Product 2

Curriculum and learning materials for the Master craftsman training

A1 Practical training for the respective occupation (in the project: Electrical Engineering)

A2 Subject theory for the respective occupation (in the project: Electrical Engineering)

A3 Business administration, law and management – uniform for all occupations

A4 Vocational and occupational education knowledge – uniform for all occupations

Languages

- The entire text – in English
- The part – Recommendations for the application of the framework curriculum with time table – in English, German and Polish

Partners involved in the work

Hanse Parlament

Chamber of Crafts Dresden

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Master craftsman training in Electrical Engineering in Baltic Sea region – Curriculum -

Contents

1. Overview and concept[1]

Master craftsman training (further in the text also master training) is widely different in the Baltic Sea regioncountries, 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 program. Another aim is to increase the efficiency and the competitiveness of SMEs by promoting the realisation of the dual vocational training.
Based on the German master craftsman training and the experience of further Baltic Sea regioncountries, a concept for unified master training for the entire Baltic Sea regionhas been developed.

As part of the project, the uniform master craftsman training was developed and implemented by the profession of electrical engineering as an example. The present curriculum applies to the master craftsman training in electrical engineering, for the use in other occupations, the curriculum for Parts A1 and A2 should be created for the specific profession anew.
Given the existing major differences in the current master craftsman training programmes in the various Baltic Sea countries, a uniform high-level qualification throughout the Baltic Sea regioncan 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 at all Baltic Sea regioncountries in the medium term. In section 3, implementation notes, development paths and basic rules are presented for transition to achieve the goals.

The concept of the unified master chraftsman training in electrical engineering in the Baltic Sea regionis based on the structure and the high qualification level of the German master craftsman training. The content and the hours of the master craftsman training are different depending on the profession. The following information only applies to the master craftsman training in the profession of the electrical engineering.

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

- Successful completion of at least three-year vocational training in the corresponding or related occupation. In case of shorter duration of training, proof of professional activity is necessary so that at least three years of professional experience in total is present.
- 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:

[1] See the product developed in the project Master BSR under O1 Basics, qualification requirements and concepts. There maybe occur deviations because Product O1 concerns Master craftsman training in general but the present concept deals with the Master craftman training contents in electrical engineering.

A: Practical training and theory with occupation-specific training contents
- Part A1: Practical training including a masterpiece or a demanding master project.[2]
- Part A2: Occupation specific 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.

Categorisation in the EU-wide qualification framework and evaluation according to the European Credit system for Vocational Education and Training (ECVET)

- Categorisation at 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.
- Max. 90 CPs out of 180 CPs can be acquired in practice.
- The acquired CPs can be transferred on the international 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 in one-year professional activity.
- In total max. 40 CPs can be acquired during studies and professional activity.
- 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 skills can be acquired alternatively
- in 950 class hours
- or during 200 class hours and at least two-year professional activity.
- In total max 90 CPs can be acquired during studies or professional activity.

[2] A demanding master 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.

- 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 must 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

- 120 class hours should be completed to acquire the necceseray competences and skills.
- 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 Electrical Engineering	
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 Electrical Engineering	**1.800 urs**

2. Curriculum

2.1 Part A1 Practical Training and Part A2 Specialised Theory[3]

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.

[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).

- Design contracts; Develop and maintain standard contracts, especially service contracts.
- 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 physical bases and technical mathematics	120 hours
Module A1/A2-2 planning bases for building system technology	136 hours
Module A1/A2-3 planning and construction of distribution, measurement and control technology	224 hours
Module A1/A2-4 planning and construction of electric machines and communication systems	160 hours
Module A1/A2-5 electronic components and infrastructure systems	140 hours

Module A1/A2-6 legal frameworks	142 hours
Module A1/A2-7 management of electrotechnical projects	88 hours
Module A1/A2-8 electric machines, protection of electrotechnical plants, renewable energy	176 hours
Module A1/A2-9 planning of building automation systems	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 physical bases and technical mathematics **Time recommendation: 120 hours**	
Technical Mathematics and Physics	16 hours

Learning objectives:

- 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

Competencies:

The master of electrical engineering...

- 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

Course contents:

- 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

Learning objectives:

- Structure and properties of matter
- Metallic materials
- Corrosion
- Isolation materials
- Magnetic materials
- Environmental protection and waste disposal regulations

Competencies:

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 planning bases for building system technology **Time recommendation: 136 hours**	
Tendering and contract regulations and Fire loads	24 hours
Learning objectives: • Determining fire loads • Tendering and contract regulations (VOB (German Construction Contract Procedures)) (country-specific modification) **Competencies:** **The master of electrical engineering...** • 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 planning[4] **Course contents:** • Fire loads based on manufacturer information • Legal requirements for cable and cable routing • Country-specific installation guidelines and directives[5]	
Technical drawing in CAD	36 hours
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 **Competencies:**	

[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))

The master of electrical engineering...

- 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

Course contents:

- 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

Learning objectives:
Principles of cost accounting and calculation
Calculating in electrical trades
Tasks and types
Cost calculation methods
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
- 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 planning and construction of distribution, measurement and control technology **Time recommendation: 224 hours**	
Switch / Gear boards	24 hours

Learning objectives:

- Power supply connection
- Switching devices
- Circuit documentation

Competencies:

The master of electrical engineering...

- 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:

- 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:

- Basics
- Electrical characteristic values and data
- Direct-reading measuring instruments
- Measurement schemes in practical use
- Transducers

Competencies:

The master of electrical engineering...

- 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 project[6]	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 systems[7]	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 languages[8]

Total Module A1/A2-3 Specialised training II	**224 hours**

Module A1/A2-4 planning and construction of electric machines and communication systems **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

[8] Complete project examples of programming in module 8

- 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)
- 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 motors[9]
- 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...

[9] Operation of frequency controls is in module 7

- 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
- 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
- ISDN[10]
- Telecom systems
- Transmission technology
- Wireless systems[11]

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)

[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

• 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 rate[12] • Applications in the field of telephony • Construction and structuring of cable systems for analogue telephony and ISDN (in particular for in-house applications)[13] • 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 electronic components and infrastructure systems **Time recommendation: 140 hours**	
Electronics / Digital technology	80 hours
Learning objectives: • 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	

[12] As a basis for various types of communication (such as Internet, telephone, cable TV)
[13] see How Frequency Controls Work in Module 7

Competencies:

The master of electrical engineering...

- 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)

Course contents:

- 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

Learning objectives:
Definitions
Line calculation for balanced loads and non-inductive loads for AC installations

Competencies:

The master of electrical engineering...

- 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

Course contents:

- 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 drop[14]
- 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 protection [15]

[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

• 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
Learning objectives: • Definitions • Reactance • Power compensation in AC installations • Power compensation in three-phase installations • Types of power compensation **Competencies:** **The master of electrical engineering...** • 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 **Course contents:** • Reactive resistance (capacitive and inductive) of equipment in the AC circuit • 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 legal frameworks **Time recommendation: 142 hours**	
VDE-regulations / accident-prevention regulations	104 hours
Learning objectives: Legal bases and legal duties (country-specific modification!) **Competencies:** **The master of electrical engineering...** • 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 **Course contents:** • Technical and legal requirements and guidelines [16]for 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 regulations[17] • Hazard potential when working with electricity	
Trade-specific regulations and technical connection conditions	38 hours
Learning objectives: Legal foundations Low voltage connection regulation Technical connection requirements – structure and contents (country-specific modification!) **Competencies:** **The master of electrical engineering...** • 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 • 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) **Course contents:** • 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 waste[19] • 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 management of electrotechnical projects **Time recommendation: 88 hours**	
Work planning and order processing	44 hours
Learning objectives:	

[16] according to DIN VDE
[17] Specifications by the German Social Accident Insurance (DGUV)
[18] If necessary, replace national technical connection requirements
[19] If necessary Ordinance on the Directive on Proof of Recycling and Disposal (NachwV)

Job planning
Order processing
Testing and commissioning
Training in a sample project

Competencies:

The master of electrical engineering...

- 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.

Course contents:

1.1 Order documents
Service description; special and additional contractual conditions; technical contractual conditions (VOB (German Construction Contract Procedures) Part C)
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.
1.3 Evaluation and correction of project documentation
1.4 Release of planning documents and documentation
1.5 Conditions of the building permit
1.6 Application procedure for power supply and communication connections
1.7 VOB (German Construction Contract Procedures) Part B
1.8 Performance control of subcontractors
1.9 Construction contracts
1.10 Testing of protective measures
1.11 Documenting audit results
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:

- 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...

- 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:

- 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

- 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 electric machines, protection of electrotechnical plants, renewable energy Time recommendation: 176 hours	
Heating, air conditioning and climate systems	48 hours
Learning objectives: • Introduction • Electrical heating types • Electrical heating devices • Specific thermal calculation/requirements of heat consumption • Air-conditioning • Room ventilation **Competencies:** **The master of electrical engineering...** • distinguishes between different heat transfer paths between solids and the environment • considers 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 specific 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 considers their advantages and disadvantages and determines the required sizes • determines the heat output based on building or system data • calculates the cooling capacity based on 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 [20]risk 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 considering 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
- Understand and consider 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

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

Renewable energies	16 hours

Learning objectives:

- General principles of renewable energy use, statistics, trends
- Use potentials of various renewable energy resources
- Calculation base for mains-powered photovoltaic installations

Competencies:

The master of electrical engineering...

