ul style="list-style-type: none"> ○ type and size ○ employment structure ○ production structure ○ performance structure; ○ balance sheet structure ○ management tasks • business management fundamentals • company organization;; <ul style="list-style-type: none"> ○ structural and process organization ○ administration organization the company's own document ○ administrative tasks • document management <ul style="list-style-type: none"> ○ reports / logs / procedure instructions ○ operational forms ○ formal design of documentation, work and control instructions as well as criteria catalogs and checklists ○ criteria for the creation of documentation, reports and logs ○ structure and content of overall documentation ○ archiving of documents and order documents ○ verification of warranty and liability 	30h

			<ul style="list-style-type: none"> • data collection, data analysis and data evaluation <ul style="list-style-type: none"> ○ information and communication technologies ○ basics and possible uses of the EDP ○ information channels, information carriers ○ information and communication technologies • time tracking methods • basics of project management • possible uses of EDP in project management: <ul style="list-style-type: none"> ○ planning and organization tools for project ○ processin ○ network planning techniques ○ ACTUAL-TARGET analysis • principles and methods of cost accounting and calculation: <ul style="list-style-type: none"> ○ cost centers ○ overhead types and surcharges ○ machine hourly rate ○ material costs ○ labor costs ○ imputed cost ○ contribution margin calculation 	
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4 b	Operational cost structure as well as calculations	<p>The trainee is able to</p> <ol style="list-style-type: none"> 1. explain the difference and the connection between expenses, services and income; 2. explain and justify the importance of business accounting, in particular of cost accounting; 3. structure, analyze, present and evaluate the costs determined, in particular the process costs; 4. review operational cost structures, identify possible weak points and take measures to address them; 5. define operating figures according to the company's own criteria and determine procedures for their application; 6. to determine operational key figures and take them into account in company management; 7. use the data of the national comparison of the carpenters' and joiners' trade for operational self-assessment. 	<ul style="list-style-type: none"> • business accounting: <ul style="list-style-type: none"> ○ financial accounting ○ cost accounting ○ operational statistics ○ planning • investment calculation: <ul style="list-style-type: none"> ○ cost comparison calculation ○ amortization calculation ○ profitability calculation • cost structures • key figures of cost accounting : <ul style="list-style-type: none"> ○ production metrics ○ material key figures ○ profitability and productivity metrics • federal company comparison • representation and presentation of operational costs development and comparison 	30h
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4 c	Marketing and concepts for customer service	<p>The trainee is able to</p> <ol style="list-style-type: none"> 1. acquire general knowledge of industry and market situations and their development and evaluate them; 2. realistically assess their own possibilities of influencing the market situation to judge under economic considerations; 3. determine and bring in marketing measures for customer care and acquiring new customers against the background of technical and economic developments; 4. explain the importance of presenting company's range of services and create and implement presentation concepts; 5. develop and implement concepts for dealing with customers, especially in the cases of request change, complaints and claims; 6. design and publish consulting and service offers in a customer-related manner. 	<ul style="list-style-type: none"> • market and customer analysis: <ul style="list-style-type: none"> ○ environmental conditions: ○ purchasing power ○ age structure ○ competitive situation ○ labor market ○ procurement market ○ sales market ○ infrastructure • development tendencies: <ul style="list-style-type: none"> ○ current and future customer structure: ○ development of competition ○ products and possible placement ○ product cycles and lifespan ○ strengths and weaknesses • corporate identity • opportunities for external representation • possible uses of EDP in sales • and when gathering information: • research and presentation on the internet • advertising and information medial: <ul style="list-style-type: none"> ○ brochures ○ employee letter ○ product descriptions ○ image and graphic software for advertising-layout • address databases and address management • opportunities for positive and negative experiences of customers <ul style="list-style-type: none"> ○ design of the offer, the invoice, the operating instructions, the data sheets, the cover letter etc. 	20 h
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			<ul style="list-style-type: none"> ○ seller contact, phone calls, service visit, corporate image and employees' appearance, manners, interpersonal relations etc. ○ delivery date, packaging of the products, accompanying documents etc. • main reasons for complaints: <ul style="list-style-type: none"> ○ defective products ○ wrong delivery date ○ wrong address ○ wrong quantity or type, unsuitable packaging ○ missing or incorrect application or ○ operational advice 	
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4 d	Quality	<p>The trainee is able to</p> <ol style="list-style-type: none"> 1. plan and initiate manage operational quality management; 2. present the structure of operational quality management; 3. plan and document the implementation of measures to achieve the quality standards of the services contractually agreed with the customer in accordance with the principles, aims and methods of quality management; 4. review and evaluate the effectiveness of the planned measures for quality assurance, quality control and quality improvement; 5. adjust, coordinate and initiate the measures of quality and test planning with those of order preparation, production planning and, if necessary, with the assembly planning. 	<ul style="list-style-type: none"> • principles, goals and methods of quality management according to DIN EN ISO 9000:2000 et seqq.. • quality and test planning as part of the production and assembly planning and as part of the overall planning • interactions and dependencies between the business and functional areas • internal customer-supplier relationship • external customer-supplier relationship • procedures to ensure the product and process quality as well as the documentation • measures for quality assurance, quality monitoring and quality improvement with regard to the agreed quality standards • evaluation of the effectiveness of the quality • management by the supervisors • company suggestion system and CIP 	20 h
4 e	Human resources management	<p>The trainee is able to</p> <ol style="list-style-type: none"> 1. present HR management tasks; 2. present the relationship between human resource management and human resource development; 3. elect and apply an appropriate management style with the knowledge of the needs and expectations of employees; 4. use contemporary communication and negotiation techniques; 5. find a balance between duties and employee orientation; 	<ul style="list-style-type: none"> • principles of staff management: <ul style="list-style-type: none"> ○ sociological and socio-pedagogical basis ○ leadership styles ○ leadership techniques ○ teamwork / we-feeling ○ effects of self-motivation ○ job description ○ performance incentives ○ performance evaluation • teamwork • communication <ul style="list-style-type: none"> ○ interaction ○ conversation management techniques ○ argumentation techniques 	30 h

		<ol style="list-style-type: none"> 6. plan and organize required number of staff for specific jobs, taking into account the necessary professional competences; 7. recognize the need for qualification and, if necessary to support and initiate training and further education measures; 8. ensure the future regular company competitiveness through employee qualification. 	<ul style="list-style-type: none"> ○ transmission techniques ○ staff meetings ○ personal conversations ○ conflict management ● suggestion system ● quality circle ● required qualifications for the provision of the assembly work ● measures for employee qualification <ul style="list-style-type: none"> ○ qualifications after the professional training of the carpenter ○ additional qualifications and further training for the assembly area ○ trade fairs ○ trade journals ○ internal training ○ external specialist seminars ○ e-learning ○ coaching ○ moderator systems● knowledge management 	
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4 f	Work, business health and safety and environmental protection	<p>The trainee is able to</p> <ol style="list-style-type: none"> 1. define, evaluate and plan company-specific measures for compliance with the relevant provisions of labor protection law; 2. organize, arrange and document employee instruction with regard to company-specific occupational health and safety as well as environmental protection requirements; 3. ensure that the necessary occupational health and safety and environmental protection measures are implemented, monitored and documented 4. carry out process-related security analyses, assess potential hazards and take measures to eliminate these hazards. 	<ul style="list-style-type: none"> • legal basis of occupational health and safety and environmental protection • environmental law fundamentals • hazardous substances ordinance • workplaces regulation • workplace policies • principles of occupational health and safety • ergonomics • basics of occupational health and safety management • basics of environmental protection • sustainability • importance of preventive measures in occupational and health protection as well as environmental protection, • technical work protection • personal protective equipment • accident prevention regulations • unsafe conditions • unsafe behavior • principles of workplace design • hazardous materials: <ul style="list-style-type: none"> ○ limits ○ technical rules for hazardous substances ○ risk and safety phrases of use of working materials 	20 h
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4 g	Planning of place of work and the logistic processes	<p>The trainee is able to</p> <ol style="list-style-type: none"> 1. design and plan the business premises and their equipment in line with corporate strategy and production planning; 2. collaborate and make competent decisions in a planning team for new construction, remodelling and expansion plans of the plant; 3. collect, analyze and assess initial data for the business premises planning; 4. design, present and lead processes in terms of quality management; 5. develop, evaluate and optimize layout plans; 6. design internal and external transport, storage and handling processes according to logistical principles; 7. design and optimize the production and material flow related to orders and monitor and control with computer-based systems; 8. process customer orders according to the principles and methods of project management. 	<ul style="list-style-type: none"> • requirement of operational planning • planning methods and procedures • operational analysis • vulnerability analysis • production planning • workflow planning • layout planning • logistics fundamentals • forms of internal logistics, procurement and sales and disposal logistics • PPS-systems • competent and objectives of the material flow • material flow planning and material flow logistics • materials management and procurement fundamentals • visualization of processes, interactions and dependencies • project management <ul style="list-style-type: none"> ○ goals and methods ○ project planning ○ project control and monitoring ○ project information ○ project presentation ○ network planning technique ○ project management programs ○ ACTUAL-TARGET analysis ○ correction and improvement options • budgeting fundamentals 	30 h
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4 h	Cooperation	<p>The trainee is able to</p> <ol style="list-style-type: none"> 1. judge under which conditions cooperation – e.g. in procurement, in production, sales and customer service, in assembly, in financial accounting as well as in training – makes sense; 2. define and observe criteria and conditions for operational cooperation; 3. analyze and evaluate the opportunities and risks of operational cooperation, especially with regard to their impacts; 4. obtain the needed information on the legal aspect before entering into cooperation and securing contractual cooperation. 	<ul style="list-style-type: none"> • research basics for cooperation • contract law • legal status of the subcontractor or the subcontractor • examples of possible cooperation goals <ul style="list-style-type: none"> ○ cost reductions ○ exchange of information and experience ○ utilization of operational capacity ○ purchasing and procurement ○ increase in sales ○ service and after-sales service ○ bulk order breakdown ○ favorable financing of large orders ○ optimization of office tasks ○ ensuring training according to the training ordinance • examples of possible cooperation <ul style="list-style-type: none"> ○ temporary partnership with other carpentry companies ○ transfer of part orders to subcontractors ○ long-term use of previous operational services by third-party procurement of services (outsourcing) ○ act as a subcontractor yourself ○ training association 	20h
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2.2 Part B1 Business administration, law and management³

2.21 Objectives Part B1

In Part B, the aim of the master craftsman training is to impart the business, commercial and legal competences necessary for independent establishment and running of a company or working as a manager in a company.

As far as business management training is concerned, the main aim is to promote professional decision-making skills, which will help to better cope with increasingly complex and variable tasks.

Competences encompass professionally relevant skills such as targeted use of specialist knowledge, systematic approach to tasks handling, communication skills or learning competence. In addition, the holistic nature of this training also takes into account personality-relevant aspects such as social or human competence.

Teaching of professional competence plays a particularly important role in the master craftsman training. Comprehensive entrepreneurial competence - in particular with regard to business management, commercial and legal matters - is crucial for the success of business activities.

The main objective of this training course is to ensure that masters can use the skills they have acquired in their professional practice. For example, they can make use of business management tools to evaluate alternative courses of action and to make decisions, as well as being aware of legal regulations and their effects. The focus of the training is not on the subject matter taught, but rather on the outcome of the learning process with the crucial question: what competence (s) does the trained master have? The master craftsman should be able to assess the competitiveness of companies, prepare, carry out and evaluate start-up and acquisition activities and finally develop corporate management strategies.

The training in Part B1 aims to pass on professional decision-making skills in order to be able to analyse and evaluate business, commercial and legal problems as an employee, business owner or manager and to identify and document possible solutions and incorporate current developments.

The competences to be acquired are:

Evaluating the competitiveness of companies

The knowledge and skills needed to assess the economic, commercial and legal prerequisites for a company's competitiveness and professional development potential as well as to be able to present decision-making requirements. In particular:

- Analysing company objectives and classifying them in a company target system.
- The importance of corporate culture and corporate image for operational performance and competitiveness.
- Analysing a company's market situation and establishing potential for success.
- Use accounting information, in particular from the balance sheet and income statement, to analyse the strengths and weaknesses of a company.
- Use information from internal and external accounting to prepare decisions,

³ The curriculum below is based on:

- a) Curriculum developed by Handwerkskammer Dresden (Dresden Chamber of Skilled Crafts).
- b) Markus Glasl, Andrea Greilinger: Curriculum framework for preparation for Part III of the Master Craftsman's Examination, 2011, Ludwig-Fröhler-Institut, Research Institute at the German Institute of Crafts (DHI).
- c) Ordinance on the Masters Examination in Parts III and IV in Crafts and Craft-Related Industries (Allgemeine Meisterprüfungsverordnung - AMVO), Date of issue: 26.10.2011.
- d) Ordinance on the Examination for a Recognised Continuing Education Certified specialist for commercial management in accordance with the Handwerksordnung and a certified specialist for commercial management according to the Handwerksordnung (Examination Ordinance for the Further Education of the Commercial Operational management HwO - PrüfVO FortkfmBf), date of issue: 11.11.2014.

- Apply legal provisions, in particular trade and craft law as well as commercial and competition law, in the analysis of business objectives and concepts.

Preparing, implementing and evaluating start-up and acquisition activities

The knowledge and skills required to prepare, carry out and evaluate tasks within the framework of the foundation and takeover of a company, taking into account personal, legal and business conditions and goals, as well as to justify their significance for a business concept. In particular:

- The importance of personal skills for the success of self-employment.
- To present and evaluate the economic, social and cultural significance of the craft and the benefits of membership in craft organisations.
- Demonstrate and evaluate the possibilities of using consulting services as well as promotional and support services for the foundation and acquisition of a company.
- Make and substantiate decisions on the location, size of the company, staffing requirements and the establishment and equipment of a company.
- Development and evaluation of marketing concepts for market introduction.
- Drawing up and substantiating the investment plan and financing concept; preparing profitability forecasts and carrying out liquidity planning.
- Take a business concept and establish it legally.
- Apply legal provisions, in particular those of civil law and corporate and tax law, in connection with the establishment or acquisition of craft enterprises.
- Establish the need for private risk and retirement provision, point out possibilities.
- To present and justify the significance of personal aspects as well as business and legal components of a corporate concept in context.

Developing management strategies

The aim is to acquire the knowledge and skills, taking into account company-related strengths and weaknesses as well as market-related opportunities and risks, to manage a company, to identify operational growth potential and to develop corporate strategies. In particular:

- Assessing the importance of the organisational structure and process organisation for the development of a company; making adjustments.
- Evaluate developments in product and service innovations as well as market conditions, also in an international context, and derive growth strategies from them.
- Establish opportunities for the use of marketing instruments for sales and procurement of products and services.
- Derive changes in capital requirements from investment, financial and liquidity planning; present alternatives to raising capital.
- Developing and evaluating concepts for personnel planning, recruitment and qualification as well as presenting instruments of personnel management and development.
- Consider the provisions of employment and social security law when developing a corporate strategy.
- Opportunities and risks of inter-company cooperation.
- Controlling for the development, pursuit, implementation and modification of corporate goals.
- Present instruments for the enforcement of claims and justify their use.
- Describe and justify the necessity of planning business succession, also taking into account inheritance and family law as well as tax regulations.
- Examine the necessity of initiating insolvency proceedings on the basis of company data; identify the legal consequences for the continuation or liquidation of a company.

Recommended Lessons Part B1 Business administration, law and management

Hours Recommendation Part B1 Business administration, law and management	
Module B1/1: Action field "Determining corporate competitiveness"	82 hours
Module B1/2: Action field "Preparing, completing and evaluating start-up and takeover activities"	86 hours
Module B1/3: Action field "Developing corporate government strategies"	98 hours
Module B1/4: Action field "Basic computer skills, bookkeeping using commercial software"	60 hours
Total Part B1 Business administration, law and management	326 hours

2.22 Curriculum Part B1

Module B1/1: Action field “Determining corporate competitiveness” Time recommendation: 82 hours	
Corporate goal system - analysing corporate goals - knowing your goals and goal relationships - establishing a target system	2 hours
Learning objectives: Analysing company objectives and classifying them in a company target system Competencies: <ul style="list-style-type: none"> Knowing important goals and target relationships Setting up a target system Course contents: <ul style="list-style-type: none"> Corporate targets <ul style="list-style-type: none"> Performance targets Financial targets Social goals Target Relationships <ul style="list-style-type: none"> Complementary Objectives Conflicting Objectives Indifferent Objectives 	
Corporate culture and image - characteristics of corporate culture - motivating significance of corporate culture - communicating corporate social responsibility in the corporate image	2 hours
Learning objectives: Establish the importance of corporate culture and corporate image for operational performance and competitiveness Competencies: <ul style="list-style-type: none"> Describe characteristics of the corporate culture Establish the importance of corporate culture through personal or social objectives Communicating corporate social responsibility in a company's corporate image Course contents: <ul style="list-style-type: none"> Corporate Culture <ul style="list-style-type: none"> Symbols and Rituals Norms and Values 	
Market analysis - significance, procedure, areas of corporate planning - strengths and weaknesses analysis - estimating market opportunities and risks - motivating profit potential	8 hours

Learning objectives:

Analysing a company's market situation and establishing potential for success

Competencies:

- Know the meaning, procedure and areas of corporate planning
- Describe the strengths and weaknesses of a company in the market with regard to the target system
- Assessing market opportunities and risks
- Assessing entrepreneurial risks

Course contents:

- Analysis of past and future developments
- Planning
 - Planning areas and their coordination
 - Planning phases
- Risk assessment

Subsystems of corporate accounting

- financial statements
- cost and performance accounting
- cash-flow statement

2 hours

Bookkeeping

- tasks in view of legal regulations
- double-entry method
- inventory and completion methods (e.g. IT)

22 hours

Annual accounts/period-end closing and business assessment

- balance sheet structure and profit & loss statement
- methods for rating scores, balance sheet figures, performance indicators

15 hours

Learning objectives:

Use accounting information, in particular from the balance sheet and profit and loss account, to analyse the strengths and weaknesses of a company

Competencies:

- Differentiate between subsystems of operational accounting, understand their interrelationships and allocate invoice sizes
- Display structural effects of typical business transactions in the subsystems
- Understand basic principles and concepts of double-entry accounting
- Explain accounting and balance sheet tasks
- Explain the possibilities and advantages and disadvantages of outsourcing accounting tasks on the basis of quality criteria
- Explain the structure and meaningfulness of annual financial statements and business evaluations (BWA) as well as other typical documents.
- Recording and evaluating important types of business assets and liabilities
- Take account of valuation margins, value adjustments, provisions and hidden reserves in the analysis of key figures from external accounting
- Describe the types of depreciation and take them into account in the accounting subsystems
- Carry out sector, time and target/actual comparisons and explain their results
- Determine the profit or loss of a company also during the year
- Perform simple periodic financial planning and know the criteria for critical liquidity situations

Course contents:

- Subsystems of corporate accounting
 - Balance sheet account
 - Cost and revenue accounting
 - Financial accounting
 - Social and potential accounting

<ul style="list-style-type: none"> • Accounting <ul style="list-style-type: none"> - Tasks and legal regulations - Double entry accounting system - Inventory and closing - Process engineering (e.g. EDP) • Annual financial statements/period-end closing <ul style="list-style-type: none"> - Structure of balance sheet and income statement - Scope for recognition and measurement + accounting principles + valuation of inventories + depreciation + provisions • Principles of the evaluation of the annual financial statements <ul style="list-style-type: none"> - Balance sheet ratios - Profit figures - Forms of control <ul style="list-style-type: none"> + Sector comparisons + Time comparisons + Target/actual comparisons 	
Cost and performance calculation - tasks and structuring of cost-type accounting, cost centre accounting, cost unit accounting, profit and loss account, cost accounting systems	17 hours
<p>Learning objectives: Information from internal and external accounting for decision preparation Competencies:</p> <ul style="list-style-type: none"> • Describe the objectives and tasks of cost element, cost centre and cost object controlling • Present the effects of cost and revenue changes on financial statements and balance sheet accounts and take them into account when making decisions • Make decisions about new investments based on budgeted cost accounting • Reason for the decision to accept (additional) orders using planned cost accounting • Determine price lower limits using cost object retroactive accounting on a partial cost basis • Calculate break-even points and derive pricing and conditions policy from them • Justify decisions on the production program <p>Course contents:</p> <ul style="list-style-type: none"> • Cost and Revenue Accounting <ul style="list-style-type: none"> - Accounting Tasks and Structuring - Cost Element Accounting - Cost Centre Accounting - Cost Object Accounting <ul style="list-style-type: none"> + Divisional Costing + Surcharge Calculation - Income Statement <ul style="list-style-type: none"> + Profit and Loss Account + Period Profit and Loss Account - Cost Accounting Systems <ul style="list-style-type: none"> + Actual and Planned Cost Accounting + Full and Partial Cost Accounting + Contribution Margin Accounting - Application of Cost Accounting <ul style="list-style-type: none"> + Cost Planning and Control 	

- + Decision Support
- + Profit Threshold Analysis

Crafts law and trade law

Crafts as a special type of industry

- entry in the Roll of Craftsmen
- unauthorised exercise of a craft and black labour

5 hours

4 hours

Commercial and corporate law

- definition of a merchant
- company name
- commercial register

5 hours

Competition law

- law against restraints on competition
- law against unfair practices
- quotation of prices act
- store closing law
- copyright law

Learning objectives:

Apply legal regulations, in particular trade and craft law as well as commercial and competition law, in the analysis of business objectives and concepts.

Competencies:

- Check legal requirements for the independent exercise of a craft trade
- Is aware of the legal consequences of unauthorised exercise and undeclared work
- Know the important points of contact when founding, changing or taking over a craftsman's business and initiate and handle administrative procedures
- Take into account the rules on company name, commercial character, registration obligation and the resulting commercial law consequences in the development of concepts
- Impact of special duties of merchants on the design of business processes
- Examine feasibility/permmissibility of market strategies against the backdrop of competition law provisions

Course contents:

- Handicraft and trade law
 - handicraft as a special form of trade
 - registration in the handicraft register
 - unauthorised exercise of handicraft and undeclared work
- Commercial and Corporate Law
 - Commercial Property
 - Company
 - Register of Companies
- Unfair Competition Law
 - Law against Restraints of Competition
 - Law against Unfair Competition
 - Pricing Ordinance
 - Closing Date Law
 - Copyright

Total Module B1/1: Action field “Determining corporate competitiveness”	84 hours
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<p>Module B1/2: Action field “Preparing, completing and evaluating start-up and takeover activities” Time recommendation: 86 hours</p>	
<p>Requirements to be met by the entrepreneur</p> <ul style="list-style-type: none"> - personality profile - family profile - subject-specific requirements 	2 hours
<p>Learning objectives:</p> <p>Establish the importance of personal prerequisites for the success of self-employment</p> <p>Competencies:</p> <ul style="list-style-type: none"> • Identifying requirements relevant to successful entrepreneurial activity • Recognizing and assessing one's own ability to run a craft business independently <p>Course contents:</p> <ul style="list-style-type: none"> • Requirements for an entrepreneur <ul style="list-style-type: none"> - Personal requirements - Family requirements - Technical requirements 	
<p>Role of craft trades in the business world and in society</p> <ul style="list-style-type: none"> - role of craft trades in national economy - economic, social and cultural relevance - craft trades organisation 	2 hours
<p>Learning objectives:</p> <p>To present and evaluate the economic, social and cultural significance of the craft and the benefits of membership in craft organisations</p> <p>Competencies:</p> <ul style="list-style-type: none"> • Research craft and sector-specific information on the development of the economy as a whole, present relevant data and compare it with other sources • Being able to explain the macroeconomic context in which a craftsman's business operates • Establish self-image and personal affiliation to the trade • Know the structure of the craft organisation as well as the tasks and services of the individual organisations • Research craft and sector-specific information on the development of the economy as a whole, present relevant data and compare it with other sources <p>Course contents:</p> <ul style="list-style-type: none"> • Positions of handicrafts in the economy <ul style="list-style-type: none"> - Economic importance - Social significance - Cultural significance 	

<ul style="list-style-type: none"> • Handicraft organisations <ul style="list-style-type: none"> - Tasks - Structures - Services 	
Start-up preparation <ul style="list-style-type: none"> - start-up consulting- financial and further support services - special offerings for craft trades and SMEs - market and location analysis - start-up planning 	8 hours
<p>Learning objective A:</p> <p>Identify and evaluate possibilities for the use of consulting services as well as promotional and support services for the foundation and takeover of a company.</p> <p>Competencies:</p> <ul style="list-style-type: none"> • Know contact points for start-up consulting and evaluate their range of services • know and reasonably select public funding and support programs as well as important prerequisites and contact points <p>Course contents:</p> <ul style="list-style-type: none"> • Foundation consulting <ul style="list-style-type: none"> - Legal aspects - Conceptual aspects - Financial aspects • Financing and support services <ul style="list-style-type: none"> - Offers for start-ups - Special offers for craft trades and SMEs 	
<p>Learning objective B:</p> <p>Make and substantiate decisions on the location, size of the company, staffing requirements and the establishment and equipment of a company</p> <p>Competencies:</p> <ul style="list-style-type: none"> • Know the importance of important location factors • Assessing the suitability of sites for operational purposes • Know the factors influencing the size of the company in terms of personnel and location • Determining personnel requirements • Determining the need for fixed and current assets <p>Course contents:</p> <ul style="list-style-type: none"> • Market and location analysis <ul style="list-style-type: none"> - sales areas and opportunities - customer structure - location assessment (factors and comparison) • Planning of the foundation <ul style="list-style-type: none"> - equipment - company size (sales, personnel) 	

Marketing - developing and evaluating a marketing scheme - estimating market potential, client groups and needs, figures for incoming orders and sales - market entry and marketing mix	12 hours
Learning objectives: Development and evaluation of marketing concepts for market introduction Competencies: <ul style="list-style-type: none"> • Estimate the type and size of possible customer groups and needs, potential orders and sales figures • Proposals for the design of products, prices, means of communication and distribution channels for market entry • Formulate the business model on the basis of customer benefit and unique selling propositions Course contents: <ul style="list-style-type: none"> • Marketing concept • Sources of information to assess market potential • Market entry-marketing mix 	
Need for private provision for old age - social security systems - private personal and property insurance - pension/retirement provision	6 hours
Learning objectives: Justify the need for private risk and retirement provision, point out possibilities Competencies: <ul style="list-style-type: none"> • Estimate the gap in retirement provision and compare and evaluate alternative private pension instruments • Planning protection against the economic consequences of business problems • Planning social security in the event of accidents, illness and disability Course contents: <ul style="list-style-type: none"> • Social security systems • Personal, property and damage insurance • Retirement provision for the self-employed craftsman 	
Entrepreneurship / company start-up - purchase price calculation - conditions of the takeover agreement - corporate concept (corporate mission, product range)	12 hours
Learning objectives: To present and substantiate the significance of personal aspects as well as business and legal components in the corporate context. Competencies: <ul style="list-style-type: none"> • Check and adjust the consistency of analysis and planning to prepare a business concept • Summarise and present results in a business plan 	

<ul style="list-style-type: none"> • Develop concepts for foundation and take-over taking into account the framework conditions • Understanding the purpose and structure of a corporate mission statement • Weighing up the possibilities of a takeover contract • Know legal obligations in the event of a takeover • Know important factors influencing purchase price <p>Course contents:</p> <ul style="list-style-type: none"> • Corporate Concept <ul style="list-style-type: none"> - Guiding Principles - Product and Service Program - Target Groups • Takeover or participation in a company <ul style="list-style-type: none"> - operational inventory protection - criteria for determining the purchase price - drafting of the takeover or company agreement (purchase, lease, pension, etc.) 	
Financing / funding <ul style="list-style-type: none"> - quantifying capital requirements - investment plan and finance concept - financing rules - revenue model, liquidity planning 	10 hours
<p>Learning objectives:</p> <p>Drawing up and substantiating an investment plan and financing concept; preparing profitability forecasts and carrying out liquidity planning</p> <p>Competencies:</p> <ul style="list-style-type: none"> • Identifying the capital needs of start-ups and larger investments • Drawing up and substantiating liquidity plans for the first 5 years for possible scenarios • Use forecasting and monitoring tools to avoid liquidity problems • Create and justify sales and profitability forecasts • Establishing a financing structure • Preparing financial negotiations <p>Course contents:</p> <ul style="list-style-type: none"> • Financing <ul style="list-style-type: none"> - Determination of capital requirements - Investment plan and financing concept - Financing rules • Revenue plan • Liquidity planning <ul style="list-style-type: none"> - Liquidity plan - Critical events affecting liquidity in the start-up phase (loss of receivables, tax payments) • Profitability forecast 	
Legal forms <ul style="list-style-type: none"> - stock corporations, partnerships/unincorporated firms, individual companies - selection criteria - company agreement 	10 hours

Learning objectives:

Derive legal form from a business concept and justify it

Competencies:

- Knowledge of common legal forms and their consequences for corporate management
- Selecting a legal form
- Check the rules in the articles of association and, if necessary, adapt them to the business concept

Course contents:

- Legal forms
 - Corporations
 - Partnerships
 - Sole proprietorships
- Choice of legal form criteria
- Articles of partnership

Classification of the legal system

- civil and public law
- contract law (general contract law, purchase agreement)
- property law (property, ownership)
- start-up relevant regulations
- tax law

12 hours

Tax law

- VAT, trade tax
- assessed income tax
- corporate tax, taxation procedure

12 hours

Learning objectives:

Apply legal provisions, in particular those of civil law and corporate and tax law, in connection with the establishment or acquisition of craft enterprises

Competencies:

- Explain the fundamentals of the German legal system
- Differentiate between legal, business and criminal capacity
- Declare the legal significance of the declaration of intent, representation and power of attorney as well as consent and approval
- Conclude contracts and assess their legal validity
- Examine the possibility of rescinding contracts
- Be aware of service obligations and liability consequences (also for vicarious agents)
- Create legal documents in business transactions
- Assessing rights and obligations arising from general terms and conditions of business and checking the use of general terms and conditions in relation to a corporate concept
- Legal representation of the management in legal matters
- Know the basic concepts of property law and security rights
- Setting up permanent establishments in compliance with legal regulations
- Understanding the main principles of taxation
- Preliminary VAT return and income tax return completed on time

Course contents:

<ul style="list-style-type: none"> • Classification of the legal system <ul style="list-style-type: none"> - Private and public law - Classification of the Civil Code • General part of the Civil Code <ul style="list-style-type: none"> - Rights and legal capacity - Legal transactions • Contract Law <ul style="list-style-type: none"> - General Contract Law - Purchase Contract - Works and Works Supply Contract - Lease and Lease Contract - Guarantee • Property law (property, ownership, security rights) • Legislation relevant to the formation of a company <ul style="list-style-type: none"> - Building, environmental protection and waste regulations - Handicraft, trade and tax law - Work place regulations • Tax law <ul style="list-style-type: none"> - Value added tax - Trade tax - Assessment of income tax - Corporation tax - Taxation procedure 	
Total Module B1/2: Action field “Preparing, completing and evaluating start-up and takeover activities”	86 hours

Module B1/3: Action field “Developing corporate government strategies” Time recommendation: 98 hours	
Organisation <ul style="list-style-type: none"> - organisational structure - types of organisation, organisational development - workflow organisation, process analysis - use of modern communication tools 	4 hours
Learning objectives: Assessing the importance of the organisational structure and process organisation for company development; making adjustments Competencies: <ul style="list-style-type: none"> • Knowing the areas, instruments and principles of an organisation • Document business processes taking into account organisational structure and process organisation • Create organisational charts and job descriptions • Suggestions for adapting the organisational structure of business processes • Recognizing the effects of planned company development on an organisation Course contents: <ul style="list-style-type: none"> • Organisational structure <ul style="list-style-type: none"> - Task analysis and synthesis - Job creation 	

<ul style="list-style-type: none"> - Organisational forms (functional, divisional, project) - Organisational development • Process Organisation <ul style="list-style-type: none"> - Process Analysis and Design - Logistics - Quality Management - Working Time Models - Group Organisation • Administration and office organisation <ul style="list-style-type: none"> - Document management - Use of modern information and communication technologies - Organisation of accounting systems 	
Product development <ul style="list-style-type: none"> - sales and purchase market analysis - market research and market analysis techniques - clients, general public, suppliers - products, preparing decisions 	8 hours
<p>Learning objectives:</p> <p>Evaluate developments in product and service innovations as well as market conditions, also in an international context, and derive growth strategies from them</p> <p>Competencies:</p> <ul style="list-style-type: none"> • Systematically explore, evaluate and document sources of information on product and service trends, taking into account company and market conditions • Weighing up and selecting methods of market research with regard to their possible applications • Evaluating customer data • Prepare and conduct customer surveys • Carry out strength-weaknesses and opportunity-risk analyses (SWOT analyses) and derive strategies • Perform pro-contra analysis and value analyses and derive decisions from them <p>Course contents:</p> <ul style="list-style-type: none"> • Analysis of the sales and procurement market <ul style="list-style-type: none"> - Methods of market analysis and market research - Objects of market analysis and market research + Customers + Public + Suppliers + Competitor (benchmarking) + Products • Methods for decision preparation and determination 	
Understanding and use of marketing instruments <ul style="list-style-type: none"> - Marketing functions and instruments - client orientation and client attention - communication and promotion policies - pricing and conditions policies - procurement planning (supplier selection) 	8 hours

Learning objectives:

Establish opportunities for the use of marketing instruments for sales and procurement of products and services

Competencies:

- Providing an overview of marketing areas and instruments and explaining common features as well as differences in marketing in procurement and sales markets
- Identify the consequences of sales policy decisions and justify decisions for a marketing mix
- Explain the sequence of procurement processes and analyse weak points

Course contents:

- Marketing functions and instruments on the sales side
 - Customer orientation and customer care
 - Communication and advertising policy
 - + Advertising
 - + Public relations
 - + Sales promotion
- Price and conditions policy
 - Procurement
 - Procurement planning (supplier selection and relationship)
 - Terms of delivery and payment
 - Material and invoice control
 - Stock keeping and warehouse disposition

Capital requirements and financing

- planning of investments, financial and liquidity planning
- types of financing
- alternative forms of financing
- money transfer

8 hours

Learning objectives:

Derive changes in capital requirements from investment, finance and liquidity planning; present alternatives for raising capital

Competencies:

- Differentiate between forms of payment transactions
- Derive opportunities for raising capital from the company's financial situation
- Differentiate between types of loan collateral and understand its significance

Course contents:

- Investment, financial and liquidity planning
- Types of financing
 - Equity-financing
 - Self-financing
 - Debt financing (loan types and collateral)
 - Alternative forms of financing
- Payment transactions

Human resources <ul style="list-style-type: none"> - personnel planning, staffing demand - recruitment and selection - personnel placement, staffing - work time models, human resources development, wages 	8 hours
<p>Learning objectives:</p> <p>Developing and evaluating concepts for personnel planning, recruitment and qualification as well as presenting instruments for personnel management and development</p> <p>Competencies:</p> <ul style="list-style-type: none"> • Determine personnel requirements on the basis of corporate planning and specify them in job descriptions • Evaluate recruitment opportunities, advertise vacancies and conduct interviews • Determine further training needs of employees and draw up concepts for qualification in line with requirements • Know measures for employee motivation and retention • Evaluate the possible applications of different working time and remuneration models • Conduct feedback meetings with employees • Understand the importance of the working climate • Understand company pension schemes • Aware of strategies to prevent bullying • Know the basics of operational reintegration management (BEM) • Reflect on one's own management behaviour and understand the effects on employees and the working atmosphere <p>Course contents:</p> <ul style="list-style-type: none"> • Personnel planning <ul style="list-style-type: none"> - Personnel requirements assessment - Recruitment and selection - Staff deployment and staffing - Working time models - Personnel development • Personnel administration <ul style="list-style-type: none"> - Personnel file - Archiving, data protection • Remuneration <ul style="list-style-type: none"> - Time recording - Work evaluation - Wages - Company pension scheme • Employee leadership <ul style="list-style-type: none"> - Leadership styles and resources - Work climate - Social relations - Welfare (work, accident and health protection) 	
Inter-company co-operation <ul style="list-style-type: none"> - value chains - co-operation schemes 	6 hours

<p>Learning objectives:</p> <p>Presenting opportunities and risks of inter-company cooperation</p> <p>Competencies:</p> <ul style="list-style-type: none"> • Analysing value chains for opportunities for cooperation and weighing up opportunities and risks • Selecting and addressing suitable cooperation partners taking into account common goals <p>Course contents:</p> <ul style="list-style-type: none"> • Inter-company cooperation • Value chains • Forms of cooperation 	
<p>Controlling</p> <ul style="list-style-type: none"> - mission and objectives - weak point analysis - operating figures and performance indicator systems - costs and revenues management and control 	16 hours
<p>Learning objectives:</p> <p>Development, pursuit, implementation and modification of corporate goals.</p> <p>Competencies:</p> <ul style="list-style-type: none"> • Present controlling tools and use them to analyse the situation, detect undesirable developments and identify future potential. • Use controlling tools to maintain liquidity and ensure profitability • Monitor the achievement of corporate goals, adjust company targets if necessary and justify measures to achieve the goals <p>Course contents:</p> <ul style="list-style-type: none"> • Controlling <ul style="list-style-type: none"> - Tasks and Objectives - Analysis of Weaknesses - Key Figures and Indicator Target Systems - Budgeting - Scenario Technique • Managing and controlling costs and revenues 	
<p>Labour law and social legislation</p> <ul style="list-style-type: none"> - labour law (employment contract, types of contracts) - dismissal protection (collective agreement, parties) - health and safety of workers in work - social insurance law - freedom to choose insurance providers, insurance fees/payments - reporting requirements 	24 hours
<p>Learning objectives:</p> <p>Consider the provisions of employment and social security law when developing a corporate strategy</p> <p>Competencies:</p> <ul style="list-style-type: none"> • Establishing and terminating employment relationships • Adhere to employment rights and obligations 	

- Take account of regulations on collective bargaining agreements, co-determination and occupational safety relevant to SMEs when drawing up contracts and working conditions.
- Analyse basic elements of the social security system with regard to company obligations and options for structuring the system and describe important regulations on compulsory insurance, contributions, benefits and reporting requirements.
- Investigate and assess tax levels, payment of income tax and the employer's liability as well as possibilities of benefits and reimbursement of expenses for payroll accounting.