- 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

Course contents:

- 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

Learning objectives:

- Industrial bus systems
- + Control hierarchy – overview
- + System types - overview
- Bus systems for buildings
- + Overview
- + EIB/KNX (European installation / fieldbus protocol for building automation)

Competencies:

The master of electrical engineering...

- 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

Course contents:

- 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

Learning objectives:

- Rectifier and inverter station
- Frequency inverter
- Switching power supplies
- UPS-installations (uninterruptible power supply)

Competencies:

The master of electrical engineering...

- 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

Course contents:

- 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 planning of building automation systems **Time recommendation: 152 hours**	
Programmable logic control systems (SPS)	88 hours
Learning objectives: • Basics • Hardware, outdoor technology • Control technology with PLC • Control types • PLC • Programming with SPS/S7[21] **Competencies:** **The master of electrical engineering...** • 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) **Course contents:** • 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
Learning objectives: • Basics • Structured wiring • Active network technology • WLAN **Competencies:**	

[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.

The master of electrical engineering...

- 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)
- 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...

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

- 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)
- 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 [23]components 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

[23] according to DIN 14675

• 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**

2.2 Part B1 Business administration, law and management[24]

2.21 Learning 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.

[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 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,
- 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 considering inheritance and family law as well as tax regulations.
- Examine the necessity of initiating insolvency proceedings based on 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:

- Knowing important goals and target relationships
- Setting up a target system

Course contents:

- Corporate targets
  - Performance targets
  - Financial targets
  - Social goals
- Target Relationships
  - 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:

- 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:

- Corporate Culture
  - 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
  - - Income Statement
    - + Profit and Loss Account
    - + Period Profit and Loss Account
  - - Cost Accounting Systems
    - + Actual and Planned Cost Accounting
    - + Full and Partial Cost Accounting
    - + Contribution Margin Accounting
  - - Application of Cost Accounting
    - + 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
Commercial and corporate law - definition of a merchant - company name - commercial register	4 hours
Competition law - law against restraints on competition - law against unfair practices - quotation of prices act - store closing law - copyright law	5 hours

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/permissibility 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**

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 - personality profile - family profile - subject-specific requirements	2 hours

Learning objectives:

Establish the importance of personal prerequisites for the success of self-employment

Competencies:

- Identifying requirements relevant to successful entrepreneurial activity
- Recognizing and assessing one's own ability to run a craft business independently

Course contents:

- Requirements for an entrepreneur
  - Personal requirements
  - Family requirements
  - Technical requirements

Role of craft trades in the business world and in society - 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:

- 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

Course contents:

- Positions of handicrafts in the economy
  - Economic importance
  - Social significance
  - Cultural significance
- Handicraft organisations
  - Tasks
  - Structures
  - Services

Start-up preparation - start-up consulting- financial and further support services - special offerings for craft trades and SMEs - market and location analysis - start-up planning	8 hours

Learning objective A:

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.

Competencies:

- 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

Course contents:

- Foundation consulting
  - Legal aspects
  - Conceptual aspects
  - Financial aspects
- Financing and support services
  - Offers for start-ups
  - Special offers for craft trades and SMEs

Learning objective B:

Make and substantiate decisions on the location, size of the company, staffing requirements and the establishment and equipment of a company

Competencies:

- 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

Course contents:

- Market and location analysis
  - sales areas and opportunities
  - customer structure
  - location assessment (factors and comparison)
- Planning of the foundation
  - 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:

- 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:

- 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:

- 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:

- 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:

- 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:

- Corporate Concept
  - Guiding Principles
  - Product and Service Program
  - Target Groups
- Takeover or participation in a company
  - operational inventory protection
  - criteria for determining the purchase price
  - drafting of the takeover or company agreement (purchase, lease, pension, etc.)

Financing / funding - quantifying capital requirements - investment plan and finance concept - financing rules - revenue model, liquidity planning	10 hours

Learning objectives:

Drawing up and substantiating an investment plan and financing concept; preparing profitability forecasts and carrying out liquidity planning

Competencies:

- 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:

- Financing
  - Determination of capital requirements
  - Investment plan and financing concept
  - Financing rules
- Revenue plan
- Liquidity planning
  - Liquidity plan
  - Critical events affecting liquidity in the start-up phase (loss of receivables, tax payments)
- Profitability forecast

Legal forms - 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:

- Classification of the legal system
  - Private and public law
  - Classification of the Civil Code
- General part of the Civil Code
  - Rights and legal capacity
  - Legal transactions
- Contract Law
  - 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
  - Building, environmental protection and waste regulations
  - Handicraft, trade and tax law
  - Work place regulations
- Tax law
  - 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 - 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:

- 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:

- Organisational structure
  - Task analysis and synthesis
  - Job creation
  - Organisational forms (functional, divisional, project)
  - Organisational development
- Process Organisation
  - Process Analysis and Design
  - Logistics
  - Quality Management
  - Working Time Models
  - Group Organisation
- Administration and office organisation
  - Document management
  - Use of modern information and communication technologies
  - Organisation of accounting systems

Product development - 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 - 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 - 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:

- 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:

- Personnel planning
  - Personnel requirements assessment
  - Recruitment and selection
  - Staff deployment and staffing
  - Working time models
  - Personnel development

- Personnel administration
  - Personnel file
  - Archiving, data protection
- Remuneration
  - Time recording
  - Work evaluation
  - Wages
  - Company pension scheme
- Employee leadership
  - Leadership styles and resources
  - Work climate
  - Social relations
  - Welfare (work, accident and health protection)

Inter-company co-operation - value chains - co-operation schemes	6 hours

Learning objectives:

Presenting opportunities and risks of inter-company cooperation

Competencies:

- 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:

- Inter-company cooperation
- Value chains
- Forms of cooperation

Controlling - 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:

- 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:

- Controlling
  - 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 - 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:

Consider the provisions of employment and social security law when developing a corporate strategy

Competencies:

- 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:

- 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
- 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:

- 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:

- 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:** • 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:** • Insolvency Proceedings - 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:** • 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:** • 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:

- Capabilities to record and check business transactions manually and electronically for accounting purposes

Course contents:

- 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

Learning objectives:

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.

Competencies:

- 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

Course contents:

- 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

Payroll procedures - entering employee information - recording of working times - payroll structure and elements - dates and deadlines	10 hours

Learning objectives:

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.

Competencies:

- 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

Course contents:

- 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
  - Payroll Account - Entering Wages and Salaries

Preparation of financial statements - 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 knowledge[25]

2.31 Learning 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, considering 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.

[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 frameworkfor 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).

- 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
Learning objectives: Presenting and substantiating the advantages and benefits of in-company vocational training **Competencies:** 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 **Course contents:** 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
Learning objectives:	

Planning, preparing and making decisions on the basis of legal, collective bargaining agreements and company framework conditions.

Competencies:
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.

Course contents:
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

Learning objectives:
Present structures of the vocational education and training system and its interfaces.

Competencies:
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.

Course contents:
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

Learning objectives:
Select training occupations for the company and justify selection**.**

Competencies:
a) Describe the emergence of state-approved training occupations.
b) Observe and represent the structure and binding nature of training regulations.
c) Describe the functions and objectives of training regulations.
d) Determine training occupations for the company on the basis of training regulations and make use of opportunities for flexibility.

Course contents:
4. Selection of training occupations
4.1 Formation and list of state-approved training occupations
4.2 Structure, functions, objectives of training regulations
4.3 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	8 hours

training contents shall be conveyed outside the company, in particular by a combination of interplant and external vocational training	

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**.**

Competencies:
a) Clarify personal and professional suitability for hiring and training and present possibilities for removing obstacles to training.
b) Examine the training facility's suitability for carrying out the training and, if necessary, present any necessary measures for establishing the suitability.
c) Identify the need for training outside the training centre and identify appropriate opportunities.
d) Describe how chambers and guilds can support enterprises with training.
e) Explain the tasks of the competent authority to monitor suitability, review the consequences of violations and know the reasons for withdrawing training entitlement.

Course contents:
5. Suitability for training
5.1 Personal and professional aptitude in accordance with BBiG and HwO, obstacles to training
5.2 Selection criteria of the training centre
5.3 External and joint training
5.4 Tasks of the craft organisations (chamber, guild) to support training
5.5 Administrative offences and withdrawal of training entitlement

Assessing chances for applying preparatory measures in vocational training	2 hours

Learning objectives:
Examine and evaluate the possibilities of using preparatory measures for vocational training.

Competencies:
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**.**

Course contents:
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

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:
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.

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:** 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
Learning objectives: Apply criteria and procedures for the selection of trainees also taking into account their diversity. **Competencies:** 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. **Course contents:** 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
Learning objectives: Prepare and conclude the vocational training contract and arrange for its registration with the competent authority. **Competencies:** 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. **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 prerequisites.
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:
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.

Course contents:
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

Learning objectives:
Inform and advise trainees on company development paths and vocational training opportunities.
Competencies:
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.

Course contents:
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. Recommendations for the application of the curriculum framework with time table

3.1 Recommendations in German

Diese Empfehlung basiert inhaltlich und zeitlich auf dem deutschen Rahmenzeitplan für Teil 1 und 2 der Meisterausbildung im Elektrotechnikerhandwerk. Die Teile B1 und B2 können vor Beginn der Teile A1 und A2 durchgeführt und abgeschlossen werden. Besonders B1 trägt bei zum Verständnis der Fachtheorie (Teil A2). Die Teile A1 und A2 können aber auch unabhängig von den Teilen B1 und B2 durchgeführt werden.
Der Dozent vor Ort muss seine Teilnehmer kennen und den nachfolgenden Lehrplan entsprechend der Vorkenntnisse und vorhandenen Ressourcen an Lehrkräften individuell planen. Der systemische Fachunterricht hat sich als sehr gut erwiesen – der fächerübergreifende, lernfeldorientierte Unterricht wurde von den Teilnehmern als weniger zielführend aufgenommen. Eine Trennung von Fachtheorie (Teil A1) und Fachpraxis (Teil A2) ist aufgrund der sehr engen Verzahnung in den Vorbereitungskursen nicht zweckmäßig. Die Fächer können von den regionalen Dozenten durchaus parallel vermittelt werden. So konnte bei unseren Teilnehmern die Aufmerksamkeit weiter erhöht werden. Auch gibt es inhaltliche Überschneidungen in den Fächern. Eine rein lineare Aufreihung der Fächer kann sich negativ auf den Lernerfolg auswirken.
Die Grundstruktur wird in vier aufeinanderfolgenden Blöcken empfohlen (mit fließenden Übergängen!).

Rahmenlehrplan Teil A1 und A2

Block 1 (Grundlagen/ Allgemeine Einführung)	
Technische Mathematik und Physik	(16 Stunden)
Werkstoffkunde	(8 Stunden)
Elektrotechnik	(96 Stunden)
Block 2 (Erste Fachbezogene Unterweisungen auf einfachen Niveau, geringe Vorkenntnisse	
VOB/Brandlasten	(24 Stunden)
Fachzeichnen in CAD	(36 Stunden)
Grundlagen der Kalkulation	(24 Stunden)
Hausgerätetechnik	(20 Stunden)
Beleuchtungsanlagen	(32 Stunden)
Block 3 (Fortgeschrittene Unterweisungen, Messtechnik und CAD werden ständig parallel zu anderen Fächern vermittelt!)	
Schaltanlagen	(24 Stunden)
Messtechnik	(56 Stunden)
CAD in Anwendung bei Installationsprojekt	(104 Stunden)
Mess-, Steuerungs- und Regeltechnik	(40 Stunden)
Elektrische Maschinen	(80 Stunden)
Antennentechnik	(20 Stunden)
Fernmeldetechnik/ CAD	(60 Stunden)
Block 4 (Weitere, fortgeschrittene Unterweisungen, je nach Situation vor Ort)	

Elektronik/ Digitaltechnik	(80 Stunden)
Leitungsanlagen	(28 Stunden)
Kompensationsanlagen	(32 Stunden)
VDE-Vorschriften	(104 Stunden)
Fachvorschriften	(26 Stunden)
Technische Anschlussbedingungen	(12 Stunden)
Arbeitsplanung und Auftragsabwicklung	(44 Stunden)
Betriebsführung und -organisation	(44 Stunden)
Heizung/ Lüftung/ Klima	(48 Stunden)
Blitz-/ Überspannungsschutz	(24 Stunden)
Regenerative Energien	(16 Stunden)
Bussysteme	(56 Stunden)
Leistungselektronik	(32 Stunden)
Speicherprogrammierbare Steuerungen	(88 Stunden)
Datentechnische Grundlagen	(32 Stunden)
Gefahrenmeldetechnik/ CAD	(32 Stunden)

Block 1
Technische Mathematik und Physik (16 Stunden)
Aufgaben und Methoden der Physik Physikalische Größen und ihre Einheiten Grundlagen der Mechanik fester Körper Teilgebiete der Mechanik Kinematik der geradlinigen Bewegung Kraft und ihre Wirkung Arbeit, Leistung, Wirkungsgrad
Werkstoffkunde (8 Stunden)
Aufbau und Eigenschaften der Materie Metallische Werkstoffe Korrosion Isolierwerkstoffe Magnetwerkstoffe Umweltschutz, Entsorgungsvorschriften
Elektrotechnik (96 Stunden)
Strömungsfeld Elektrisches Feld Magnetfeld Grundlagen der Wechselstromtechnik Grundlagen der Drehstromtechnik

Block 2
VOB (Vergabe- und Vertragsordnung) / Brandlasten (24 Stunden) länderspezifisch anzupassen!
Bestimmung von Brandlasten VOB Teil A-C
Fachzeichnen in CAD (36 Stunden)
Allgemeine Grundlagen Fachzeichnen/Normen Ausführung von Zeichnungen im Metalltechnik Fachzeichnungen der E-Technik (Installationsplan, Stromlaufplan, Übersichtsschaltplan) CAD-Elektro-Einführung
Grundlagen der Kalkulation (24 Stunden)

Grundlagen der Kostenrechnung und Kalkulation Die Kalkulation im Elektrohandwerk Aufgaben und Arten Die Kalkulationsmethoden Die Zuschlagskalkulation Deckungsbeitragsrechnung
Hausgerätetechnik (20 Stunden)
Grundlagen Regler- und Steuerungseinrichtungen Kochgeräte Warmwassergeräte Kühlgeräte Übersicht
Beleuchtungsanlagen (32 Stunden)
Lichttechnische Grundlagen Lampenarten Messungen und Berechnungen von Beleuchtungsanlagen Projektierung von Innenbeleuchtungsanlagen Mess- und Berechnungsverfahren für Außenbeleuchtungsanlagen

Block 3
Schaltanlagen (24 Stunden)
Aufbau der Energieversorgung Schaltgeräte Schaltungsunterlagen
Messtechnik (56 Stunden)
Grundlagen Kennwerte elektrischer Größen Direktanzeigende Messinstrumente Messschaltungen im praktischen Einsatz Messumformer
CAD in Anwendung bei Installationsprojekt (104 Stunden)
Planung mit CAD Installationsplan- und Übersichtsschaltplanerstellung Kalkulation softwarebasiert
Mess-, Steuerungs- und Regelungstechnik (40 Stunden)
Digitale Meßgeräte und Meßumformer Elektrische Messung nicht elektrischer Größen Regelungstechnik Steuerungstechnik
Elektrische Maschinen (80 Stunden)
Umlaufende elektrische Maschinen (allg.) Gleichstrommaschinen Transformatoren Drehstromasynchronmotoren Schaltungsarten, Drehzahlverstellungen Drehstromsynchronmotoren
Antennentechnik (20 Stunden)
Grundlagen des Sende- und Empfangsvorganges Allg. Normen für Planungsarbeiten an Antennensignalverteileranlagen Komponenten für DVB-S, DVB-C, DVB-T Berechnungsaufgaben Windlastberechnung, Erdung, Blitzschutz von Antennenanlagen
Fernmeldetechnik/ CAD (60 Stunden)

Einführung in die Fernsprechtechnik Analoge Anschlusstechnik Vermittlungstechnik ISDN Telekommunikationsanlagen Übertragungstechnik

Block 4
Elektronik/ Digitaltechnik (80 Stunden)
Halbleiterdioden Bipolartransistor Feldeffekttransistor Operationsverstärker Thyristoren Versorgungsschaltungen Digitaltechnik: Zahlensysteme Logische Zustände und Pegel Logische Verknüpfungen Grundgesetze der Schaltalgebra Signalspeicher und Kippstufen Zählerschaltungen Schieberegister Codewandler Rechenschaltungen
Leitungsanlagen (28 Stunden)
Begriffsbestimmungen Leitungsberechnung in Gleich- und induktionsfrei belasteten Wechselstromanlagen Leitungsberechnungen mit induktiver Belastung
Kompensatiosnanlagen (32 Stunden)
Begriffsbestimmungen Blindwiderstände Kompensation in Wechselstromanlagen Kompensation in Drehstromanlagen Kompensationsarten
VDE-Vorschriften/ Unfallverhütungsvorschriften (104 Stunden) länderspezifisch anzupassen!
Rechtsgrundlagen und Rechtspflichten
Fachvorschriften (26 Stunden) länderspezifisch anzupassen!
Technische Anschlussbedingungen (12 Stunden) länderspezifisch anzupassen!
Gesetzliche Grundlagen Niederspannungsanschlussverordnung Aufbau und Inhalte der technischen Anschlussbedingungen
Arbeitsplanung und Auftragsabwicklung (44 Stunden)
Auftragsplanung Auftragsabwicklung Prüfung und Abnahmen Training an einem Musterprojekt
Betriebsführung und –organisation (44 Stunden)

Rechtsformen der Unternehmung Geschäftsfeldplanung Marketingmaßnahmen Personalentwicklung Stundenverrechnungssätze Controlling Training an einem Musterprojekt

Heizung/ Lüftung/Klima (48 Stunden)
Einführung Elektrische Heizungsarten Elektrische Heizgeräte Wärmetechnische Anforderungen und Berechnungen Raumklimatisierung Raumbelüftung
Blitz-/Überspannungsschutz (24 Stunden)
Grundlagen Gesetze und Normen Aufbau des äußeren Blitzschutzes Übersicht des Überspannungsschutzes
Regenerative Energien (16 Stunden)
Allg. Grundlagen Regenerativer Energienutzung, Statistik, Tendenzen Nutzungspotenziale verschiedener Regenerativer Quellen Berechnungsgrundlagen für netzspeisende PV-Anlagen
Bussyteme (56 Stunden)
Industriebussysteme Übersicht Steuerungshierarchie Übersicht Systemarten Gebäudebussysteme Übersicht EIB/KNX (Europäische Installationsbus/Feldbus zur Gebäudeautomation)
Leistungselektronik (32 Stunden)
Gleich- und Wechselrichteranlagen Frequenzumrichter Schaltnetzteile USV-Anlagen (Unterbrechungsfreie Stromversorgung)
Speicherprogrammierbare Steuerungen (SPS) (88 Stunden)
Grundlagen Hardware, Außentechnik Steuerungstechnik mit SPS Steuerungsarten SPS Programmierung mit SPS/S7
Datentechnische Grundlagen (32 Stunden)
Grundlagen Strukturierte Verkabelung Aktive Netzwerktechnik WLAN
Gefahrenmeldetechnik/CAD (32 Stunden)