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Course contents:

- Labour law
 - Employment contract
 - + Contract types
 - + Contractual obligations of the employer and employee
 - + Termination of employment relationship
- Protection against dismissal
 - + Collective agreement
 - + Parties to a collective agreement
 - + Collective agreement
- Works constitution
 - + Works Councils
 - + Works agreement
- Occupational health and safety at work
 - Occupational Safety and Health Ordinance
 - + Maternity leave
 - Protection for severely handicapped persons
- Labour jurisdiction
- Social security law (insurance provider, obligation, freedom, contributions, benefits, obligations to register)
 - Health and nursing care insurance
 - unemployment insurance, work promotion
 - pension insurance
 - statutory accident insurance
- Income Tax
 - Determination and Payment
 - Wage Tax Liability

Claims management

- accounts receivable management
- dunning and legal actions
- debt collection and compulsory execution

6 hours

Learning objectives:

Present instruments for the enforcement of claims and justify their use

Competencies:

- Assessing risks of non-payment defaults and presenting possibilities for monitoring incoming payments
- Assessing measures to enforce claims and accelerate payments
- Know the procedure and costs of legal proceedings (especially reminders and enforcement)

Course contents:

- Account receivables management and payment terms

<ul style="list-style-type: none"> • Warning and legal action proceedings • Debt collection and enforcement 	
Corporate succession - family law, inheritance law, marital property regime - legal succession, inheritance tax and gift tax Insolvency proceedings - leading indicators of insolvency - insolvency act, reorganisation and winding-up	10 hours
<p>Learning objectives:</p> <p>Describe and justify the necessity of planning business succession, also taking into account inheritance and family law as well as tax regulations</p> <p>Competencies:</p> <ul style="list-style-type: none"> • Know and understand the rules of legal succession • Weighing up the possibilities of structuring by means of inheritance contracts and wills • Know the basic tax-free amounts and tax classes of inheritance and gift tax as well as the possibilities for structuring inheritance and gift tax • Know the differences between profit sharing and property separation <p>Course contents:</p> <ul style="list-style-type: none"> • Family and inheritance law • Matrimonial property law • Succession • Inheritance and gift tax 	
<p>Learning objectives:</p> <p>Evaluate the necessity of initiating insolvency proceedings on the basis of company data; identify the legal consequences of insolvency for the continuation or liquidation of a company</p> <p>Competencies:</p> <ul style="list-style-type: none"> • Recognizing the obligation to file for insolvency depending on the legal form and presenting the consequences of corporate and private insolvency • Describe the course of insolvency proceedings and assess possibilities for continuation and liquidation • Knowing the possibilities and prerequisites for residual debt relief <p>Course contents:</p> <ul style="list-style-type: none"> • Insolvency Proceedings <ul style="list-style-type: none"> - Early Insolvency Indicators - Insolvency Regulations - Restructuring and Liquidation 	
Total Module B1/3: Action field “Developing corporate government strategies”	98 hours

Module B1/4: Action field “Basic computer skills, bookkeeping using commercial software” Time recommendation: 60 hours	
Basic computer skills - basics of operating systems - file architecture - data security and protection	3 hours
<p>Learning objectives:</p> <p>To learn about operating systems, data organisation, data security and protection as well as to use information and communication technologies</p> <p>Competencies:</p> <ul style="list-style-type: none"> • Master operating systems, data organisation, data security and protection • Be able to use information and communication technologies for business purposes • Be able to carry out systematic searches <p>Course contents:</p> <ul style="list-style-type: none"> • Performing important basic tasks in the IT system • Get to know operating systems • Learn about data organisation, security and protection • Gain and test an overview of information and communication technologies 	
Creating, checking and posting vouchers - assets accounting, accounts payable - cash accounting - payroll accounting - account assignment and posting	28 hours
<p>Learning objectives:</p> <p>Accounting in a craftsman's business using industry-standard software</p> <p>Competencies:</p> <ul style="list-style-type: none"> • Capabilities to record and check business transactions manually and electronically for accounting purposes <p>Course contents:</p> <ul style="list-style-type: none"> • Account system, chart of accounts, account classes, company codes • Entering company data and accounting documents in the EDP system • Create, check and assign documents, • Create, manage and check the cash book, • Prepare payroll, • Posting balance sheet and profit and loss accounts • Post business transactions 	
Creating and checking the cash ledger - cash ledger structure - recording of cash operations, cheque transactions - cash book control, differences - document control and record keeping	7 hours

<p>Learning objectives:</p> <p>Use an electronic cash journal to enter all of a company's cash transactions and enter and check business transactions with date, document number, tax rate, amount of revenue or expenditure, sales tax and current cash balance.</p> <p>Competencies:</p> <ul style="list-style-type: none"> • Know the structure of the cash book, make all entries and carry out controls • Know basic legal requirements • Master relevant software and be able to keep cash books directly online <p>Course contents:</p> <ul style="list-style-type: none"> • Get to know cash book structure and create a cash book • Get to know relevant software and test alternative software • Make all entries • Keeping the cash book online • Carry out inspections 	
<p>Payroll procedures</p> <ul style="list-style-type: none"> - entering employee information - recording of working times - payroll structure and elements - dates and deadlines 	10 hours
<p>Learning objectives:</p> <p>Carry out computer-aided payroll accounting and payroll accounting in accordance with the requirements of social insurance law and income tax law, carry out regular monthly payroll accounting by means of EDP as well as annual financial statement work in the area of payroll accounting.</p> <p>Competencies:</p> <ul style="list-style-type: none"> • Be able to carry out computer-aided payroll accounting and payroll accounting • Be able to assess the advantages and disadvantages of alternative solutions and systems <p>Course contents:</p> <ul style="list-style-type: none"> • Data maintenance of employees • Recording of working hours • Create gross and net payroll • Creating health insurance plans create income tax filing • Data medium exchange for salaries, asset accumulations, other transfers • Registrations and cancellations of employees • Simple <ul style="list-style-type: none"> Wage Posting - Payroll Account - Entering Wages and Salaries 	
<p>Preparation of financial statements</p> <ul style="list-style-type: none"> - inventory - recognition and valuation principles - asset accounting 	12 hours

Learning objectives:

Prepare an annual financial statement, carry out closing entries, carry out evaluations and submit reports as well as a business analysis of the annual financial statements

Competencies:

- To be able to fully prepare an annual financial statement and make final entries
- Master all regulations and submit required reports
- Carry out well-founded business analysis, derive consequences and develop conclusions for entrepreneurial strategies

Course contents:

- Annual financial statements postings
 - Creation of the reservation list annual financial statements
 - Correction by general reversal
 - Creation of fixed mirror - Depreciation
 - Bookings ARAP and provisions
 - Bad debt, general allowance
- Evaluations:
 - Primanota Sales Tax Advance Notification
 - Summary Notification
 - Further evaluations (movement balance sheet, etc.)
- Preparation fix annual accounts
 - Fix lead time - Update balance sheet values
 - Official depreciation - Table
- Evaluations for year-end closing
 - Business management evaluations (BWA)
 - Evaluations (balance sheet, profit and loss statement)

Total Module B1/4: Action field "Basic computer skills, bookkeeping using commercial software"

60 hours

2.3 Part B2 Vocational and occupational education knowledge⁴

2.31 Objectives Part B2

The trained master craftsman should have vocational and work pedagogical knowledge, so that he has the necessary competence for proper training of apprentices (trainees) to plan, carry out and control the vocational training independently. The competencies relate to the following fields of action:

Examine training requirements and plan training

The master craftsman must be able to examine and assess training prerequisites on the basis of company, occupation-related and legal provisions and to plan training, also taking into account extra-company training periods. This is linked to the qualifications required to carry out the following tasks.

- To present and justify the advantages and benefits of in-company vocational training.
- Planning, preparing and making decisions on the basis of legal, collective bargaining agreements and company framework conditions.
- Present structures of the vocational education and training system and its interfaces.
- Select training occupations for the company and justify selection.
- Examine the company's suitability for training in the target occupations to be trained, in particular taking into account training within the network, inter-company and extra-company training.
- Examine and evaluate the possibilities of using preparatory measures for vocational training.
- Coordinate internal distribution of responsibilities for training within the company, taking into account the functions and qualifications of those involved in training.

Preparing training and hiring trainees

The master craftsman must have the necessary knowledge and skills to perform preparatory training tasks, define selection criteria for recruitment and carry out recruitment procedures, including taking into account company work and business processes as well as legal aspects. This is linked to the qualifications required to carry out the following tasks.

- Drawing up an in-company training plan on the basis of training regulations, which is oriented in particular towards work and business processes typical of the occupation.
- To present and justify opportunities for participation and co-determination of company interest groups in vocational education and training.
- Determining the need for cooperation and coordinating its content and organisation with cooperation partners, in particular the vocational school.
- Apply criteria and procedures for the selection of trainees also taking into account their diversity.
- Prepare and conclude the vocational training contract and arrange for its registration with the competent authority.
- Check if parts of the vocational training can be carried out abroad.

⁴ The curriculum below is based on:

- a) Curriculum developed by Handwerkskammer Dresden (Dresden Chamber of Skilled Crafts).
- b) Ordinance on the examination of master craftsmen in parts III and IV in craft and craft-like trades (General Master Examination Regulations - AMVO), Date of issue: 26.10.2011.
- c) Curriculum framework for the preparation for the master craftsman's examination for electrical engineering trades, Central Office for Further Training in the Craft Trades Sector (Zentralstelle für die Weiterbildung im Handwerk, ZWH).

Perform training

The master must be able to plan and control learning processes in an action-oriented manner and to promote independent learning. In doing so, work and business processes typical for the profession as well as the trainees' job opportunities and learning requirements must be taken into account. This is linked to the qualifications required to carry out the following tasks.

- Creating learning conditions and motivating learning culture, giving and receiving feedback.
- Organise, design and evaluate probationary periods.
- Develop and design learning and work assignments based on the company's training plan and the work and business processes typical of the occupation.
- Selecting training methods and media appropriate to the target group and using them in specific situations.
- Support apprentices in the event of learning difficulties through individual training arrangements and training guidance, use training support aids and examine possibilities for extending the training period.
- Examine and propose additional training opportunities for trainees, in particular additional qualifications; examine possibilities of shortening the duration of training and early admission to the final examination or apprenticeship examination.
- Promoting the social and personal development of trainees; identifying problems and conflicts in good time and working towards solutions.
- Develop learning and working in a team.
- Determine and evaluate the performance of trainees, evaluate performance assessments of third parties and examination results, conduct appraisal interviews, draw conclusions for further course of training.
- Promoting intercultural competences in the company.

Finish training

The master must possess the ability to lead the training to a successful conclusion and to point out opportunities for further learning and qualification paths. This is linked to the qualifications required to carry out the following tasks.

- Prepare trainees for the final examination or apprenticeship examination taking into account the examination dates and lead the training to a successful conclusion.
- Ensure that the trainees register for examinations with the competent body and draw their attention to any special features relevant for implementation.
- Create written certificates based on performance appraisals.
- Inform and advise trainees on company development paths and vocational training opportunities.

Recommended hours Part B2: Vocational and occupational education knowledge

Hours Recommendation Part B2: Vocational and occupational education knowledge	
Module B2/1: Action field "Review of training requirements and training planning"	25 hours
Module B2/2: Action field "Training preparation and assisting in recruiting prospective trainees"	23 hours
Module B2/3: Action field "Conducting training"	52 hours
Module B2/4: Action field "Completion of training"	15 hours
Total Part B2: Profession and working-educational knowledge	115 hours

2.32 Curriculum framework part B2

Module B2/1: Action field "Review of training requirements and training planning"	
Time recommendation: 25 hours	
Presenting and motivating the benefits and use of in-company training	2 hours
<p>Learning objectives: Presenting and substantiating the advantages and benefits of in-company vocational training</p> <p>Competencies:</p> <ul style="list-style-type: none"> a) Emphasise the aims and tasks of vocational training, in particular the importance of professional competence for the sector and the company. b) Describe the advantages and benefits of training for young people, business and society. c) Justify the benefits of training also taking into account the costs for the own company <p>Course contents:</p> <ul style="list-style-type: none"> 1. Advantages and benefits of in-company training <ul style="list-style-type: none"> 1.1 Objectives and tasks of vocational training 1.2 Importance of training for young people, the economy and society 1.3 Benefits and costs of training for the company 	
Participating in planning and decision-making with regards to specific training needs, to legal and operational conditions, and to the collective agreement	3 hours
<p>Learning objectives: Planning, preparing and making decisions on the basis of legal, collective bargaining agreements and company framework conditions.</p> <p>Competencies:</p> <ul style="list-style-type: none"> a) Determine training needs on the basis of the company's development and operating environment. b) Emphasize the importance of training in personnel development. c) Draw on the legal and collective bargaining framework for training decisions. <p>Course contents:</p> <ul style="list-style-type: none"> 2. Occupational training needs and framework conditions of training <ul style="list-style-type: none"> 2.1 Personnel planning and training requirements 2.2 Legal framework conditions of training - in particular the Vocational Training Act, Handicrafts regulations, youth employment protection law 	
Presenting the vocational training system structures and its liaising areas	2 hours
<p>Learning objectives: Present structures of the vocational education and training system and its interfaces.</p> <p>Competencies:</p> <ul style="list-style-type: none"> a) Describe the integration of the vocational training system into the structure of the education system. b) Demands on the education system for vocational education and training. c) Describe the dual system of vocational training in terms of structure, responsibilities, tasks and control. 	

<p>Course contents:</p> <p>3. Structures and interfaces of the vocation training system</p> <p>3.1 Classification of the vocational training system in the national education system</p> <p>3.2 Essential requirements for the education system: in particular equal opportunities, permeability, transparency and equivalence</p> <p>3.3 The dual system of vocational training: structure, responsibilities, areas of responsibility, supervision</p>	
<p>Selecting training professions for a company and specifying their purpose</p>	<p>2 hours</p>
<p>Learning objectives:</p> <p>Select training occupations for the company and justify selection.</p> <p>Competencies:</p> <ol style="list-style-type: none"> Describe the emergence of state-approved training occupations. Observe and represent the structure and binding nature of training regulations. Describe the functions and objectives of training regulations. Determine training occupations for the company on the basis of training regulations and make use of opportunities for flexibility. <p>Course contents:</p> <p>4. Selection of training occupations</p> <p>4.1 Formation and list of state-approved training occupations</p> <p>4.2 Structure, functions, objectives of training regulations</p> <p>4.3 Training opportunities in the company</p>	
<p>Examining qualification of a company with regards to training in a desired vocational training field and whether and to what extent training contents shall be conveyed outside the company, in particular by a combination of interplant and external vocational training</p>	<p>8 hours</p>
<p>Learning objectives:</p> <p>Examine the company's suitability for providing training in the target occupations to be trained, in particular taking into account training within the network, inter-company and inter-company vocational training.</p> <p>External vocational training.</p> <p>Competencies:</p> <ol style="list-style-type: none"> Clarify personal and professional suitability for hiring and training and present possibilities for removing obstacles to training. Examine the training facility's suitability for carrying out the training and, if necessary, present any necessary measures for establishing the suitability. Identify the need for training outside the training centre and identify appropriate opportunities. Describe how chambers and guilds can support enterprises with training. Explain the tasks of the competent authority to monitor suitability, review the consequences of violations and know the reasons for withdrawing training entitlement. <p>Course contents:</p> <p>5. Suitability for training</p> <p>5.1 Personal and professional aptitude in accordance with BBiG and HwO, obstacles to training</p> <p>5.2 Selection criteria of the training centre</p> <p>5.3 External and joint training</p> <p>5.4 Tasks of the craft organisations (chamber, guild) to support training</p>	

5.5 Administrative offences and withdrawal of training entitlement	
Assessing chances for applying preparatory measures in vocational training	2 hours
<p>Learning objectives: Examine and evaluate the possibilities of using preparatory measures for vocational training.</p> <p>Competencies:</p> <ul style="list-style-type: none"> a) Present target group-specific vocational preparation measures for training planning and justify selection. b) Evaluate the importance of vocational preparation measures for recruiting junior staff and indicate funding opportunities. c) Clarify the possibilities of implementing job preparation measures in the company. <p>Course contents:</p> <ul style="list-style-type: none"> 6. Vocational preparation measures 6.1 Target groups, prerequisites and legal foundations for preparatory measures for the profession 6.2 Importance of vocational preparation measures and funding opportunities 6.3 Structuring the content of vocational preparation measures (qualification modules) 	
In a company – co-ordinating tasks of personnel involved in the training, in due consideration of their functions and qualifications	6 hours
<p>Learning objectives: Coordinate internal distribution of responsibilities for training within the company, taking into account the functions and qualifications of those involved in training.</p> <p>Competencies:</p> <ul style="list-style-type: none"> a) Determine the tasks and responsibilities of those involved in training. b) To illustrate the function and tasks of the trainer in the field of conflicting expectations. c) Clarify tasks of participating specialists and coordinate their involvement in the training. <p>Course contents:</p> <ul style="list-style-type: none"> 7. Tasks and responsibilities of those involved in training 7.1 Delimitation: trainers, instructors, training officers 7.2 Role and tasks of the instructor 7.3 Role, tasks and prerequisites of the participating training officers 	
Total Module B2/1: Action field “Review of training requirements and training planning”	25 hours

Module B2/2: Action field “Training preparation and assisting in recruiting prospective trainees”	
Time recommendation: 23 hours	
Drawing up an operational training plan based on training regulations, in due consideration of job-specific work and business processes	5 hours
<p>Learning objectives: An in-company training plan based on training regulations which is geared in particular to work and business processes typical of the profession.</p> <p>Competencies:</p> <ul style="list-style-type: none"> a) Justify the importance, objective and content of an in-company training plan for regular training. b) Highlight the contents of the training regulations relevant for training planning. 	

- c) Establish a link between the objective and temporal structure of the training framework plan and the company's work and business processes.
- d) Drawing up an in-company training plan taking into account specific company requirements and individual learning prerequisites; take into account the time and organisational framework conditions of the different places of learning.
- e) Monitor the implementation of training plans and adjust them if necessary.

Course contents:

1. In-company training plan

1.1 Legal basis, planning requirements and limits of training planning

1.2 Training regulations as a basis for the in-company training plan

1.3 Importance of typical occupational work and business processes and individual learning prerequisites for achieving the training objectives

1.4 Criteria for drawing up and adapting an in-company training plan

Taking into account prospective participation and co-participation in vocational training of involved occupational interest groups

2 hours

Learning objectives:

To present and justify opportunities for participation and co-determination of company interest groups in vocational education and training.

Competencies:

a) Describe the possibilities of representing interests in vocational education and training within the company.

b) Present opportunities for participation by the youth and trainee representatives in the area of vocational education and training.

Course contents:

2. Rights of co-determination in vocational education and training

2.1 Co-determination rights of employee representatives

2.2 Possibilities of participation by the youth and trainee representatives

Determining co-operation needs and co-ordinating with project partners, in particular with the involved vocational school, organisation and contents of the training

4 hours

Learning objectives:

Determining the need for cooperation and coordinating its content and organisation with cooperation partners, in particular the vocational school.

Competencies:

a) Describe the benefits of cooperation networks, in particular vocational schools, inter-company educational institutions, consultants in chambers and guilds as well as employment agencies.

b) Clarify possibilities of cooperation with the cooperation partners involved in the training.

Course contents:

3. Cooperation partners in training

3.1 Network of key cooperation partners in training

3.2 Possibilities of learning location cooperation

Applying criteria and procedures for selection of trainees, taking into consideration their diversity	4 hours
<p>Learning objectives: Apply criteria and procedures for the selection of trainees also taking into account their diversity.</p> <p>Competencies:</p> <ul style="list-style-type: none"> a) Present and evaluate opportunities for recruiting prospective trainees. b) Requirements of the training occupation and suitability requirements as selection criteria. c) Apply appropriate procedures for selecting candidates, taking into account different groups of applicants and observing legal rules. d) Show training applicants the career prospects associated with training. <p>Course contents:</p> <ul style="list-style-type: none"> 4. Planning and carrying out recruitment procedures 4.1 Opportunities for recruiting prospective trainees 4.2 Criteria for the selection of applicants 4.3 Procedure for the selection of candidates 4.4 Career path and career opportunities 	
Preparing a vocational training contract and its registration with the competent body	6 hours
<p>Learning objectives: Prepare and conclude the vocational training contract and arrange for its registration with the competent authority.</p> <p>Competencies:</p> <ul style="list-style-type: none"> a) Describe the essential content of an apprenticeship contract; conclude a training contract. b) Represent the rights and obligations of the trainee under the contract. c) Explain the prerequisites for entering the training contract in the apprentice role; submit an application for entry in the training directory. d) Apply to vocational school. e) Describe the possibilities and limits of termination, in particular termination of an apprenticeship. <p>Course contents:</p> <ul style="list-style-type: none"> 5 Conclusion of the training contract 5.1 Legal basis and contents of the training contract 5.2 Rights and duties of the trainee and the apprentice 5.3 Entry in the apprentice role 5.4 Registration with the vocational school 5.5 Legal options for termination and termination of training contracts 	
Examining chances of organising the vocational training program partly abroad	2 hours
<p>Learning objectives: Check if parts of the vocational training can be carried out abroad.</p> <p>Competencies:</p> <ul style="list-style-type: none"> a) Weighing up the advantages and possible risks of training periods abroad for trainees and the company. b) Draw on legal bases for decision-making on the implementation of training elements abroad. 	

- c) Observe forms of vocational training in other European countries when planning your stay abroad.
- d) Provide advice and support for the implementation of stays abroad.
- e) Documentation of stays abroad.

Course contents:

6. Parts of training abroad

6.1 Advantages, possible risks and legal basis for parts of training abroad

6.2 Vocational training in other European countries

6.3 Advice and support for the realisation of training elements abroad

6.4 Documentation of stays abroad

Total Module B2/2: Action field "Training preparation and assisting in re-
cruiting prospective trainees"

23 hours

Module B2/3: Action field "Conducting trainings"

Time recommendation: 52 hours

Creating learning-conductive conditions and a motivating learning culture,
giving and receiving feedback

8 hours

Learning objectives:

Creating learning conditions and motivating learning culture, giving and receiving feedback.

Competencies:

- a) Consider the trainees' individual prerequisites for designing learning processes.
- b) Support the development of a self-directed learning culture and reflect on the role of the trainer as a learning guide.
- c) Promote learning by observing basic didactic principles.
- d) Support learning processes by agreeing on goals, strengthening motivation and ensuring transfer.
- e) Encourage learning through the transfer of learning and working techniques as well as through appropriate framework conditions.
- f) Determine learning outcomes and show the trainee his or her competence development through appropriate feedback and receive feedback.

Course contents:

1. Learning requirements, promotion of learning and learning culture

1.1 Learning, learning competence, learning culture of self-directed learning

1.2 The trainer as learning guide

1.3 Didactic principles for promoting learning

1.4 Phases and ways of promoting the learning process, agreeing on learning goals, increasing motivation,

Ensure learning success

1.5 Learning and working techniques, framework conditions

1.6 Feedback possibilities

Organising, designing and evaluating the probation period

4 hours

Learning objectives:

Organise, design and evaluate probationary periods.

Competencies:

- a) Determine the content and organisational structure of the probationary period and observe the legal basis.
- b) Select learning tasks to determine the trainee's suitability and inclination for the probationary period.
- c) Planning the introduction of the trainee into the company.
- d) Evaluating the trainee's development during the probationary period and feedback with the trainee, evaluating the execution and outcome of the probationary period.

Course contents:

2. Organisation of the probationary period

2.1 Introduction of the apprentice to the company

2.2 Significance, design and evaluation of the probationary period

Developing and defining operational learning and work-related tasks, based on the in-company training plan and the typical occupational and business processes

5 hours

Learning objectives:

From the in-company training curriculum and the job-specific work and employment conditions of the company.

Develop and design business processes for corporate learning and work tasks.

Competencies:

- a) Emphasize the importance of learning in order and business processes.
- b) Analysing the training plan as well as work and business processes and use this information to design suitable learning and work tasks.
- c) Integrate trainees into work tasks, taking into account individual requirements.

Course contents:

3. Training in typical job and business processes

3.1 Methodological concept of order- and business-oriented training

3.2 Selection of suitable tasks and involvement of the trainees

3.3 Design of learning and work assignments

Selecting proper training methods and media for target groups, and applying them accordingly, if necessary

8 hours

Learning objectives:

Selecting training methods and media appropriate to the target group and using them in specific situations.

Competencies:

- a) Describe essential training methods and their possible applications.
- b) Describe criteria for selecting methods; justify method selection.
- c) Plan and evaluate the training discussion and work instruction.
- d) Methodical design of training content according to target group planning, implementation and evaluation.
- e) Describe the function of educational media and resources and select them according to the method.
- f) Evaluate the use of e-learning for training.

Course contents:

4. Training methods and media

4.1 Overview of training methods and method selection criteria

<p>4.2 Planning and realisation of teaching talks and work instructions</p> <p>4.3 Presentation of a training situation</p> <p>4.4 Functions and Selection of Training Media</p> <p>4.5 E-learning in training</p>	
Assisting trainees with individual training and guidance in case of learning difficulties by applying training aids, if necessary, or by checking the possibility of extending the training period	4 hours
<p>Learning objectives:</p> <p>To support apprentices in the event of learning difficulties through individual training and learning guidance, to use training support aids, and</p> <p>Consider possibilities to extend the training period.</p> <p>Competencies:</p> <ul style="list-style-type: none"> a) Identify typical learning difficulties in training and identify possible causes, check learning pre-requisites. b) Provide individual assistance in case of learning difficulties and initiate support measures. c) Identifying the need for assistance during training (abH) and organising measures. d) Check the possibility of extending the training period. <p>Course contents:</p> <p>5. Learning difficulties and learning aids</p> <p>5.1 Forms of manifestation and causes of learning difficulties and related learning aids and support measures</p> <p>5.2 Assistance during training (abH)</p> <p>5.3 Extension of the training period</p>	
Providing trainees with additional training opportunities, in particular in the form of additional qualifications, and by checking the possibility of shortening the training period or chances for an early approval of the final examination	4 hours
<p>Learning objectives:</p> <p>Examine and propose additional training opportunities for trainees, in particular additional qualifications; examine possibilities of shortening the duration of training and early admission to the final examination or apprenticeship examination.</p> <p>Competencies:</p> <ul style="list-style-type: none"> a) Recognise special requirements and talents of apprentices and make them available through suitable offers such as: additional qualifications. b) Clarify options for shortening the duration of training and for early admission to the final examination/apprenticeship examination for these trainees as well as the remaining training period. <p>Course contents:</p> <p>6. Promotion of high-performing trainees</p> <p>6.1 Funding opportunities for high-performing trainees</p> <p>6.2 Shortening the duration of training and early admission to the final examination/apprenticeship examination</p>	
Promoting social and personal development of trainees, identifying problems and conflicts in good time, solution-oriented approach	8 hours
Learning objectives:	

Promoting the social and personal development of trainees; identifying problems and conflicts in good time and working towards solutions.

Competencies:

- a) Describe the development tasks of young people in training, take into account the developmental behaviour of trainees and significant environmental influences when designing training.
- b) Describe the importance of the company for the socialization of trainees.
- c) Designing communication processes during the training, promoting communication skills of the trainees.
- d) Identify conspicuous behaviour and typical conflict situations in training in good time, analyse them and apply strategies for constructive conflict management.
- e) Identifying and avoiding intercultural causes of conflicts.
- f) Reflect on the frequent causes of imminent drop-outs and take measures to avoid them.
- g) Take advantage of dispute resolution opportunities during training.

Course contents:

7. Development of young people and dealing with conflicts
 - 7.1 Development tasks in adolescence and development typical trainee behaviour and environmental influences
 - 7.2 Socialization of the trainee in the company
 - 7.3 Communication in training
 - 7.4 Behavioural disorders and conflict situations in training
 - 7.5 Conflict prevention and strategies for constructive conflict management
 - 7.6 Avoiding intercultural conflicts
 - 7.7 Abandonment of training: Causes and solutions for prevention
 - 7.8 Arbitration procedure for apprenticeship disputes

Measuring and evaluating performance and test results of third parties, conducting assessment discussions and drawing conclusions with regard to the further training process

8 hours

Learning objectives:

Determine and evaluate the performance of trainees, evaluate performance assessments of third parties and examination results, conduct appraisal interviews, draw conclusions for further course of training.

Competencies:

- a) Select appropriate forms of performance review to determine and evaluate achievements in training, taking into account fundamental requirements for training performance reviews.
- b) Perform success checks and draw conclusions for further training.
- c) Evaluate the behaviour of trainees regularly on the basis of suitable criteria and lead to appraisal interviews.
- d) Evaluate the results of external performance reviews.
- e) Use evidence of formal qualifications for monitoring, promotion and comparison with the training plan.

Course contents:

8. Determining training success
 - 8.1 Forms and functions of performance reviews in training
 - 8.2 Essential requirements for performance reviews
 - 8.3 Execution of internal performance reviews
 - 8.4 Assessment sheet and appraisal interview

8.5 Evaluation of external performance reviews 8.6 Evidence of formal qualifications/report booklet	
Learning and working in a team as well as intercultural skills in the company promote.	3 hours
<p>Learning objectives: Learning and working in a team, developing and promoting intercultural competences in the company.</p> <p>Competencies:</p> <ul style="list-style-type: none"> a) Form teams based on selected criteria. b) Promoting teamwork. c) Facing up to other cultures openly and taking up cultural differences positively (intercultural learning). d) Specific support for trainees with a migration background. <p>Course contents:</p> <ul style="list-style-type: none"> 9. Learning and working in a team <ul style="list-style-type: none"> 9.1 Criteria for the formation of teams 9.2 Teamwork 10. Intercultural competences <ul style="list-style-type: none"> 10.1 Fundamental cultural differences and intercultural competences 10.2 Specific support for trainees with a migration background 	
Total Module B2/3: Action field "Conducting training"	52 hours

Module B2/4: Action field "Completion of training"	
Time recommendation: 15 hours	
Preparing trainees for their final or journeyman's examination by taking into account the examination dates, and leading the training to successful completion	6 hours
<p>Learning objectives: Prepare trainees for the final examination or apprenticeship examination taking into account the examination dates and lead the training to a successful conclusion.</p> <p>Competencies:</p> <ul style="list-style-type: none"> a) The main requirements of the intermediate and final examinations/apprenticeship examinations are laid down in the training regulations and the particularities of an examination situation are explained. b) Describe the meaning and sequence of the extended final examination/apprenticeship examination. c) Demonstrate appropriate aids for exam preparation and to avoid examination failures as well as justify the provision of necessary examination equipment. <p>Course contents:</p> <ul style="list-style-type: none"> 1. Preparation for the final examination/apprenticeship examination <ul style="list-style-type: none"> 1.1 Examination requirements and examination procedure 1.2 Stretched final examination/apprenticeship examination 1.3 Specific aids and techniques for exam preparation 1.4 Avoidance/reduction of examination anxiety 	

Ensuring that the trainees register with the competent commission and making sure that the commission will be aware of any specifics that might be relevant with regard to the examination	3 hours
<p>Learning objectives: Ensure that the trainees register for examinations with the competent body and draw their attention to any special features relevant for implementation.</p> <p>Competencies:</p> <ul style="list-style-type: none"> a) Observe legal requirements for the registration of trainees for examinations and exemption; carry out registration. b) Observe legal conditions for early admission to the examination. c) Communicate the examination-relevant particularities of the trainees to the competent body. d) If the examination is not passed, take into account legal requirements for a repeat examination or supplementary examination and extension of the training period. <p>Course contents:</p> <ul style="list-style-type: none"> 2. Registration for the exam 2.1 Registration, exemption and admission to the examination 2.2 Examination-relevant particularities of trainees 2.3 Repeat examination, supplementary examination and extension of the training relationship 	
Contributing in the issuing of a written certificate, on the basis of performance assessments	3 hours
<p>Learning objectives: Create written certificates based on performance appraisals.</p> <p>Competencies:</p> <ul style="list-style-type: none"> a) Observe legal and company regulations and emphasize the significance of certificates for the trainee in terms of employment law. b) Differentiate between different types of certificates. c) Draw up certificates, in particular taking into account previous performance assessments, and take legal consequences into account. <p>Course contents:</p> <ul style="list-style-type: none"> 3. Issuing certificates 3.1 Significance, types and contents of certificates 3.2 Formulation of certificates 3.3 Legal consequences of certificates 	
Informing and advising trainees about inter-company development and career opportunities, and about occupational further training options	3 hours
<p>Learning objectives: Inform and advise trainees on company development paths and vocational training opportunities.</p> <p>Competencies:</p> <ul style="list-style-type: none"> a) The importance of continuing vocational education and training. b) Describe career and company advancement and further training opportunities, especially for the master craftsman's examination. c) Identify funding opportunities for continuing vocational education and training as well as possibilities for the promotion of gifted students. <p>Course contents:</p> <ul style="list-style-type: none"> 4. Advancement and training opportunities 	



4.1 Vocational further education and training opportunities, master craftsman's examination 4.2 Financial support for vocational training measures	
Total Module B2/4: Action field "Completion of training"	15 hours



3. Examination regulations for a Master's certificate in carpenter

The Master's exam consists of the four following independent test parts:

- occupation-specific exam parts
 1. Examination in mastering the usual work
 2. Examination in the relevant theoretical knowledge
- uniform examination parts for all professions
 3. Examination in the relevant business, commercial and legal knowledge
 4. Examination in the relevant occupational and work-pedagogical knowledge.