Einbruchmeldeanlagen Grundlagen Mechanische Sicherheit Elektronische Sicherheit CAD Anwendungen Brandmeldeanlagen Grundlagen Regelwerke Planungsrichtlinien CAD Anwendungen Meldetechnik Rufanlagen

Rahmenlehrplan Teil B1

Handlungsfeld 1: **Wettbewerbsfähigkeit von Unternehmen beurteilen** **84 UE (Stunden)**	
Unternehmenszielsystem - Unternehmensziele analysieren - Ziele und Zielbeziehungen kennen - Zielsystem aufstellen	2 Stunden
Unternehmenskultur und Unternehmensimage **-** Merkmale der Unternehmenskultur beschreiben - Bedeutung der Unternehmenskultur begründen - Gesellschaftliche Verantwortung eines Unternehmens im Unternehmensimage kommunizieren	2 Stunden
Marktanalyse **-** Bedeutung, Ablauf, Bereiche der Unternehmensplanung - Stärken- und Schwächenanalyse - Marktchancen und -risiken abschätzen - Erfolgspotenziale begründen	8 Stunden
Teilsysteme der Unternehmensrechnung **-** Bilanzrechnung - Kosten- und Leistungsrechnung - Finanzrechnung	2 Stunden
Buchführung **-** Aufgaben und gesetzliche Regelungen - System der doppelten Buchführung - Inventur und Abschluss Verfahrenstechniken (z. B. EDV)	30 Stunden
Jahresabschluss/Periodenabschluss und BWA- Aufbau von Bilanz und Gewinn- und Verlustrechnung- Ansatz und Bewertung- Bilanzkennzahlen, Erfolgskennzahlen	16 Stunden

Kosten- und Leistungsrechnung Aufgaben und Gliederung Kostenartenrechnung, Kostenstellenrechnung, Kostenträgerrechnung Erfolgsrechnung, Kostenrechnungssysteme	12 Stunden

Handwerks- und Gewerberecht **Handwerk als besondere Form eines Gewerbes** - Eintragung in der Handwerksrolle - Unberechtigte Ausübung des Handwerks und Schwarzarbeit **Handels- und Gesellschaftsrecht** **-** Kaufmannseigenschaft - Firma - Handelsregister **Wettbewerbsrecht** **-** Gesetz gegen Wettbewerbsbeschränkungen - Gesetz gegen unlauteren Wettbewerb - Preisangabenverordnung - Ladenschlussgesetz - Urheberrecht	6 Stunden 4 Stunden 6 Stunden
Summe Handlungsfeld 1	**84 Stunden**

Handlungsfeld 2: **Gründungs- und Übernahmeaktivitäten vorbereiten, durchführen und bewerten** **86 UE (Stunden)**	
Anforderungen an einen Unternehmer - Persönliche Anforderungen - Familiäre Anforderungen - Fachliche Anforderungen	2 Stunden
Handwerk in Wirtschaft und Gesellschaft **-** Stellung des Handwerks in der Volkswirtschaft - Wirtschaftliche, gesellschaftliche und kulturelle Bedeutung - Handwerksorganisation	2 Stunden
Gründung vorbereiten **-** Gründungsberatung - Finanzierungs- und Unterstützungsleistungen - Spezielle Angebote für Handwerk und KMU - Markt- und Standortanalyse - Planung der Gründung	8 Stunden
Marketing - Marketjngkonzept entwickeln und bewerten - Marktpotenzial, Kundengruppen, -bedürfnisse, Auftrags- und Umsatzzahlen einschätzen - Markteintritts-Marketing-Mix	12 Stunden

Notwendigkeit privater Altersvorsorge **-** Soziale Sicherungssysteme - Private Personen-, Sachversicherung - Altersversorgung	6 Stunden
Unternehmensgründung - Kriterien der Kaufpreisermittlung - Gestaltung des Übernahmevertrages - Unternehmenskonzept (Leitbild, Produktprogramm)	12 Stunden
Finanzierung **-** Kapitalbedarfsermittlung - Investitionsplan und Finanzierungskonzept - Finanzierungsregeln - Umsatzplan, Liquiditätsplanung	10 Stunden
Steuerrecht **-** Umsatzsteuer, Gewerbesteuer - Veranlagte Einkommenssteuer - Körperschaftssteuer, Besteuerungsverfahren	12 Stunden
Rechtsformen - Kapitalgesellschaften, Personengesellschaften, Einzelunternehmen - Kriterien der Rechtsformwahl - Gesellschaftsvertrag	10 Stunden
Einteilung der Rechtsordnung - Privates und öffentliches Recht - Vertragsrecht (Allg. Vertragsrecht, Kaufvertrag) - Sachenrecht (Besitz, Eigentum) - Gründungsrelevante Rechtsvorschriften - Steuerrecht	12 Stunden
Summe Handlungsfeld 2	**86 Stunden**
Handlungsfeld 3: **Unternehmensführungsstrategien entwickeln** **98 UE (Stunden)**	
Organisation - Aufbauorganisation - Organisationsformen, Organisationsentwicklung - Ablauforganisatjon, Prozessanalyse - Einsatz moderner Kommunikationstechnologien	4 Stunden
Produktentwicklung - Analyse des Absatz- und Beschaffungsmarktes - Methoden der Marktanalyse und Marktforschung - Kunden, Öffentlichkeit, Lieferanten - Produkte, Entscheidungsvorbereitung	8 Stunden
Marketinginstrumente kennen und nutzen **-** Marketingfunktionen und -Instrumente - Kundenorientierung und Kundenbehandlung - Kommunikatjons- und Werbepolitik - Preis- und Konditionspolitik - Beschaffungsplanung (Lieferantenauswahl)	8 Stunden

Kapitalbedarf und Finanzierung **-** Investition-, Finanz- und Liquiditätsplanung - Arten der Finanzierung - Alternative Finanzierungsformen - Zahlungsverkehr	8 Stunden
Personalwesen **-** Personalplanung, Personalbedarfsermittlung, Personalbeschaffung und -auswahl - Personaleinsatz, Stellenbesetzung - Arbeitszeitmodelle, Personalentwicklung, Lohn	8 Stunden
Zwischenbetriebliche Zusammenarbeit **-** Wertschöpfungsketten - Kooperationsformen	6 Stunden
Controlling **-** Aufgaben und Ziele - Schwachstellenanalyse - Kennzahlen und Kennzahlensysteme - Steuerung und Kontrolle von Kosten und Erlösen	16 Stunden
Arbeits- und Sozialrecht - Arbeitsrecht (Arbeitsvertrag, Vertragsarten) - Kündigungsschutz (Tarifvertrag, Parteien) - Betrieblicher Arbeitsschutz - Sozialversicherungsrecht - Versicherungsträgerfreiheit, -beitrage, -leistungen, Meldepflichten	24 Stunden
Forderungsmanagement **-** Forderungsmanagement - Mahn- und Klageverfahren - Inkasso und Zwangsvollstreckung	6 Stunden
Unternehmensnachfolge - Familien- und Erbrecht, Eheliches Güterrecht - Erbfolge, Erbschaft- und Schenkungssteuer **Insolvenzverfahren** **-** Insolvenzfrühindikatoren - Insolvenzordnung, Sanierung und **Liquidation**	10 Stunden
Summe Handlungsfeld 3	**98 Stunden**

Handlungsfeld 4: **Grundlagen EDV, Buchhaltung unter Einsatz von Software umsetzen** **60 UE (Stunden)**	
Grundlagen EDV **-** Grundlagen Betriebssysteme - Datenorganisation - Datensicherheit und Datenschutz	3 Stunden

Belege erstellen, prüfen und buchen **-** Anlagenbuchhaltung, Kreditorenbuchhaltung - Kassenbuchführung - Lohn- und Gehaltsbuchhaltung - Kontierung und Verbuchung	28 stunden
Kassenbuch anlegen und prüfen **-** Kassenbuchaufbau - Erfassung der Barvorgänge, Scheckverkehr - Kassenbuchkontrolle. Differenzen - Belegkontrolle, Belegaufbewahrung	7 Stunden
Lohnabrechnung vorbereiten **-** Erfassung der Mitarbeiterdaten - Erfassung von Arbeitszeiten - Struktur und Bestandteile einer Lohnabrechnung - Termine und Fristen	10 Stunden
Vorbereitung des Jahresabschlusses **-** Inventur - Ansatz- und Bewertungsgrundsätze - Anlagenbuchführung	12 Stunden
Summe Handlungsfeld 4	**60 Stunden**

Rahmenlehrplan Teil B2

Handlungsfeld 1 (25 Stunden) **Ausbildungsvoraussetzungen prüfen und Ausbildung planen**	
▪ Vorteile und den Nutzen betrieblicher Ausbildung darstellen und begründen ▪ bei den Planungen und Entscheidungen hinsichtlich des betrieblichen Ausbildungsbedarfs auf der Grundlage der rechtlichen, tarifvertraglichen und betrieblichen Rahmenbedingungen mitzuwirken, ▪ die Strukturen des Berufsbildungssystems und seine Schnittstellen darzustellen, ▪ Ausbildungsberufe für den Betrieb auszuwählen und dies zu begründen, ▪ die Eignung des Betriebes für die Ausbildung in dem angestrebten Ausbildungsberuf zu prüfen sowie, ob und inwieweit Ausbildungsinhalte durch Maßnahmen außerhalb der Ausbildungsstätte, insbesondere Ausbildung im Verbund, überbetriebliche und außerbetriebliche Ausbildung, vermittelt werden können, ▪ die Möglichkeiten des Einsatzes von auf die Berufsausbildung vorbereitenden Maßnahmen einzuschätzen, ▪ im Betrieb die Aufgaben der an der Ausbildung Mitwirkenden unter Berücksichtigung ihrer Funktionen und Qualifikationen abzustimmen.	▪ 2 Stunden ▪ 3 Stunden ▪ 2 Stunden ▪ 2 Stunden ▪ 8 Stunden ▪ 2 Stunden ▪ 6 Stunden

Handlungsfeld 2 (23 Stunden) **Ausbildung vorbereiten und bei der Einstellung von Auszubildenden mitwirken**	
▪ auf der Grundlage einer Ausbildungsordnung einen betrieblichen Ausbildungsplan zu erstellen, der sich insbesondere an berufstypischen Arbeits- und Geschäftsprozessen orientiert, ▪ die Möglichkeiten der Mitwirkung und Mitbestimmung der betrieblichen Interessenvertretungen in der Berufsbildung zu berücksichtigen, ▪ den Kooperationsbedarf zu ermitteln und sich inhaltlich sowie organisatorisch mit den Kooperationspartnern, insbesondere der Berufsschule abzustimmen, ▪ Kriterien und Verfahren zur Auswahl von Auszubildenden auch unter Berücksichtigung ihrer Verschiedenartigkeit anzuwenden ▪ den Berufsausbildungsvertrag vorzubereiten und die Eintragung des Vertrages bei der zuständigen Stelle zu veranlassen, ▪ die Möglichkeiten zu prüfen, ob Teile der Berufsausbildung im Ausland durchgeführt werden können.	▪ 5 Stunden ▪ 2 Stunden ▪ 4 Stunden ▪ 4 Stunden ▪ 6 Stunden ▪ 2 Stunden

Handlungsfeld 3 (52 Stunden) **Ausbildung durchführen**	
▪ lernförderliche Bedingungen und eine motivierende Lernkultur zu schaffen, Rückmeldungen zu geben und zu empfangen, ▪ die Probezeit zu organisieren, zu gestalten und zu bewerten, ▪ aus dem betrieblichen Ausbildungsplan und den berufstypischen Arbeits- und Geschäftsprozessen betriebliche Lern- und Arbeitsaufgaben zu entwickeln und zu gestalten, ▪ Ausbildungsmethoden und -medien zielgruppengerecht auszuwählen und situationsspezifisch einzusetzen, ▪ Auszubildende bei Lernschwierigkeiten durch individuelle Gestaltung der Ausbildung und Lernberatung zu unterstützen, bei Bedarf ausbildungsunterstützende Hilfen einzusetzen und die Möglichkeit zur Verlängerung der Ausbildungszeit zu prüfen, ▪ Auszubildenden zusätzliche Ausbildungsangebote, insbesondere in Form von Zusatzqualifikationen, zu machen und die Möglichkeit der Verkürzung der Ausbildungsdauer und die der vorzeitigen Zulassung zur Abschlussprüfung zu prüfen, ▪ die soziale und persönliche Entwicklung von Auszubildenden zu fördern, Probleme und Konflikte rechtzeitig zu erkennen sowie auf eine Lösung hinzuwirken, ▪ Leistungen festzustellen und zu bewerten, Leistungsbeurteilungen Dritter und Prüfungsergebnisse auszuwerten, Beurteilungsgespräche zu führen, Rückschlüsse für den weiteren Ausbildungsverlauf ziehen	▪ 8 Stunden ▪ 4 Stunden ▪ 6 Stunden ▪ 8 Stunden ▪ 6 Stunden ▪ 4 Stunden ▪ 8 Stunden ▪ 8 Stunden

Handlungsfeld 4 (15 Stunden) **Ausbildung abschließen**	
▪ Auszubildende auf die Abschluss- oder Gesellenprüfung unter Berücksichtigung der Prüfungstermine vorzubereiten und die Ausbildung zu einem erfolgreichen Abschluss zu führen,	▪ 6 Stunden ▪ 3 Stunden

▪ für die Anmeldung der Auszubildenden zu Prüfungen bei der zuständigen Stelle zu sorgen und diese auf durchführungsrelevante Besonderheiten hinzuweisen, ▪ an der Erstellung eines schriftlichen Zeugnisses auf der Grundlage von Leistungsbeurteilungen mitzuwirken, ▪ Auszubildende über betriebliche Entwicklungswege und berufliche Weiterbildungsmöglichkeiten zu informieren und zu beraten.	▪ 3 Stunden ▪ 3 Stunden

3.2 Recommendations in Polish

Niniejsze zalecenie bazuje pod kątem treści i czasu na niemieckim ramowym programie nauczania dla części 1 i części 2 mistrzowskiej nauki zawodu dla rzemiosła elektrotechnicznego. Miejscowi wykładowcy powinni nim dysponować, a następnie dokonać dopasowania na miejscu, odpowiednio do stanu wstępnej wiedzy i regionalnego ustawodawstwa. Części B1 i B2 mogą być zrealizowane i zakończone przed rozpoczęciem A1 i A2. Szczególnie B1 przyczyni się do zrozumienia teorii przedmiotu (część A1). Części A1 i A2 mogą być również zrealizowane niezależnie od części B1 i B2.

Wykładowca na miejscu musi znać swoich uczestników i indywidualnie zaplanować poniższy program nauczania odpowiednio do stanu wstępnej wiedzy i istniejących zasobów kadry nauczycielskiej. Systemowa nauka przedmiotu została bardzo dobrze przyjęta w Izbie Rzemieślniczej w Dreźnie - uczestnicy uznali jednak, że zajęcia interdyscyplinarne bazujące na fragmentach do nauczenia się, prowadzą w mniejszym stopniu do celu. Z uwagi na bardzo ścisłe zazębienie na kursach przygotowawczych nie jest celowy rozdział teorii przedmiotu (część A1) od zajęć praktycznych z przedmiotu (część A2). Wiedza przedmiotowa może być zdecydowanie przekazywana przez regionalnych wykładowców w sposób równoległy. Pozwala to na podniesienie poziomu uwagi naszych uczestników. Istnieją również merytoryczne punkty styku przedmiotów. Całkowicie liniowe uszeregowanie przedmiotów może negatywnie oddziaływać na powodzenie procesu nauczania. Zalecana jest podstawowa struktura w czterech następujących po sobie blokach (przy czym przejścia są płynne!).

Ramowa część programowa A1 & A2

Blok 1 (podstawy/ogólne wprowadzenie)	
• matematyka i fizyka techniczna • materiałoznawstwo • elektrotechnika	(16 godzin) (8 godzin) (96 godzin)
Blok 2 (pierwsze przedmiotowe wdrożenia na prostym poziomie, wymagana niewielka wiedza wstępna)	
• znormalizowane niemieckie zasady zamawiania i wykonawstwa robót budowlanych VOB / obciążenie ogniowe • profesjonalne rysowanie w CAD • podstawy kalkulowania • technika sprzętu gospodarstwa domowego	(24 godziny) (36 godzin) (24 godziny) (20 godzin)

• instalacje oświetleniowe	(32 godziny)
Blok 3 (wdrożenia w stopniu zaawansowanym, technika pomiarowa i CAD będą stale przekazywane równolegle do innych przedmiotów!)	
• rozdzielnice • technika pomiarowa • zastosowanie CAD w projekcie instalacyjnym • technika pomiaru, sterowania i regulacji • maszyny elektryczne • technika antenowa • teletechnika / CAD	(24 godziny) (56 godzin) (104 godziny) (40 godzin) (80 godzin) (20 godzin) (60 godzin)
Blok 4: kolejne wdrożenia w stopniu zaawansowanym, zależnie od sytuacji na miejscu	
• elektronika / technika cyfrowa • sieć elektryczna • urządzenia kompensacyjne • przepisy VDE (Związku Elektrotechników Niemieckich) • przepisy specjalistyczne • techniczne warunki przyłączeniowe • planowanie pracy i realizacja zleceń • kierowanie zakładem i organizacja zakładu • ogrzewanie / wentylacja / klimatyzacja • ochrona odgromowa / przepięciowa • odnawialne źródła energii • systemy magistralowe • energoelektronika • sterowniki z programowaną pamięcią • podstawy z zakresu danych • technika ostrzegawczych systemów alarmowych / CAD	(80 godzin) (28 godzin) (32 godziny) (104 godzin) (26 godzin) (12 godzin) (44 godziny) (44 godziny) (48 godzin) (24 godziny) (16 godzin) (56 godzin) (32 godziny) (88 godzin) (32 godziny) (32 godziny)