Regulation for a Master's certificate for a carpenter

Section I Uniform provisions

Article 1. Admission requirements and exemption from examination parts

- (1) Following are uniform requirements for admission to the Master's examination:
1. Successful completion of at least three years of professional training in the respective or related profession. In the case of shorter training periods: proof of a professional activity, so that a total of at least three years can be evidenced. Or
 2. Professional activity of at least five years in a relevant or related profession. Or
 3. Successful completion of a degree course in a discipline with relevance to the respective profession of the Master's training.
Skills, knowledge and abilities already acquired in other qualification measures, equivalent to a Master's training, are recognised for the Master's training and may lead to the exemption from specific test parts, for example:
 - a) training as a specialist (*Fachwirt*) or certified business administration specialist with exemption from test Part III of the Master's examination.
 - b) completion of a recognised pedagogic qualifying examination with exemption from Part IV of the Master's examination.
 - c) content-wise appropriate degree courses with complete or partial exemption from test Parts II, III or IV of the Master's examination.

Article 2. Occupational profile for the carpenter in Master's examination

- (1) The master's presentation determines whether the examinee is capable of
1. to lead a company independently,
 2. to perceive technical, commercial and human resources management tasks,
 3. to carry out the training and to implement your professional skills independently and to adapt it to new beds in these areas.
- (2) With the master carpenter training the following skills and knowledge are to be acquired as integrated qualifications for the purpose of the examination:
1. determining customer requirements, advising customers, offering services, conducting contract negotiations and setting order goals, calculating services and creating offers, concluding contracts,
 2. carrying out tasks in technical, commercial and personnel management, in particular taking into account the company organization, company training and further education, quality management, occupational safety law, data protection, environmental protection, as well as information and communication technologies,
 3. planning, organising, carrying out and monitoring order handling processes,

4. carrying out orders, in particular taking into account design aspects, construction manufacturing and assembly techniques, professional legal regulations and technical standards, as well as the generally recognized rules of technology, personnel, material, machines and guarantees, including the opportunities to employ trainees,
5. preparing and presenting drafts, sketches, production drawings and plans, also using computer-aided systems,
6. recognizing static systems and carrying out plausibility checks; evaluating construction documents for the use of the service to be provided as well as create and evaluating product-related static calculations required for an application in building authority approval procedures,
7. recognising style directions as well as historical and contemporary design language in architecture and design in drafting, manufacturing, restoration and reconstruction,
8. designing, planning, constructing, manufacturing, assembling and maintaining furniture, interior fittings and extensions, in particular office and shop fittings, kitchens, ceiling linings, floors and trade fair structures,
9. designing, planning, constructing, manufacturing, installing, assembling and maintaining facade-closing and construction elements and components, in particular windows, doors and sunrooms, stairs and bodywork,
10. planning, carrying out and documenting restoration work,
11. determining the use of ready-to-assemble, manufactured products and purchased parts,
12. planning, installing, assembling and maintaining locking and security systems to order,
13. assembling products and objects including the electrical and water connections, assembly instruction, coordinating trade-specific and comprehensive installation processes,
14. considering types and properties of processed materials, in particular wood, woodwork and plastic materials, as well as glass and dry building materials, including the methods of surface treatment, in which design, planning, construction, manufacture, assembly and maintenance are taken into account,
15. planning and monitoring the use of systems, machines, tools and devices,
16. developing and implementing concepts for business premises including factory and warehouse equipment as well as for logistical processes,
17. carrying out quality and function tests, evaluating and documenting result,
18. approving and documenting services and carrying out post-calculation.

Article 3. Structuring and content of the Master's examination

- (1) The Master's examination in carpenter includes the following independent examination parts:
 1. Examination to prove masterly execution of the usual work (Part I),
 2. Examination in the relevant theoretical knowledge (Part II),
 3. Examination in indispensable business, commercial and legal knowledge (Part III); and
 4. Examination in the required occupational and work-pedagogical knowledge (Part IV).
- (2) The Master's examination is deemed to have been passed as a whole, if each of the four Parts of
- (3) the Master's examination were successfully passed. Granted exemption from one of the Parts of
- (4) the Master's examination is equivalent to passing of the respective Part.

Article 4. Evaluation/Grading system

- (1) The following 100-point scale shall be used for the assessment of examination in the examination areas, subjects, and fields of action, further, for practical examination in Part IV, as well as in case of supplementary examinations:

100 – 92 points for a performance particularly fulfilling the set requirements,

below 92 – 81 points for a performance fulfilling the set requirements,

below 81 – 67 points for a performance fulfilling the set requirements in general

below 67 – 50 points for a performance which has deficiencies yet on the whole still meets the set requirements,

below 50 – 30 points for a performance which does not meet the set requirements, yet indicates that certain basic knowledge is still available,

below 30 – 0 points for a performance that does not meet the set requirements and identifying very poor or missing basic knowledge.

The 100-point key shall be also applied in specific evaluation of test achievements gained by their nature within the scope of examination areas, examination subjects and fields of action.

(2) Evaluation for each Part of the Master's examination shall be determined as the weighted average of the test points obtained. Where:

100 – 92 points mean: very good,

below 92 – 81 points mean: good

below 81 – 67 points mean: satisfactory,

below 67– 50 points mean: sufficient,

below 50– 30 points mean: insufficient,

below 30 – 0 points mean: not satisfactory.

(3) Promptly upon examination, the examinee obtains a written notification with legal remarks/remedies about the results of the examination in each Part of the Master's examination and the grade obtained.

(4) A certificate is issued by the Master's examination due board, which has been active last year, stating passage of the Master's examination. The certificate shall include the grades obtained for the Master's examination parts passed, as well as exemptions, indicating their legal basis. The shall be signed by the chairman of the Master's examination board.

Article 5. Re-examination of the Master's examination

(1) Each individual part of the Master's examination may be repeated three times within ten years upon completion of the first exam.

(2) Upon request, the examinee shall be exempted from re-examination in examination areas/subjects, areas of activity or in the practical part of the examination, if in a previous examination, respective achievements were evaluated with at least 50 points. Exemption is only possible, if the examinee registers for the re-examination within ten years from the date of the written notification regarding the failed examination part.

Section II Provisions for examination in Part A1 Practical training

Article 6. Structure of the part A1

Part A1 of the master examination includes the following examination areas:

1. A master examination project and a specialist discussion related to it,
2. A situation task

Article 7 Master examination project

- (1) The examinee has to carry out a master's examination project that corresponds to a customer's amount. Proposals of the test subject for the customer order should be taken into account. The order -related customer requirements are determined by the master examination board. AUL of this basis, the examinee is enerable in a implementation concept including time and material requirements planning. He must submit this to the master's presentation committee for approval before the master's present project was carried out. The master's examination board checks whether the implementation concept meets the order-related customer requirements.
- (2) The master's examination project consists of planning, implementation and documentation work.
- (3) As a master examination project is for
 1. A LNNen expansion,
 2. A LNNen device,
 3. A component or
 4. A facade end
 To create a concept of the design and planning documents. From this concept, a product or a partial product must be calculated, manufactured and documented.
- (4) The design, planning and calculation underneath were weighted with 40 percent, the work car-ried out with 50 percent and the documentation documents with 10 percent.

Article 8 Technical discussion

After the master examination project was carried out, the technical discussion must be conducted. Sol! the examinee prove that it is commemorated

1. To show the technical relationships that are based on the master's examination project,
2. to justify the course of the master examination project,
3. Conditional problems associated with the master's examination project and their solutions to be presented and it is able to take new developments into account.

Article 9 Situation task

- (1) The situation task is order-oriented and compromised the proof of qualification for the master examination in carpentry. The tasks take place through the master examination committee.
- (2) As a situation task, a product is to be made with special consideration of functional, material-related, Ferti-based and economic requirements.

Article 10 Exam duration and passing of the part A1

- (1) The implementation of the master's examination project should not be ieer than 18 working days, the technical discussion does not take longer than 30 minutes and the execution of the sit-uation task does not take an INERNG than eight hours.
- (2) Master examination project, technical discussion and situation task are assessed separately. The examination services in the master examination project and in the technical discussion are weighted in a ratio of 3: 1. An overall rating is formed from this. This overall rating is weighted for the test result of the situation task in a ratio of 2: 1.

- (3) Minimum prerequisite for the existence of part A1 of the master's examination is an overall exciting examination performance, although the exam may not have been assessed with less than 30 points in the master examination project or in the technical discussion or in the situation task.

Section III Provisions for examination in Part A2 Specialised theory

Article 11 Structure, test duration and existence of the part A2

- (1) The test in Part A2 is intended to demonstrate its skills in the fields of action mentioned in Article 2 by analyzing and evaluating and evaluating professional problems, and shows and documented solutions.
- (2) In each of the following fields of action, at least one task must be processed that must be case-oriented:

1. Design, construction and manufacturing technology

The examinee is intended to demonstrate that it is able to process design, design and manufacturing technology tasks, taking into account economic and ecological aspects in a carpenter. In doing so, he analyzes and evaluated job-related issues. In the Jieiwei-league task, several of the qualifications listed under letters A to E are to be linked:

- Conceptual and functional solutions for the production, taking into account the materials to be carried out and processing, including the processes for surface treatment as well as static calculations, evaluating, evaluating and corrected,
- The importance of styles and art history as well as the historical and contemporary formal language for the design, production, restoration and reconstruction of furniture, Lnnenein-directions as well as of facade-related elements describe and justify,
- Prepare, evaluate and correct sketches, design and design drawings,
- Design furniture and within the LNNen, in particular office and shop facilities, kitchens as well as trade fair buildings, also while taking into account the ergonomics, determining manufacturing techniques and justifying the selection,
- Proposal for construction measures, in particular for facade-closing ELE mentions and components as well as for wall and ceiling cladding, taking into account and converting, taking into account different building physics conditions; Evaluate and correct design-specific requirements.

2. Installation and maintenance

The examinee should prove that he can convert, coordinate and control the performance and the reminder of the maintenance. In the respective up-to-the-ceremony, several of the qualifications listed under letters A to G are to be linked:

- Design and greeting process plans for assembly work including the tools and MA-Schinen used; Check, evaluate and correct specified assembly plans,
- Concepts for transportation, construction site equipment, develop, valued and correct, security and absorption,
- Present and justify the need for object-related intermediate and end controls of assembly work and the relation measures,
- Determine and justify criteria for the coordination of assembly services with contracts and involved trades,
- Assess the assembly techniques, assign usage purposes and justify assignment,
- Suggestions for measures of heat, moisture, sound, smoke, fire and radiation protection unter Berücksichtigung der Normen, Richtlinien und Vorschriften erarbeiten, begründen und korrigieren,
- Assign the locking and protective systems of different usage corners and select the selection.

3. Order processing

The examinee is intended to prove that it is able to plan the order processing processes, also under the application of sector software, success, customers and quality-oriented, to control and complete them. With the respective task should

Several of the qualifications listed under the letters A to J are linked:

- a) represent the possibilities of the procurement of the recording,
- b) Create the offer documents and evaluate offers, carry out offer calculation,
- c) Evaluate methods and procedures of the work planning and organization, taking into account the production and assembly and the use of personnel, material and devices, represent a quality-cherish aspects.
- d) Apply job-related legal regulations and technical norms as well as recognized rules of technique, in particular assess liability in manufacturing, assembly, maintenance and services,
- e) Determine the order-related use of material, machines and devices and select the selection,
- f) Create, evaluate and correct drawings and schedule for production,
- g) forgiven substructures and check their drafting,
- h) Select the design, procedural, manufacturing and upper-level techniques as well as fittings, assign and assign and use purposes,
- i) Determine and calculate the quantities and times, carry out before and post-calculation,
- j) Determine and justify the labeling, packaging, storage and transport of products.

4. Management and company organization

The Prüfling should prove that he is able to perform the tasks of operational management and company organization, taking into account the legal regulations, also using the information and communication systems. In the respective task, several of the qualifications listed under letters A to H are to be linked:

- a) determine operational costs, considering business relationships,
 - b) CALCULATE CONTACTS; Determine operational key figures,
 - c) Develop marketing measures for customer care and to obtain new customers against the background of technical and economic developments as well as concepts for dealing with customers; Create presentation concepts,
 - d) Planning and presenting operational management,
 - e) represent human resources; Show the connection between personnel management as-is-how to leadership and development,
 - f) develop operational measures to comply with the provisions of occupational safety law and environmental protection; Assessing the danger potential and determining measures to avoid danger and disposal,
 - g) Planning and presenting operating and storage equipment as well as logistical processes,
 - h) represent and assess opportunities and risks of operational cooperation.
- (1) The test in Part A2 must be carried out in writing. It should not take an icing in every field of action than three hours. An examination duration of six hours a day must not be exceeded.
 - (2) The overall rating of part A2 is formed from the arithmetic means of the individual reviews of the fields of action in accordance with paragraph 2.
 - (3) The written examination must be supplemented in one of the fields of action mentioned in paragraph 2 at the request of the test or at the discretion of the examination board by an oral examination (Supplementary test) if this enables the part A2 of the master's examination. The oral examination should not take longer than 20 minutes per examinee. In this field of action, the results of the written examination and the supplementary test are to be weighted 2: 1.
 - (4) Minimum prerequisite for passing the part A2 of the master examination is an overall extensive examination performance. If the examination in a field of action has been assessed even after the supplement examination carried out with less than 30 points, the examination of the part A2 is not buried.

Section IV Provisions for examination in part B1 business, commercial and legal knowledge

Article 12. Special provisions for examination eligibility and examination exemptions

- (1) The admission requirements for examination in required business, commercial and legal knowledge (Part III) is the completion of the course B1 “Business administration, law and management”, as preparation for the Master's examination.
- (2) At the request of the examinee, exemption from Part III of the Master's examination shall be granted, if the examinee can prove successful completion of an equivalent training course, stating a recognised final examination. E.g., in particular:
 - a) relevant university studies, e.g. in business management, SME management.
 - b) relevant recognised advanced qualifications, e.g. “Certified Specialist in Commercial Business Administration”.

Article 13. Objective, structure and content of Part III

- (1) Examination in Part III, shall demonstrate the examinee’s professional competence as business owner or manager in the fields of action referred to in Article 2.1-3, by displaying competence in analysing and assessing business, commercial, and legal problems and in adequately addressing and documenting them, taking into account current market trends.
- (2) At least one complex case-related exercise shall be performed in each of the following fields of action:

1. Competitiveness assessment of enterprises

The examinee shall prove the ability to display competence in assessing and in decision-making with regard to business, commercial and legal competitiveness requirements of a company, including assessment and decision making in the area of HR career planning. The exercise shall combine several of the qualifications listed in points (a) to (f):

- a) analysing corporate objectives and classifying them into a business objectives system,
- b) motivating the significance of the corporate culture and of the company image for the company's performance and competitiveness,
- c) analysing the market position of a company, and motivating potential for success,
- d) using accounting data for analysis of a company's strengths and weaknesses, in particular, from the balance sheet and the profit and loss account,
- e) using data for decision making from internal and external accounting,
- f) applying legal provisions in the analysis of corporate objectives and concepts, in particular, commercial and trade law, trade and competition law;

2. Preparing, executing and evaluating start-up and take-over activities

The examinee shall display competence in preparing, executing and evaluating tasks related to a business start-up and business take-over, taking into account personal, legal and business conditions and objectives, as well as competently explain their significance for a business concept. In this exercise, several of the qualifications listed in points (a) to (j) shall be combined:

- a) motivating significance of personal prerequisites for the success of professional self-employment
- b) motivating and evaluating economic, social and cultural importance of the craft sector and the benefits of membership in craft organisations,
- c) exploring and evaluating chances for engaging advisory services, finance and support services for start-ups and business takeovers,
- d) making and motivating decisions regarding the location, size, staffing requirements, setup and equipment of a company,
- e) developing and evaluating a marketing concept for a market launch,

- f) establishing and motivating an investment plan and a finance concept; preparing a profitability forecast and implementing liquidity planning,
- g) deducing and motivating a legal form, depending on the business concept,
- h) applying legal provisions, in particular, civil law and company and tax law, in the context of a craft business set-up or take-over
- i) motivating the need for private risk and pension provision, indicating market possibilities
- j) comprehensively motivating the significance of personal aspects and business and legal components of a business concept;

3. Developing business management strategies

The examinee has to demonstrate the ability to identify operational growth potentials and to develop corporate strategies, taking into account company strengths and weaknesses as well as market-related opportunities and risks of managing a business. For this exercise, several of the qualifications listed in points (a) to (k) shall be combined:

- a) assessing the significance of organisational business structures and workflows; introducing modifications,
- b) evaluating trends in product and service innovation as well as general market conditions, also in the international context, and thus deriving adequate growth strategies,
- c) motivating the use of marketing instruments for sale and procurement of products and services,
- d) identifying changes in capital requirements, depending on investment, financial and liquidity planning; demonstrating alternative forms of capital procurement,
- e) developing and evaluating concepts for personnel planning, recruitment, and qualification measures, as well as presenting tools for HR management and development,
- f) taking into account provisions of labour and social insurance legislation when drafting a business strategy,
- g) presenting chances and risks of inter-company cooperation,
- h) using controlling to develop, pursue, implement and modify corporate objectives,
- i) presenting and motivating tools for legal enforcement of claims,
- j) presenting and motivating the need to plan a business succession, taking into account e.g. inheritance and family law, and tax provisions,
- k) Examining the need to initiate insolvency proceedings, based on company data; indicating insolvency law consequences for the continuation or liquidation of a business.

Article 14. Examination duration and passage of Part III

- (1) The exam in Part III shall be carried out in writing and it shall last two hours in each field of action.
- (2) The overall assessment of Part III is calculated as the arithmetic mean of individual evaluations in the fields of action, pursuant to Article 2.2.
- (3) If in at most two of the fields of activity, stipulated in Article 2.2, at least 30 points, however less than 50 points were reached, an oral supplementary examination may be carried out in one of the respective fields of action, if this allows passage of Part III of the Master's examination.
- (4) A minimum requirement for passage of Part III of the Master's examination is an overall satisfactory examination performance. Examination of Part III is deemed to be failed, if:
 - a. An action field was evaluated with less than 30 points, or;
 - b. After supplementary examination, two fields of action were evaluated with less than 50 points.
- (5) Passage of Part III of the Master's Examination leads to the recognised advanced training title "Business Administrator".

Section V Provisions for examination in part B2 occupational and work-related pedagogical knowledge

Article 15. Specific admission provisions and exemptions

- (1) Admission provision to examination in the required occupational and work-related pedagogical knowledge (Part IV) is a completion of the preparatory course B2 for the Master's examination "Profession and work-related pedagogical knowledge".
- (2) At the request of the examinee, exemption from Part III of the Master's examination may be granted upon providing evidence of successful completion of an equivalent training course with a recognised final examination, e.g., related recognised advanced trainings certifying qualification to train instructors.

Article 16. Objective, structure and content of Part IV

- (1) Examination in Part IV proves the examinee's professional and work-pedagogical knowledge and competence, required to independently plan, carry out and control proper vocational training of apprentices (trainees).
- (2) Examination in Part IV consists of a written and a practical part.
- (3) In the written part of the examination, the examinee shall solve case-related exercises in each of the following fields of action:

1. Review of training requirements and drafting of a training plan

The examinee shall demonstrate the ability to assess and evaluate training requirements, on the basis of corporate, occupational and legal provisions, as well as the ability to plan a training, including, e.g. taking into account non-job-related training periods. The exercise shall combine several of the qualifications listed in points (a) to (g):

- a) demonstrating and motivating the benefits of in-company training,
- b) planning of corporate training requirements, taking into account legal and collective agreements and the general corporate framework; preparing and making decisions,
- c) presenting structures of a vocational training system and its interfaces,
- d) selecting training professions for a company and motivating the selection,
- e) exploring suitability of a company for training in the selected training professions, in particular, taking into account cooperative, supra-corporate and external training,
- f) exploring and evaluating chances to use preparatory vocational training measures,
- g) coordinating intra-company allocation of responsibilities during training, taking into account functions and qualifications of the training participants;

2. Training preparation and recruitment of trainees

The examinee has to demonstrate the ability to perform all pre-training tasks, to introduce selection criteria for recruiting candidate, and to execute recruitment procedures, including taking into account corporate organisation and workflows as well as legal aspects. In the exercise, several of the qualifications listed in points (a) to (f) are to be combined:

- a) drawing up a corporate training plan, based on training regulations and, in particular, on occupational and typical work-related corporate processes;
- b) presenting and motivating to occupational corporate interest groups the benefits from participation and co-determination in vocational training,
- c) identifying cooperation requirements and organising the content and organisational coordination with co-operation partners, in particular, with vocational schools,
- d) applying criteria and procedures for the selection of trainees, taking into account their diversity,

- e) preparing and concluding vocational training contracts and initiating registration with the competent body,
- f) exploring chances to perform vocational training partly abroad;

3. Training delivery

The examinee has to demonstrate the ability to plan and control learning processes in a work-oriented manner as well as the ability to promote independent learning. Job-specific work- and business-related processes shall be hereby considered, as well as possible areas of application and learning requirements of the trainees. The exercise shall combine several of the qualifications referred to in points (a) to (j):

- a) creating learning-friendly and motivating conditions, give and receive feedback,
- b) organising, shaping and evaluating a probationary period,
- c) developing and drafting typical corporate learning and work-related tasks, derived from the company's corporate training plan and from occupational and business-related workflows,
- d) selecting training methods and media for the target group and use them accordingly, if required,
- e) assisting trainees with learning difficulties by individual approach during training and by learning guidance; using training-supportive aids and exploring chances to extend the training period,
- f) exploring and proposing additional training opportunities, in particular supplementary qualifications, for trainees; chances to reduce the training period and early admission to the final or journeyman's exam,
- g) promoting social and personal development of trainees; identifying problems and conflicts at an early stage and endeavour to arrive at an amicable solution,
- h) promoting learning and working in teams,
- i) noting and assessing the performance of trainees; evaluating performance assessments and test results of third parties, performing assessment interviews, drawing conclusions for the remaining part of the training course,
- j) promoting corporate intercultural skills;

4. Training completion

The examinee has to prove the ability to lead the training to a successful end and to point out prospects for further learning and qualification courses. This exercise shall combine several of the qualifications listed in points (a) to (d):

- a) preparing trainees for the final or journeyman's examination, taking into account the examination dates and leading the training to a successful end,
- b) ensuring that the trainees are registered with the competent body and ensuring that trainees know about all relevant exam specifics,
- c) preparing a written certificate based on performance assessments,
- d) informing and advising trainees about possibilities of a corporate career and professional advanced learning possibilities.

(4) The practical Part of the examination consists of:

1. Presentation or practical performance of a training situation and
2. Technical discussion.

For presentation or for practical execution, the examinee selects a job-specific training situation. The selection and draft of the training situation are explained during the technical discussion.

Article 17. Examination duration and passage of Part B2

- (1) The written part of the examination lasts three hours. The practical part of the examination shall not exceed a maximum of 30 minutes, whereby the presentation or the practical execution of a training situation shall not exceed 15 minutes.

- (2) The assessment of the written part of the examination is calculated as the arithmetic mean of equally weighted individual evaluations of each field of action. For the overall assessment, the written and practical parts of the examination shall be equally weighted.
- (3) If in each of at least two of the fields of action, referred to in Article 16.3, at least 30 points, however less than 50 points, were reached, an oral supplementary examination may be carried out in one of the respective fields of action, if this allows passage of the written Part IV of the Master's examination.
- (4) Precondition for passage of Part IV of the Master's Examination is the evaluation of the written and practical part of the examination, each with at least 50 points.
- (5) Passage of Part B2 of the Master's examination leads to the recognised advanced training title "Instructor".

4. Course implementation and other documents

Implementation notes

The main objective of the training is to enable the master students to use the skills acquired during the training in their professional life. For example, they can make use of business management tools to evaluate alternative courses of action and to make decisions, as well as being aware of legal regulations and their impact. Therefore, the problem that often occurs in connection with school learning that only "slow" short-term knowledge is built up among learners must be addressed. As far as the curriculum is concerned, this can be ensured by focusing on the teaching of lasting decision-making skills and the choice of an appropriate teaching structure for the learning content.

With the concept of action and competence orientation, the focus is shifted away from abstract knowledge transfer to contextual and job-related learning.

The importance of this for the sustainability of learning processes and the ability of learners to transfer what they have learned to practical problems has been widely confirmed by cognitive psychological research. Furthermore, this approach does not aim to impart specialist knowledge in separate "learning areas". Rather, it offers the learner the opportunity to acquire complete knowledge, to coordinate and structure individual elements and to build on previous knowledge. In this way, learners do not develop isolated skills that are tailored to specific requirements, but instead acquire extensive competence in dealing with complex situations and contexts.

The learning objectives must be prepared in such a way that the competences outlined in the curriculum can be acquired. What breadth and depth of learning content is necessary for this?

The starting point of the learning process should be complex, realistic and typical real life situations which enable master students to practise planning as well as the execution and control of professional activities. Master students should be given the opportunity to learn by means of self-executed or mentally understood professional actions.

Separation of learning objectives according to individual subject specific learning content should be avoided by teaching across disciplines. If it is not possible to train complete work and business processes, the learner should at least be made aware of the classification of the respective learning content in the larger context of action, e.g. by naming upstream and downstream action steps. This later helps the master craftsmen to better use their acquired individual skills in practice.

Master students should have the willingness and ability to learn on their own, especially when it comes to basics, and to obtain the necessary information themselves, because the course focuses on the processing of tasks relevant to a company. This should be pointed out to the participants at the beginning of the training.

As a rule, it is not enough to impart knowledge via the courses in isolation. Without reference to the practical experience of the participants, i.e. without direct application of the knowledge in practical

tasks, the participants may fail to implement the knowledge learnt on the course in the future day-to-day business of the master craftsman. This means, for example, that mathematical tasks should not be taught as a separate subject, but rather should be taken up when they are necessary for the understanding and processing of certain operational tasks.

It is therefore necessary to acquire specialist knowledge in real-life situations as part of the master craftsman's training so that they are transferred into practice and therefore professional objectives can be achieved. For this purpose, it is necessary to orient the training strongly towards action.

The main objective of the action-oriented approach is to combine knowledge from theory with the practical experience of the participants. The following basic parameters must be observed in this respect.

Participant orientation and practical relevance:

This means that a bridge has to be built between the core topics of the curriculum framework and the participants. Only in this way will a participant be individually and emotionally engaged and willing to get involved and participate actively. It is often not enough to introduce just one example to promote the willingness of the participants to deal with the situation. Rather, it is necessary to build on the participants' prior knowledge and experiences with the topic. Appropriate action opportunities from the participants' professional experience must be identified, taken up and processed.

Participant activation and promotion of interactivity:

Participants' own actions (thinking, discussing, exploring, determining, calculating, comparing, discovering, testing, creating, etc.) The participant must actively and intensively deal with a situation in order to be able to build up internal structures of action for himself/herself. The lecturer is stronger in the role of learning organiser and learning advisor. However, this does not mean that all tasks are to be solved by the participants independently or in groups. Rather, depending on the prerequisites of the participants, a flexible and versatile methodical approach is required, in which, for example, short introductions to completely new topics, on which the participants have not yet had any experience of their own, alternate with joint development phases and moderated discussions in the entire group. In particular, the interaction and exchange of experience between learners should be enhanced through partner or group work, especially on topics of particular importance for professional practice, which can build on the experiences of the participants.

Comprehensive tasks and results orientation:

It is important to grasp complex situations and to enable as complete an action as possible, i.e. from analysis to planning and execution to control. The participant should think through an activity or situation in all these phases and carry it out independently. The aim is to address all learning areas (cognitive/head, affective/heart and psychomotor/hand) and to have an impact on all areas of competence (self-competence, professional competence, social competence).

At the end of teaching/learning units, there should be concrete results or products e.g. a completed checklist, a prepared business concept, a summary of results, a test report etc., which can be presented and "taken away" by the participants.

Ultimately, it is particularly important for courses in vocational adult education to take particular account of experience orientation, participant orientation and activation as well as action

orientation in planning and design through the use of modern media (e.g. e-learning and blended learning).⁵

Courses that observe these basic values are more interesting for both the participants and the lecturers in the long term, even if they are initially more labour-intensive, since additional documents are often required for phases of group work. From the previous experience of the lecturers, who practice action-oriented instruction, the participants tend to work with greater commitment and interest after a short acclimatisation period.

As discussed earlier, the learning objectives and contents of Part A1 (generally speaking: professional practice) and Part A2 (generally speaking: specialist theory) are not clearly separated to illustrate the overlapping character of the strongly action-oriented concept. Therefore, parts A1 and A2 should always be planned and communicated together. Parts B1 and B2 can – to a certain extent – also be

taught separately from A1 and A2 as individual courses. However, Part B1 is closely connected to some of the specialist theoretical core contents of Part A2, which is why Part B2 should be taught alongside with Part A2 or with A1/ A2. Part B2 with a special human resources view of the topic “Training of skilled workers” can be taught independently of the other parts. However, it might be useful to teach B2 in the follow-up to part B1, because part B1 already contains basic personnel management contents (without any special reference to training) and thus there are certain points of contact for part B2.

With regard to the possible division of the different parts of the master craftsman's qualification, a strict separation of Specialised Theory (part A2) and Practical Training (part A1) is not appropriate as these two areas are very closely linked. The subject content derived from the learning objectives can be taught by the lecturers in parallel or alongside each other. In this way, the engagement of the participants can be further increased. Courses that pursue a strict separation of theory and practice – without taking into account the respective relationships between them – can have a very negative impact on learning success, especially in adult education.

In part B1, module B1/1: Action field “Determining corporate competitiveness” should be taught first, as content from the other fields of activity is based on it. Ideally, also consider the sequence in which field of action 2 to 3 should be taught in order to maintain the logic of the company life cycle.

In part B2, it is crucial to impart competence for independent planning, execution and monitoring of vocational training in the four fields of activity:

1. Examine training requirements and plan training
2. Prepare training and assist in hiring trainees
3. Carry out training
4. Complete training

When conducting the training in different countries and regions, it is essential that the instructors on site adapt according to the regional legislation and characteristics as well as the previous knowledge of the participants.

Literature recommendations and other teaching materials

For A1 and A2 the following literature and teaching programs are recommended:

⁵ See e.g. Reich-Claassen, J.; von Hippel, A.: Supply planning and design. In: Tippelt, R.; von Hippel, A. (Hrsg.): Manual adult education / training. 4th, revised edition. Wiesbaden 2010. p. 1003-1015

- Prüfungsbuch für Tischler/Schreiner: Vorbereitung zur Gesellen- und Meisterprüfung. Fachkunde und Technische Mathematik in Frage und Antwort, 2019. Das Prüfungsbuch für Tischler/Schreiner enthält das aktuelle und relevante Wissen zur Vorbereitung auf die Gesellen- und Meisterprüfung und entspricht im Wesentlichen den theoretischen Anforderungen der Rahmenlehrpläne für die Berufsausbildung. Es besteht aus den Teilen Technologie und Technische Mathematik.
- Rahmenlehrplan zur Meisterprüfungsverordnung im Tischler- und Schreiner-Handwerk, Bundesverband Holz und Kunststoff, HKH Service + Produkt GmbH 10179 Berlin, www.tsd-online-shop.de
- Prüfungsvorbereitung Tischler: Gesellenprüfung von Konrad Metzger und Karl-Martin Sedlmeier, 2018
- Holztechnik – Prüfungswissen in Fragen und Antworten
Fragen · Antworten · Erklärungen · Abbildungen Programmierte Testaufgaben · Lösungen · Bewertung. VERLAG EUROPA-LEHRMITTEL · Nourney, Vollmer GmbH & Co. KG, Düsseldorf
Straße 23 · 42781 Haan-Gruiten, Europa-Nr.: 40915
- Erläuterungen zur Meisterprüfungsverordnung im Tischler- und Schreinerhandwerk, Bundesverband im Tischler- und Schreinerhandwerk

The following literature and working documents are recommended for the training parts B1 and B2 :

- Sackmann - Das Lehrbuch für die Meisterprüfung: Accounting - Betriebs und Wirtschaft - Recht und Steuern, Verlagsanstalt Handwerk, ISBN 978-3878649076
- Handyman's Primer, Volumes 1 to 3, Holzmann Medien, ISBN 978-3-7783-1153-0
- Field of action: training (workbook to prepare for the instructor suitability test), Feldhaus-Verlag, ISBN 978-3-88264-564-4
- Examination check instructor qualification, Feldhaus-Verlag, ISBN 978-3-88264-563-7
- Handyman's Primer, volume 4 Berufs- und Arbeitspädagogik, Holzmann Medien, ISBN 978-3-7783-1157-8
- Ordinance on the examination for the recognised advanced training qualification Certified specialist for commercial business management in accordance with the Craft Trades Act and certified specialist for commercial business management in accordance with the Craft Trades Act (Test Ordinance for the Completion of Further Training for Commercial Business Management HwO - PrüfVO FortkfmBf), date of issue: 11.11.2014
- Recommendation of the main committee of the Federal Institute for Vocational Education and Training on the framework plan for the training of trainers. Reference/publication: Federal Gazette No. 111/2009 of July 30, 2009, BIBB press release: No. 22 of July 3, 2009 (www.bibb.de/de/51843.htm), journal "Vocational Education in Science and Practice", no 4/2009 (www.bibb.de/bwp/aevo)
- Ausbildereignungsverordnung, Federal Law Gazette Year 2009, Part I, No. 5, 30.01.2009

Work Package 4 Second center level
"Continuing vocational training"

Activity A11 Training Construction Technician

Concept, Curriculum and Examination Regulation “Construction Technician”

Prepared by:

Hanse Parlament

December 2021

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Instruction and Overview

The training “Construction Technician” comprises a total of max. 2,450 lessons of teaching. The qualification is completed with an official state-approved examination as a "construction technician". Successful completion of Part D "Vocational and occupational education" of the technician training entails the license to perform vocational educations (qualification as an instructor).

The training “Construction Technician” consists of four parts:

Part A Interdisciplinary general basics: 490 hours lessons

- foreign language (English) 150 h lessons
- native language 90 h lessons
- State and society, environmental engineering 100 h lessons
- Energy Saving and House technic 150 h lessons

Part B Subject-specific part: 1,457 hours lessons and project work 120 hours lesson

- Structural designing and engineering 315 h lessons
- Structural CAD drawing 130 h lessons
- Mathematics, Geometry, Physics 180 h lessons
- Materials science / Chemistry 200 h lessons
- Construction management 126 h lessons
- Technical mechanics 220 h lessons
- Construction machinery and equipment 16 h lessons
- Surveying technology 70 h lessons
- Interdisciplinary project work 120 h

Part C Interdisciplinary Business Administration and Management 378 hours lessons

- Determining corporate competitiveness 82 h lessons
- Preparing, completing and evaluating start-up and takeover activities 86 h lessons
- Developing corporate management strategies 98 h lessons
- Basic computer skills, bookkeeping using commercial software 52 h lessons
- Innovation management 60 h lessons

Part D Interdisciplinary Vocational and occupational education 105 hours lessons

- Review of training requirements and training planning 20 h lessons
- Training preparation and assisting in recruiting prospective trainees 18 h lessons
- Conducting trainings 52 h lessons
- Completion of training 15 h lessons

All four parts are divided into mainly compulsory and a few elective modules; each module is rated with credit points in relation to the learning outcomes. The entire training is located at EQF Level 6.

Building technician, discipline: structural and civil engineering, expansion, renewing/renovation, reinforced concrete steel construction				
No.		Module	Emphasis	Hours
B1	Subject-specific topics	Structural design	Structural designing and engineering	315
B2		Structural drawing	Structural CAD drawing	130
B3		Mathematics, Geometry, Physics	Performing mathematical and building-related physical calculations	180
B4		Materials science / Chemistry	Concrete and reinforced concrete	200
B5		Building law	Local building regulations, permits, contract law principles, warranty	80
B6		Construction management	Calculation and planning of construction costs, staff, equipment, materials, tendering, tender vetting, procurement, production, service specification for award procedures, building supervision, site accounting	126
B7		Technical mechanics	Statics, materials strength, dynamics	220
B8		Construction machinery and equipment	Overview	16
B9		Surveying technology	Application of surveying equipment	70
A1	General principles	Work-related English	Technical terms, business correspondence	150
A2		Native-tongue teaching	Speaking and listening, correspondence, arguing, interpreting, work-related skills	90
A3		State and society, environmental engineering	Labour and social order, technical progress, Europe, environment	100
A4		Energy consultancy and HVACR	Building control systems, ventilation systems, fire and burglar alarm systems	150
C1	Interdisciplinary business administration and management	Determining corporate competitiveness	Knowledge and skills to evaluate the competitiveness of a company	82
C2		Preparing, completing and evaluating business foundation and takeover activities	Preparing, conducting and evaluating company set-up/acquisition	86
C3		Developing corporate management strategies	Corporate strengths and weaknesses, opportunities and risks to lead and develop a business	98
C4		Basic computer skills, bookkeeping using commercial software	Use of operating systems and ICT technology, implementing software-based accounting, EDP payroll accounting, business analysis	52
C5		Innovation management	Evaluating complex business issues and developing a solution design. Presenting a business-related strategy with implications for operational management	60
D1	Interdisciplinary vocational and occupational education	Review of training requirements and training planning	Checking training requirements and vocational training planning	20
D2		Training preparation and assisting in recruiting prospective trainees	Preparing vocational training, setting of selection criteria for recruitment and conducting recruitment procedures	18
D3		Conducting trainings	Action-oriented planning and monitoring of learning processes; promoting independent learning	52
D4		Completion of training	Successful completion of the training; pointing out perspectives for further education and qualification pathways	15
B10		Project work	Interdisciplinary project	120
			Total hours:	2430
			Hours / week:	32
			Weeks:	76

The aim of the project is to carry out also master craftsman trainings in the Center of vocational Excellence. Like the technician's training, the master craftsman training is directly connected to the first level when a journeyman's or skilled worker's qualification is obtained. The master craftsman training comprises four parts as well:
Part I: Subject-related practice

- Part II: Subject-related theory
- Part III: Business Administration and Management
- Part IV: Vocational and occupational education

Each part of the master craftsman training concludes with an independent examination; upon successful completion of all four examinations, the master craftsman's title is awarded in the chosen profession. At the same time, in Germany the graduates are entitled to study at a university. The master craftsman training is also located at EQF level 6.

The curriculum for the technician training of parts B, C and D includes all contents of the professional master qualification, so that it can be used directly for the master training. This means that participants in the technician training course can either obtain the technician's or master's degree or both degrees at the same time.

Parts C "Interdisciplinary business administration and management" and D "Interdisciplinary vocational and occupational education" of the Technician Training Course are identical to Parts III "Business Administration and Management" and Part IV "Vocational and occupational education" of the Master Training Course. In both cases, they are cross-occupational.

Curriculum for career advancement:

Building technician, discipline: structural and civil engineering, expansion, renewing/renovation, reinforced concrete steel construction

No.		Module	Emphasis	Hours
B1	Subject-specific topics	Structural design	Structural designing and engineering	315
B2		Structural drawing	Structural CAD drawing	130
B3		Mathematics, Geometry, Physics	Performing mathematical and building-related physical calculations	180
B4		Materials science / Chemistry	Concrete and reinforced concrete	200
B5		Building law	Local building regulations, permits, contract law principles, warranty	80
B6		Construction management	Calculation and planning of construction costs, staff, equipment, materials, tendering, tender vetting, procurement, production, service specification for award procedures, building supervision, site accounting	126
B7		Technical mechanics	Statics, materials strength, dynamics	220
B8		Construction machinery and equipment	Overview	16
B9		Surveying technology	Application of surveying equipment	70
A1	General principles	Work-related English	Technical terms, business correspondence	150

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A2		Native-tongue teaching	Speaking and listening, correspondence, arguing, interpreting, work-related skills	90
A3		State and society, environmental engineering	Labour and social order, technical progress, Europe, environment	100
A4		Energy consultancy and HVACR	Building control systems, ventilation systems, fire and burglar alarm systems	150
C1	Interdisciplinary business administration and management	Determining corporate competitiveness	Knowledge and skills to evaluate the competitiveness of a company	82
C2		Preparing, completing and evaluating business foundation and takeover activities		86
C3		Developing corporate management strategies	Corporate strengths and weaknesses, opportunities and risks to lead and develop a business	98
C4		Basic computer skills, bookkeeping using commercial software	Use of operating systems and ICT technology, implementing software-based accounting, EDP payroll accounting, business analysis	52
C5		Innovation management	Evaluating complex business issues and developing a solution design. Presenting a business-related strategy with implications for operational management	60

490

378

D1	Interdisciplinary vocational and occupational education	Review of training requirements and training planning	Checking training requirements and vocational training planning	20
D2		Training preparation and assisting in recruiting prospective trainees	Preparing vocational training, setting of selection criteria for recruitment and conducting recruitment procedures	18
D3		Conducting trainings	Action-oriented planning and monitoring of learning processes; promoting independent learning	52
D4		Completion of training	Successful completion of the training; pointing out perspectives for further education and qualification pathways	15
B10		Project work	Interdisciplinary project	120

105

<u>Total hours:</u>	<u>2430</u>
Hours / week:	32
Weeks:	76

No.	Subject	Course contents	Learning objectives	Time guideline
A1	Work-related English	Grammar	Understanding and formulating statements, questions and demands worded positively and negatively;	40
			Identifying and reproducing actions, events and facts in present, past, future or timeless mode; identifying and reproducing several events as either simultaneous or consecutive, preceding or subsequent	
			Identifying and establishing spatial, temporal and logical relationships	
			Understanding and formulating action perspectives (active and passive tense)	
			Identifying and describing the number, nature and affiliation of objects, living beings and facts	
			Literal and mediated reproduction of information (direct/indirect speech)	
			Formulating conditions and references	
		Vocabulary	Developing profound vocabulary	30
			Understanding further lexical units by listening or reading (receptive vocabulary) or by independently deriving from texts (potential vocabulary)	
		Pronunciation and intention	Knowledge of different pronunciation variants in the target language	10
			Mastering pronunciation to an extent to generally avoid misunderstandings, at word and at sentence level	
			Ability to translate characters of phonetic spelling into words	
		Text production		20
		Notes		
		Continuous test		
		Business correspondence		
		Stages in the writing process (drafting, writing, revising)		
		Keywords, text divisions		
		Presentation and media		20

Applying a writing technique		
New technologies for information collection		
Presentations		
Delivering a speech		
Occupation-relevant skills		30
Technical terms		
Making phone calls		
Business correspondence		

150

No.	Subject	Course contents	Learning objectives	Time guideline
A2	Native-tongue teaching	Speaking and listening	Identifying the relation between language, thought and reality; learning presentation techniques; writing and holding speeches	30
		Spoken texts		
		Perception and reflection on the effect of spoken text		
		Forms of practical rhetoric		
		Development of argumentative structures by listening and producing argumentative texts for oral contribution		
		Presentations		
		Organising a speech		
		Correspondence	DIN 5008; Business letter, Email; addressing authorities	25
		Occupational correspondence		
		Citation guidelines		
		Correct punctuation		
		Theoretical basics of documentation and presentation		
		Arguing	Comprehending, describing and evaluating texts; method of text analysis; selection of adequate linguistic means for phrasing and sentence structure	15
		Interpreting		10
		Linguistic creative tools and their function		
		Methods of interpretation		
		Work-related skills	Acquiring all necessary job-specific knowledge	20
		Making phone calls		
		Technical terms		
		Specialist literature		

<i>No.</i>	<i>Subject</i>	<i>Course contents</i>	<i>Learning objectives</i>	<i>Time guideline</i>
A3	State and society, environmental engineering	Labour and social order	The role of the individual in society; acknowledging the role of labour	15
		Qualifications		
		Progress of vocations		
		Importance and value of labour		
		Essence of labour and relevance of human effort		
		Evolution of work ethics		
		Industrialisation	Brief historical overview; understanding the significance of industrialisation	10
		Progress in social legislation		
		Ensuring livelihood		
		Equality of men and women		
		Social equality and social security		
		Significance and value of labour		10
		Scientific-technical progress and changes in way of life		
		Technological innovations		
		Opportunities and risks of information and communication technology		
		Power and responsibility		
		Europe	Insight into the foundations of the EU; understanding correlations; obtaining findings by statistics, forecasts, theory formation and comparison; use of print and electronic media	35
		European integration		
		European cooperation vs. historical development		
		Common ground vs. diversity of European traditions		
		Main EU Treaties		
		Democracy in the EU		
		Social dialogue in the EU		
		Environmental engineering	Classifying energy sources according to environmental compatibility, availability and price	30
			Evaluating properties and possibilities of different energy sources for heat generation	

	Evaluating different types of heat generation with respect to additional requirements, e.g. energy source storage, construction of waste gas ducts, residues disposal	
	Describing alternative/regenerative heat/power generation systems; e.g. solar systems, heat recovery systems, heat pumps	
	Assessing the effects of user behaviour on energy consumption, e.g. perceived temperature, comfort, surface temperatures of building components, room air temperature, room ventilation	
	Ecology	
	Applying environment protection and energy saving laws, e.g. Energy Savings Act, Federal Emission Control Act	

No.	Subject	Course contents	Learning objectives	Time guideline
A4	Energy consultancy and HVACR	Systems engineering - heating	Distinguishing heating systems by design features, such as heat generation, heat transfer medium, heat distribution system and heat delivery system	10
			Evaluating the effects of system temperatures and the type of heat release by co-active properties of the building structure, e.g. control response of the systems on storage capacity of the building components	
			Evaluating properties of commonly used materials for heating system components and their application	
			Explaining technical terms of the heat demand calculation and performing calculations according to DIN 4701 and by using a computer program	
			Describing different control options for central heating systems and their use options	
		Systems engineering - ventilation	Describing different types of ventilation systems of residential buildings and their design features (exhaust air systems, supply and exhaust air systems with and without heat recovery, single room ventilation)	10
			Evaluating advantages and disadvantages of different systems with respect to different applications	
			Describing the basics for determining size formats of ventilation systems for residential buildings, e.g. air exchange rates for different rooms, acc. to DIN 1946, DIN 4701	
			Describing the influence of air volume, air speed and air temperature on comfort	
			Indicating options for heat recovery from exhaust air, specifying different materials for air pipes and ducts and evaluating their potential applications	
			Taking into consideration measures of fire and sound insulation with respect to ventilation systems in buildings	
		Air tightness	Describing the relevance and system requirements	5

	Describing organisational requirements, e.g. air tightness concept, on-site responsibility, workflow scheduling, detailed planning	
	Selecting air tightness materials (compatibility, effectiveness, durability), and designing joints and connections	
	Detecting weak points of a dense building envelope, e.g. quality of the building components (windows and doors), their connections and pipe lead-ins, installation areas (shafts, pre-wall installation, etc.)	
Modernisation planning		
<i>Applying laws and regulations to save energy in existing buildings</i>	Applying the Energy Saving Act, Energy Saving Ordinance and related regulations and DIN standards	
	Describing requirements according to the German Energy Saving Ordinance in new buildings and existing buildings	
	Describing retrofit obligations for existing building	
<i>Including buildings and technical facilities and documenting them for the evaluation of building physics</i>	Collecting and clearly documenting data relevant for the physics assessment of an existing building with regard to drafting of a modernisation concept, e.g. exterior walls, exterior wall cladding, windows, boilers, radiators, exhaust ducts	35
<i>Drafting and presenting a concept for improvement of the energy balance of an existing building</i>	Drafting and verifying modernisation measures for a building and its technical systems with regard to comfort; e.g. insulation of the heat-transferring enclosing surfaces of a building, including effect on the systems, replacement of the heating system and the effect on the heat-transferring encapsulation areas, recycling of building materials and (systems) components	
	Indicating modernisation measures for a building and its technical facilities, e.g. preparing reports and conducting consultations	

<i>Preparing a cost-benefit analysis of the planned modernisation measure</i>	Contrasting estimated costs of a modernisation measure with expected savings, calculated on the basis of the annual heating demand; e.g. insulation expenses for heat-transferring enclosure surfaces, including modifications of the heating system, with saved energy costs due to a reduced annual heating demand	
	A realistic calculation, including explanation with regard to amortisation and profitability by computer-aided standardised calculation methods for partial measures or for the overall modernisation measure, e.g. insulation of the heat-transferring surrounding surfaces, modification of the heating system, etc.	
<i>Drafting a disposal concept for a planned modernisation measure</i>	Producing a waste disposal concept during the modernisation measure, e.g. removal and disposal of materials, structural elements and equipment	
<i>Considering in a modernisation planning legal provisions for construction works in existing buildings</i>	Taking into account building and environmental laws when planning modernisation, as well as the close surrounding property and marginal distances, e.g. when changing the shape of the roof or changing the heating energy source	15
	Characterising investor's responsibility resulting from the consulting service	
Air tightness measurement with blower door and thermography	Performing a blower door measurement and determining the n50 air tightness rate	
	Evaluating planning and execution of the air tightness class	
	Creating an air tightness concept, taking into account adjacent construction elements	
	Offering consultancy service for the investor and planner	
	Defining deadlines for planning, execution as well as furnishing documentation on proof of air tightness	
	Locating and assessing any leaks (by flowmeter, thermography) and indicating suggestions for further sealing	

Fire alarm system	Overview of the basics and on interworking with other construction elements	25
Fire variables		
Fire emergence		
Fire detectors		
Fire brigade control panel		
Key depot		
Cable network		
Switchboard technology		
Controllers for extinguishing system shutters		
Smoke and heat exhaust system		
Configuration and documentation		
Regulations and guidelines		
Building services engineering	Overview of the basics and on interworking with other construction elements	50
Heating and air-conditioning technology		
Antennae and satellite technology		
Basics of receiving technology		
Antennae		
Mounting of antennae		
Satellite technology		
Refrigeration, air conditioning and heating systems		
Water-bearing pipe systems		
Lightning protection systems		
Earthing systems		
Emergency power systems		
Compensation systems		
Regenerative energy technologies		
Lighting technology		
Communication technology		
Escape routes		

No. B1		Subject Structural design
Course contents	Learning objectives	Time guideline
Principles of structural design		25
Overview of history of structural design	Knowledge of chronological classification of architectural history	
Load exposure and building stability	Promoting student ´s competence to understand building constructions	
Dimensional coordination in structural engineering		
Masonry and bonds		
Timber and timber joints		
Formwork and reinforcement works in reinforced concrete constructions		
Moisture protection		
Local building regulations	Ability to apply local building codes	
Basics of foundation engineering		15
Interactions between building and ground	Insight into the area of foundation engineering	
Rock cycle	Overview of solid and granular soils	
Cohesive, granular and organic soils	Knowledge of soil types and soil classes	
Ground water, seepage water, capillary water, adhesive water, adsorption water	Knowledge of water types in the soil	
Bearing capacity and settlements	Overview of settlements and ground seepage	
Methods of soil exploration, drilling, probing	Knowledge of the content of subsoil surveys and subsoil comments	
Site excavation and drainage		8
Soil pressure on vertical wall at departure angle	Insight into securing of construction pits	
Excavation pit and excavation pit sheeting (embankments, horizontal construction, driven steel girders, sheet piling)	Knowledge of excavations with arched and vertical walls	
Dewatering (open drainage, drilled well, vacuum process, electro-osmosis)	Overview of the procedures on lowering groundwater	
Foundations		8
Types of foundations (shallow foundations, deep foundations, single foundations, strip foundations, slab foundations, pile foundations, pile gratings)	Overview of foundations	
Securing existing flat foundations next to a lower lying pit	Knowledge of underpinning work on existing foundations	

Constructive measures for foundation levelling	Attaining ability to create foundation plans	
Moisture protection		
Constructive measures	Knowledge of moisture types and moisture damage	
Construction examples (sealing of structures against soil moisture, sealing of structures against non-pressurised surface water and leachate, water-pressure-bearing bituminous waterproofing for structures)	Knowledge of structures, options and principles of structure protection against soil moisture, groundwater and pressurised water, against precipitation moisture and condensation	8
Steelwork Introduction to steelwork, functions of steelwork, production areas, steel structures, standards Riveted connections in steel structures, standards, rivet types, tubular rivet diameter, rivet length, rivet materials, symbols for riveted joints, strength, structural steels, rolled products, steel structures, dimensioning and verification Screw connections in steel structures, standards, types of screws, strength classes, symbols for bolted joints, strength, structural steels, rolled products, steel structures, dimensioning, verification Welded joints, standards, welding processes, structural steels according to their suitability for welding, filler metals, seam types, graphic representation of welds, welding specifications, weldable constructions, test methods, rolled products, steel structures, dimension, verification Tension rods, constructions, steel profiles, design features, dimensioning, verification Pressure rods, bar constructions, column constructions, steel profiles, dimensioning, verification Column feet, constructive design, anchoring, dimensioning, verification Column heads, constructive design Carrier positioning, types of positioning, verification Carrier systems, ceiling beams, beams, dimensioning, verification	Insight into different production areas of steelwork and steel structures Insight into rivet types, materials, strength; acquiring skills in design and verification of riveted joints Insight into screw types, strength classes, types of connection, strength Insight into welding processes and ability to design and proof welds, knowledge of weldable designs and test methods Insight into the construction of tension rods, acquiring the ability of dimensioning tension rods and to carrying out proof tensile strength tests Developing knowledge in construction of pressure bars, skills in designing pressure bars Insight into the column construction with anchoring, ability to proof own work	40
Timber construction		20

<p>Basics of timber construction, historical development, timber, wood-based materials</p> <p>wood preservation technology, structural and chemical wood protection</p> <p>Timber joints, wooden carpenter joints (longitudinal, transverse and corner joints, off-setting), engineered timber joints (dowel and nail joints, joints with sheet steel mouldings)</p> <p>Building physics in timber construction, thermal insulation, climate-related moisture protection, fire protection, sound insulation</p> <p>Rooftops, purlin roof, rafter and collar beam roof, special forms, selected roof construction parts</p> <p>Wooden house constructions, panel construction, multi-storey buildings in skeletal construction</p>	<p>Reliable knowledge of wood structure and of wood-based materials</p> <p>Knowledge in decision-making with regard to proper selection of wood preservation methods</p> <p>Knowledge of key wood joints, ability to read work drawings, including the ability to monitor project execution</p> <p>Knowledge of key roof construction types, skills to graphically represent truss laying plans</p>	
Wall-building		16
Wall structures	Insight into static effectiveness between walls and ceilings within the building structure	
Stiffening function of the walls	Overview of the function of freestanding and inclined walls	
	Overview of the interaction of walls and ceilings	
	Knowledge of constructional and static effectiveness of solid structures with load-bearing longitudinal and transverse walls	
Wall assembly		8
Walls made of prefabricated parts / supporting systems	Insight into prefabrication systems of assembled wall constructions	
Load-bearing and non-load-bearing walls	Overview of constructional structures, element sizes and production methods	
Upright wall panels		
Window and door lintels	Overview of large and small panel construction	
Staircase walls		
Internal dividing	Knowledge of module and measures coordination	
Partition walls	Insight into manufacturing and installation tolerances	

Firewalls	Knowledge of static-constructive connections (thermal material movements, assembly joints, joints on exterior wall elements, dimensioning of joints, sealing measurements)	
Skeleton construction		10
Skeleton constructions and building functions	Overview of the classification system of skeleton construction	
Anchors	Insight into skeletons types	
Bracing		
Staff connection	Insight into the static structure of structural systems	
Load-bearing structures material		
Load-bearing systems		
Supports and joints		
Outer wall constructions	Insight into the outer wall formation	
Reinforced concrete, steel and wood frame construction (framework)	Insight into skeleton structures determined by the selected material	
Architectural history		26
Antiquity (Egypt, Mesopotamia, Crete-Mycenae)	Knowledge of architectural styles	
Antiquity (Greece, Rome-Byzantium)	Identifying style elements, supporting systems, technology and materials as a function of the progress of respective production forces	
Middle Ages (Romanticism, Gothic period)	Overview of technical possibilities, tools and procedures	
Modern era (Renaissance, Baroque / Rococo, Classicism)	Identifying the relevance of ancient architectural ideas in European architecture	
20th century: historicism, art nouveau, functionalism	Knowledge of predominantly used construction materials, recognition of the significance of form and content of selected architectural objects	
Preservation of monuments (tasks and examples)	Competent determining of historical buildings in the home country with regard to the origin of individual details and ornaments and using them for monument preservation tasks	26
Thermal insulation in buildings		
Calculating a double shell exterior wall	Ability to arithmetically and constructionally solve simple heat protection problems	

Calculating a back-ventilated cold roof	Overview of issues of sound insulation, sound absorption, noise reduction and vibration isolation	
Sound insulation in buildings	Overview of components with adequate sound insulation	
Fire protection in buildings	Overview of the role of fire protection	
	Knowledge of regulations and terms of building material and fire resistance classes	
	Insight into fire protection measures (escape routes, horizontal and vertical fire sections)	
Ceiling construction		10
Ceiling function, ceiling types	Insight into/overview of ceiling construction systems	
Static, functional, building physics, material requirements	Knowledge of various materials used for ceiling structures	
Wood, steel, concrete, reinforced concrete ceilings	Knowledge of the technological process	
Ceiling types and constructions	Knowledge of static systems	
Detailing of ceiling systems	Types of beamed ceilings, stone, concrete, reinforced concrete and steel ceilings	
Windows and doors		12
Types of construction of windows (frame, double box)	Insight into the function of windows	
Window types and their installation	Knowledge of the window design depending on: type of connection with the structure, type of glass surface, type of building material	
Window sizes		
Door structures	Insight into functions and knowledge of the construction	
Exterior and interior doors		
Installation of doors		
Door sizes		
Stairwell		25
Regulations of the staircase	Insight into stair forms - stairs as a function of the building size, relevance, available space, material and construction type	

Offsetting methods	Knowledge of the staircase - left and right stairs, running width, head height, platform length	
Stair structures made of wood, reinforced concrete and other materials	Knowledge of rise-to-tread-ratio calculation, rules for sizing widths and slopes	
Chimneys		14
Function of heating and chimney	Insight into the functional context	
Dimensioning	Overview of the formation of the chimney	
Chimney construction	Overview of the dimensioning of the chimney cross section and height	
Chimney positioning and constructing		
Roof constructions		44
Roof supporting structures for house and hall construction	Overview of the correlation between roof skin, roof shape and the supporting structure	
Joining means	Overview of the types of roof supporting structures	
Purlin and rafter roofs	Knowledge of the construction of purlins and rafter roofs	
Roof cladding	Overview of the shape of the roof skin (stress, types, installation)	
Flat roofs	Knowledge of the construction of flat roofs as a warm/cold roof	
Roof drainage	Knowledge of ecological construction	

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Subject didactics

Presenting essential design principles for traditionally constructed buildings. Indicating relations between construction, statics and building physics. Pointing out fire protection principles. It is recommended to introduce under the guidance of the teacher a planning exercise for a concrete structure so that the participating students can autonomously acquire knowledge and deepen their proficiency level, as well as their acquired and existing skills. Students shall be able to read architectural drawings and to graphically depict components and structural elements. They shall have basic knowledge of traditional building constructions and be able to include structural and building physics aspects into building design. They shall assess existing building designs and, construction-wise, decide on necessary renovation measures. In the field of architectural history, audio-visual teaching materials shall prevail. When interpreting selected architectural examples, excursions are of high methodological-didactic value.

No.	Subject	Course contents	Learning objectives	Time guideline
B2	Construction drawing aided by selected user programs (CAD)	Basics of structural drawing		12
		Purpose and types of architectural drawings	Knowledge of the usual types of architectural drawings	
		Standards governing construction drawings	Proper selection of the scale depending on the representation	
		Line types and line widths, hatchings	Knowledge of dimensioning principles	
		Standard fonts and scales		
		Dimensioning of objects		
		Geometric basic constructions		8
		Straight line, angle, circle and its divisions	Command of basic geometric constructions	
		Triangle, square, polygon		
		Arch structures		
		Displaying of objects		6
		Oblique parallel projection (isometry, dimetry, trimetry)	Performing development of lateral surfaces of simple architectural forms	
		Right-angled parallel projection (two-panel projection, three-panel projection)	Determination of roof bevels, including model making	
		Determination of true sizes		8
		Projections, true lengths, true surfaces		
		Structural Design Drawing		26
		Presentation rules (sections, hatchings and symbols, dimensional coordination)	Knowledge of the arrangement of horizontal and vertical sections	
		Dimensioning of floor plans, sections and components	Knowledge of abbreviations and symbols for building materials, components and furnishings	
		Presentation of floor plans, sections and views		
		Layout plan representation		
		Representation of components (installation and assembly plans, roof structures, stairs, chimneys, detail drawings)		
		perspective drawings		

Practice-oriented introduction to a CAD program		18
User interface	Attaining skills and abilities to compose own drawings	
Loading and saving drawings	Further deepening with the goal to compose complex drawings	
Plotting and printing graphics		
Drawing lines and polygons		
Drawing objects		
Drawing aids		
Working with reference points		
Entering and altering texts		
Presenting parts of a simple drawing in different layers	Recognising the significance of the layer technology	
Executing complex editing functions with line styles and hatchings, modifying and querying object properties		
Parameterising drawings		
Using different dimension types		
Changing dimension settings		
Drawing a floor plan		12
Composing a floor plan, and, additionally, practicing the following subtasks on other objects	Developing and deepening skills to effectively compose drawings	
Using Layers		
Drawing objects with different coordinate entries		
Proper use of the command "chamfer"		
Parameterising drawings		
Adding text		
Printing different layers	Printing drawings to scale	
Plotting a drawing		
Complex constructions		20
Examples of building constructions		
Selected examples (by students) from practical work		

Data processing		20
EDP fundamentals		
Operating systems		
Word processing		

Subject didactics

The purpose of the training in the field of constructional drawing is to impart to students the basics of architectural drawing who thus shall acquire the ability to read constructional drawings. Priority hereby is placed on the achieved level of spatial sense by presentation of different bodies (hand drawing) and by observation of corresponding structures and components. General principles and functions are to be implemented with regard to CAD. Continuous practical relevance via corresponding constructions will support the learning process. In particular, the linkage with the learning area of structural design is best suited to this end. Basic skills are acquired by proper exercises on selected objects and components in the construction practice.

No. B3 Subject Mathematics, Geometry, Physics**Course contents****Learning objectives****Time
guideline**

Basic principles		15
Computational laws, brackets and fractions, roots, powers, logarithms	Safe knowledge in the use of real numbers operations	
Proportions, percentage calculation, interest calculation		
Functions		10
Linear, quadratic, exponential functions	Mastery of the concept of function and safe handling of elementary functions	
Trigonometric functions	Ability to safely solve equations	
Circle and ellipse as a function		
Linear and quadratic equations		
Equations systems		
Application: continuous carriers; moment surfaces		
Geometry and trigonometry		21
Intercept and similarity theorems	Safe knowledge of the geometry of the triangle and polygons	
Pythagorean theorems		
Trigonometric functions, sine and cosine theorems		
Angle types and conversions		
Applications: resolution of forces, trusses, embankments, embankment sections, roofs, ramps		
Stereometry		20
Cylinders, cones, stumps	Safe knowledge in the calculation of construction-relevant objects	
Prisms, pyramids, stumps		
Prismatoid, wedge, pontoon, ramp		
Spheres, spherical segments		
Applications: excavations, roofs, foundations		
Statistics		15
Measurement series, averages, dispersion measures	Safe knowledge in the application of statistical methods	
Distributions, diagrams		

Linear correlation and regression		
Application: building physics, building materials		
infinitesimal calculus		
Difference and differential quotient, geometric interpretation	Insight into methods of higher mathematics, skills in solving simple problems with the help of calculus	
Derivatives of polynomial functions		15
Differential relationship between internal forces		
Application: deflection, bending moment, lateral force, supporting forces of a beam under bending moment		
Introduction to building physics	Insights	
Application areas and functions		4
Types of heat transfer		
Room air conditioning components		
Basics of Building Physics		
Heat transfer	Development of skills in the determination of K-values	8
Heat storage capacity		
Temperature profile in components		
Thermal protection in winter		
Heat balance method		32
Simplified process		
Requirements for structural changes to existing buildings		
Verification on a residential building		
Thermal bridges		
Thermal insulation in summer	Knowledge of heat storage capacity of interior components (total energy transmittance, reduction factors of sun protection devices)	8
Moisture protection		
Protection against water vapour condensation		10
Glaser diagram		
Verification		
Sound insulation		
Basic principles		16
Protection against external noise		

Structure-borne noise insulation and impact sound insulation in buildings		
Fire protection		6
Fire safety standards		
Fire protection requirements		
Fire-retardant and fire-resistant components		

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Subject didactics

The purpose of this subject is to empower students on the basis of reliable numeracy skills and mastery of mathematical procedures and algorithms, to safeguard mathematical penetration of other teaching areas, such as: N. Statics, reinforced concrete, surveying and building materials. Mathematical theories and derivations shall be applied only insofar as they are deemed necessary for the understanding of solution methods. When selecting exercise examples for the individual material areas, building-specific reference should always be sought for and the relevance of the teaching area is to be presented on the basis of construction-relevant tasks. Thus, the subject is an independent contribution to the student's ability to solve emerging practical problems based on acquired knowledge. When designing the lesson, it should be emphasised that many solutions may be used to solve a mathematical problem. Frequently recurring calculations, such as the solving of equations and systems of equations, are to show the advantage of using algorithms, which can be proven especially by the use of computer technology. Special emphasis is placed on providing students with ready-to-use, constantly accessible skills supported by the use of formulary collections, spreadsheets and the use of the calculator.

This subject allows students to gain expertise in construction planning and executing, and in conducting rehabilitation works for the partial areas of heat protection, moisture protection, sound insulation and fire protection. Students will be equipped with prerequisites to properly assess and evaluate building physics. They will be familiar with standards, regulations and guidelines of building physics. They will be able to provide evidence in the areas of thermal insulation, both, in the cold and warm season, moisture protection and sound insulation. The students will know about possibilities of influencing environmental protection.

Course contents**Learning objectives****Time
guideline**

Substance composition	Knowledge of the atomic structure	10
Atomic structure	Ability to describe chemical bonds and their structure	
Chemical bonding and structure	Ability to read from PSE corresponding values of the atomic structure	
Chemical processes in aqueous solution		7
Electrolytic dissociation	Understanding the relevance of electrolytic dissociation and the ability to draw architecture-related conclusions	
pH value	Knowledge of the formation of the pH value and its measuring methods; ability to explain variable relevance of the pH value of different building materials	
Neutralisation	Knowledge of the basics of neutralisation and its application in construction	
Chemical reaction		7
Essence of chemical reaction	Recognition of the essence of a chemical reaction	
Energy conversions in chemical reactions	The student can explain energy transformations in chemical reactions and relate these to essential building examples	
Reaction rate	The student shall be able to interpret the significance of reaction rates on the properties of building materials and to apply this knowledge accordingly	
Chemical balance	The student will understand the basics of chemical equilibrium and its effects	
Redox reactions	Knowledge of the nature of a redox reaction and its application in building	4
Essence of redox reaction	Knowledge of an electrochemical redox reaction and its relevance	
Electrochemical redox reactions		
Stoichiometry		14

Basic laws	The student will learn about different basic laws of stoichiometry	
Stoichiometric calculations	Ability to relate these basic laws to the construction industry and to perform and explain stoichiometric calculations	
Building material parameters and substance-specific test methods	Overview of the most important building material parameters; ability to apply these building material parameters to all construction materials and to describe and evaluate their interactions with each other	10
Densities and porosities		
Moisture content		
Mechanical engineering parameters		
Resistiveness		
Impermeability		
Thermal transition characteristics		
Water	Overview of the critical relevance of water to life and especially in construction engineering; the student shall explain the water cycle and its relevance; he shall know the different types of water and be able to name their essential characteristics and their relation to construction engineering; ability to enumerate specific water constituents and to explain their impact on construction engineering; overview of some methods of water analysis	8
Water cycle		
Relevance of water		
Types of water		
Water properties		
Water components and their relevance		
Natural building blocks	Overview of the origin of different natural stones (stone types, including examples)	5
Rock cycle		
Usage characteristics of natural stones	Knowledge of the essential properties of natural stones	
Application in construction		
Damage to natural stone and its elimination	Disposal options and prior explanation of the damage	
Artificially manufactured building blocks	Overview of different types of man-made building blocks, their production, properties and respective fields of application	6
Bricks		
Sand-lime brick		
Aerated concrete block		
Concrete and lightweight concrete block		

Aggregates	Presentation of different types of aggregates for the respective building material quantity	15
Function and types	Knowledge of individual functions of aggregates; ability to identify substance-specific properties of aggregates and to relate them for respective requirements with regard to their use	
Grain structure, assessment and improvement	Ability to produce and assess required grain compositions	
Grain shape and surface condition	Ability to perform required tests	
Hazardous elements		
Building material internships	Ability to perform and evaluate essential building material tests independently, under supervision	10
Water testing		
Mass and void characteristics		
Aggregates		
Mineral binders	Substantial knowledge of the general principles of binders (types, hardening behaviour, hydraulic factors); knowledge of all construction-relevant binders, their manufacture, performance characteristics and fields of application; ability to assign and evaluate binders in terms of their hardening behaviour; ability to perform and evaluate required building material tests	5
Building plasters		
Building limes		
Cements		
Other binders		
Mortar		5
Types, production and characteristics	Knowledge of different mortar types, their production, properties and resulting application options (masonry mortar, plasters)	
Hazardous components	Knowledge of relevant harmful mortar components that may significantly affect its properties	
Mortar tests	Knowledge of key mortar tests and how to perform their evaluation	
Concrete (normal concrete)		12
Definition, composition, classification	The student shall explain the term "concrete" with reference to its different types and be able to perform respective type classification	
Concrete properties	Basic knowledge of functional properties and resulting application conditions	

Factors influencing concrete properties		
Solid space calculation	Ability to perform and evaluate solid space calculations of materials	
Concrete planning	Competence to calculate and evaluate various concrete projects; competence to identify reference to building material topics related to concrete (water, aggregates, cements)	
Concrete tests	Knowledge of concrete tests and the competence to autonomously perform and evaluate essential tests; competence to detect, avoid or correct basic concrete damage	
Other concrete types	Special knowledge of other concrete types with regard to their production, properties and respective fields of application	4
Aerated concrete		
Heavy concrete		
Special concrete		
Construction metals		6
Basic fundamentals	Overview of the general building metal structure and resulting properties	
Iron and steel	Knowledge of key metals in construction engineering (Fe, Cu, Zn, Al), their production, substance-specific properties and fields of application	
Aluminium		
Zinc		
Copper		
Other construction metals		
Corrosion and corrosion protection	Ability to identify and explain different types of corrosion; ability to name and apply active and passive corrosion protection measures	
Construction glass	Knowledge of glassmaking; knowledge of key glass properties and the resulting application areas for construction engineering	3
General glass properties		
Construction glass products		
Lumber		7
Structure of wood	Overview of wood structure (macro- and microstructure); wood species	
Wood properties		
Wood defects	Ability to identify various wood defects and to draw conclusions on their application	

Wood types		
	Ability to detect typical wood pests and to perform proper wood preservation; basic knowledge of main wood protection groups; overview of their environmental impact	
Wood damage and wood preservation		
Lumber products	Knowledge of resulting timber products	
Polymeric materials		
Chemistry of polymeric materials	Basic knowledge of plastics (chemistry and production)	2
Properties of polymeric materials	Explanation of resulting properties and applications for construction engineering	
Use of polymeric materials in construction		
Bituminous building materials		
Origin of bituminous building materials	Overview of the bitumen origin	2
Properties and characteristics of bitumen	Knowledge of key properties and ranges	
Bitumen range	Knowledge about the application of bitumen ranges in construction	
Bitumen application in building protection		
Bituminous mixtures in road construction		
Insulation materials	Overview of different types of insulation; presentation of different artificial and natural insulation materials; emphasizing the importance of natural insulation materials for the environment and construction engineering	
Resilient lightweight construction materials		
Self-supporting lightweight construction materials		
Non-load-bearing fibre insulating materials		
Loose fillers		
Artificial and natural insulation materials		
Building material internships	Ability to conduct and evaluate essential building material tests, independently under guidance	14
Building plasters		
Cements		
Concrete		
Construction steel		
Wood / wood protection		
Reinforced concrete construction		
Introduction to reinforced concrete construction	Knowledge of the properties of the composite material "reinforced concrete"; insight into the required civil	40

	engineering documents for reinforced concrete structures	
Knowledge of reinforced steels	Reinforcing bars and welded steel mesh	
Reinforcement of reinforced concrete components	Acquisition of skills in the representation of reinforcements; ability to detect concrete coverages; knowledge of spacers and their distances	
Calculation of reinforced concrete components	Knowledge of limiting crack width and deflection	
Bending stressed components	Ability to determine the cross-section of reinforcement with the aid of dimensioning tables; knowledge of types of shear reinforcement	
Reinforced concrete slabs	Ability to dimension uniaxially tensioned single-span slabs	
Reinforced concrete slabs and beams	Ability to dimension reinforced concrete rectangular beams (single-span beams)	
Pressure-prone components, supports	Knowledge of the arrangement of reinforcement on pressure-prone components	
Walls	Knowledge about the use of reinforcement in walls; ability to calculate reinforcement	
Foundations	Knowledge about the use of reinforcement in foundations; acquisition of the skill to calculate reinforcement	

Subject didactics

Hereby, students shall gain insight into the structure and properties of materials as well as insight into essential chemical reactions and their resulting changes in properties. The subject shall indicate the essential functional properties of building materials and substance-specific test methods. Students shall acquire the ability and skill to select proper building materials, taking into account substance-specific, economic and environmental considerations. To this end, lessons in seminar form with a high practice share are especially suitable. The subject is supplemented by demonstration experiments, construction material internships and targeted excursions. The use of digital media will support student learning.