Blok 1
matematyka i fizyka techniczna (16 godzin)
• zadania i metody fizyki • wielkości fizyczne i ich jednostki • podstawy mechaniki ciał stałych • dziedziny mechaniki • kinematyka ruchu prostoliniowego • siła i jej działanie • praca, moc, sprawność
materiałoznawstwo (8 godzin)
• struktura i właściwości materii • materiały metalowe • korozja • materiały izolacyjne • materiały magnetyczne • ochrona środowiska, przepisy o usuwaniu odpadów

elektrotechnika (96 godzin)
• pole przepływowe • pole elektryczne • pole magnetyczne • podstawy techniki prądu zmiennego • podstawy techniki prądu trójfazowego

Blok 2
niemieckie znormalizowane zasady zamawiania i wykonawstwa robót budowlanych VOB / obciążenie ogniowe (24 godziny) -> dostosować do specyfiki krajowej!
• określanie obciążenia ogniowego • niemieckie znormalizowane zasady zamawiania i wykonawstwa robót budowlanych VOB część A-C
profesjonalne rysowanie w CAD (36 godzin)
• ogólne podstawy profesjonalnego rysowania/norm • wykonywanie rysunków dla techniki metalowej • profesjonalne rysunki dla elektrotechniki (plan instalacyjny, schemat obwodowy, schemat poglądowy) • wprowadzenie do CAD w elektryce
podstawy kalkulowania (24 godziny)
• podstawy rachunku kosztów i kalkulacji • kalkulacja w rzemiośle elektrycznym • zadania i rodzaje • metody kalkulacji • kalkulacja narzutowa • rachunek pokrycia kosztów
technika sprzętu gospodarstwa domowego (20 godzin)
• podstawy • urządzenia regulacyjne i sterujące • kuchenki • urządzenia do podgrzewania wody • urządzenia chłodnicze • zestawienie
instalacje oświetleniowe (32 godziny)
• techniczne podstawy oświetleniowe • rodzaje lamp • pomiary i wyliczenia instalacji oświetleniowych • projektowanie wewnętrznych instalacji oświetleniowych • metody pomiarowe i obliczeniowe zewnętrznych instalacji oświetleniowych

Blok 3
rozdzielnice (24 godziny)
• struktura zaopatrzenia energetycznego • przyrządy rozdzielcze • dokumentacja do układów połączeń

technika pomiarowa (56 godzin)
• podstawy • parametry wielkości elektrycznych • systemy pomiarowe z bezpośrednim wskazaniem • układy pomiarowe w zastosowaniu praktycznym • przetworniki pomiarowe
zastosowanie CAD w projekcie instalacyjnym (104 godziny)
• projektowanie z CAD • sporządzanie planów instalacyjnych i schematów poglądowych • kalkulacja bazująca na oprogramowaniu
technika pomiaru, sterowania i regulacji (40 godzin)
• cyfrowe mierniki i przetworniki pomiarowe • pomiar elektryczny wielkości nieelektrycznych • technika regulacji • technika sterowania
maszyny elektryczne (80 godzin)
• maszyny elektryczne w otoczeniu (ogólnie) • maszyny na prąd stały • transformatory • silniki indukcyjne na prąd trójfazowy • rodzaje połączeń, regulacja prędkości obrotowej • silniki synchroniczne na prąd trójfazowy
technika antenowa (20 godzin)
• podstawy procesu nadawania i odbioru • ogólne normy dla prac projektowych przy instalacjach rozprowadzających sygnał antenowy • komponenty DVB-S, DVB-C, DVB-T • zadania obliczeniowe • obliczanie naporu wiatru, uziemienie, ochrona odgromowa instalacji antenowych
teletechnika / CAD (20 godzin)
• wprowadzenie do teletechniki • analogowa technika przyłączeniowa • telekomutacja • ISDN • urządzenia telekomunikacyjne • technika nadawania

Blok 4:
elektronika / technika cyfrowa (80 godzin)
• diody półprzewodnikowe • tranzystor bipolarny • tranzystor unipolarny • wzmacniacze operacyjne • tyrystor • połączenia zasilające technika cyfrowa:

• systemy liczbowe • stany i poziomy logiczne • powiązania logiczne • podstawowe zasady algebry Boola • pamięć sygnałów i przerzutnik • układy zliczające • rejestr przesuwający • przetworniki kodowe • połączenia obliczeniowe
sieć elektryczna (28 godzin)
• definicje • obliczania dla przewodów elektrycznych w urządzeniach na prąd stały i urządzeniach na prąd zmienny obciążanych bez indukcji • obliczenia dla przewodów elektrycznych z obciążeniem indukcyjnym
urządzenia kompensacyjne (32 godziny)
• definicje • opory bierne • kompensacja w urządzeniach na prąd zmienny • kompensacja w urządzeniach na prąd trójfazowy • rodzaje kompensacji
przepisy VDE (Związku Elektrotechników Niemieckich) (104 godzin) / przepisy o zapobieganiu wypadkom -> dostosować do specyfiki krajowej!
• podstawy prawne i obowiązki prawne
przepisy specjalistyczne (26 godzin) -> dostosować do specyfiki krajowej!
techniczne warunki przyłączeniowe (12 godzin) -> dostosować do specyfiki krajowej!
• podstawy ustawowe • rozporządzenie dot. przyłączania do sieci niskiego napięcia • struktura i treści technicznych warunków przyłączeniowych
planowanie pracy i realizacja zleceń (44 godziny)
• planowanie zlecenia • realizacja zlecenia • kontrola i odbiory • trening na projekcie wzorcowym
kierowanie zakładem i organizacja zakładu (44 godziny)
• formy prawne przedsiębiorstw • planowanie obszaru działania • działania marketingowe • rozwój personelu • godzinowe stawki rozliczeniowe • controlling • trening na projekcie wzorcowym

ogrzewanie / wentylacja / klimatyzacja (48 godzin)
• wprowadzenie • rodzaje ogrzewania elektrycznego

• grzejniki elektryczne • cieplne wymogi techniczne i obliczenia • klimatyzowanie pomieszczeń • wentylacja pomieszczeń
ochrona odgromowa / przepięciowa (24 godzin)
• podstawy • ustawy i normy • struktura zewnętrznej instalacji odgromowej • zarys ochrony odgromowej
odnawialne źródła energii (16 godzin)
• ogólne podstawy wykorzystania odnawialnej energii, statystyka, tendencje • potencjały wykorzystania różnych źródeł energii odnawialnej • podstawy obliczeniowe dla podłączanych do sieci instalacji fotowoltaicznych
systemy magistralowe (56 godzin)
przemysłowe systemy magistralowe • zestawienie hierarchii sterowania • zestawienie rodzajów systemów budynkowe systemy magistralowe • zestawienie • EIB/KNX (europejska magistrala instalacyjna / magistrala polowa (fieldbus) do automatyzacji budynków)
energoelektronika (32 godzin)
• prostowniki i falowniki • przetwornice częstotliwości • zasilacze impulsowe • zasilacze awaryjne UPS (niezakłóconego zasilania energią)
sterowniki z programowaną pamięcią (88 godzin)
• podstawy • hardware, technika zewnętrzna • technika sterowania przy pomocy sterowników z programowaną pamięcią • rodzaje sterowników • sterowniki z programowaną pamięcią SPS • programowanie z SPS/S7
podstawy z zakresu danych (32 godzin)
• podstawy • okablowanie strukturalne • aktywna technika sieciowa • WLAN
technika ostrzegawczych systemów alarmowych / CAD (32 godzin)
instalacje informujące o włamaniu • podstawy • bezpieczeństwo mechaniczne • bezpieczeństwo elektroniczne • zastosowania CAD instalacje informujące o pożarze • podstawy

• zbiory reguł • dyrektywy projektowe • zastosowania CAD technika zgłoszeniowa • telefoniczne instalacje przywoławcze

Ramowa część programowa B1

1 płaszczyzna działania: **Ocena konkurencyjności przedsiębiorstw** **84 jednostek lekcyjnych (godzin)**	
System celów w przedsiębiorstwie - analiza celów w przedsiębiorstwie - poznanie celów i relacji między celami - zbudowanie systemu celów	2 godziny
Kultura przedsiębiorstwa i wizerunek przedsiębiorstwa - opis cech kultury przedsiębiorstwa - uzasadnienie znaczenia kultury przedsiębiorstwa - zakomunikowanie społecznej odpowiedzialności przedsiębiorstwa poprzez wizerunek przedsiębiorstwa	2 godziny
Analiza rynku - znaczenie, przebieg, obszary planowania w przedsiębiorstwie - analiza silnych i słabych stron - oszacowanie szans i ryzyk na rynku - uzasadnienie potencjałów do odniesienia sukcesu	8 godzin
Częściowe systemy finansowe w przedsiębiorstwie - bilans - rachunkowość zarządcza - rachunek ekonomiczny	2 godziny
Księgowość - zadania i ustawowe regulacje - system podwójnego księgowania - inwentaryzacja i zamknięcia, metody realizacji (np. komputerowe)	30 godzin
Bilans roczny/bilans okresowy i analiza ekonomiczna w przedsiębiorstwie - struktura bilansu i rachunku zysków i strat - założenia i ocena - wskaźniki bilansowe, wskaźniki rachunku wyników	16 godzin
Rachunkowość zarządcza Zadania i podział Rachunek rodzajów kosztów, rachunek według miejsca powstawania kosztów, rachunek podmiotu odpowiedzialnego za koszty, rachunek wyników, systemy rachunku kosztów	12 godzin