No. B5 Subject Building law

Course contents

Learning objectives

**Time
guideline**

Functions of the construction industry	Knowledge of the construction industry	5
Construction volume		
System		
Business forms		
Main features of the execution of construction projects	Knowledge of the complexity of construction preparation and implementation	5
Tasks of the participants in the construction process		
Planning preparation and implementation (land, financing, etc.)		
Public construction law	Basic knowledge of building planning law	10
Construction planning law		
Building regulations	Knowledge of the building code; safe handling of selected legal articles; ability to complete construction contracts; knowledge of urban land-use planning	
Bylaws		
Environmental legislation	Knowledge of environmental protection in the construction of buildings and facilities	
Private building law	Knowledge of selected legal terms	5
Contracts		
Legal dunning procedures		
Fee arrangement for architects and engineers	Reliable knowledge of the performance areas (work stages) as a basis for the construction preparation and the construction process	2
Organisation		
Principles on the application		
Service sectors		
Types of costing as a service of the planner	Ability to apply certain DIN standards	5
Cost estimate		
Cost calculation		
Quotation		
Cost statement		

Construction contracts as a basis for price determination		
Legal basis of construction contracts		
Construction contracts according to the Civil Code (German BGB)		
Construction contracts according to the regulations for contracting terms for supplies (VOB)		
Bidding and tender procedure		
Evaluation of offers	Knowledge of legal bases; ability to handle German VOB, Part A	15
Assignment of construction works	Ability to evaluate price comparisons	
	Knowledge of bidding documents	
Performance description and quantity calculation		
Types of service description (specification of services, standard service catalog, functional description of services)	Knowledge of different specifications; ability to set up a bill of quantities using a standard service book; ability to perform quantity calculations; knowledge of measurement provisions	10
Process engineering		
Construction machinery and equipment		
Earthworks (earth excavation, refilling)		
Formwork		
Reinforcements		
Concrete building		
Scaffolding		
Wall construction		
Prefabricated building		
Occupational safety, accident prevention	Ability to plan and monitor operations for individual construction work; ability to identify and coordinate equipment and machine performance and perform cost-benefit comparisons; knowledge of the principles of occupational safety	10
Site setup		
Elements of the construction site setup		
Assignment of equipment parts	Competence to design a site plan	5
Planning of the construction site setup		
Building sequence planning		
Setting up work directories		
Gantt chart		
Path-time diagram		
Critical path analysis	Ability to draft a construction schedule	4
Billing of construction works		2

Site measuring according to German VOB	Knowledge of billing of construction works	
Financial reporting		
Budgeting		
Target-actual comparison		
Selected practical examples for a construction contract	Deepening of knowledge	2
Approval		
Warranties		

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In red lettering: country-specific design required!

Subject didactics

Students learn major laws and regulations relevant for planning and building. Priority is given to the use of sample forms. Students are to achieve the ability to draft performance descriptions as well as to plan and monitor operations. It is especially essential to draw associations to subject C1 (Basics in business administration).

No. B6 Subject Construction management**Course contents****Learning objectives****Time
guideline**

Basics of business management		10
Basic technical terms	Knowledge of basic concepts	
Standards in business management	Knowledge of economic principles	
Cost-theoretical basics	Ability to calculate the break-even-point	
Operational production factors	Knowledge of operational production processes	
Business management operating principles		10
Object of business activity		
Legal forms of business	Knowledge of key differences in legal forms	
Company concentration and cooperation	Ability to characterise company mergers	
Operational business management	Knowledge of management levels and managerial styles	10
Management levels		
Management systems		
Operational planning		
Business structure and workflow of a construction company	Knowledge of the structure of a construction company	10
Work methods		
Structuring a business organisation		
Organisational chart of a construction company		
Entrepreneurial evaluation		
Use of human labour in business organisations		10
Principles of business labour	Knowledge of the basics of human labour	
Payroll accounting in the construction industry	Knowledge of payrolling in the construction industry	
Resource deployment and engagement		10
Types of operating equipment	Knowledge of the definition and types of operational resources	
Cost of used resources		
Depreciation methods	Knowledge of different depreciation methods	
Overview of award procedures		16

National / international procedures, EU threshold amounts	Knowledge of different procurement procedures for construction works	
Contents of service description, supplements	Ability to enumerate and describe construction services	
Legal protection of the tenderer		
Materials management		10
Essence of materials management	Overview of the areas of materials management	
Needs assessment	Ability to perform materials requirements planning	
Procurement	Knowledge of the nature of procurement	
Warehousing and storage	Knowledge of types of warehousing and storage	
Transport	Calculation of transport services	
Control system of materials management		
Costing		40

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Subject didactics

In conjunction with subject C1, students learn how to calculate construction costs, how to plan staff, machines and materials, and how to act economically in the area of procurement. The students shall know the correlation between production and business administration. Case studies, practical examples and problem solutions illustrate to the students procurement-, production-, and sales methods. By predetermined criteria, students shall be able to draft offers and to evaluate them. A sound mixture of classical lectures, group work and seminar classes will empower students in the area of action competence.

No. B7 Subject Technical mechanics

Course contents

Learning objectives

**Time
guideline**

Building structure from a static point of view	Insight into functions of statics and strength theory	4
Load-bearing structures		
Tasks of the theory of statics and strength		
Dynamics	Developing skills in graphic and mathematical determination of forces; ability to determine moments	20
Combining forces		
Decomposition of forces		
Balance of forces		
Moments		
Load assumptions	Insight into the load types; performing load calculations	16
Classification of loads		
Standard DIN 1055		
Static-specific systems	Insight into the types of support; ability to determine support forces and internal forces, and to represent the N, M, and Q area	30
Basics		
Internal forces		
Beam on two supports		
Beam with cantilever arm		
Cantilever beam		
Trussed rafter	Basic knowledge of different constructions of trusses; ability to determine bar forces of trusses following the Cremona method	16
Rules for trussed frames		
Load conditions		
Rules for recognising zero bars		
Cremona diagram		
Introduction to strength theory	Safe knowledge of the technical terms "tension", "deformation" and "strain"	10
Stress		
Deformation		
Tensile stress		

Tensile stress	Identifying aspects of a realistic calculation of components subject to tensile stress	4
Compressive stress, surface pressure	Developing an understanding of proofs of compressive stress	10
Shear stress	Demonstrating the ability to conduct shear stress tests	4
bending stress	Knowledge of physical values and dependencies; ability to determine area moments and resistance moments; ability to provide evidence of flexural strength and flexural rigidity, including the ability to performing structural calculations	30
Reference stresses	Safe knowledge of the conditions when determining reference stress and the ability to provide evidence of reference stress	10
Torsional stress	Knowledge of torsion-stressed components and the ability of performing torsion stress tests	16
Buckling stress	Detailed knowledge of components subject to buckling; insight into buckling according to Euler's equation; acquiring the ability of performing measurements and conducting buckling proofs	20
Tensions at longitudinal force with bending	Knowledge of components that are simultaneously subjected to a longitudinal force and to a bending moment; ability to perform stress proofs	20
Ground pressure on foundations	Knowledge of off-centre pressure on foundations; ability to determine the existing footing pressure and to compare it with the permissible value	10

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Subject didactics

Imparting methods to allow an independent analysis of the task content. Students learn about solution algorithms that are used in exercises. The load effect on components is explained by visual and colour design. The students attain the ability to identify the type of stress of a component in the respective cross-section, and know how to perform dimensioning and verification. Following all exercises, the student will receive a result review.

No. B8 Subject Construction machinery and equipment

Course contents

Learning objectives

***Time
guideline***

Concrete construction machinery		4
Formwork		2
Cranes		4
Earth moving machines		4
Cost calculation		2

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No. B9 Subject Surveying technology**Course contents****Learning objectives****Time
guideline**

Introduction to construction surveying		4
Surveying tasks for the building technician	Knowledge of the surveying work on the construction site	
Official documents	Insight into the most common official documents in surveying	
Official maps	Ability to read cards	
Measurement units and surveying elements	Knowledge of length and angle measurement	
Position measurement		15
Marking of products	Knowledge about marking points in the building	
Gauss-Krueger coordinates	Insight into the Gauss-Krueger coordinate system	
Basics of length measurement	Ability to measure length	
Stakeout and measuring of straight lines	Knowledge of right-angle devices; ability to stake straight lines; ability to apply different procedures	
Indirect radiation measurement using helper lines, parallel shift, auxiliary triangles	Knowledge of possibilities of indirect distance measurement; ability to apply direct and indirect distance measurement in a practical exercise	
Stakeout and recording procedure	Knowledge of staking of building structures; ability to perform simple building stakeouts; overview of recording procedures	
Field accounting	Competence of exact field accounting	
Official site plans	Knowledge of mapping scales; knowledge of key information on an area map as well as the ability to draw diagrams of site plans	
Application of the Heronic formula	Knowledge of area calculations	
Height measurement		20
Ordnance survey directory	Overview of the structure of the national elevation network	
Levelling instruments and devices	Knowledge of height measuring devices and their use capabilities	

Area levelling in the square grid process	Ability to determine height differences of adjacent points	
Recording of longitudinal and transverse profiles	Competent use of a levelling device in practical work; bookkeeping competence	
Fixed point levelling		
Staking out through-cuts and embankments		
Field accounting		
Angle measurement and stakeout	Competence of staking buildings and structures using polar methods; competent handling of a construction theodolite	15
Scale readings on the theodolite		
Horizontal angle measurement and staking out required angles and distances		
Application of the polar method		
Road course measurement		6
GPS + Total stations		5
Location of building structures		5
		70
		70

Subject didactics

Most suitable for this subject is the classic apprenticeship contract, which is well suited for explaining different work processes, including a device demonstration. Students receive practical training in exercises on proper devices, they can easily perform position and altitude measurements and execute stakeouts of buildings and structures, sketches, geodetic and area calculations. This subject is about deepening methodological competence and handling of industry-specific devices.

No. B10 Subject Project work***Course contents******Learning objectives******Time
guideline***

Processing a multidisciplinary
technician-appropriate project

Students shall analyse a defined sector-specific problem, independently develop solutions, document their work in an appropriate form, followed by presenting their results. Students will inform themselves about the project goals, analyse them and draft a solution strategy. In proper contact with their client or tutor, they will work out all required steps and, if necessary, carry out further studies. Students will independently search for essential specialist information, perform any needed calculations and drawings, and will offer potential solutions.

Students shall prepare all necessary documents for the realization of the respective project, they shall document the work and present it in suitable written form. Students shall summarise their work and results, taking into account a pre-set target group, and present it. They shall be ready to face a critical discussion and to justify their solution approach.

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No. C1 Subject Determining corporate competitiveness

Course contents

Learning objectives

**Time
guideline**

Corporate goals	Understanding key goals and target relationships; setting up a target system	2
Performance targets		
Financial targets		
Social goals		
Target relationships.		
Complementary goals		
Conflicting targets		
Indifferent goals		
Corporate culture	Describing features of the corporate culture	2
Symbols and rituals	Pointing out the relevance of corporate culture via personal or social goals	
Norms and values	Communicating social responsibility of the company in the corporate image	
Analysis of past and future development	Understanding the relevance of process and areas of corporate planning	8
Planning	Describing strengths and weaknesses of a company on the market with reference to the target system	
Planning areas and their harmonisation	Estimating market opportunities and risks	
Planning stages	Assessing business risks	
Risk assessment		
Subsystems of company accounting	Ability to distinguish subsystems of business accounting; understanding their inter-action and assigning calculated values	39
- Balance sheet processing	Structuring the impact of typical business transactions in the subsystems	
- Cost and revenue accounting	Understanding the basic principles and concepts of double entry accounting	

- Financial statement	Explaining the tasks of accounting and balance sheet
- Social balance sheet and calculation of potentials	Explaining options and benefits and disadvantages of outsourcing accounting tasks based on quality criteria
Bookkeeping	Explaining the structure and relevance of financial statements and business evaluations (German BWA) and of further typical documents
- Tasks and legal regulations	Recording and assessing key types of assets and liabilities
- Double entry system	Considering valuation margins, value adjustments, provisions and hidden reserves in the analysis of external accounting indicators
- Inventory and completion of inventory	Describing types of depreciation and considering them in the accounting subsystems
- Process techniques (e.g. EDP)	Performing industry, period and target/actual comparisons and explaining findings
Annual financial statement/period-end closing	Determining corporate profit or loss also during the year
- Structure of the balance sheet and profit and loss statement	Performing of simple periodic financial planning and understanding criteria for critical liquidity situations
- Flexibilities with respect to recognition and measurement	
+ Accounting principles	
+ Stock valuation	
+ Depreciation	
+ Accruals	
Fundamentals of the evaluation of annual financial statements	
- Balance sheet figures	
- Performance indicators	
- Forms of control	
+ Industry comparisons	
+ Time comparisons	
+ Target-actual comparisons	

Costs and revenue accounting	Characterising goals and tasks of cost type, cost center and cost unit accounting	17
- Tasks and structure	Illustrating the impact of cost and revenue changes on financial and accounting statements and considering them for decision-making	
- Cost type accounting	Making decisions with respect to new investments based on standard costing	
- Cost center accounting	Justifying the decision of accepting (additional) orders by means of standard costing	
- Cost-unit accounting	Determining bottom price using cost unit accounting determined on a partial cost basis	
+ Division calculation	Calculating break-even thresholds and thus deriving pricing and conditions policy	
+ Surcharge calculation	Justifying decisions based on the production program	
- Profit and loss accounts		
+ Piece rate costing		
+ Calculation of loss or profit per period		
- Cost accounting systems		
+ Actual and planned costs calculation		
+ Full and partial cost accounting		
+ Contribution margin calculation		
- Application of cost accounting		
+ Cost planning and control		
+ Decision-making support		
+ Break-even analysis		
Craft and trade law	Verifying legal requirements to carry on a craft autonomously.	14
- Craft as a special form of a trade	Knowing about legal consequences of unauthorised practice and moonlighting	

- Entry in the crafts register	<p>Knowing relevant contact points when founding, changing or taking over a craft business, as well as initiating and handling administrative procedures</p> <p>Considering regulations regarding the company name, merchant status, obligation to register and subsequent commercial legal consequences for drafting of concepts</p> <p>Outlining impacts of special obligations of a proper merchant for the design of operational processes</p> <p>Verifying feasibility / legal admissibility of market strategies against the background of competition rules</p>
- Unauthorized practice of craft and moonlighting	
Commercial and corporate law	
- Qualification as a merchant	
- Company	
- Commercial register	
Competition law	
- Act against restraints of competition	
- Law against unfair competition	
- Quotation of prices act	
- Shop closing law	
- Copyright law	

No. C2 Subject Preparing, completing and evaluating start-up and takeover activities

Course contents

Learning objectives

Time guideline

Requirements to be met by an entrepreneur	Identifying relevant requirements for successful entrepreneurship	2
Personal requirements	Identifying and assessing own ability to independently manage a craft business	
Requirements with regard to families		
Functional requirements		
Role of crafts in economics	Researching craft and industry-specific information on the development of the economy as a whole, presenting relevant data and comparing them with other sources	2
Economical	Explaining the macroeconomic context in which a craft company operates	
Social relevance	Establishing a self-image and personal affiliation to the craft	
Cultural relevance	Structure of the craft organisation and tasks and services offered by individual organisations	
Craft organisations	Understanding and evaluating the benefits of memberships in craft organisations	
- Tasks		
- Structures		
- Services		
Firm births consultation	Addressing contact points of set-up consultation and evaluating their range of services	8
- Legal aspects	Knowledge of public support programmes, justifying implementation of a certain form, and understanding key prerequisites thereof; knowledge of contact points	
- Conceptual aspects		
- Financial aspects		
Financing and funding support services		
- Offers for business start-ups		
- Special offers for crafts and SME		

Market and location study	Understanding the relevance of key location factors	
- Sales territories and sales opportunities	Assessing suitability of sites for operational purposes	
- Customer structure	Understanding the determining factors with regard to personnel and company size	
- Location assessment (factors and comparison)	Identifying optimum staffing needs	
Business foundation planning	Determining demand for fixed and current assets	
- Operating equipment		
Company size (turnover, personnel)		12
Marketing	Estimating the type and size of potential customer groups and needs, as well as potential order and turnover figures	
Concept of marketing	Proposals on drafting of products, prices, means of communication and distribution channels when entering the market	
Sources of information to estimate the market potential	Formulating the business model based on customer benefits and unique selling points	
Market entry marketing mix		6
Social security systems	Estimating the gap in old-age provision, comparing and evaluating alternative private provisioning instruments	
Private personal, property and damage insurance	Planning protection against economic consequences of entrepreneurial problems	
Retirement provision for the self-employed craftsman	Planning social protection in the event of accidents, illness and reduced earning capacity	
Business concept	Verifying and adapting consistency in plans and analyses for preparation of a business concept	12
- Mission statement/business objectives	Summarising and presenting results in a business plan	
- Product and service program	Developing concepts for founding or taking over a business, taking into account general framework conditions	
- Target groups	Understanding the purpose and structure of a corporate mission statement	
Company takeover or participation	Weighing up design options of an acquisition agreement	
- Company grandfathering	Knowing legal obligations with respect to company takeovers	
Purchase price determination criteria	Knowing important influencing factors on the purchase price	

- Design of the acquisition or partnership agreement (purchase, lease, annuities, etc.)		
Financing		
Determining capital requirements for business creation and for larger investments	Determining capital requirements for business creation and for larger investments	10
Creating and justifying a liquidity plan for the first five years based on possible scenarios	Creating and justifying a liquidity plan for the first five years based on possible scenarios	
Use of forecasting and monitoring tools to avoid liquidity problems	Use of forecasting and monitoring tools to avoid liquidity problems	
Formulating and justifying sales and profitability forecasts	Formulating and justifying sales and profitability forecasts	
Justifying the financing structure	Justifying the financing structure	
Preparing financing talks	Preparing financing talks	
Legal forms		
- Incorporated companies	Familiarity with legal forms and their consequences for corporate management	10
- Partnerships/private companies	Justifying selection of a legal form	
- Individual company	Verifying provisions in the articles of association and, if necessary, adapting them according to the corporate concept	
Criteria for choice of legal form		
Company agreement		
Statutory provisions		
Classification of the legal system	Explaining the fundamentals of the national legal system	24
- Private and public law	Distinguishing legal capacity, business ability and responsibility for civil wrongs	
- System of the Civil Code	Explaining the legal meaning of a declaration of intent, of representation and mandating as well as "consent" and "approval"	
	Concluding contracts and assessing their legal validity	
General part of the Civil Code	Considering options of contesting contracts	
Legal personality and capacity	Understanding performance obligations and liability consequences (also for vicarious agents or assistants)	
Legal transactional capacity	Creating legal documents of business transactions	

Contract law	Assessing rights and obligations pursuant to general terms and conditions and verifying the use thereof according to the corporate concept	
- General contract law	Organising legal representation of the management	
- Sales contract	Knowledge of basic concepts of property law and security rights	
- Service contract and contract for labour and materials	Setting up operating sites in compliance with legal regulations	
- Rental and lease contract	Understanding key principles of taxation	
- Security	Timely preparation of interim VAT return and income tax return	
- property law (property, ownership, security interests)		
Foundation-relevant legislation		
- Construction, environmental and waste regulations		
- Craft, commercial and tax law		
- Workplace ordinance		
Tax law		
- VAT		
- Trade tax		
- Assessed income tax		
- Corporate tax		
- Taxation procedure		

No. C3 Subject Developing corporate government strategies

Course contents

Learning objectives

**Time
guideline**

Organisation		4
Organisational structure	Knowing areas, instruments and principles of business organization	
- Task analysis and synthesis	Documenting business processes, taking into account the organisational structure and process organization	
- Job creation	Creating organisational charts and job descriptions	
- Organisational forms (functional, divisional, project)	Suggestions for adjustments to the organisational structure of business processes	
- Organisation development	Identifying the effects of planned company development measures on the company organisation	
Process organisation		
- Process analysis and design		
- Logistics		
- Quality management		
- Work time models		
- Group organisation		
Administrative and office organisation		
- Document Management		
- Use of modern information and communication technologies		
- Organisation of accounting		
Product development		8
Analysis of the sales and procurement market	Systematically exploring sources of information on product and service trends, evaluating and documenting them taking into consideration company and market conditions	
- Methods of market analysis and market research	Weighing up and selecting methods of market research with regard to their potential application	
- Objects of market analysis and market research	Evaluating customer data	
+ Customers	Preparing and conducting customer surveys	

+ Public	Conducting SWOT analyses and deriving strategies	
+ Suppliers	Conducting pro-contra analyses and value analysis and deriving decisions	
+ Competitors (benchmarking)		
+ Products		
Decision preparation and decision-making methods		
Marketing tools		8
Marketing functions and tools relevant to sales	Presenting an overview of marketing areas and marketing instruments; outlining similarities and differences in marketing with respect to procurement and sales markets	
- Customer orientation and customer care	Determining the consequences of sales policy decisions and justifying decisions for a marketing mix	
- Communication and advertising policy	Explaining procurement processes and performing a weak points analysis	
+ Advertising		
+ Public relations		
+ Sales promotion		
- Price and terms policy		
Procurement		
- Procurement planning (supplier selection and relationship)		
- Shipping and payment		
- Material and invoice control		
- stockpiling and warehouse scheduling		
Investment, financial and liquidity planning	Distinguishing between various forms of payment transactions	8
Types of financing	Deriving options of raising capital based on the financial standing of the company	
- Equity-financing	Differentiating types of collateral and understanding their relevance	
- Self-financing		
- Debt financing (types of loans and collateral)		
- Alternative forms of financing		
Payment transactions		
Human resource planning	Determining personnel requirements on the basis of corporate planning, including specifying job descriptions	8
- Staff demand analysis	Assessing recruitment opportunities, advertising vacancies and conducting job interviews	

- Recruitment and selection	Determining advanced training needs for employees and setting up concepts for needs-based qualification	
- Personnel placement and staffing	Knowledge of employee motivation and staff loyalty	
- Work time models	Evaluating possible applications of different work time and remuneration models	
- Personnel development	Conducting feedback interviews with employees	
Personnel management	Motivating the significance of corporate climate	
- Personnel files		
- Archiving, data protection		
Remuneration		
- Time recording		
- Job assessment		
- Wage payment types		
- Corporate pension scheme		
Personnel management		
- Management styles and resources		
- Working atmosphere		
- Social relationships		
- Care (occupational, accident and health protection)		
Representing opportunities and risks of inter-company cooperation		6
Inter-company cooperation	Analysing value chains for prospective cooperations and weighing up opportunities and risks	
Value chains	Selecting and addressing suitable cooperation partners, bearing in mind common goals	
Forms of cooperation		
Controlling		16
Controlling	Describing controlling instruments and their use for situation analysis, for detecting undesirable developments as well as for uncovering future potentials	
- Tasks and goals	The use of controlling tools to maintain liquidity and to ensure profitability	
- Weak point analysis	Monitoring the achievement of company goals, adjusting company goals, if necessary, and justifying measures for achieving them	
- Key figure and key figure target systems		

- Budgeting		
- Scenario technique		
- Control and control of costs and revenues		
Labour and social security law		24
Labour law	Setting up and terminating legally effective employment contracts	
- Employment contract	Observing rights and obligations arising from employment contacts	
+ Contract types	Considering in contracts and in work design SME-relevant regulations on collective bargaining, codetermination and occupational safety	
+ Contractual obligations of the employer and employee	Analysing basic elements of the social security system with regard to company-related duties and options; characterising key regulations on statutory insurance, premiums, benefits and reporting obligations	
+ Termination of the employment relationship	Exploring and assessing payroll accounting-relevant tax categories, the form of payment of income tax and the employer's liability as well as allowances options and reimbursement of expenses	
- Dismissal protection		
- Collective labour agreement		
+ Collective bargaining parties		
+ Bargaining coverage		
- Works constitution		
+ Works councils		
+ Works agreement		
- Occupational safety		
+ Occupational health and safety regulations		
+ Maternity protection		
+ Severely disabled protection		
- Labour jurisdiction		
Social security law (insurer, mandatory insurance, free choice of insurer, insurance premiums, benefits, reporting obligations)		
- Medical and nursing insurance		
- Unemployment insurance, employment promotion		
- Pension insurance		
- Statutory accident insurance		
Payroll tax		

- Correct calculation and payment		
- Payroll tax liability		
Accounts receivable management		6
Receivables management and payment arrangements	Assessing risks of defaults and providing options for monitoring incoming payments	
Dunning and lawsuit proceedings	Considering measures to enforce claims and accelerate payments	
Debt collection and execution	Knowledge of processes and costs of legal proceedings (especially judicial dunning and enforcement)	
Business succession		10
Family and inheritance law	Knowledge and understanding of statutory inheritance regulations	
Matrimonial property rights	Weighing up design options given by an inheritance contract or testament	
Line of succession	Knowledge of basic allowances and tax classes in inheritance and gift tax and legal design options	
Inheritance and gift tax	Knowledge of differences between the "shared gains accrued" model and property separation	
Insolvency		
insolvency proceedings	Understanding the duty to report insolvency proceedings pursuant to a legal form and representing consequences of corporate and private insolvency	
- Early indicators of pending insolvency	Describing the process of insolvency proceedings and assessing options arising with respect to business continuation and liquidation	
- Insolvency code	Knowledge of options and conditions for a residual debt discharge	
- Reorganisation and winding up		

No. C4 Subject Basic computer skills, bookkeeping using commercial software

Course contents	Learning objectives	Time guideline
Operating systems, data organisation		3
Configuring basic settings in the EDP	Command of operating systems, data organisation, data security and protection	
Familiarity with operating systems	Use of information and communication technologies for business purposes	
Familiarity with data organisation, data security and protection	Ability to carry out systematic searches	
Getting an overview of information and communication technologies and testing them		
Implementing accounting in a craft business using industry-standard software		20
Accounting system, chart of accounts, account categories, company codes	Ability to record and check accounting transactions, both, manually and electronically	
Entering company data and bookkeeping vouchers in the EDP		
Processing, checking and assigning vouchers		
Creating, maintaining and verifying a cash ledger		
Organising payroll procedures		
Crediting/debiting of balance sheet and P&L accounts		
Posting business transactions		
Understanding the cash ledger structure and creating a cash ledger	Understanding the cash register structure, recording all entries and performing checks	7
Familiarity with relevant software; testing alternative software	Understanding basic legal requirements	
Entering all records	Mastering relevant software and managing the cash journal directly and online	
Maintaining an online cash ledger		
Performing checks		
Payrolling and payroll accounting		10
Maintaining master data of employees	Executing EDP-compliant payroll and payroll accounting	

Recording of working hours	Ability to assess advantages and disadvantages of alternative solutions and systems	
Creating gross and net payrolling		
Creating health insurance lists and PAYE tax notices		
Exchange of data volumes on salaries, asset accumulations and other transfers		
Registrations and cancellations of employees		
Simple wage booking		
- Proper wages and salaries account		
- Recording of payroll bookings		
Annual financial statement		12
Revaluation to the end-of-year procedure	Ability to comprehensively prepare a financial statement and to be able to record closing entries	
- Preparation of the booking list of annual accounts	Mastering all regulations and submit required reports	
- Rectification by general reversal	Carrying out well-founded business analyses, deriving consequences and developing conclusions for entrepreneurial strategies	
- Compilation of an asset schedule - depreciation		
- Accrued income bookings and provisions		
- Bad debt, general bad debt allowance		
Evaluations:		
- Prima nota sales tax pre-announcement		
- Summary statement		
- further evaluations (movements balance)		
Preparation of the financial statements		
- Updating balance sheet values		
- Applying current official tax depreciation tables		
Statistical analyses on the annual financial statements		
- Business evaluations		
- Evaluations (balance sheet, profit and loss account)		

No. C5 Subject Innovation management***Course contents******Learning objectives******Time guideline***

Definition of innovation	Establishing references and effects on corporate strategy	60
Types of innovation	Considering possibilities of operational management	
Role of the engineer in the innovation process	Considering perspectives for developing business strategies	
Innovation management	Ability to present own innovative ideas	
Protecting innovation (patents, trademark protection)		
Success factors and deficits		
Consultation and support services		
Innovation and promotion of technology		

No. D1 Subject Review of training requirements and training planning**Course contents****Learning objectives****Time guideline**

Advantages and benefits of in-company training	Highlighting the objectives and tasks of vocational training, in particular, the relevance of vocational competence for industries and companies	2
Objectives and tasks of vocational training	Characterising advantages and benefits of education for young people, for the economy and society	
Relevance of education for young people, as well as for the economy and society	Highlighting the benefits of training also with respect to the company's expenses	
Corporate training - cost and benefits		
Corporate occupational training needs	Identifying training needs based on company development and operational boundary conditions	3
Framework conditions of education	Emphasising the relevance of training within the context of human resources development	
Personnel planning and training needs	Considering framework conditions such as legal and collective wage agreements for training decisions	
Legal framework of education, especially the vocational training act		
Crafts code, youth health and safety at work act		2
Structures and interfaces of the VET system	Describing the integration of the VET system into the education system structure	
Classification of the VET system in the national education system	Outlining the requirements for VET education system.	
Key requirements for the education system, in particular: equal opportunities, permeability, transparency, equivalence	Characterising the dual system of vocational education by structure, powers, responsibilities and control	
A dual system of vocational training: structure, responsibilities, areas of responsibility and control		2
Selection of training professions	Describing the emergence of state-recognised training professions	

Formation and list of officially recognised training professions	Observing and presenting the structure and binding nature of training regulations	
Structure, functions, goals of training regulations	Describing the functions and goals of training regulations	
Training opportunities in the company	Defining company-relevant training professions in view of the training regulations via the flexible options given	
Company		8
Suitability for training	Clarifying personal and professional aptitude for hiring and training, and identifying ways to eliminate training barriers	
Personal and professional qualification according to the Vocational Training Act and Craft Code, training obstacles	Checking the suitability of the training facility with regard to proper conducting of the training and, if necessary, indicating necessary measures to restore proper suitability	
Suitability criteria of the training facility	Identifying possible need for training outside the training facility and indicating appropriate opportunities	
Out-of-company training and combined training	Characterising options of chambers and guilds to support companies in training matters	
Tasks of the craft organisations (chamber, guild) with respect to supporting the training	Outlining the responsibilities of competent bodies to monitor training fitness, review the consequences of non-compliance and being aware of the reasons for a withdrawal of training authorisation	
Administrative offenses and withdrawal of the training authorisation		
Career preparation measures	Outlining target group-specific pre-employment measures for training planning and justification of a certain choice	2
Target groups, requirements and legal basis for pre-employment measures	Evaluating the relevance of pre-employment measures for recruitment of young talents and indicating state funding opportunities	
Relevance of pre-employment measures and funding opportunities	Clarifying possibilities of operational implementation of pre-employment measures	
Content structuring of pre-employment measures (qualification modules)		
Tasks and responsibilities of the training participants	Determining tasks and responsibilities of the training participants	6
Conceptual delineation: trainer, instructor, educational officer	Functions and tasks of the instructor in view of differing expectations	
Function and tasks of the instructor	Matching tasks of contributing invited specialists and harmonising their integration into the training	

Function, tasks and requirements of the participating educational officer	
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No. D2 Subject Training preparation and assisting in recruiting prospective trainees

Course contents

Learning objectives

Time guideline

Company training plan	Motivating the relevance, purpose and content of an in-company training plan with respect to proper education	5
Legal basis, planning needs and training planning boundaries	Highlighting the contents of the training-relevant regulations of the training planning	
Training regulations as the basis of the company training plan	Establishing a context between a subject-specific and timely scheduled organisation of the training framework and the workflow and business processes of the company	
Significance of typical work and business processes and individual learning prerequisites for achieving the training goals	Drafting a company training plan, taking into account specific business operational requirements and individual learning dispositions; observing schedule-related and organisational conditions of altering learning locations	
Drafting and adaptation criteria for of a company training plan	Monitoring implementation of training plans and adjusting plans, if necessary	
Participation rights in VET	Outlining possibilities of workplace representation in VET	2
Co-determination rights of the company workforce interest representation	Outlining participation opportunities of youth and trainee representation in vocational training	
Participation possibilities of the youth and trainee representation		
Cooperating parties in training	Presenting benefits of cooperation networks, in particular, with vocational schools, central training facilities, with advisers in chambers and guilds as well as with employment agencies	4
Network of key cooperating training partners	Examining possibilities of cooperation with partners involved in the training	
Options of inter-centre cooperation		
Planning and implementation of recruitment procedures	Presenting and evaluating opportunities for recruiting prospective trainees.	4
Recruitment options of prospective trainees	Identifying as selection criteria requirements and qualifications of the training profession	

Selection criteria for candidates	Applying proper procedures in selecting prospective trainees by taking into account different groups of applicants, and by observing legal rules	
Selection procedure for candidates	Highlighting to prospective trainees vocational career perspectives associated with training	
Career path and career opportunities		
Conclusion of a training contract	Illustrating essential contents items of a training contract; concluding a training contract	6
Legal basis and content of the training contract	Representing rights and obligations of the trainer and trainee under the contract	
Rights and obligations of the trainer and trainee	Explaining the prerequisites for entry of the training contract with the register of apprentices; applying for entry in the training register	
Enrolment in the apprentices' register	Registering apprentices with the vocational school	
Registration with the vocational school	Outlining legal options and boundaries regarding termination, in particular, termination of an apprenticeship relationship	
Legal options of termination and discontinuation of training		
Components of training spent abroad	Checking benefits and possible risks regarding training sections abroad, both, for trainees and the company	2
Advantages, possible risks and legal basis for training abroad	Use of legal foundations for decision-making regarding implementation of training sections abroad	
Vocational training in other European countries	Paying attention to forms of vocational training in other European countries when planning a stay abroad	
Advice and support on the realisation of training components abroad	Providing advice and support for implementation of stays abroad	
Documentation of stays abroad	Understanding respective documentation of stays abroad	

No. D3 Subject Conducting trainings

Course contents

Learning objectives

Time guideline

Learning preconditions, learning support and learning culture	Considering individual requirements of trainees in the structuring of learning processes	8
Learning, learning competence, learning culture of self-driven learning	Supporting a learning culture of self-driven learning and reflecting on the role of the trainer as a learning companion	
The instructor as learning companion	Encouraging learning by observance of basic didactic principles	
Didactic principles of learning support		
Stages and opportunities of the learning process, agreeing upon learning objectives, strengthening motivation	Supporting learning processes by goal-setting, by strengthening motivation and by ensuring knowledge transfer	
Learning and working techniques, framework conditions	Encouraging learning by imparting proper learning and working techniques as well as by proper framework conditions	
Feedback	Determining learning outcomes and showing the trainee his skills progress by proper feedback as well as by receiving feedback	4
Arrangement of the probationary period	Determining content and organisational structure of the probationary period and observing legal requirements	
Familiarisation of the apprentice with the company	Selecting learning tasks to determine the trainee's suitability and disposition in the probationary period	
Relevance, arrangement and evaluation of the probationary period	Planning the introduction of the trainee into the company	
	Evaluating the trainee's progress during the probationary period and exchanging the results with the trainee; evaluating the performance and results of the probationary period	5
Training in job-typical order and business processes	Emphasizing the relevance of learning with respect to order and business processes	
Methodology of order and business process-driven training	Analysis of the training plan and of the work and business processes and drafting suitable learning and work tasks following the analysis	
Selection of adequate work tasks and involvement of trainees	Including trainees in work tasks, taking into account individual preconditions	
Setting of learning and work contracts		8
Training methods and media	Key training methods and their possible use	