Kontynuacja **1 płaszczyzna działania:** **Ocena konkurencyjności przedsiębiorstw**

84 jednostek lekcyjnych (godzin)	
Prawo rzemieślnicze i prawo o działalności gospodarczej **Rzemiosło jako szczególna forma działalności gospodarczej** **-** wpis do rejestru rzemieślników - nieuprawnione wykonywanie działalności rzemieślniczej i praca na czarno	6 godzin
Prawo handlowe i prawo spółek handlowych - cechy charakterystyczne kupca/handlowca - firma - rejestr handlowy	4 godziny
Prawo konkurencji - ustawa o ograniczeniach konkurencji - ustawa o nieuczciwej konkurencji - rozporządzenie dotyczące informowania o cenach produktów i usług - ustawa regulująca godziny otwarcia i zamknięcia sklepów - prawo autorskie	6 godzin
suma 1 płaszczyzny działania:	**84 godziny**

2 płaszczyzna działania: **Przygotowanie, realizacja i ocena aktywności związanych z założeniem i przejęciami** **86 jednostek lekcyjnych (godzin)**	
Wymagania stawiane przedsiębiorcy - wymagania osobiste - wymagania rodzinne - wymagania fachowe	2 godziny
Rzemiosło w gospodarce i społeczeństwie - pozycja rzemiosła w gospodarce narodowej - znaczenie gospodarcze, społeczne i kulturalne - organizacja rzemiosła	2 godziny
Przygotowanie do założenia - konsultacje założycielskie - usługi w zakresie kredytowania i wsparcia - specjalne oferty dla rzemiosła i małych i średnich przedsiębiorstw - analiza rynku i lokalizacji - zaplanowanie założenia	8 godzin
Marketing - opracowanie i ocena koncepcji marketingowej - oszacowanie potencjału rynku, grup klientów, potrzeb klientów, wielkości zleceń i wielkości obrotu - mieszanka marketingowa przy wejściu na rynek	12 godzin
Konieczność prywatnego zabezpieczenia emerytalnego - systemy zabezpieczenia społecznego - prywatne ubezpieczenie osób, mienia - ubezpieczenie emerytalne	6 godzin

Założenie przedsiębiorstwa - kryteria ustalania ceny zakupu - opracowanie umowy przejęcia - koncepcja przedsiębiorstwa (wzór, program produktów)	12 godzin
Kredytowanie - ustalenie zapotrzebowania na kapitał - plan inwestycyjny i koncepcja kredytowania - zasady kredytowania - plan obrotów, planowanie płynności	10 godzin
Prawo podatkowe - podatek obrotowy, podatek od działalności gospodarczej - wymierzony podatek dochodowy - podatek dochodowy od osób prawnych, metody opodatkowania	12 godzin
Formy prawne - spółki kapitałowe, spółki osobowe, przedsiębiorstwa jednoosobowe - kryteria wyboru formy prawnej - umowa spółki	10 godzin
Podział porządku prawnego - prawo prywatne i publiczne - prawo o umowach (ogólne prawo o umowach, umowa kupna-sprzedaży) - prawo rzeczowe (posiadanie, własność) - przepisy prawne istotne z punktu widzenia zakładania firmy - prawo podatkowe	12 godzin
suma 2 płaszczyzny działania:	**86 godzin**

3 płaszczyzna działania: **Opracowanie strategii prowadzenia przedsiębiorstwa** **98 jednostek lekcyjnych (godzin)**	
Organizacja - organizacja struktury - formy organizacji, rozwój organizacji - organizacja przebiegu procesów, analiza procesów - wykorzystanie nowoczesnych technologii komunikacji	4 godziny
Opracowanie produktu - analiza rynku zbytu i rynku pozyskiwania towaru - metody analizy i badania rynku - klienci, opinia publiczna, dostawcy - produkty, przygotowanie do podjęcia decyzji	8 godzin
Poznanie i wykorzystywanie instrumentów marketingowych - funkcje i instrumenty marketingowe - zorientowanie na klienta i traktowanie klienta - polityka komunikacyjna i reklamowa - polityka cenowa i polityka warunków handlowych - zaplanowanie pozyskiwania towarów (wybór dostawców)	8 godzin

Zapotrzebowanie na kapitał i kredytowanie - planowanie inwestycji, kredytów i płynności - rodzaje kredytowania - alternatywne formy kredytowania - obrót płatniczy	8 godzin
Sprawy kadrowe - zaplanowanie personelu, określanie zapotrzebowania na personel, pozyskiwanie i wybór personelu - wykorzystanie personelu, obsada stanowisk - modele czasu pracy, rozwój personelu, wynagrodzenie	8 godzin
Współpraca międzyzakładowa - łańcuchy tworzenia wartości - formy kooperacji	6 godzin
Controlling - zadania i cele - analiza słabych miejsc - wskaźniki i systemy wskaźników - sterowanie i kontrola kosztów i dochodów	16 godzin
3 płaszczyzna działania: **Opracowanie strategii prowadzenia przedsiębiorstwa** **98 jednostek lekcyjnych (godzin)**	

Kontynuacja **3 płaszczyzna działania:** **Opracowanie strategii prowadzenia przedsiębiorstwa** **98 jednostek lekcyjnych (godzin)**	
Prawo pracy i prawo socjalne - prawo pracy (umowa o pracę, rodzaje umów) - ochrona przed wypowiedzeniem (zbiorowy układ pracy, strony) - zakładowa ochrona pracy - prawo ubezpieczeń społecznych - wolność wyboru podmiotu ubezpieczeniowego, składki ubezpieczeniowe, świadczenia ubezpieczeniowe, obowiązki zgłoszeniowe	24 godziny
Zarządzanie wierzytelnościami - zarządzenie wierzytelnościami - postępowanie upominawcze i powództwo sądowe - windykacja i egzekucja	6 godzin
Sukcesja w przedsiębiorstwie - prawo rodzinne i spadkowe, małżeńskie prawo majątkowe (ustrój majątkowy) - kolejność dziedziczenia, podatek od spadków i darowizn **Postępowanie upadłościowe** - wczesne wskaźniki upadłości - prawo upadłościowe, restrukturyzacja i **likwidacja**	10 godzin

suma 3 płaszczyzny działania:	**98 godzin**

4 płaszczyzna działania: **Podstawy informatyki, realizacja księgowania z wykorzystaniem oprogramowania komputerowego** **60 jednostek lekcyjnych (godzin)**	
Podstawy informatyki - podstawy systemów operacyjnych - organizacja danych - bezpieczeństwo i ochrona danych	3 godziny
Sporządzanie, sprawdzanie i księgowanie dokumentów - księgowość środków trwałych, księgowość wierzytelności - prowadzenie raportów kasowych - księgowość wynagrodzeń - zapisy na kontach i księgowanie	28 godzin
Zakładanie i prowadzenie raportu kasowego - struktura raportu kasowego - ewidencjonowanie zdarzeń gotówkowych, obrót czekowy - kontrola raportu kasowego, różnice - kontrola dokumentów, przechowywanie dokumentów	7 godzin
Przygotowywanie rozliczeń wynagrodzeń - ewidencjonowanie danych o pracownikach - ewidencjonowanie czasów pracy - struktura i składniki rozliczenia wynagrodzenia - terminy i okresy	10 godzin
Przygotowanie bilansu rocznego - inwentaryzacja - podstawy dla kalkulacji i wyceny - księgowanie środków trwałych	12 godzin
suma 4 płaszczyzny działania:	**60 godzin**

Ramowa część programowa B2

1 płaszczyzna działania (25 godzin) **Sprawdzenie warunków nauki zawodu i zaplanowanie kształcenia**	
- przedstawienie i uzasadnienie korzyści i pożytku z przyzakładowej nauki zawodu	- 2 godziny
- współdziałanie przy planowaniu i decyzjach w odniesieniu do zapotrzebowania na przyzakładową naukę zawodu na podstawie prawnych warunków ramowych, warunków ramowych zbiorowych układów pracy i zakładowych warunków ramowych,	- 3 godziny
- przedstawienie struktur systemu nauki zawodu i jego powiązań,	- 2 godziny
- wybór zawodów do nauki w zakładzie i uzasadnienie go,	- 2 godziny
- sprawdzenie przydatności zakładu do nauki w nim pożądanego zawodu, jak również sprawdzenie, czy i w jakim stopniu można przekazywać elementy nauki zawodu w formie działań poza	- 8 godzin

miejscami nauki zawodu, w szczególności w formie zespolonej, ponadzakładowej i pozazakładowej nauki zawodu, - oszacowanie możliwości wykorzystania działań przygotowujących do nauki zawodu, - uzgodnienie zadań osób współdziałających w zakładzie przy nauce zawodu, z uwzględnieniem ich funkcji i kwalifikacji	 - 2 godziny - 6 godzin