Overview of training methods and criteria for method selection	Describing criteria for the selection of certain methods; justifying the selected methods	
Planning and implementation of doctrinal consultations and work instructions	Planning and evaluating a tutorial dialogue and work instruction	
Presentation of a training situation	Target group-tailored planning, implementing and evaluating of the methodological setup of the training content	
Functions and selection of training media	Describing the function of educational media and resources and selecting them accordingly, based upon the chosen method	
E-learning in education	Assessing the use of e-learning for training	
Learning difficulties and learning aids	Identifying typical learning difficulties in the course of the training, determining possible causes, verifying learning dispositions	4
Manifestations as well as causes of learning difficulties; matched learning aids and support measures	Individual assistance in case of learning difficulties followed by initiating support measures	
Training-accompanying aids	Recognising the need for training-related assistance and organising measures accordingly	
Extension of the training period	Possibility to extend the training period	
Promotion of outperforming trainees	Recognising special dispositions and talents of trainees and providing them with adequate additional offers such as, e.g. additional qualifications	4
Funding programmes for outperforming trainees	Verifying options to shorten the training period and for early admission to the final / journeyman's examination for these trainees, while rescheduling the remaining training period	
Shortening of the training period and early admission to the final / journeyman's examination		
Development of youth and handling of conflicts	Describing developmental tasks of youth in training, considering in drafting of the training development-typical behaviour of trainees and significant social influences	8
development functions with regard to youth and development-typical behaviour of trainees, including social influences	Describing the relevance of the company in terms of socialisation of trainees	
	Designing communication processes during the training, promoting communicational skills of trainees	
Socialisation of the trainee in the company	Recognising in due time conspicuous behaviour and typical conflict situations in training, analysing them and applying strategies for constructive conflict management	
Communication in education	Recognising and avoiding intercultural causes of conflict	

Behavioural problems and conflict situations in education	Reflecting on common causes of pending trainee dropouts and implementing preventive measures	
Conflict avoidance and strategies for constructive conflict management	Use of arbitration options for disputes during the training	
Avoiding intercultural conflicts		
Training dropouts: reasons and approaches for avoidance		
Conciliation mechanisms in trainee disputes		
Determining training success	Selecting appropriate forms of performance assessment to identify and evaluate achievements in training, while adhering to basic training performance assessment requirements	8
Forms and functions of performance reviews in education	Conducting of performance reviews and drawing conclusions on further education	
Core requirements for performance reviews	Regular evaluation of trainees' behaviour based on suitable criteria, and conducting of assessment interviews	
Conducting of in-house performance reviews	Evaluating the results of out-of-house performance reviews	
Evaluation sheet and evaluation discussion	Use of training evidence for controlling and promoting and for aligning with the training plan	
Evaluation of external performance reviews		
Training certificate / record book		3
Learning and working in a team	Forming teams based on selected criteria	
Criteria for the formation of teams	Promoting teamwork in the team	
Team working	Opening up to other cultures and positively addressing cultural differences (intercultural learning)	
Intercultural competences	Specifically promoting trainees with migration background	
Basic cultural differences and intercultural competences		
Specific support for trainees with migration background		

No. D4 Subject Completion of training**Course contents****Learning objectives****Time guideline**

Preparation for the final / journeyman examination	Highlighting essential requirements of the interim and final / journeyman examination in training regulations, and conveying particular aspects of an examination situation	6
Examination requirements and examination process	Describing the relevance and course of the final exam	
Stretched final / journeyman examination	Providing appropriate assistance for exam preparation and avoiding exam failure, as well as providing necessary exam aids	
Specific aids and techniques for exam preparation		
Avoidance / reduction of exam nerves		
Registration for the exam	Observing legal requirements for the apprentices' registration for examination and for exemption; observing exam registration	3
Registration, exemption and admission to the exam	Observing legal conditions for early admission to the examination	
Exam-relevant characteristics of trainees	Informing the competent body of exam-specific characteristics affecting apprentices	
Retesting, supplementary examination and extension of the training relationship	If the exam fails, taking into account legal requirements for repeat examination or supplementary examination and extension of the training period	
Issuing certificates	Observing legal and operational requirements and emphasising labour law-specific relevance of certificates for the trainee	3
Relevance, types and content of certificates	Identifying different types of certificates	
Formulation of a certificate	Generating certificates, in particular, taking into account previous performance assessments and observing legal consequences	
Legal consequences to certificates		
Career and training opportunities	Relevance of continuing vocational training	3
Advanced vocational education and training opportunities, master's examination	Describing vocational and occupational promotion and advanced training opportunities, in particular with regard to the master's examination	

Financial support of vocational education	Pointing out funding possibilities for continuing professional vocational education as well as possibilities for outstanding trainees	
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Examination Regulations

Part I

Uniform provisions

Article 1

Admission requirements and exemption from examination parts

(1) Admission to examination for a Technician grade is subject to uniform requirements pursuant to successful completion of at least three years of vocational training in the field of structural engineering or in a related profession. For shorter training periods, proof of professional activity over one year is additionally required so that a total of at least three years can be proven in a specialist field.

(2) Abilities and skills already acquired in other qualification measures that meet advanced training standards are recognised for the Technician's training. They may entitle to exemption from certain parts of the examination, e.g.

- a) Further education as Business Management Specialist; exemption from the module examinations C1-C5 of the Technician's training,
- b) Completion of a recognised pedagogical qualification test; exemption from the module examinations D1-D4 of the Technician's training,
- c) Similar content-related training; full or partial exemption from module exams C1-C5 and D1-D4.

Article 2

Standard study period

The standard study period is two years. It includes theoretical knowledge transfer, module examinations and the processing time related to the final exam.

Article 3

Occupational profile of the Technician in the discipline of construction engineering

(1) The Technician's certificate proves that the participant is able to autonomously run a company, to perform managerial tasks in the relevant areas of technology, corporate management, personnel management and development, to carry out trainings and to independently contribute own professional expertise, as well as to constantly adapt to new demands in the respective area.

(2) The Technician's degree in construction engineering shall focus on building construction, construction management, energy and building engineering and construction law. Under the module examinations and the project work, following joint activities, competences and skills are categorised as integral qualifications:

1. Identifying customer needs, advising customers, calculating services and generating quotes, conducting contract negotiations, and determining contract goals.
2. Taking responsibility for technical and commercial business management, corporate organisation, personnel planning and deployment, quality management, liability, occupational safety, data and environmental protection.

3. Executing orders taking into account technical rules and regulations, standards, labour laws and personnel requirements, as well as order processing and execution, planning and monitoring.
4. Processing documentation, specifically by means of computer-aided systems.
5. Considering material properties in planning, arrangement and execution of orders.
6. Planning and construction of buildings taking into account structural engineering and physical aspects and, in particular, safety and health-relevant precautionary measures. Review and implementation of remedial measures.
7. Application of testing techniques, assessment and recording of results.
8. Performing errors and error detection, initiating measures to eliminate errors, evaluating, documenting and recording results.

Article 4 **Degree**

Upon passing the final exam, the title “Construction Technician” is awarded.

Article 5 **Types of examination achievements**

(1) Subject to the module plan (Appendix 1), the following types of exam achievements are laid down:

1. Class exercises,
2. Oral exams,
3. Homework,
4. Oral presentations,
5. Participation in simulation games / conducting case studies
6. Project work,
7. The following are possible alternative examination achievements:
 - Oral presentations,
 - Computer programs,
 - Discussion boards,
 - Other written work,
 - Construction or drawn drafts,
 - Homework,
 - Project work.

Alternative examination achievements may also be delivered as in-session examinations, outside the specified examination period.

(2) In oral examinations, the examinee shall prove understanding of interrelations in the examination area and the ability to classify specific context-related issues. Furthermore, the objective is to establish whether the candidate has command of broad basic fundamental knowledge of the examination area.

(3) An oral presentation related to the teaching and learning context of the courses is to be delivered. It shall include autonomous systematic processing of a respective course-related topic or a subject area, including relevant source literature. Upon a brief, 15-30 minutes presentation, a discussion focused around relevant topic is opened and deepened.

(4) The aim of project works is to demonstrate the ability to develop, implement and present problem solutions, action instructions and concepts as well as, if necessary, collaboration in a team. The

processing time for a project work is at least two weeks and a maximum of six months. Processing time and scope of a project work is determined by the respective teacher.

(5) Experimental work includes theoretical preparation, structuring and delivering of an experiment, as well as a written presentation of the process steps, the experiment setup and the experiment results.

(7) The scope of exemption from one or more module examinations is equivalent to the passing of the respective module examination.

Article 6

Evaluation of individual examination achievements, forming grades

(1) Examination achievements shall be graded as follows:

100-92 points	= very good	= outstanding achievement
Below 92-81 points	= good	= performance significantly above average requirements
Below 81-67 points	= satisfying	= performance that meets average requirements
Below 67-50 points	= sufficient	= performance that meets the requirements, despite its deficiencies
Below 50-30 points	= inadequate	= performance not meeting the requirements due to its deficiencies, yet still manifesting some basic knowledge
Below 30-0 points	= unsatisfactory	= performance not meeting the requirements, manifesting very poor or lacking basic knowledge

(2) Evaluation of a written examination achievement is announced four weeks at the latest upon delivery of the examination achievement.

(3) If a module examination consists of several examinations, the module grade is calculated as weighted grade average of individual examinations. If a module examination consists of a class exercise and an alternative examination achievement, the exam is weighted 70%, vs. 30% for the alternative examination achievement.

(4) The final examination project and the technical discussion are weighted with a ratio of 3: 1, thus forming the overall score.

(5) The grades of all module examinations and weighted overall grade of the final assignment are included in the final grade. For the weighting, grades of the module examinations are multiplied by respective credits, in accordance with Appendix 1. The credits for the final examination project and the expert discussion are doubled for the weighting. The overall grade is calculated as the sum of weighted grades divided by the sum of credits allocated to the corresponding modules and to the final assignment.

Article 7

Repetition of examinations

(1) Module examinations that are not passed for the first time are deemed not to have taken place, provided they were held within the standard study period at scheduled standard examination dates (non-binding examination).

(2) A second repetition of a failed module examination is permitted in case:

1. of a particular hardship or
2. if the examinee has passed at least half of all previous module examinations with at least “satisfying”, whereby no more than eight module examinations can be repeated a second time, or
3. of only one failed module examination.

The application shall be addressed in writing to the head of the proper examination board in the field of “structural engineering” and submitted to the proper examination office.

(3) A failed final examination can be repeated once with a new topic. Assignment of the new topic shall be requested at the examination board, at the latest six weeks upon the announcement of the evaluation of the first final examination.

Part II

Examination requirements in the required general and subject-related theoretical knowledge

Article 8

Specific regulations concerning admission to examination

Admission requirements to final examination as a Construction Technician are a successful completion of the modules

- a) A1-A4, containing knowledge required for the general part to obtain matriculation standard, as well as
- b) B1-B9, containing required knowledge in the field of structural engineering.

Article 9

Objective, structuring and content of modules A1-A3

- (1) In the examinations in modules A1-A4, the examinee shall prove general and subject-related competence with regard to professional communication, political and creative competence, and to sustainable energy.
- (2) According to the module plan, in each of the modules at least one complex case-related exercise is to be carried out:
 1. Vocational English
The examinee shall understand issues of complex texts on specific and abstract topics, as well as be able to lead discussions in his own area of expertise. He shall be able to communicate spontaneously and fluently, expressing precisely and in detail his point of view on a wide range of topics, and explaining a topical issue by outlining advantages and disadvantages of various possible options.
 2. Native-language teaching
The examinee shall have the ability to apply business communication and business correspondence, in accordance with current regulations. Furthermore, he shall be able to offer to customers and clients different presentation techniques.
 3. Politics, social studies and environmental engineering

The examinee shall identify and evaluate relevant issues subject to attention of policy-makers, and forms in which politics occurs; he shall understand and analyse processes that take place between participants of a political process. Likewise, the examinee shall characterise the interplay between economic efficiency, environmental compatibility and social acceptability, by outlining own recommendations for a sustainable economic system.

4. Energy counselling

The examinee shall determine and compare energy requirements of energy converters in private households. Likewise, he shall identify technical and constructive energy-saving measures, by calculating their saving potential.

Article 10

Objective, structuring and content of modules A1-A3

(1) In examination in modules B1-B9, the examinee has to prove the required level of expertise in the action fields, by demonstrating the ability to prepare, plan and execute construction projects, taking into account economic and legal framework conditions and technical regulations, and he shall prove how to best document the entire development process.

(2) According to the module plan, at least one complex case-related exercise in each module should be conducted:

1. Structural design

The examinee shall be able to read architectural drawings and generate them by himself for components and elements, by working in building design aspects of structural and building physics. He may assess existing building structures, including a proposal of remedial measures. The exercise comprises several qualification areas listed below under a) to p):

- a) Basics of building construction
- b) General information on foundation engineering
- c) Construction pit and drainage
- d) Foundation
- e) Moisture protection
- f) Steel construction
- g) Wooden structure
- f) Wall construction
- h) Mounting wall elements
- i) Frame construction
- j) Architectural history
- k) Thermal protection in structural engineering
- l) Ceiling construction
- m) Window and door construction
- n) Staircase construction
- o) Chimney construction
- p) Roof structures

2. Structural drawing

The examinee shall be able to produce structural construction drawings by using a CAD system. In doing so, knowledge of dimensions and tolerances should be taken into account. Further, load-bearing and non-load-bearing walls, windows, ceilings, ceiling cladding and

suspended ceilings, stairs and sloped roofs with roofing can be chosen. The exercise comprises several of the following qualification areas listed under a) to i):

- a) Fundamentals of structural drawing
- b) Geometric basic construction
- c) Representation of bodies
- d) Determination of true sizes
- e) Architectural drawing
- f) Practical introduction to a CAD program
- g) Drawing a layout
- h) Complex construction
- i) Data processing

3. Mathematics, geometry and physics

The examinee shall be able to apply mathematical procedures and algorithms and explore further teaching areas such as statics and surveying by applying knowledge on the use of formulas and tables.

4. Structural material science / Building material chemistry

The examinee shall prove knowledge of essential properties of building materials, and thus select proper building materials for construction projects, according to substance-specific, economic and ecological criteria, and he shall be able to apply substance-specific test methods.

The exercise comprises several of the qualification areas listed below, under a) to d):

- a) Chemical processes and reactions
- b) Building material parameters and test methods
- c) Natural and synthetic building materials
- d) Reinforced concrete steel construction

5. Building law

The examinee shall have the ability to prepare marketable service descriptions for construction projects as well as execution planning and billing of the service provided. The exercise consists of the following qualification areas listed under a) to e):

- a) Public and private building law
- b) Allowances, service description and quantity calculation
- c) Types of costing
- d) Construction contracts and operations scheduling
- e) Billing of construction services

6. Construction management

The examinee shall prove the ability to produce building calculations according to principles of personnel, material and machine planning. Likewise, the examinee shall be able to differentiate between different procurement procedures.

7. Engineering mathematics

The examinee shall prove the ability to recognise the proper type of stress of a component in cross-section and to undertake the dimensioning, including verification. The exercise comprises several of the qualification areas listed below under a) and b):

- a) Physical strengths
- b) Mechanics of materials

8. Machinery and construction equipment

The examinee shall prove the ability to specifically select proper machinery and construction equipment for construction projects.

9. Surveying

The examinee shall prove the ability to stake out buildings and engineered structures and to execute survey planning, geodetic calculations and surface calculations. The exercise covers several of the qualification areas listed under a) to e):

- a) Position measurement
- b) Altimetry
- c) Angular measurement and stakeout
- d) Initial measurement of the building structure
- e) Road course measurement

Article 11

Duration of the Examination

(1) The examination in modules A1-A4 and B1-B9 is in written form. Scope and duration of the individual module examinations depend on the amount of the credits to be earned, following the standard:

1-3 Credits	= 90	minutes
4-6 Credits	= 120	minutes
7-9 Credits	= 180	minutes
10-12 Credits	= 240	minutes

(2) If in the second attempt at least 30 points but less than 50 points were achieved, in at least two of the modules referred to in Art. 9 and 10, oral complementary examination may be carried out in the respective modules.

(3) The module examinations are considered as failed if a module was awarded less than 30 points or less than 50 points upon a complementary examination.

Part III

Provisions for examination in required managerial, commercial and legal knowledge

Article 12

Special provisions for admission to examination and exemptions

(1) The admission requirement to the final examination as a "Construction Technician" is a successful completion of modules C1-C5 containing required knowledge in "Business Administration, Law and Management".

(2) Examination in modules C1-C5 is organised as an examination performance.

(2) At the request of the examinee, exemption from examination in modules C1-C5 shall be granted if the candidate can prove an equivalent degree course with a recognised final examination, e.g.:

- a) applicable degree course with focus on corporate governance or SME management or
- b) applicable recognised advanced qualification, such as e.g. "Certified Business Administrator".

Article 13
Objective, structuring and content of modules C1-C5

(1) In examination in modules C1-C5, the candidate's professional capability as entrepreneur shall be demonstrated in the relevant action fields by adequately proving and documenting competence in analysing and duly assessing business, economic and legal issues, based on current market trends.

(2) According to the module plan, in each module at least one complex case-related exercise shall be carried out:

1. Assessment of competitiveness of companies

The examinee shall demonstrate competent evaluation and decision-making with regard to business, economic and legal requirements for a company's competitiveness. This includes competent evaluation and decision-making in the area of personnel development planning. The exercise consists of several qualifications listed below under a) to f):

- a) analysis of business objectives and their classification in a business target system,
- b) defending the significance of corporate culture and a company's image for market performance and competitiveness,
- c) analysis of the market positioning of a company and argumentation of success potentials,
- d) use of internal and external accounting, in particular, the balance sheet and the profit and loss account, to analyse strengths and weaknesses of a company,
- e) application of legal provisions in the analysis of corporate objectives and concepts, in particular, taking into account the crafts and trade code, commercial, industrial and competition law;

2. Preparation, implementation and evaluation of business setup and acquisition activities

The examinee shall prove expertise in preparation, execution and evaluation of tasks related to a business setup and a takeover, taking into account personal, legal and business conditions, and objectives, explaining their significance for a business concept. In this exercise, several of the qualifications listed under a) to j) shall be combined:

- a) supporting significance of personal qualification for successful self-employment,
- b) presenting and considering the economic, social and cultural significance of craft, and the benefits of memberships in craft organisations;
- c) identifying and assessing opportunities to use advisory services, support and public benefits in setting up and taking over a business;
- d) making and justifying decisions with regard to location, size, personnel requirements, structure and equipment of a business,
- e) development and evaluation of a marketing concept for market launch,
- f) preparing and arguing for investment planning and a financial concept; preparing a profit forecast and implementing liquidity planning,
- g) deriving and arguing for a certain legal form, attendant to a business idea,
- h) application of legal provisions, in particular, civil law, corporate and tax law, in the context of a company formation or takeover,
- i) considering the need for private risk and retirement provision, pointing out options
- j) cohesively explaining and supporting the significance of personal aspects as well as business and legal components of a corporate concept;

3. Development of corporate governance strategies

The examinee shall demonstrate the ability to identify operational growth potential and to develop business strategies, taking into account corporate strengths and weaknesses as well

as market-related corporate governance opportunities and risks. For this exercise, several of the qualifications listed below under a) to k) shall be combined:

- a) assessment of the importance of organisational business structures and workflows; introducing changes,
- b) assessing trends in product and service innovation, as well as in general market conditions, also in an international context, and deriving appropriate growth strategies;
- c) arguing the use of marketing tools for sales and procurement of products and services; recognising changes in capital requirement as a function of investment, financial and liquidity planning; demonstrating alternative forms of capital raising,
- e) development and evaluation of concepts for personnel planning, recruitment and qualification measures,
- f) taking account of labour and social security legislation in the formulation of a corporate strategy,
- g) presentation of opportunities and risks of inter-company cooperation,
- h) use of controlling to develop, pursue, enforce and modify business objectives;
- i) outlining instruments for the enforcement of claims and justifying their use,
- j) describing and arguing the need for business succession planning, including inheritance and family law and tax regulations,
- k) examining the need to initiate insolvency proceedings based on company data; indicating the consequences of insolvency law with respect to the continuation or liquidation of a business company.

4. Implementing accounting in a craft business using industry-standard software

The examinee shall demonstrate the ability to record and check business transactions, both, manually and electronically. In the task, several qualifications listed below under a) to d) shall be combined.

- a) generating documents, checking and allocating them to an account,
- b) creating, maintaining and checking the cash journal,
- c) preparing payroll accounting,
- d) contributing to the preparation of the annual financial statements.

5. Innovation management

In the examination part “Innovation Management”, the examinee shall present evaluate and devise in a draft solution a complex business problem of a company with operational relevance. The examinee shall outline references to the corporate strategy that affect the operational management of the company, by proposing a need for an innovation-based solution as part of the corporate strategy. The topic of the project work is provided by the examination board and the processing by the examinee is subject to supervision by a teacher belonging to the specialist field.

Article 14.

Duration of the examination

(1) Examination in modules C1-C4 lasts two hours each and is to be delivered in writing. In the “Innovation management” module, the examinee shall prepare a written project work, amounting to approx. 30 processing hours.

(2) The overall assessment of modules C1-C5 is calculated as arithmetic mean of the respective individual assessments.

(3) If at least 30 points but less than 50 points were achieved in at most two of the

examination modules referred to in Article 15, a complementary oral examination may be held in the respective modules,

(4) Passing the module examinations C1-C5 requires a generally satisfactory examination. The module examination is considered as failed, if

a) a module was awarded less than 30 points or

b) a module was awarded less than 50 points even upon a complementary examination.

(5) Passing of the module examinations C1-C5 leads to the recognised advanced training qualification "Certified specialist for commercial management".

Part IV

Provisions for the examination of required skills in vocational pedagogy

Article 15

Special approval requirements and exceptions

(1) The admission requirement for the final examination as a Construction Technician is a successful completion of modules D1-D4.

(2) At the request of the examinee, exemption from examination may be granted, if the student can prove to have passed an equivalent course with a recognised final examination.

Article 16

Objective, Structure and Content

(1) The examination in the modules D1-D4 is held in form of an examination and it shall prove the subject-related and work-pedagogical knowledge and skills of the examinee, which are required for autonomous planning, implementation and control of a proper vocational training of trainees.

(2) Examination consists of a written and a practical part.

(3) In the written part of the examination, the candidate has to solve case-related tasks in each of the following action fields:

1. Checking the training requirements and planning of the training

Module D1 includes the professional and pedagogical competence to scrutinise training requirements and to plan a training. The trainers shall be able

- a) to demonstrate and argue advantages and benefits of in-company training;
- b) to participate in planning and decision-making to bridge the needs of in-company training, based on the legal, collective agreement and the operational framework,
- c) to outline structures of the VET system and its interfaces;
- d) to choose and justify training occupations for a company,
- e) to examining the suitability of a business company with respect to a desired occupation, as well as, if and to what extent training content may be provided by measures outside the training centre, in particular, by training in a network, or as inter-company or off-company training,
- f) assessing options of using preparatory training measures; and
- g) coordinating the tasks of the involved participants in a training, taking into account their function and qualification.

2. Training preparation and recruitment of apprentices

Module D2 includes a vocational and work-pedagogical competence to prepare a training taking into account organisational as well as legal aspects. The instructors and trainers shall hereby be able

- a) to draw up an in-company training plan, based on training regulations, in particular, dedicated to work and business-related work processes,
- b) to take into account VET-related participation and co-determination options of company interest groups
- c) to explore the need for cooperation and to coordinate its content and organisation in collaboration with partners, in particular, with vocational schools,
- d) to apply criteria and procedures for the selection of trainees, taking into account, amongst others, their diversity;
- e) to prepare a vocational training contract and to arrange for the registration of the contract with a competent authority; and
- f) to examine options whether parts of vocational training might be carried out abroad.

3. Implementing training

Module D3 includes vocational and work-pedagogical competence to endorse autonomous action-orientated learning in job-typical work and business processes. The trainers shall be able

- a) to establish learning-conducive conditions and a motivating learning culture, to give and receive feedback,
- b) to organise, design and evaluate the probation period,
- c) to develop and design company-oriented learning and work tasks, based on the company training plan and on typical work and company processes;
- d) to select adequate training methods and media, according to the target group and use them in a situation-specific manner,
- e) to assist trainees in learning difficulties by tailoring their training and learning guidance, and, if necessary, by providing training support and by exploring the possibility of extending the training period;
- f) to provide trainees with additional training opportunities, in particular, in the form of additional qualifications, and to examine the option of shortening the training duration, as well as a possible early admission to the final examination;
- g) to promote social and personal development of trainees, to opportunely recognise problems and conflicts in order to seek an amicable solution,
- h) to identify and assess performance; to evaluate third party performance assessments and examination results; to conduct assessment interviews; to draw conclusions for the remaining course of training, and
- i) to promote intercultural competences.

4. Completing the training

Module D4 includes vocational and work-pedagogical competence needed to lead the trainee to a successful end and it highlights perspectives of a trainees's professional development. The trainers shall hereby be able

- a) to prepare trainees for final or journeyman's examination, taking into account exam dates, as well as to lead the training to a successful completion,
- b) to ensure that trainees register for examinations at the competent authority by explaining the trainees any implementation-relevant issues;
- c) to participate in the preparation of a written certificate on the basis of performance assessment; and
- d) to inform and advise trainees on in-company career paths and further training options.

Article 17

Examination duration and organisation of Part IV

- (1) The written part of the examination shall last three hours.
- (2) The practical part of the examination consists of a presentation of a training situation and a technical discussion with a maximum duration of 30 minutes. Accordingly, the exam participant has to choose a typical vocational training situation. The presentation should not exceed 15 minutes. The selection and arrangement of the training situation are explained in the technical discussion. Instead of the presentation, a training situation may be also accomplished practically.
- (3) The assessment of the written part of the examination results from the arithmetic mean of the equally weighted individual assessments of the individual modules. In the overall assessment, the written and the practical part of the exam are weighted equally.
- (4) If in at least two of the modules referred to in Article 16 at least 30 points but less than 50 points were achieved, an oral complementary examination may be held in the respective modules.
- (5) The prerequisite for passing the modules D1-D5 is the scoring of the written and practical part of the examination, each with a total of at least 50 points.
- (6) Passing of the modules D1-D5 leads to the separately recognised advanced training title "Trainer".

Part V

Provisions regarding the final thesis to acquire the recognised title "Construction technician"

Article 18

Objective, Structure and Content

- (1) Module B10 is a comprehensive qualifying final examination for the recognised title "Construction technician". The final examination comprises a project work and a technical discussion to prove relevant theoretical knowledge.
- a) Condition for admission to the final exam are at least 115 achieved credits, upon passing the module examinations, according to the module plan (Appendix 1).
- b) A proposal for the subject of the project work shall be submitted for approval by the examinee to the examination board, alternatively the subject may be provided by the examination board. The project work is to be carried out by the examinee, under the supervision of a teacher belonging to the specialist field. The topic of the project work can be changed only once and only within the first two weeks of the processing time. In such case, within two weeks, the examinee is required to submit to the Examination Board for

approval a proposal of a new topic, otherwise, within four weeks, the examination board will choose and assign a new topic.

- c) A technical discussion shall be conducted using the results of the project work, in which the examinee shall prove full understanding of the technical coherence of the project work. Furthermore, the examinee shall prove the sequencing of the project work process and the ability to identify subject-related issues in the project creation process, indicating respective solutions, always taking into account latest technological trends.

Article 19

Examination duration and organisation

- 1) The processing time of the final thesis is seven weeks. Upon a reasoned request by the examinee, the examination board may extend the processing time. As a rule, the extension period granted should not exceed four weeks. In cases of particular hardship, if the candidate is prevented from completing the thesis on time due to reasons beyond his control, the examination board may extend the processing time by more than four weeks or suspend the process.
- 2) Within two weeks upon submission of the final thesis, the examinee shall be notified in writing by the examination board of a date for the technical discussion. At the beginning of the technical discussion, the examinee presents to the examination board the process course and the results of the thesis by means of self-selected presentation media.
- 3) The technical discussion should not exceed a maximum duration of 60 minutes.
- 4) The grade for the final thesis and for the technical discussion is to be announced to the examinee immediately afterwards.

Appendix 1 – Module plan

		657	20,53	Weeks		639	19,97	Weeks		613	19,16	Weeks		521	16,28	Weeks		
Introductory modules		University study																
		Semester One				Semester Two				Semester Three				Semester Four				
		Module h	Autonomous learning	Assignment, total	CR	Module h	Autonomous learning	Assignment, total	CR	Module h	Autonomous learning	Assignment, total	CR	Module h	Autonomous learning	Assignment, total	CR	
A2	Native-language teaching	45	20	65	2	45	20	65	2									
A3 I	State and society	70	25	95	4													
A3 II	Environmental engineering					30	8	38	1									
B3	Mathematics, geometry and physics	90	20	110	4	90	20	110	4									
B4	Material science	200	35	235	9													
B7 I	Engineering mechanics	110	30	140	5													
B7 II	Engineering mechanics					110	30	140	5									
B1 I	Structural design	90	20	110	4													
B1 II	Structural design					148	32	180	7									
B1 III	Structural design									77	35	112	4					
A1 I	Vocational English									80	25	105	2					
A1 II	Vocational English													70	50	120	2	
B6 II	Construction management					80	30	110	4									
B6 II	Construction management									46	15	61	2					
B5 I	Building law									32	30	62	2					
B5 II	Building law													48	50	98	4	
C1	Determining corporate competitiveness					82	20	102	4									
C4	Basic computer skills	52	10	62	2													
D1 - D4	Interdisciplinary vocational and occupational education					38	15	53	2	67	60	127	5					
B8	Machinery and construction equipment					16	4	20	1									
B9	Surveying									70	50	120	4					
B2 I	Structural drawing									80	25	105	4					
B2 II	Structural drawing													50	30	80	3	
A4 I	Energy counselling / Utilities management									75	50	125	5					
A4 II	Energy counselling / Utilities management													75	50	125	5	
C2	Preparing, completing und evaluating business foundation and takeover activities									86	40	126	5					
C3	Developing corporate government strategies													98	25	123	5	
C5	Innovation management													60	50	110	3	
B10	Project work													120		120	5	
		817			30	818			30	943			33	776			27	
		Full time academic year 1635 hours. Assignment/60 Credits										Full time academic year 1719 hours. Assignment/60 Credits						

Curriculum

Installation and Building Technology –

Service Technician

Part of Work Package 4:

Second center level "Continuing vocational training" (EQF Level 4 – 6)

Prepared by:

Wirtschaftsförderungsinstitut (WIFI) Steiermark (PP14)

October, 2023



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Service Technician (NQR 5)

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1. Introduction

1.1 Project Background

Around 99% of all EU businesses are SMEs, creating up to 70% of all jobs. In general, SMEs have good growth prospects for the future and are particularly well equipped to solve environmental problems and to enhance the green economy. However, in most of the project countries, SMEs are confronted with a shortage of skilled workers and young entrepreneurs. This shortage of skilled workers is even more alarming considering that due to aging of current entrepreneurs, a large and growing number of companies will have to be handed over to the next generation. Furthermore, young specialists and entrepreneurs often lack the qualifications and skills needed to respond to contemporary developments in the fields of energy, climate, and environmental protection. The following problems have been identified in SMEs working in the fields of green economy, energy, and environmental protection:

- Blatant and growing shortage of skilled workers.
- Large qualification deficits, especially in the Green Economy.
- Loss of attractiveness and low qualification of school-based VET.
- Low rates of further training and insufficient orientation of offers to SME needs.
- Ageing of entrepreneurs and increasing shortage of young people (demographic change).
- Failure of business transfers and low rates of business start-ups.
- Low innovation rates and insufficient productivity.
- Not enough cooperation between universities and SMEs and a lack of teaching geared to SME needs.
- Comparably low internationalization of SMEs and vocational training providers.

To meet these challenges, work-based learning and new paths in vocational training must be provided through cooperation between educational institutions, economic chambers, and SMEs. University graduates are often well-qualified in theory, but lack practical knowledge, skills and abilities that are crucial for SMEs. For this reason, VET reforms must also involve higher education, and should implement dual bachelor's degree programs that combine a bachelor's degree with vocational training and on-site work in companies.

In the 3LoE project, an innovative and complex project structure with 22 project partners from 7 countries as well as 60 associated partners from 13 countries was designed. In each country, centers of professional excellence (COEs) in Green Economy is established, managed and their permanent

continuation ensured. A transnational cooperation of the centers will be developed, extended to 60 education stakeholders, and operated permanently in an institutionalized form. The centers offer a wide range of dual education measures in vocational training, further education, and higher education, that are being developed, tested, and evaluated in the project.

These educational measures on EQF levels 3-6 focus on Green Economy, Digitalization and Entrepreneurship. Furthermore, vocational, and educational consulting and innovation support for SMEs will be developed and implemented. In total, seven Train-the-Trainer programs will be developed and implemented permanently by the project partners. All results will be transferred to the 60 associated partners together with implementation advice.

This curriculum was developed to carry out an education on EQF level 5 called “Service Technician”. It shows the required modules and courses which need to be completed to finish the education.

This education is intended for participants, who already possess a completed education on the NQR level 4, especially in the area of heating, building and gas/water installers. However, the education is designed in a way that people who have a different background, such as people who finished the general higher education entrance qualification, are also able to participate in this education.

In Austria a qualification on NQR level 4 is necessary to enter this educational level. However, it must be noted that legislation differs within EU countries on the entrance qualifications, thus if the modules which are described in this document are used, certain amendments might have to take place according to national legislations.

1.2 Decision-making basis for the establishment and contents

This (continuing) education course aims to provide people, who have already gained professional experience - especially in small and medium-sized enterprises - and people who don't have practical but theoretical expertise, with further knowledge in relevant topics required to work as a service technician. This can be skilled workers, people who finished a secondary education, finished apprentices, etc.

Many of the employees in these small and medium-sized enterprises carry out their professional activities on the basis of a final apprenticeship examination (EQF level 4). While some continue their professional education with a master craftsmanship education, most employees do not take part in any further educational programs. Due to the ever-changing requirements for carrying out



**Three-level Centers of Professional Excellence: Qualification,
Entrepreneurship and Innovation in the Green Economy”
(3LoE)**



any professional activity this educational program aims to provide employees on EQF level four with a further educational program that qualifies them on EQF level 5.

The aim of the course, which is held as a dual study program, meaning that the participants complete the courses next to their work, is to provide the participants with a theoretically sound basis for the knowledge they have acquired in their practical work, to deepen their knowledge and to expand it to include skills required to work as a qualified service technician in the area of building and heating technology.



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2. Executive Summary

This curriculum was designed during the runtime of the 3LoE project to offer comprehensive, specialized factual and theoretical knowledge in the area of work and learning of a new professional further education in the trade of heating technology and installation and building technology, as well as to show awareness of the limitations of that knowledge.

The education is classified as qualification standard EQF of level 5. The participants of for the EQF 5 level education must fulfill the prerequisites, which are an education on EQF level 4 (e.g., final school examination, completion of an initial vocational training, etc.).

The service technician is designed that non-specialised people can take part in the education. However, it is generally aimed at persons with a background in heating and gas/water installation. The individual modules, which are listed further below, were developed inline with required knowledge, skills and qualification based on the professional contents of the trade and the requirements of an education on EQF/NQR level 5.

The education “Service Technician” is a program for new professionals in the area of building and heating technology on NQR level 4 as well as people outside of the trade to educate themselves and to deepen their technological knowledge and gain professional experience. This course is specifically designed for people who want to work as service technicians in the field of heating and building technology. The course is developed as a program that can be attended by people carrying out an occupation. Furthermore, it is specifically aimed at people who have completed a vocational education on European Qualification Framework (EQF) Level 4.

This education consists of five modules:

- Module I – “Basics of Thermodynamics, Electrotechnology, Combustion Technology and Heat Generation”
- Module II – “Heating technology, domestic hot water, renewable energies”
- Module III – “Hydraulics of heating systems, ventilation technology and measurement, control, regulation (practice)”
- Module IV – “Refrigeration technology & apprenticeship examination”
- Module V – “Customer orientation & Time management”

Completion of all courses in all modules results in obtaining the qualification requirements for a “Service technician” in installation and building technology on NQR Level 5.

2.1 Name of the course

“Installation and Building Technology – Service Technician”

2.2 Contact Details

WIFI Steiermark Körblergasse 111-113 A-8010 Graz Tel.: +43 306 602 1234 Fax: +43 316 602 301 E-Mail: info@stmk.wifi.at Web: https://www.stmk.wifi.at

2.3 Type of the course

Further Education Programme – NQR Level 5

2.4 Type of Degree

Degree for Further Education Programme on Level NQR 5

2.5 Duration of the study

The total amount of the study programme is 1044 learning units excluding self-study time. The study programme can be completed within four semesters of two years.

2.6 Provider

Wirtschaftsförderungsinstitut der Wirtschaftskammer Österreich (WIFI) Steiermark.

3. Demand and Acceptance

The main aim of this curriculum is to provide a further educational opportunity for beginners as well as professionals in installation and building technology to counteract the huge demand and gap in this sector, within the legal requirements of Austrian national law.

The objective is to impart knowledge in the field of installation and building technology on a relatively new educational level (NQR 5). This curriculum is part of a permeable training programme that makes the transition of experts on EQF level 5 to EQF level 6 possible.

4. Field of activity and qualification profile

4.1 Main Activities

- Commissioning, maintenance and troubleshooting of air conditioning, chilled water, and refrigeration systems as well as different heating systems within the trade of installation and building technology.
- Installation and commissioning of new systems
- Participation in on-call service
- Consulting of customers

4.2 Typical Functions

Service technicians are employed primarily in small and medium-sized businesses that specialize in troubleshooting and maintenance services in the areas of refrigeration and air conditioning and heating technology. Employment opportunities are also available in the service departments of industrial companies, as well as in warehouses. Furthermore, service technicians can work in administrative organizations in the area of building services.

4.3 Typical Organizations

Service technicians work for companies that plan, install, and maintain heating and cooling systems, air conditioning and heating systems, while several other installation and building technologies are involved.

4.4 Typical Industries

These can be specialized craft businesses or larger companies in installation and building services engineering. Furthermore, there are employment opportunities in companies that use such systems and employ their own maintenance personnel for this purpose.

4.5 Qualifications, Skills and Knowledge

All learning outcomes of this further education programme correspond to the competence level of EQR 5. Persons who complete this further education programme holder can independently manage projects in their field of work and coordinate work teams. In doing so, they can independently and flexibly carry out even comprehensive and challenging projects in their field of work. In the event of different, even unforeseeable situations and events, they can re-evaluate the situation and define and propose alternative courses of action. In doing so, they are aware of the limits of their competencies (knowledge and skills) or their scope for decision-making and can assess when they need to involve high levels (e.g., the management level). They can reflect on their own behavior and draw conclusions for future action as well as critically and responsibly assess the actions of others, give feedback and contribute to the development of their potential.

The learning outcomes of the programme are described in the following:

1) The participant is able to independently instruct and supervise installation and building services work tasks and check accordingly.

Knowledge: The participant has a comprehensive, specialized theoretical and factual knowledge and awareness of the limitations of that knowledge of:

- Work organization and project planning
- Employee management
- Operational quality management
- Technical knowledge installation and building technology
- Relevant technical regulations
- Occupationally and operationally relevant environmental protection and hygiene standards
- Occupational and operational safety and legal regulations
- Health protection at work
- Accident prevention
- Occupation-specific software such as CAD

Skills: The participant can...

- ...define work steps, work equipment and work methods.
- ...use, maintain, and care for operating and auxiliary materials in accordance with their function.
- ...select, prepare, and use tools, equipment, and materials according to the task.
- ...plan, prepare, and coordinate work steps and sequences.
- ...consider the principles of efficiency.
- ...carry out specified operational work processes.
- ...inspect and monitor the performance of installation and building services work assignments.
- ...comply with quality standards in the work process and ensure that they are monitored.
- ...optimize internal operational processes.
- ...in the event of unforeseeable changes or challenging and complex problems in an installation and building technology task, independently develop and implement appropriate solutions in compliance with the applicable standards, regulations, and rules.
- ...ensure the safety and health protection in the course of the work.
- ...ensure compliance with legal requirements, standards and relevant guidelines.

2) The participant is able to plan, calculate, select, combine and install, maintain, service and repair installation and building technology equipment, machinery and systems.

Knowledge: The participant has a comprehensive, specialized theoretical and factual knowledge and awareness of the limitations of that knowledge of:

- Devices, machines, and systems of installation and building technology, their mode of operation and structure as well as handling.
- Preparations for work
- Materials and auxiliary materials, their properties, possible uses, and processing methods.
- Tools, machine tools, materials science, and equipment science.
- Sound insulation and the insulation of heating, cold and hot water systems as well as drainage systems.
- Methods of water treatment.
- Hydraulics.
- Alternative forms of energy and alternative energy generation such as thermal solar systems, heat pumps and biogenic systems.
- Subject-related measuring and safety equipment.
- Measurement, control, and regulation technology.
- Chimneys and exhaust systems and about their installation
- Applied technical mathematics such as length and area calculation, volume and mass calculation, percentage and proportion calculation and physical calculation such as thermal expansion, pressure, power, and efficiency.
- Properties and use of different fuels
- Protective measures against internal and external destruction on lines and equipment.
- Structure and the mode of action of fittings.
- Functionality and installation options of energy and building technology devices.
- Simple electrical engineering, electronics and electrical measurement techniques and knowledge of the dangers of electric current.
- The dimensioning of pipelines.
- Fluid mechanics and pipe network calculation.
- Fixed and detachable connections.
- Combustion regulations and their inspection on gas appliances and heating systems.
- Fire protection
- Relevant technical regulations.
- Environmental protection and hygiene standards relevant to the profession and company.
- Occupational and operational safety and legal regulations.
- Health protection at work.
- Accident prevention.

Skills: The participant can...

- ...carry out the necessary work preparations in a professional manner.
- ...assemble pipe systems with heat generators and consumers.
- ...set up, connect, and commission heat generators and consumers as well as hot water systems.
- ...maintain and service heat generators and consumers as well as hot water systems and identify, assess, and rectify faults.
- ...install required control devices, measuring and safety devices and equipment.
- ...adjust systems.
- ...use, maintain, and care for operating and auxiliary equipment in a functional manner.
- ...read and prepare piping, assembly, and dimensional sketches.
- ...process metals and plastics using techniques such as scribing and cutting to size, bending, and straightening, threading, especially for pipe threads, soldering, flanging, pressing, gas fusion welding, simple electric welding, and plastic welding and bonding, observing hazards and applying accident prevention measures.
- ...apply the main measuring, testing, safety, and control systems.

- ...fabricate piping systems for supply and disposal, including installation of appropriate shut-off and conveyance equipment.
- ...fabricate and inspect pipe protection and pipe insulation.
- ...prepare and argue a flow analysis based on individual processes in building and plumbing equipment and systems.
- ...prepare and interpret test and project documentation.
- ...perform functional checks, pressure and leak tests, and measure media and pressures.
- ...systematically locate faults and malfunctions and initiate measures to rectify them.
- ...perform leak and pressure tests professionally.
- ...develop suitable solutions.
- ...based on the participant's expertise, comply with the relevant safety regulations, protective measures and accident prevention measures.
- ...incorporate occupational and operationally relevant safety, environmental protection and hygiene standards based on the participant's expertise.

3) The participant is able to ensure compliance with safety-related regulations as well as environmental protection and quality control measures.

Knowledge: The participant has a comprehensive, specialized theoretical and factual knowledge and awareness of the limitations of that knowledge of:

- | | |
|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| • Quality management and quality control | • Operating resources |
| • Waste management | • Relevant technical regulations |
| • Avoidance of waste as well as material and thermal recycling options | • Occupational and company-relevant environmental protection and hygiene standards |
| • Environmentally friendly, sustainable, energy-efficient operation and management | • occupational and operational safety and legal regulations |
| • First aid in the event of company-specific occupational accidents | • health protection at work |
| • Materials and equipment knowledge | |

Skills: The participant can...

- ...define work steps, work equipment and work methods.
- ...use, maintain, and care for operating and auxiliary materials in accordance with their function.
- ...select, prepare, and use tools, equipment, and materials according to the task.
- ...plan, prepare, and coordinate work steps and sequences.
- ...consider the principles of efficiency.
- ...carry out specified operational work processes.
- ...inspect and monitor the performance of installation and building services work assignments.
- ...comply with quality standards in the work process and ensure that they are monitored.
- ...optimize internal operational processes.
- ...in the event of unforeseeable changes or challenging and complex problems in an installation and building technology task, independently develop and implement appropriate solutions in compliance with the applicable standards, regulations, and rules.
- ...ensure the safety and health protection in the course of the work.
- ...ensure compliance with legal requirements, standards, and relevant guidelines.

4) The participant is able to commission the installed devices, machines and systems for installation and building technology.

Knowledge: The participant has a comprehensive, specialized theoretical and factual knowledge and awareness of the limitations of that knowledge of:

- Types of installation and building technology devices, machines and systems, their components, design, equipment, mode of operation and handling
- Safety-related requirements when working with devices, machines and systems in installation and building technology
- Types of measuring, control and regulation equipment and their components, how they work and how to use them
- Control and regulation technology
- Basic function and structure of mechanical, pneumatic and hydraulic, electronic and hybrid control chains and control circuits
- Function and structure of hydraulic circuits in heating and cooling systems
- Types of test methods, their application and procedure
- Methods and application of measurement technology
- Design, function and application of test equipment, measuring devices and their components
- Fundamentals of electrical engineering
- Fundamentals of electronics, e.g. semiconductor technology and electrical machines
- Fundamentals of automation technology e.g. sensors
- Calibration, e.g. of measuring and control devices and sensors
- Measurement technology for electrical and physical variables
- Basics of DDC control
- Types and methods of remote access
- Types and methods of smart home systems
- Basics of building management systems
- Occupational standards, legal requirements, in particular special technical regulations
- Application of manufacturer specifications
- Combustion technology and combustion theory
- Environmentally relevant requirements

Skills: The participant can...

- ...check installed systems and devices for compliance with manufacturer specifications and normative requirements.
- ...in the event of deviations, identify, document and evaluate them.
- ...flush, fill and vent properly installed systems and devices with the required operating fluids.
- ...carry out a leak test.
- ...put systems and devices into operation in accordance with the manufacturer's specifications.
- ...make necessary adjustments and initial settings to the systems and devices.
- ...carry out and monitor necessary trial operations.
- ...carry out necessary measurements, checks and findings for commissioning.
- ...confirm proper commissioning.
- ...ensure compliance with legal requirements and professional standards based on specialist knowledge.

5) The participant is able to optimize the installed devices, machines and systems of installation and building technology.

Knowledge: The participant has a comprehensive, specialized theoretical and factual knowledge and awareness of the limitations of that knowledge of:

- cross-system and cross-device effects, interrelationships and influences
- Types of installation and building technology devices, machines and systems,

- their components, design, equipment, mode of operation and handling
- Safety-related requirements when working with devices, machines and systems in installation and building technology
- Types of measuring and control equipment and their components, how they work and how to use them
- Control and regulation technology
- Function and structure of mechanical, pneumatic (basic knowledge) and hydraulic (basic knowledge), electronic and hybrid control chains and control circuits
- Function and structure of hydraulic circuits in heating and cooling systems
- Types of test methods, their application and procedure
- Methods and application of measurement technology
- Design, function and application of test equipment, measuring devices and their components
- Fundamentals of electrical engineering
- Fundamentals of electronics, e.g. semiconductor technology
- Fundamentals of automation technology, e.g. sensors,
- Fundamentals of electrical machines, e.g. direct current, alternating current and three-phase drives, compressors and fans
- Calibration, e.g. of measuring and control devices and sensors
- Measurement technology for electrical and physical variables
- Basics of DDC control
- Types and methods of remote access
- Types and methods of smart home systems
- Basics of building management systems
- Occupational standards, legal requirements, in particular special technical regulations
- Application of manufacturer specifications
- Combustion technology and theory
- Environmentally relevant requirements

Skills: The participant can...

- ...select suitable measuring devices to record the operating data.
- ...use and operate the measuring devices in a task-specific manner.
- ...read out and document the recorded operating data.
- ...analyze and interpret the documented operating data.
- ...recognize optimization possibilities from the analysis.
- ...develop solutions considering economic, ecological and safety-related aspects.
- ...communicate the developed optimization proposals to the operator in a customer-oriented manner.
- ...implement the agreed optimization proposals.
- ... ensure compliance with legal requirements and professional standards based on specialist knowledge.

6) The participant is able to maintain the installed devices, machines and systems for installation and building technology.

Knowledge: The participant has a comprehensive, specialized theoretical and factual knowledge and awareness of the limitations of that knowledge of:

- Types of installation and building technology devices, machines and systems, their components, design, equipment, mode of operation and handling
- Safety-related requirements when working with devices, machines and systems in installation and building technology
- Types of measuring, control and regulation equipment and their components, how they work and how to use them
- Control and regulation technology
- Function and structure of mechanical, pneumatic and hydraulic, electronic and hybrid control chains and control circuits
- Function and structure of hydraulic circuits in heating and cooling systems
- Types of test methods, their application and procedure
- Methods and application of measurement technology

- Design, function and application of test equipment, measuring devices and their components
- Fundamentals of electrical engineering
- Fundamentals of electronics, e.g. semiconductor technology
- Fundamentals of automation technology, e.g. sensors,
- Fundamentals of electrical machines, e.g. direct current, alternating current and three-phase drives, compressors and fans
- Calibration, e.g. of measuring and control devices and sensors
- Measurement technology for electrical and physical variables
- Basics of DDC control
- Types and methods of remote access
- Types and methods of smart home systems
- Basics of building management systems
- Occupational standards, legal requirements, in particular special technical regulations
- Application of manufacturer specifications
- Combustion technology and theory
- Environmentally relevant requirements

Skills: The participant can...

- ...check systems and devices for compliance with manufacturer specifications and normative requirements.
- ...in the event of deviations, identify, document and evaluate them.
- ...take necessary measures based on the evaluation results, e.g. blocking devices.
- ...diagnose systems and devices during operation and identify maintenance requirements.
- ...carry out maintenance in accordance with the manufacturer's specifications or statutory regulations.
- ...carry out the necessary measurements, inspections and findings for maintenance.
- ...add suitable operating resources as required.
- ...confirm that maintenance has been carried out correctly.
- ... ensure compliance with legal requirements and professional standards based on specialist knowledge.

7) The participant is able to maintain the installed devices, machines and systems for installation and building technology.

Knowledge: The participant has a comprehensive, specialized theoretical and factual knowledge and awareness of the limitations of that knowledge of:

- Types of installation and building technology devices, machines and systems, their components, design, equipment, mode of operation and handling
- Safety-related requirements when working with devices, machines and systems in installation and building technology
- Types of measuring, control and regulation equipment and their components, how they work and how to use them
- Control and regulation technology
- Function and structure of mechanical, pneumatic and hydraulic, electronic and hybrid control chains and control circuits
- Function and structure of hydraulic circuits in heating and cooling systems
- Types of test methods, their application and procedure
- Methods and application of measurement technology
- Design, function and application of test equipment, measuring devices and their components
- Fundamentals of electrical engineering
- Fundamentals of electronics, e.g. semiconductor technology
- Fundamentals of automation technology, e.g. sensors,
- Fundamentals of electrical machines, e.g. direct current, alternating current and three-phase drives, compressors and fans
- Calibration, e.g. of measuring and control devices and sensors
- Measurement technology for electrical and physical variables
- Basics of DDC control
- Types and methods of remote access

- Types and methods of smart home systems
- Basics of building management systems
- Occupational standards, legal requirements, in particular special technical regulations
- Application of manufacturer specifications
- Combustion technology and theory
- Environmentally relevant requirements

Skills: The participant can...

- ...check systems and devices for compliance with manufacturer's specifications and standard specifications.
- ...use the customer's fault description to narrow down troubleshooting.
- ...read out and analyze error messages using the electronic controller systems.
- ...take appropriate measures based on the analysis using the manufacturer's specifications.
- ...select and use suitable measuring devices.
- ...determine, evaluate and analyze switching and control processes in the systems and devices.
- ...find and document faults and/or damage and defects.
- ... ensure compliance with legal requirements and professional standards based on specialist knowledge.

8) The participant is able to rectify faults found and to repair devices, machines and systems in installation and building technology as well as to replace defective structural elements and components.

Knowledge: The participant has a comprehensive, specialized theoretical and factual knowledge and awareness of the limitations of that knowledge of:

- Cross-system and cross-device effects, interrelationships and influences
- Types of installation and building technology devices, machines and systems, their components, design, equipment, mode of operation and handling
- Safety-related requirements when working with devices, machines and systems in installation and building technology
- Types of measuring and control equipment and their components, how they work and how to use them
- Control and regulation technology
- Function and structure of hydraulic circuits in heating and cooling systems
- Fundamentals of electrical engineering
- Fundamentals of automation technology, e.g. sensors, actuators
- Fundamentals of electrical machines, e.g. direct current, alternating current and three-phase drives, compressors and fans
- Types and methods of remote access
- Occupational standards
- Occupational legal requirements, in particular special technical regulations
- Application of manufacturer specifications
- Combustion technology and combustion theory
- Environmentally relevant requirements

Skills: The participant can...

- ...derive suitable steps or measures for troubleshooting based on existing error documentation.
- ...explain the possible measures to the operator in a customer-oriented manner.
- ...rectify faults or repair damage and defects on devices, machines and systems.
- ...identify and organize suitable spare parts.
- ...remove defective parts with the aid of suitable tools and dispose of them properly in consultation with the customer.
- ...install, adjust and check the function of the organized spare part according to the manufacturer's instructions.
- ...create work reports.
- ... ensure compliance with legal requirements and professional standards based on specialist knowledge.

9) The participant is able to carry out renovations of installed devices, machines and systems in installation and building technology.

Knowledge: The participant has a comprehensive, specialized theoretical and factual knowledge and awareness of the limitations of that knowledge of:

- Cross-system and cross-device effects, interrelationships and influences
- Types of installation and building technology devices, machines and systems, their components, design, equipment, mode of operation and handling
- Safety-related requirements when working with devices, machines and systems in installation and building technology
- Types of measuring and control equipment and their components, how they work and how to use them
- Control and regulation technology
- Function and structure of hydraulic circuits in heating and cooling systems
- Fundamentals of electrical engineering
- Fundamentals of automation technology, e.g. sensors, actuators
- Fundamentals of electrical machines, e.g. direct current, alternating current and three-phase drives, compressors and fans
- Types and methods of remote access
- Occupational standards, legal requirements, in particular special technical regulations
- Application of manufacturer specifications
- Combustion technology and theory
- Environmentally relevant requirements

Skills: The participant can...

- ...determine the need to refurbish appliances and systems and communicate this to customers.
- ...select suitable components using calculations.
- ...coordinate or combine components.
- ...take control deviations into account.
- ...assemble the measuring and control equipment and its components.
- ...install electrical and electronic equipment.
- ...read, interpret and use circuit documents and circuit diagrams.
- ...select and use measuring devices for specific tasks.
- ...carry out measurement tasks.
- ...parameterize, set and operate electronic control systems.
- ...configure, adapt and operate software programs for electronic devices, machines and systems.
- ...dimension, select, install, adjust and commission system hydraulics components.
- ...prepare measuring and control devices for commissioning and put them into operation.
- ...ensure compliance with legal requirements and professional standards.

10) The participant is able to document the activities carried out in a professional manner.

Knowledge: The participant has a comprehensive, specialized theoretical and factual knowledge and awareness of the limitations of that knowledge of:

- Types of installation and building technology devices, machines and systems, their components, design, equipment, mode of operation and handling
- Safety-related requirements when working with devices, machines and systems in installation and building technology
- Types of measuring, control and regulation equipment and their components, how they work and how to use them
- Control and regulation technology
- Function and structure of mechanical, pneumatic and hydraulic, electronic and hybrid control chains and control circuits
- Function and structure of hydraulic circuits in heating and cooling systems

- Types of test methods, their application and procedure
- Methods and application of measurement technology
- Design, function and application of test equipment, measuring devices and their components
- Fundamentals of electrical engineering
- Fundamentals of electronics, e.g. semiconductor technology, phase-angle control
- Fundamentals of automation technology, e.g. sensors, actuators
- Fundamentals of electrical machines, e.g. direct current, alternating current and three-phase drives, compressors and fans
- Calibration, e.g. of measuring and control devices and sensors
- Measurement technology for electrical and physical variables
- Basics of DDC control
- Types and methods of remote access
- Types and methods of smart home systems
- Basics of building management systems
- Occupational standards
- Occupational legal requirements, in particular special technical regulations
- Application of manufacturer specifications
- Combustion technology and theory
- Environmentally relevant requirements

Skills: The participant can...

- ...specify and document the work steps relevant to the documentation.
- ...record, document and document the measurement and test results relevant to the documentation.
- ...identify, document and evaluate measurement and test deviations.
- ...apply legally compliant administrative procedures and documentation requirements when identifying defects.
- ...ensure compliance with legal requirements and professional standards.

11) The participant is able to carry out checks and prepare the data for a report.

Knowledge: The participant has a comprehensive, specialized theoretical and factual knowledge and awareness of the limitations of that knowledge of:

- Reporting and documentation of inspections, e.g. inspection reports, findings and final findings, expert opinions, defect reports, usability findings, inspections in accordance with country-specific regulations
- Statutory and needs-based inspection activities and measurements
- Administrative procedures for identifying and rectifying defects
- Cross-system and cross-device effects, correlations and influences
- Types of devices, machines and systems in installation and building technology, their components, structure, equipment, mode of operation and handling
- Safety-related requirements when working on devices, machines and systems in installation and building technology
- Safety equipment in rooms and safety technology on and for installed devices, machines and systems for installation and building technology
- Structural design and installation of installed devices, machines and systems for installation and building technology
- Installation and construction of devices, machines and systems for installation and building technology
- Types of measuring, control and regulation equipment and their components, how they work and how to use them
- Technical documents such as sketches, implementation and detailed plans, manufacturer's specifications and operating instructions, circuit diagrams
- Control and regulation technology
- Function and structure of mechanical, pneumatic (basic knowledge) and hydraulic (basic knowledge), electronic and hybrid control chains and control circuits

- Function and structure of hydraulic circuits in heating and cooling systems
- Types of test methods, their application and procedure
- Methods and application of measurement technology
- Design, function and application of test equipment, measuring devices and their components
- Fundamentals of electrical engineering
- Fundamentals of electronics, e.g. semiconductor technology, phase-angle control
- Fundamentals of automation technology, e.g. sensors, actuators
- Fundamentals of electrical machines, e.g. direct current, alternating current and three-phase drives, compressors and fans
- Calibration, e.g. of measuring and control devices and sensors
- Measurement technology for electrical and physical variables
- Basics of DDC control
- Types and methods of remote access
- Types and methods of smart home systems
- Basics of building management systems
- Occupational standards, legal requirements, in particular special technical regulations
- Application of manufacturer specifications
- Combustion technology and combustion theory
- Environmentally relevant requirements

Skills: The participant can...

- ...check installed systems and devices for compliance with manufacturer specifications and normative requirements.
- ...in the event of deviations, identify, document, and evaluate them.
- ...carry out a leak test.
- ...carry out the necessary measurements, inspections, and usability determinations.
- ...carry out legally prescribed inspection activities on the pipe systems, record, document and analyze their measurement results and subsequently prepare them for legally compliant reporting.
- ...carry out inspections of installed devices, machines and systems in installation and building technology regarding safety, economy and ecology at intervals specified by law, prepare them for legally compliant documentation and explain and present them in a target group-oriented manner.
- ...collect and outline all relevant data and factors influencing the serviceability of devices, machines and systems in installation and building technology regarding their condition and structural state as well as their serviceability and derive the resulting conclusions, prepare them for a report and explain them to the customer.
- ...recognize, specify, record, and document all factors involved in recording a finding or equivalent deviations.
- ...recognize, record, document and analyze the condition and serviceability of installed devices, machines and systems of installation and building technology in the context of cross-system and cross-device effects, correlations, and influences.
- ...carry out and document legally compliant administrative procedures for the detection of defects and damage.
- ...ensure compliance with legal requirements and professional standards.

12) The participant is able to instruct the operator of installed devices, machines and systems of installation and building technology in the correct handling and operation and to advise on maintenance and service requirements.

Knowledge: The participant has a comprehensive, specialized theoretical and factual knowledge and awareness of the limitations of that knowledge of:

- Professional customer advice and customer-oriented communication
- Specialist knowledge of building and installation technology
- Occupational standards
- Occupational legal requirements, in particular special technical regulations
- Environmentally relevant requirements

Skills: The participant can...

- ...train the operator in the handling and operation of installation and building technology devices, machines and systems and provide comprehensive and professional advice on energy efficiency, environmental protection, and safety.
- ...explain and explain to the operator the safety, operational and economic necessity of recurring maintenance and service intervals for installation and building technology devices, machines, and systems in a target group-specific manner.
- ...assign, communicate, and explain the statutory inspections for serviceability, efficiency, emissions and safety and their legal basis as well as the inspection intervals for installed devices, machines and systems in installation and building technology to specific target groups.
- ...create, organize, and interpret the necessary service and maintenance plans and explain them to the operator in a target group-specific manner.
- ...develop, concretize, document and explain solutions for maintenance and service requirements to specific target groups.
- ...interpret the determined technical key figures and communicate them in a target group-specific manner.
- ...explain diagnosed faults and defects to specific target groups.
- ...explain legally compliant administrative procedures and documentation requirements for the detection of defects to specific target groups.
- ...ensure compliance with legal requirements and professional standards.

5. Description of the Curriculum

The modules of the curriculum ...

Module I	“Basics of Thermodynamics, Electrotechnology, Combustion Technology and Heat Generation”
Module II	“Heating technology, domestic hot water, renewable energies”
Module III	“Hydraulics of heating systems, ventilation technology and measurement, control, regulation”
Module IV	“Refrigeration technology”
Module V	“Customer orientation & Time management”

...are defined and standardized. Participation (of at least 75 %) in the courses is required to be eligible to take the examinations. All modules are characterized by theoretical lecture contents and independent self-study work.

The examinations take place via a written examination in each course of each module. The module grades are then calculated via the average course scores of the courses within the respective module. All modules taken together result in the final grade.

Module I “Basics of Thermodynamics, Electrotechnology, Combustion Technology and Heat Generation”

Module title: “Basics of Thermodynamics, Electrotechnology, Combustion Technology and Heat Generation”	
Module Number: 1	Scope: ECTS Credits: 30 / Teaching Units: 400
Level of course unit:	NQR 5
Semester when the course unit is delivered:	Extra-Occupational: First Semester
Subject area:	Installation and Building Technology – Heating Technology
Allocated courses:	I Fundamentals of Thermodynamics II Fundamentals of Electrotechnology III Basics of Combustion Technology and Heat Generation IV Electrotechnical instructed person according to EN 50110-1 V Combustion technology - gaseous fuels VI Combustion technology - solid fuels VII Combustion technology - gaseous liquid fuels VIII Examination Combustion technology - Smoke and exhaust gas measuring element
Prerequisites and corequisites:	None
Guiding idea, methods, and competences acquisition:	<p>The participants are guided through the theory in a targeted manner by means of learning documents. Complicated learning content can be conveyed clearly using audiovisual media, such as videos and presentations. Lectures and exercises on the individual topics complete the wide range of knowledge transfer. After the positive completion of the module the course participants will have knowledge in:</p> <ul style="list-style-type: none"> - Simple electrical engineering, electronics and electrical measurement technology and knowledge of the dangers of electric current - Applied technical mathematics such as length and area calculation, volume and mass calculation, percentage and proportion calculation and physical calculation such as thermal expansion, pressure, power, and efficiency. - Chimneys and exhaust systems and their installation - Properties and use of different fuels
Assessment methods and criteria:	<p>Performance Assessment Methods:</p> <p>The module will be completed with an overall assessment of the module. The performance assessment is based the written examinations of the individual courses within the module. Performance assessment is 100% by written examination paper. Special features of the 2nd and 3rd attempt:</p> <p>The criteria of the 2nd attempt correspond to those of the 1st attempt. The 3rd attempt is to be completed as a board written exam with the criteria of the 2nd attempt.</p>

Course I.I “Fundamentals of Thermodynamics”

Course title: “Fundamentals of Thermodynamics”	
Course unit code: 1.1	Scope: Teaching Unites 38 (2,85 ECTS)
Level of course unit:	NQR 5
Semester when the course unit is delivered:	1 st Semester
Type of course unit – (compulsory/optional)	Compulsory Course
Mode of Delivery	Integrated Course (lecture, case studies, exercises, self-study)
Language	German
Required previous courses	-
Course Contents	<ul style="list-style-type: none"> - Fundamentals and application of thermodynamics (heat transfer, fluid mechanics, technical thermodynamics) - Heat conduction, heat radiation, convection, heat exchanger - Thermodynamic systems and states - First and second law of thermodynamics - specific heat capacities (c, cp, cv, q reversible) - state diagrams (T-s, h-s, p-v, examples) - Circular processes, exergy and anergy - Thermodynamics of ideal gases and mixtures (molar quantities, standard state, mass, volume and mole fractions, gas constant, changes of state) - Thermodynamics of real gases (heat of vaporization, state diagrams and changes) - Combustion (air demand, calorific value, combustion temperature, dew point)
Learning outcomes of the Course Unit	<p>Upon positive completion of the course, participants will be able to...</p> <ul style="list-style-type: none"> ...understand and describe the basic features of energy, mass, and momentum exchange. ...recognize the importance for the application in building technology and in the calculation of energy performance indicators. ...understand and be able to calculate simple circular processes. ...understand and be able to calculate steady-state heat transfer processes. ...be able to apply the continuity equation and Bernoulli's theorem. ...understand and be able to describe the basic principles of energy, mass, and momentum exchange.
Recommended literature	<ul style="list-style-type: none"> - Baehr, H., Kabelac, S.: Thermodynamik – Grundlagen und technische Anwendungen, Springer Vieweg Verlag, in the current version - Weber, G.: Thermodynamik in der Gebäudesystemtechnik: Grundlagen und Anwendung, VDE Verlag, in the current version - Babu, V.: Fundamentals of Engineering Thermodynamics, CRC Press, in the current version

	<ul style="list-style-type: none"> - Weber, G., Weber, J.: Thermodynamik der Energiesysteme, VDE Verlag, in the current version - Berties W.: Übungsbeispiele aus der Wärmelehre, Fachbuchverlag Leipzig, in the current version
Planned learning activities and teaching methods	Didactic and methodological design: <ul style="list-style-type: none"> - Lecture and discussion - Case study - independent repetition
Assessment Method	Written final examination.

Course I.II “Fundamentals of Electrical Engineering”

Course title: “Fundamentals of Electrical Engineering”	
Course unit code: 1.2	Scope: Teaching Unites 38 (2,85 ECTS)
Level of course unit:	NQR 5
Semester when the course unit is delivered:	1 st Semester
Type of course unit – (compulsory/optional)	Compulsory Course
Mode of Delivery	Integrated Course (lecture, case studies, exercises, self-study)
Language	German
Required previous courses	-
Course Contents	<ul style="list-style-type: none"> - Fundamentals of electrical engineering - Fundamentals of measurements technology - Fundamentals of control engineering - Current, voltage, resistance, power and work - Electrical measurement techniques - Safety rules - Electrical troubleshooting of heating and ventilation systems
Learning outcomes of the Course Unit	Upon positive completion of the course, participants will be able to... <ul style="list-style-type: none"> ...understand and can express the basics of electrical power consumption. ...understand and name the application areas and definitions of resistors. ...understand and read circuit diagrams. ...know and understand the safety rules regarding the handling of electricity. ...know and explain the symbols on devices. ...understand electric and magnetic fields, propagation of field states. ...know various technical components (e.g., resistors, capacitors, semiconductors, etc.). ...understand simple electrical networks and electrical properties in sensors. ...understand circuitry, analog and digital circuits
Recommended literature	- Hagmann, G.: Grundlagen der Elektrotechnik, AULA-Verlag, in the current version

	<ul style="list-style-type: none"> - Latschar, M.: The Beginner's Guide to Engineering: Electrical Engineering, CreateSpace Independent Publishing Platform, in the current version - Hacker, V., Sumereder, C.: Electrical Engineering: Fundamentals, De Gruyter Oldenbourg, in the current version
Planned learning activities and teaching methods	Didactic and methodological design: <ul style="list-style-type: none"> - Lecture and discussion - Case study - independent repetition
Assessment Method	Written final examination

Course I.III “Basics of Combustion Technology and Heat Generation”

Course title: “Basics of Combustion Technology and Heat Generation”	
Course unit code: 1.3	Scope: Teaching Unites 38 (2,85 ECTS)
Level of course unit:	NQR 5
Semester when the course unit is delivered:	1 st Semester
Type of course unit – (compulsory/optional)	Compulsory Course
Mode of Delivery	Integrated Course (lecture, case studies, exercises, self-study)
Language	German
Required previous courses	-
Course Contents	<ul style="list-style-type: none"> - Fundamentals of technical combustion - Pollutant formation and mitigation - The future of combustion technology - Fundamentals of heat generation - Combustibles, Boilers, CFD-Simulations
Learning outcomes of the Course Unit	Upon positive completion of the course, participants will be able to... <ul style="list-style-type: none"> ... understand the fundamentals of combustion technology including combustion reaction equations, fuel properties (air demand, heating and calorific values, etc.), exhaust gas composition, combustion rates and flame stabilization and pre-, partially pre- and non-premixed combustion. ... know and describe combustion-related and process emissions, limit values, CO and NO_x formation and prevention, and primary and secondary reduction measures. ... know the background, advantages, and limitations of CFD-simulations. ... are aware of the role of combustion technology in terms of efficiency, decarbonization and “new” fuel-technologies. ... explain origin and hazards of pollutants and limits. ... name the components and functions of a boiler. ... know basic properties and characteristics of solid, liquid and gaseous fuels. ... name safety equipment and recognize the different heating systems and the measures to be taken during troubleshooting

Recommended literature	<ul style="list-style-type: none"> - Joos, F.: Technische Verbrennung: Verbrennungstechnik, Verbrennungsmodellierung, Emissionen. Springer Verlag, in the current Version - Raghavan, V.: Combustion Technology: Essentials of Flames and Burners, Springer Verlag, in the current Version - El-Mahallawy, F., E-Din Habik, S.: Fundamentals and Technology of Combustion, Elsevier Science, in the current valid version - Böckh P., Wetzel T.: Wärmeübertragung: Grundlagen und Praxis, Springer Vieweg Berlin, Heidelberg, in the currently valid version - Beckmann, G., Gilli, P. V.: Thermal Energy Storage: Basics, Design, Applications to Power Generation and Heat Supply (Topics in Energy), Springer Verlag, in the currently valid version
Planned learning activities and teaching methods	<p>Didactic and methodological design:</p> <ul style="list-style-type: none"> - Lecture and discussion - Case study - independent repetition
Assessment Method	Written final examination

Course I.IV “Electrotechnical instructed person according to EN 50110-1”

Course title: “Electrotechnical instructed person according to EN 50110-1”	
Course unit code: 1.4	Scope: Teaching Unites 24 (1,8 ECTS)
Level of course unit:	NQR 5
Semester when the course unit is delivered:	1 st Semester
Type of course unit – (compulsory/optional)	Compulsory Course
Mode of Delivery	Integrated Course (lecture, exercises, self-study)
Language	German
Required previous courses	-
Course Contents	<ul style="list-style-type: none"> - Fundamentals and basic laws of electrical engineering (e.g., Ohm's law, power calculation). - Simple electrical circuits and circuit diagrams - Protective measures according to OVE E 8101 - Simple measurements on electrical installations - Dangers of the electric current - Safety and first aid - Standards, directives, legal principles, safety regulations and environmentally relevant regulations for electrical engineering - Practical exercises
Learning outcomes of the Course Unit	<p>Upon positive completion of the course, participants will be able to...</p> <p>... be an electro-technically instructed person who has been sufficiently instructed by electrical specialists so that he or she can avoid hazards that can be caused by electricity.</p> <p>... have basic electrotechnical knowledge based on a selected theory section and practical exercises.</p>

	<p>... have acquired knowledge of safety regulations and protective measures in the low-voltage range, and have learned about electrotechnical components, materials and tools.</p> <p>... to be considered "electrotechnically instructed persons" in the sense of ÖVE/ÖNORM EN 50110-1 Operation of electrical systems and are therefore allowed to carry out simple recurring electrotechnical work such as connection and disconnection work as part of maintenance. The <u>prerequisite</u> for this is appropriate instruction in the company, which is also documented in writing.</p> <p><i>[More extensive work on electrical systems is <u>reserved</u> only for electrical companies!]</i></p>
Recommended literature	- Standard: ÖVE/ÖNORM EN 50110-1
Planned learning activities and teaching methods	<p>Didactic and methodological design:</p> <ul style="list-style-type: none"> - Lecture and discussion - Case study - independent repetition - practical examples
Assessment Method	Written final examination

Course I.V “Combustion Technology - Gaseous Fuels”

Course title: “Combustion Technology - Gaseous Fuels”	
Course unit code: 1.5	Scope: Teaching Unites 74 (5,55 ECTS)
Level of course unit:	NQR 5
Semester when the course unit is delivered:	1 st Semester
Type of course unit – (compulsory/optional)	Compulsory Course
Mode of Delivery	Integrated Course (lecture, exercises, self-study)
Language	German
Required previous courses	-
Course Contents	<ul style="list-style-type: none"> - Combustion technology application areas - Safety equipment - Gaseous Fuels and Gas supply - Various gas burners, function, characteristics - Gas calorific value - Exhaust systems - Combustion of gaseous fuels - Maintenance and troubleshooting - Application and development in the future - Practical application
Learning outcomes of the Course Unit	<p>Upon positive completion of the course, participants will be able to...</p> <ul style="list-style-type: none"> ... name, know and understand gaseous fuels and combustion devices. ... know and understand safety standards and equipment. ... understand gas supply. ... understand the components, characteristics, and functions of different gas burners.

	<p>... calculate calorific values of various gases.</p> <p>... transfer theoretical knowledge to solve problems.</p> <p>... know about exhaust systems.</p> <p>... carry out various maintenance steps and troubleshooting methods including adjustment work.</p> <p>... knows about gas monitoring.</p> <p>... knows about the future applications, development and changes of gaseous fuels and their application in combustion technology.</p>
Recommended literature	<p>- Gumz, W.: Kurzes Handbuch der Brennstoff- und Feuerungstechnik. Springer Verlag, in the current Version</p> <p>- Joos, F.: Technische Verbrennung: Verbrennungstechnik, Verbrennungsmodellierung, Emissionen. Springer Verlag, in the current Version</p>
Planned learning activities and teaching methods	<p>Didactic and methodological design:</p> <ul style="list-style-type: none"> - Lecture and discussion - Case study - independent repetition - practical examples
Assessment Method	Written final examination

Course I.VI “Combustion Technology - Solid Fuels”

Course title: “Combustion Technology - Solid Fuels”	
Course unit code: 1.6	Scope: Teaching Unites 74 (5,55 ECTS)
Level of course unit:	NQR 5
Semester when the course unit is delivered:	1 st Semester
Type of course unit – (compulsory/optional)	Compulsory Course
Mode of Delivery	Integrated Course (lecture, exercises, self-study)
Language	German
Required previous courses	Course I.V “Combustion Technology – Gaseous Fuels”
Course Contents	<ul style="list-style-type: none"> - Combustion technology application areas - Safety equipment - Solid Fuels, characteristics - Heating and ignition - heat and mass transfer - Calorific values - Combustion of solid fuels - Maintenance and troubleshooting - Application and development in the future - Practical application
Learning outcomes of the Course Unit	<p>Upon positive completion of the course, participants will be able to...</p> <p>... name. know and understand solid fuels and combustion devices.</p> <p>... know and understand safety standards and equipment.</p> <p>... understand the characteristics of solid fuels.</p> <p>... calculate calorific values of various solid fuels.</p>

	<p>... transfer theoretical knowledge to solve problems.</p> <p>... know about heating and ignition methods.</p> <p>... carry out various maintenance steps and troubleshooting methods including adjustment work.</p> <p>... knows about the future applications, development and changes of solid fuels and their application in combustion technology.</p>
Recommended literature	<p>- Gumz, W.: Kurzes Handbuch der Brennstoff- und Feuerungstechnik. Springer Verlag, in the current Version</p> <p>- Joos, F.: Technische Verbrennung: Verbrennungstechnik, Verbrennungsmodellierung, Emissionen. Springer Verlag, in the current Version</p>
Planned learning activities and teaching methods	<p>Didactic and methodological design:</p> <ul style="list-style-type: none"> - Lecture and discussion - Case study - independent repetition - practical examples
Assessment Methods and Criteria	<p>Written final examination.</p> <p>(The whole module is concluded with an overall assessment of the module.)</p>

Course I.VII “Combustion Technology - Liquid Fuels”

Course title: “Combustion Technology - Liquid Fuels”	
Course unit code: 1.7	Scope: Teaching Unites 74 (5,55 ECTS)
Level of course unit:	NQR 5
Semester when the course unit is delivered:	1 st Semester
Type of course unit – (compulsory/optional)	Compulsory Course
Mode of Delivery	Integrated Course (lecture, exercises, self-study)
Language	German
Required previous courses	<p>Course I.V “Combustion Technology – Gaseous Fuels”</p> <p>Course I.VI “Combustion Technology – Solid Fuels”</p>
Course Contents	<ul style="list-style-type: none"> - Combustion technology application areas - Safety equipment - Characteristics of liquid fuels - Combustion of liquid fuels - Provision of fuel oil - Oil burner connections - Various oil burners - Calorific value of oil - Exhaust systems - Maintenance and troubleshooting - Application and development in the future - Practical application
Learning outcomes of the Course Unit	<p>Upon positive completion of the course, participants will be able to...</p> <p>... name. know and understand liquid fuels and combustion devices.</p>

	<p>... know and understand safety standards and equipment.</p> <p>... understand the characteristics of liquid fuels.</p> <p>... calculate calorific values of various liquid fuels.</p> <p>... transfer theoretical knowledge to solve problems.</p> <p>... carry out various maintenance steps and troubleshooting methods including adjustment work.</p> <p>... knows about the future applications, development and changes of gaseous fuels and their application in combustion technology.</p>
Recommended literature	<p>- Gumz, W.: Kurzes Handbuch der Brennstoff- und Feuerungstechnik. Springer Verlag, in the current Version</p> <p>- Joos, F.: Technische Verbrennung: Verbrennungstechnik, Verbrennungsmodellierung, Emissionen. Springer Verlag, in the current Version</p> <p>- Lucka, K. & Köhne, H.: 6. Aachener Ölwärme-Kolloquium (Berichte aus der Verbrennungstechnik). Shaker. in the current Version</p>
Planned learning activities and teaching methods	<p>Didactic and methodological design:</p> <ul style="list-style-type: none"> - Lecture and discussion - Case study - independent repetition - practical examples
Assessment Method	Written final examination

Course I.VIII “Examination Combustion Technology - Smoke and exhaust gas measuring element”

Course title: “Examination Combustion Technology - Smoke and exhaust gas measuring element”	
Course unit code: 1.8	Scope: Teaching Unites 40 (3 ECTS)
Level of course unit:	NQR 5
Semester when the course unit is delivered:	1 st Semester
Type of course unit – (compulsory/optional)	Compulsory Course
Mode of Delivery	Integrated Course (lecture, exercises, self-study)
Language	German
Required previous courses	<p>Course I.V “Combustion Technology – Gaseous Fuels”</p> <p>Course I.VI “Combustion Technology – Solid Fuels”</p> <p>Course I.VI “Combustion Technology – Liquid Fuels”</p>
Course Contents	<p>Refreshing of contents of courses I.V; I.VI; I.VII; e.g.</p> <ul style="list-style-type: none"> - Combustion process - Basics of thermodynamics - Dimensions and units - Construction and firing technology - Fuel storage rooms - Design of boilers and burners - Safety engineering - Emissions and measures for emission reduction - Flue gas measurement in biomass plants

	<ul style="list-style-type: none"> - Regulations, Standards and their application - Heat demand calculation - Metrology - Combustion Plant Ordinance - Measuring devices - Practical realization of measurement - Issue of verification reports
Learning outcomes of the Course Unit	<p>Upon positive completion of the course and examination, participants will be able to...</p> <p>... know and understand all occupational and legal regulations and standards necessary for the maintenance or inspection of boilers.</p>
Recommended literature	See courses I.V; I.VI; I.VII
Planned learning activities and teaching methods	<p>Didactic and methodological design:</p> <ul style="list-style-type: none"> - Lectures and discussion - independent repetition - practical examples
Assessment Method	Written final examination

Module II “Heating technology, domestic hot water, renewable energies”

Module title: “Heating technology, domestic hot water, renewable energies”	
Module Number: 2	Scope: ECTS Credits: 15 / Teaching Units: 200
Level of course unit:	NQR 5
Semester when the course unit is delivered:	Extra-Occupational: Second Semester
Subject area:	Installation and Building Technology – Heating Technology
Allocated courses:	I Fundamentals of Heating Technology II Fundamentals of Domestic Hot Water Technology III Renewable Energy: Heating Pumps IV Renewable Energy: Solar V Renewable Energy: Photovoltaic
Prerequisites and corequisites:	Module I
Guiding idea, methods, and competences acquisition:	<p>The participants are guided through the theory in a targeted manner by means of learning documents. Complicated learning content can be conveyed clearly using audiovisual media, such as videos and presentations. Lectures and exercises on the individual topics complete the wide range of knowledge transfer. After the positive completion of the module the course participants will have knowledge in:</p> <ul style="list-style-type: none"> - Heating technology - Domestic hot water technology. - Renewable energy and the application of heating pumps, solar and photovoltaic
Assessment methods and criteria:	<p>Performance Assessment Methods:</p> <p>The module will be completed with an overall assessment of the module. The performance assessment is based on a written examination (module examination).</p> <p>Performance assessment is 100% by written examination paper. Special features of the 2nd and 3rd attempt:</p> <p>The criteria of the 2nd attempt correspond to those of the 1st attempt. The 3rd attempt is to be completed as a board written exam with the criteria of the 2nd attempt.</p>

Course II.I “Fundamentals of Heating Technology”

Course title: “Fundamentals of Heating Technology”	
Course unit code: 2.1	Scope: Teaching Unites 40 (3 ECTS)
Level of course unit:	NQR 5
Semester when the course unit is delivered:	2 nd Semester
Type of course unit	Compulsory Course
Mode of Delivery	Integrated Course (lecture, case studies, exercises, self-study)
Language	German
Required previous courses	Module I
Course Contents	<ul style="list-style-type: none"> - Hygienic basics of heating technology - General basics and terms - Physical basics of heating technology - Calculation and explanation of heating pump - Energy supply and distribution - Heating load calculation (ÖNORM EN 12831) - Condensing technology - Hydronic balancing - Heating valve technology - Ecodesign and energy label - Fuels, combustion technology, efficiencies
Learning outcomes of the Course Unit	<p>Upon positive completion of the course, participants will be able to...</p> <ul style="list-style-type: none"> ... know, calculate and explain heating technology. ... differentiate between pumps and reproduce the technical data of the pumps. ... can adapt heating pumps to the specific conditions. ... know and are able to explain relevant terms. ... can calculate heating loads. ... know the basic structure of heating systems and of heating technology systems. ... can implement hydronic balancing ... can calculate hydronic balancing
Recommended literature	<ul style="list-style-type: none"> - Ziegler, S.: Wärmepumpen - Komplettpaket für Einsteiger: Technik, Planung bis Inbetriebnahme, Förderung und Kosten mit Praxisbeispielen sowie Checkliste. Published.Just.4U. - Blickle, S. & Flegel, R. & Grevenstein, H.: Fachkunde Installations- und Heizungstechnik: Grundlagen & Lernfelder 1 – 15. Europa-Lehrmittel. in the currently valid version - Tiator, F.: Heizungsanlagen (Sanitär - Heizung - Klima). Vogel Communications Group GmbH +Co KG. in the currently valid version
Planned learning activities and teaching methods	<p>Didactic and methodological design:</p> <ul style="list-style-type: none"> - Lecture and discussion - Case study - independent repetition
Assessment Methods and Criteria	Written final examination.

Course II.II “Fundamentals of Domestic Hot Water Supply”

Course title: “Fundamentals of Domestic Hot Water Supply”	
Course unit code: 2.2	Scope: Teaching Unites 40 (3 ECTS)
Level of course unit:	NQR 5
Semester when the course unit is delivered:	2 nd Semester
Type of course unit –	Compulsory Course
Mode of Delivery	Integrated Course (lecture, case studies, exercises, self-study)
Language	German
Required previous courses	Course II.I
Course Contents	<ul style="list-style-type: none"> - Design of domestic hot water systems - Determining energy requirement for domestic hot water - Domestic hot water heating systems - Domestic hot water heating - Procedure for shutting off, depressurizing and restarting domestic hot water systems - Various repair techniques and required tools - Design and function of boilers - Principle of district heating - Pipes for cold and hot water and circulation - Centralized and decentralized domestic hot water systems - Basics of dimensioning - Circulation systems
Learning outcomes of the Course Unit	<p>Upon positive completion of the course, participants will be able to...</p> <p>... know about various standards and know about hygiene, maintenance and service.</p> <p>... are able to explain the specifications of various boilers.</p> <p>... know centralized and decentralized domestic hot water systems.</p> <p>... know basics about repairing these systems.</p>
Recommended literature	<ul style="list-style-type: none"> - Herman, G.: Heizung und Warmwasser: Modernisieren, berechnen, planen. Verbraucher-Zentrale Nieders. In the currently valid version. - Kemper, H.: "Die Heiz- und Lüftungsanlagen in den verschiedenen Gebäudearten einschließlich Warmwasserversorgungs-, Befeuchtungs-, Entnebelungs- und Klimaanlage". Springer. In the currently valid version.
Planned learning activities and teaching methods	<p>Didactic and methodological design:</p> <ul style="list-style-type: none"> - Lecture and discussion - Case study - independent repetition
Assessment Methods and Criteria	Written final examination.

Course II.III “Renewable Energy: Heating Pumps”

Course title: “Renewable Energy: Heating Pumps”	
Course unit code: 2.3	Scope: Teaching Unites 40 (3 ECTS)
Level of course unit:	NQR 5
Semester when the course unit is delivered:	2 nd Semester
Type of course unit – (compulsory/optional)	Compulsory Course
Mode of Delivery	Integrated Course (lecture, case studies, exercises, self-study)
Language	German
Required previous courses	-
Course Contents	<ul style="list-style-type: none"> - Renewable energy – Basics and outlook - Laws and regulations on health, safety and environmental protection. - Standards and safety when handling refrigerants, personal protective equipment. - Components and functionality of refrigeration circuits - Refrigerants and environmental influences - Heat pump technologies - Performance and annual coefficient of performance calculation - Planning heat sources and regulations - Laws and standards as well as funding guidelines - Dimensioning and planning of heat pumps in accordance with ÖNORM H 5151 and their hydraulic integration - Combination of heat pumps with solar thermal or photovoltaic systems
Learning outcomes of the Course Unit	<p>Upon positive completion of the course, participants will be able to...</p> <ul style="list-style-type: none"> ... know the basics of heat pump technology. ... know and explain the components of heat pumps ... explain how they work in refrigeration circuits ... know various refrigerants and their environmental impact on heat pump heating. ... know the basics of planning heat pumps and their heat sources. ... know the applicable regulations, laws and standards for issuing the necessary certificates. ... know types of heat pump technologies and all components ... understand the basics of heat pump applications and classify systems ... plan and dimension heat pump systems
Recommended literature	<ul style="list-style-type: none"> - Schramek, E., Recknagel, H., Sprenger, E.: Taschenbuch für Heizung + Klimatechnik. Oldenburg Industrieverlag, in the currently valid version - Quaschnig, V.: Erneuerbare Energien und Klimaschutz. Hanser Verlag, in the currently valid version

Planned learning activities and teaching methods	Didactic and methodological design: - Lecture and discussion - Case study - independent repetition
Assessment Methods and Criteria	Written final examination.

Course II.IV “Renewable Energy: Solar”

Course title: “Renewable Energy: Solar”	
Course unit code: 2.4	Scope: Teaching Unites 40 (3 ECTS)
Level of course unit:	NQR 5
Semester when the course unit is delivered:	2 nd Semester
Type of course unit – (compulsory/optional)	Compulsory Course
Mode of Delivery	Integrated Course (lecture, case studies, exercises, self-study)
Language	German
Required previous courses	Course II.III
Course Contents	<ul style="list-style-type: none"> - Renewable energy – Basics and outlook - Laws and regulations on health, safety and environmental protection. - Standards and safety, personal protective equipment. - General principles of solar energy technology and systems - Collector technology - Components in solar energy technology - Domestic hot water demand - Building integration - Solar domestic hot water systems in different house systems - Solar combination systems in different house systems - Solar thermal systems in different house systems - Theory and practical application
Learning outcomes of the Course Unit	<p>Upon positive completion of the course, participants will be able to...</p> <ul style="list-style-type: none"> ... understand the basics of solar and utilization ... know types of solar thermal systems and components ... apply the basics of solar thermal energy ... know and explain solar systems for the production of hot water, heating and cooling ... know technical operation, economic efficiency and system integration ... evaluate the possibilities of solar energy utilization ... plan and dimension solar thermal systems
Recommended literature	<ul style="list-style-type: none"> - Holmes, P. & Mohile, S.: Solar Power for Beginners: How to Design and Install the Best Solar Power System for Your Home. Independently published. In the currently valid version. - Knobloch, M.: Modellierung einer Erdwärmepumpe mit solarer Unterstützung: Verschiedene solare Einspeisemöglichkeiten in Kombination mit einer Erdwärmepumpe am

	Beispiel eines Einfamilienhauses. DM Verlag. In the currently valid version.
Planned learning activities and teaching methods	Didactic and methodological design: - Lecture and discussion - Case study - independent repetition
Assessment Methods and Criteria	Written final examination.

Course II.V “Renewable Energy: Photovoltaic”

Course title: “Renewable Energy: Photovoltaic”	
Course unit code: 2.5	Scope: Teaching Unites 40 (3 ECTS)
Level of course unit:	NQR 5
Semester when the course unit is delivered:	2 nd Semester
Type of course unit – (compulsory/optional)	Compulsory Course
Mode of Delivery	Integrated Course (lecture, case studies, exercises, self-study)
Language	German
Required previous courses	Course II.III & Course II.IV
Course Contents	<ul style="list-style-type: none"> - Renewable energy – Basics and outlook - Laws and regulations on health, safety and environmental protection. - Standards and safety, personal protective equipment. - Planning-specific properties of components - Mounting systems and statics - Standards and guidelines for approval and installation (fire protection, lightning protection, overvoltage protection ...) - Storage systems and battery systems (emergency power, blackout ...) - System coordination - Load profiles (self-consumption and self-sufficiency, e-mobility, power to heat ...) - Project planning using a simulation program - Costs and economic efficiency are examined in depth using examples
Learning outcomes of the Course Unit	<p>Upon positive completion of the course, participants will be able to...</p> <p>...know the standard-compliant installation of grid-connected photovoltaic and battery systems.</p> <p>...know the basics of planning and project management using a simulation program for grid-connected photovoltaic and battery systems.</p> <p>...know and apply the relevant standards and guidelines for approval and installation</p>
Recommended literature	<ul style="list-style-type: none"> - Mertens K.: Photovoltaik: Lehrbuch zu Grundlagen, Technologie und Praxis. Carl Hanser Verlag GmbH & Co. KG, in the currently valid version. - Kofler, M. & Offenheuser, C.:

	Photovoltaik: Praxisbuch mit Grundlagen für Planung und Installation: Technik, Fördermöglichkeiten, Kosten und Umsetzung. Rheinwerk Computing. in the currently valid version.
Planned learning activities and teaching methods	Didactic and methodological design: - Lecture and discussion - Case study - independent repetition
Assessment Methods and Criteria	Written final examination.

Module III “Heating systems hydraulics, Ventilation Technology, Measurement, control, regulation”

Module title: “Heating systems hydraulics, Ventilation Technology, Measurement, control, regulation”	
Module Number: 3	Scope: ECTS Credits: 15 / Teaching Units: 200
Level of course unit:	NQR 5
Semester when the course unit is delivered:	Extra-Occupational: Second Semester
Subject area:	Installation and Building Technology
Allocated courses:	I Hydraulics of heating systems and their balancing II Basics of ventilation technology III Measurement, control, regulation (practice)
Prerequisites and corequisites:	Module I and Module II
Guiding idea, methods, and competences acquisition:	<p>The participants are guided through the specialist theory in a targeted manner by means of learning documents. Complicated learning content can be conveyed clearly using audiovisual media, such as videos and presentations. Lectures and exercises on the individual topics complete the wide range of knowledge transfer.</p> <p>After the positive completion of the module the course participants will have knowledge in:</p> <ul style="list-style-type: none"> - Hydraulics of Heating technology - Ventilation Technology. - Practical experience in measurement, control and regulation
Assessment methods and criteria:	<p>Performance Assessment Methods:</p> <p>The module will be completed with an overall assessment of the module.</p> <p>The performance assessment is based on a written examination (module examination).</p> <p>Performance assessment is 100% by written examination paper.</p> <p>Special features of the 2nd and 3rd attempt:</p> <p>The criteria of the 2nd attempt correspond to those of the 1st attempt. The 3rd attempt is to be completed as a board written exam with the criteria of the 2nd attempt.</p>

Course III.I “Hydraulics of heating systems and their balancing”

Course title: “Hydraulics of heating systems and their balancing”	
Course unit code: 3.1	Scope: Teaching Unites 40 (3 ECTS)
Level of course unit:	NQR 5
Semester when the course unit is delivered:	2 nd Semester
Type of course unit – (compulsory/optional)	Compulsory Course
Mode of Delivery	Integrated Course (lecture, case studies, exercises, self-study)
Language	German
Required previous courses	-
Course Contents	<ul style="list-style-type: none"> - Basics of heating technology - Comfortability - Physical basics - Types of heat generators - Basic hydraulic components - Circulation pumps - Safety components - Fittings - Actuators - Heat output systems (radiator, floor and wall heating systems) - Basic hydraulic circuits and distribution technology - Fundamentals of valve design and the heating medium - Hydraulic circuits of various energy generation systems (oil, gas with solar, biomass and heat pumps) - Delay, load balancing and buffer tank designs
Learning outcomes of the Course Unit	<p>Upon positive completion of the course, participants will be able to...</p> <p>... combine theoretical input with practical knowledge</p> <p>... know the basics of heating system technology and hydraulic balancing.</p> <p>... know all about the structure and function of heat generation systems as well as their energy-saving potential and the integration of renewable energies (solar, biomass and heat pumps).</p> <p>... gain experience in practical application.</p>
Recommended literature	- Anderer, R. et al. Fachkunde Sanitär-, Heizungs- und Klimatechnik: Grundlagen & Lernfelder 1 – 15. Europa-Lehrmittel. In the currently valid version.
Planned learning activities and teaching methods	<p>Didactic and methodological design:</p> <ul style="list-style-type: none"> - Lecture and discussion - Case study - independent repetition
Assessment Methods and Criteria	Written final examination.

Course III.II “Fundamentals of Ventilation Technology”

Course title: “Fundamentals of Ventilation Technology”	
Course unit code: 3.2	Scope: Teaching Unites 40 (3 ECTS)
Level of course unit:	NQR 5
Semester when the course unit is delivered:	2 st Semester
Type of course unit – (compulsory/optional)	Compulsory Course
Mode of Delivery	Integrated Course (lecture, case studies, exercises, self-study)
Language	German
Required previous courses	-
Course Contents	<ul style="list-style-type: none"> - Basic concepts ventilation technology and comfortability - Areas of application - Air exchange rates and air distribution. - Controlled ventilation - Basics of ventilation technology, room air routing, air supply, air discharge - Air conditioning and ventilation components - Types of heat recovery in ventilation systems - Heating and cooling with ventilation systems - Design criteria and dimensioning of centralized and decentralized systems - Volume flow control - Operating strategies, various air conditioning systems and design technology - Efficient energy utilization - Standards
Learning outcomes of the Course Unit	<p>Upon positive completion of the course, participants will be able to...</p> <ul style="list-style-type: none"> ...know the structure of ventilation systems. ...know the most important components and concepts. ...know the relevant norms and regulations. ...know about air routing, supply and discharge. ...know about design and dimensioning criteria. ...understand and apply the basics of ventilation systems. ...understand all the main components of a ventilation system.
Recommended literature	- Trogisch, A. & Reichel, M.: Planungshilfen Lüftungstechnik. VDE VERLAG GmbH. In the currently valid version.
Planned learning activities and teaching methods	<p>Didactic and methodological design:</p> <ul style="list-style-type: none"> - Lecture and discussion - Case study - independent repetition
Assessment Methods and Criteria	Written final examination.

Course III.III “Measurement, control, regulation”

Course title: “Measurement, control, regulation”	
Course unit code: 3.3	Scope: Teaching Unites 120 (9 ECTS)

Level of course unit:	NQR 5
Semester when the course unit is delivered:	2 nd Semester
Type of course unit – (compulsory/optional)	Compulsory Course
Mode of Delivery	Integrated course focused on practical experience (lecture, case studies, exercises, self-study)
Language	German
Required previous courses	-
Course Contents	<ul style="list-style-type: none"> - Basics of electrical engineering and measurement technology - Basics of electronics - Basics of digital technology - Control and regulation technology - Basics of automation technology - PLC programming - Protective measures - Electrical machines - Relevant Terms and components - Norms, guidelines and standards - Circuit diagrams and wiring - Practical troubleshooting
Learning outcomes of the Course Unit	<p>Upon positive completion of the course, participants will be able to...</p> <ul style="list-style-type: none"> ... know basic of electrical engineering and electronics. ... carry out simple measurement tasks. ... undergo troubleshooting in simple circuits. ... distinguish between control and regulation. ... solve simple problems with controllers and regulators. ... read and evaluate circuit diagrams and wiring of control and ventilation systems. ...know definitions and examples of control and regulating elements. ...carry out settings on flow controls. ...make presetting on thermostatic valves and know the advantages and disadvantages.
Recommended literature	<ul style="list-style-type: none"> - Böttle, P. et al. Elektrische Mess- und Regelungstechnik. Vogel Communications Group GmbH +Co KG. in the currently valid version. - Reichenwein, J. et al. Messen, Regeln und Steuern: Grundoperationen der Prozessleittechnik. Wiley-VCH. in the currently valid version.
Planned learning activities and teaching methods	<p>Didactic and methodological design:</p> <ul style="list-style-type: none"> - Lecture and discussion - Case study - independent repetition
Assessment Methods and Criteria	Written final examination and practical test.

Module IV “Refrigeration technology”

Module title: “Refrigeration Technology”	
Module Number: 4	Scope: ECTS Credits: 20 / Teaching Units: 180
Level of course unit:	NQR 5
Semester when the course unit is delivered:	Extra-Occupational: Third Semester and fourth Semester
Subject area:	Installation and Building Technology
Allocated courses:	I Fundamentals of Refrigeration Technology II Final apprenticeship examination Refrigeration Technology
Prerequisites and corequisites:	Module I, Module II, Module III
Guiding idea, methods, and competences acquisition:	<p>The participants are guided through the specialist theory in a targeted manner by means of learning documents. Complicated learning content can be conveyed clearly using audiovisual media, such as videos and presentations. Lectures and exercises on the individual topics complete the wide range of knowledge transfer.</p> <p>After the positive completion of the module the course participants will have knowledge in:</p> <ul style="list-style-type: none"> - Refrigeration Technology - Completed final apprenticeship examination of refrigeration technology
Assessment methods and criteria:	<p>Performance Assessment Methods:</p> <p>The module will be completed with an overall assessment of the module. The performance assessment is based on a written examination (module examination).</p> <p>Performance assessment is 100% by written examination paper. Special features of the 2nd and 3rd attempt:</p> <p>The criteria of the 2nd attempt correspond to those of the 1st attempt. The 3rd attempt is to be completed as a board written exam with the criteria of the 2nd attempt.</p>

Course IV.I “Fundamentals of Refrigeration Technology”

Course title: “Fundamentals of Refrigeration Technology”	
Course unit code: 4.1	Scope: Teaching Unites 180 (15 ECTS)
Level of course unit:	NQR 5
Semester when the course unit is delivered:	3 rd Semester
Type of course unit – (compulsory/optional)	Compulsory Course
Mode of Delivery	Integrated Course (lecture, case studies, exercises, self-study)
Language	German
Required previous courses	-
Course Contents	<ul style="list-style-type: none"> - Theory and practical exercises with regard to the requirements of the final examination - Safety-related knowledge - Laws and regulations - Test and system logbook - Handling refrigerants - Physics and thermodynamics - System components of refrigeration systems - Environmental impact of refrigerants - Leakage checks and pressure tests - Installation, commissioning and maintenance of compressors, condensers, evaporators, thermostatic expansion valves - Electrical and control technology for refrigeration systems - Compound system technology, control technology - Soldering, bending and flanging
Learning outcomes of the Course Unit	<p>Upon positive completion of the course, participants will be able to...</p> <p>...depending on other requirements, take the final apprenticeship examination.</p> <p>... build, install, maintain and repair mechanically or electronically controlled refrigeration machines and systems.</p> <p>... install, program and maintain air conditioning equipment such as air conditioning systems, ventilation systems and heat pumps as well as refrigeration and air conditioning measurement, control and regulation equipment.</p> <p>... process pipes made of copper, steel, iron or aluminum, e.g. by welding, soldering and screwing, using soldering irons, welding equipment and cutting machines.</p>
Recommended literature	<ul style="list-style-type: none"> - Subbiah M.: Grundlagen der Kältetechnik: Kältetechnik. Verlag Unser Wissen. In the currently valid version. - Planck, E. & Schmidt, D.: Kälteanlagentechnik in Fragen und Antworten (Set): Arbeits- und Übungsbuch mit Aufgaben und Lösungen, Set bestehend aus: Band 1: Grundlagen, Band 2: Fachwissen. VDE VERLAG GmbH. In the currently valid version

Planned learning activities and teaching methods	Didactic and methodological design: - Lecture and discussion - Case study - independent repetition
Assessment Methods and Criteria	Written final examination.

Course IV.II “Final apprenticeship examination Refrigeration Technology”

Course title: “Fundamentals of Refrigeration Technology”	
Course unit code: 4.1	Scope: Teaching Unites 0 (5 ECTS)
Level of course unit:	NQR 5
Semester when the course unit is delivered:	4 th Semester
Type of course unit – (compulsory/optional)	Compulsory Course
Mode of Delivery	Self-study
Language	German
Required previous courses	Course IV.I
Course Contents	Self-study repetition and preparation for the final apprenticeship exam in Refrigeration Technology.
Learning outcomes of the Course Unit	Upon positive completion of the course, participants will be able to... ...n.a.
Recommended literature	- Subbiah M.: Grundlagen der Kältetechnik: Kältetechnik. Verlag Unser Wissen. In the currently valid version. - Planck, E. & Schmidt, D.: Kälteanlagentechnik in Fragen und Antworten (Set): Arbeits- und Übungsbuch mit Aufgaben und Lösungen, Set bestehend aus: Band 1: Grundlagen, Band 2: Fachwissen. VDE VERLAG GmbH. In the currently valid version
Planned learning activities and teaching methods	Didactic and methodological design: - independent repetition
Assessment Methods and Criteria	Written and oral final examination.

Module V “Customer orientation & Time management”

Module title: “Customer orientation & Time management”	
Module Number: 5	Scope: ECTS Credits: 8 / Teaching Units: 64
Level of course unit:	NQR 5
Semester when the course unit is delivered:	Extra-Occupational: Fourth Semester
Subject area:	Installation and Building Technology
Allocated courses:	I Customer Orientation II Time Management
Prerequisites and corequisites:	Module I, Module II, Module III, Module IV
Guiding idea, methods, and competences acquisition:	<p>The participants are guided through the specialist theory in a targeted manner by means of learning documents. Complicated learning content can be conveyed clearly using audiovisual media, such as videos and presentations. Lectures and exercises on the individual topics complete the wide range of knowledge transfer.</p> <p>After the positive completion of the module the course participants will have knowledge in:</p> <ul style="list-style-type: none"> - Customer Orientation - Time Management
Assessment methods and criteria:	<p>Performance Assessment Methods:</p> <p>The module will be completed with an overall assessment of the module. The performance assessment is based on a written examination (module examination).</p> <p>Performance assessment is 100% by written examination paper.</p> <p>Special features of the 2nd and 3rd attempt:</p> <p>The criteria of the 2nd attempt correspond to those of the 1st attempt. The 3rd attempt is to be completed as a board written exam with the criteria of the 2nd attempt.</p>

Course V.I “Customer Orientation”

Course title: “Customer Orientation”	
Course unit code: 5.1	Scope: Teaching Unites 40 (5 ECTS)
Level of course unit:	NQR 5
Semester when the course unit is delivered:	4 th Semester
Type of course unit – (compulsory/optional)	Compulsory Course
Mode of Delivery	Integrated Course (lecture, case studies, exercises, self-study)
Language	German
Required previous courses	-
Course Contents	<ul style="list-style-type: none"> - Sharpening self-awareness - how I come across to the customer - Understanding customers - confident, conscious and goal-oriented communication with different types of customers - Building customer relationships through active-constructive conversation - De-escalating conversation techniques - Dealing with objections and pretexts - Basic psychological patterns of people - Using (body) language correctly - Sensory-specific communication - Recognizing customer motives - Good questions as the basis for sales success - Understanding needs through effective questioning - Present effectively and conclude with determination
Learning outcomes of the Course Unit	<p>Upon positive completion of the course, participants will be able to...</p> <ul style="list-style-type: none"> ... deal with customers and know how to actively listen. ... understand the customers needs and motives. ... know how to apply which questions are particularly effective in sales talks ... know about how to exceed the customers' expectations with customer-oriented behavior.
Recommended literature	To be announced by the trainer.
Planned learning activities and teaching methods	<p>Didactic and methodological design:</p> <ul style="list-style-type: none"> - Lecture and discussion - Case study - independent repetition
Assessment Methods and Criteria	Written or oral final examination.

Course V.II “Time Management”

Course title: “Time Management”	
Course unit code: 5.2	Scope: Teaching Unites 24 (3 ECTS)
Level of course unit:	NQR 5
Semester when the course unit is delivered:	4 th Semester
Type of course unit – (compulsory/optional)	Compulsory Course
Mode of Delivery	Integrated Course (lecture, case studies, exercises, self-study)
Language	German
Required previous courses	-
Course Contents	<ul style="list-style-type: none"> - Analysis of the participants situation. - Development of an individual time management system - Define concrete goals and strive towards a goal-oriented manner - Set priorities and long-term targets - Develop realistic time and deadline management - Minimize disruptive factors - Standardizing work processes - Strategies for coping with stress
Learning outcomes of the Course Unit	<p>Upon positive completion of the course, participants will be able to...</p> <ul style="list-style-type: none"> ... reflect on their working style. ... know how to improve their working techniques. ... know how to complete tasks on time. ... know various strategies for coping with stress. ... learn how to work more efficiently with different customers.
Recommended literature	Will be provided by the trainer.
Planned learning activities and teaching methods	<p>Didactic and methodological design:</p> <ul style="list-style-type: none"> - Lecture and discussion - Case study - independent repetition
Assessment Methods and Criteria	Written or oral final examination.