2 płaszczyzna działania (23 godzin) **Przygotowanie nauki zawodu i współdziałanie przy przyjmowaniu uczniów**	
- na podstawie regulaminu nauki zawodu należy sporządzić zakładowy plan nauki zawodu, który jest w szczególności zorientowany na typowe dla danego zawodu procesy robocze i gospodarcze, - uwzględnienie w nauce zawodu możliwości współdziałania i współdecydowania pod kątem reprezentacji interesów zakładowych, - określenie zapotrzebowania na współpracę i porozumienie się, zarówno pod kątem treści, jak i pod kątem organizacyjnym - z kooperującymi partnerami, w szczególności ze szkołą zawodową, - zastosowanie kryteriów i metod wyboru uczniów również z uwzględnieniem ich różnorodności, - przygotowanie umowy o naukę zawodu i zarządzenie zarejestrowania umowy we właściwej placówce, - sprawdzenie możliwości, czy części nauki zawodu mogą być zrealizowane za granicą.	- 5 godzin - 2 godziny - 4 godziny - 4 godziny - 6 godzin - 2 godziny

3 płaszczyzna działania (52 godziny) **Realizacja nauki zawodu**	
- stworzenie warunków wspomagających naukę i zbudowanie motywującej kultury nauki, dawanie i przyjmowanie sygnałów zwrotnych, - zorganizowanie, zbudowanie i ocena okresu próbnego, - na podstawie zakładowego planu nauki zawodu i w oparciu o typowe dla zawodu procesy robocze i gospodarcze należy opracować i stworzyć zadania związane z nauką i pracą w zakładzie, - wybór odpowiednich dla grupy docelowej metod i mediów do nauki zawodu i ich wykorzystanie stosownie do sytuacji, - wspieranie uczniów mających trudności w nauce w formie indywidualnego budowania programu nauki zawodu i doradztwa związanego z nauką, w razie potrzeby angażowanie środków pomocowych wspierających naukę zawodu i badanie możliwości przedłużenia okresu nauki zawodu, - składanie uczniom dodatkowych ofert nauki zawodu, w szczególności w formie dodatkowych kwalifikacji i sprawdzenie	- 8 godzin - 4 godziny - 6 godzin - 8 godzin - 6 godzin - 4 godziny - 8 godzin

możliwości skrócenia okresu nauki zawodu i przedterminowego dopuszczenia do egzaminu końcowego, - wspieranie społecznego i osobistego rozwoju uczniów, wczesne rozpoznawanie problemów i konfliktów, jak również dążenie do rozwiązania, - ustalanie i ocena osiągnięć, analizowanie ocen osiągnięć przez osoby trzecie i analizowanie rezultatów egzaminów, prowadzenie rozmów oceniających, wyciąganie wniosków pod kątem dalszego przebiegu nauki zawodu.	- 8 godzin

4 płaszczyzna działania (15 godzin) **Zakończenie nauki zawodu**	
- przygotowanie uczniów do egzaminu końcowego lub czeladniczego z uwzględnieniem terminów egzaminów i doprowadzenie do tego, aby nauka zawodu została zakończona sukcesem, - zadbanie o zgłoszenie uczniów na egzaminy we właściwych placówkach i zwrócenie im uwagi na cechy szczególne mające znaczenie przy przeprowadzaniu egzaminu, - współdziałanie przy sporządzaniu pisemnego świadectwa na podstawie ocen poszczególnych osiągnięć, - informowanie uczniów o drogach rozwoju w zakładzie i o zawodowych możliwościach dokształcania się i doradzanie im w tym zakresie.	- 6 godzin - 3 godziny - 3 godziny - 3 godziny

3.3 Recommendations in English

This recommendation as to the course content and duration is based on the German Framework Curriculum for Part 1 and Part 2 of the Master Training Program for Master Electricians. Regional instructors (*Dozent*) shall have it available and be able to introduce adaptations according to the knowledge status and the requirements of regional legislation. The parts B1 and B2 can be conducted prior to the parts A1 and A2. Particularly, B1 contributes to the understanding of subject-specific theory (Part A2). However, it is admissible to perform the parts A1 and A2 independently of the parts B1 and B2.

The on-site lecturer needs to know his or her participants and he or she shall individually plan the curriculum according to the knowledge status of the participants and the resources available. At the Dresden Chamber of Crafts, systemic technical subject teaching has proven successful – the interdisciplinary, learning-field oriented teaching was perceived by the participants as less effective. A split-up between subject-specific theory (Part A1) and practice (Part A2) is not recommended due to their tight interlinking in the preparatory courses. A subject may well be taught parallelly by regional lecturers. This approach has ensured an increased attention of our course participants, and again, there are contents overlaps in the subjects. Pure linear classification of subjects may have a negative impact on the learning

outcome.
A recommended basic structure are four consecutive modules (with smooth transitions!).

Curriculum framework part A1 & A2

Module 1 (General principles/ Introduction)	
Technical Mathematics and Physics	(16 hours)
Material science	(8 hours)
Electrical engineering	(96 hours)
Module 2 (Initial subject-specific instructions on a simple level, little prior knowledge is required)	
VOB / fire loads	(24 hours)
Technical drawing in CAD	(36 hours)
Basics of calculation	(24 hours)
Home appliance technics	(20 hours)
Lighting systems	(32 hours)
Module 3 (instructions for advanced participants, measurement technology and CAD are offered parallel to other subjects on an instant basis)	
Switch / Gear boards	(24 hours)
Measurement technology	(56 hours)
CAD applied in an installation project	(104 hours)
Measurement, control and regulation systems	(40 hours)
Electrical machinery	(80 hours)
Antenna technology	(20 hours)
Telecommunications / CAD	(60 hours)
Module 4 (further instructions for advanced participants, according to on-site situation-specific needs)	
Electronics / Digital technology	(80 hours)
Circuit / wiring systems	(28 hours)
Power Compensation system	(32 hours)
VDE-regulations	(104 hours)
Trade-specific regulations	(26 hours)
Technical connection conditions	(12 hours)
Work planning and order processing	(44 hours)
Business management and business organisation	(44 hours)
Heating, air conditioning and climate systems	(48 hours)
Lightning and overvoltage protection	(24 hours)
Renewable energies	(16 hours)
Bus systems	(56 hours)
Power electronics	(32 hours)
Programmable logic control systems	(88 hours)
Data technical principles	(32 hours)
Hazard alarm technology / CAD	(32 hours)

Module 1
Technical Mathematics and Physics (16 hours)
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
Material science (8 hours)

Structure and properties of matter Metallic materials Corrosion Insulation materials Magnetic materials Environmental protection and waste disposal regulations
Electrical engineering (96 hours)
Flow field Electrical field Magnetic field Principles of A/C power technology Principles of three-phase current technology

Module 2
VOB (tendering and contract regulations)/ Fire loads (24 hours) – country-specific modification!
Determining fire loads VOB Part A-C
Technical drawing in CAD (36 hours)
General principles of technical drawing / standards Execution of drawings in metals technology Technical drawing in electrical engineering (installation plan, circuit diagram, overview circuit diagram)
Basics of calculation (24 hours)
Principles of cost accounting and calculation Calculating in electrical trades Tasks and types Cost calculation methods Overhead calculation Contribution margin accounting
Home appliance technics (20 hours)
Principles Control devices Cooking appliances Hot-water devices Cooling units Overview
Lighting systems (32 hours)
Light-technical basics Light types Measurement and calculation of lighting systems Project planning of indoor lighting systems Measurement and calculation of outdoor lighting systems

Module 3
Switch / Gear boards (24 hours)
Power supply connection Switching devices Circuit documentation
Measurement technology (56 hours)

Basics Electrical characteristic values and data Direct-reading measuring instruments Measurement schemes in practical use Transducers
CAD applied in an installation project (104 hours)
Planning with CAD Execution of Installation plans and overview circuit diagrams Software-assisted calculation
Measurement, control and regulation systems (40 hours)
Digital measurement instruments and transducers Electrical measurement of nonelectric values Control systems Process control technology
Electrical machinery (80 hours)
Rotating electrical machinery (general) DC machines Transformers Three phase asynchronous motors Switching types, speed adjustment Three phase synchronous motors
Antenna technology (20 hours)
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
Telecommunications / CAD (60 hours)
Introduction into telecommunications Analogue connection technology Switching technology ISDN Telecom systems Transmission technology

Module 4
Electronics / Digital technology (80 hours)
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
Circuit / Wiring systems (28 hours)

Definitions Line calculation for balanced loads and non-inductive loads for AC installations
Compensations systems (32 hours)
Definitions Reactance Power compensation in AC installations Power compensation in three-phase installations Types of power compensation
VDE-regulations / accident-prevention regulations (104 hours) – country-specific modification!
Legal bases and legal duties
Trade-specific regulations (26 hours) – country-specific modification!
Technical connection conditions (12 hours) – country-specific modification!
Legal foundations Low voltage connection regulation Technical connection requirements – structure and contents
Work planning and order processing (44 hours)
Job planning Order processing Testing and commissioning Training in a sample project
Business management and business organisation (44 hours)
Legal types of businesses Business segment planning Marketing measures HR development Hourly wage rates Controlling Training in a sample project

Heating, air conditioning and climate systems (48 hours)
Introduction Electrical heating types Electrical heating devices Specific thermal calculation/requirements of heat consumption Air-conditioning Room ventilation
Lightning and overvoltage protection (24 hours)
Basics Laws and standards Setup of an external lightning protection system Overvoltage protection - overview
Renewable energies (16 hours)
General principles of renewable energy use, statistics, trends Use potentials of various renewable energy resources Calculation base for mains-powered photovoltaic installations
Bus systems (56 hours)
Industrial bus systems Control hierarchy – overview System types - overview Bus systems for buildings Overview EIB/KNX (European installation / fieldbus protocol for building automation)
Power electronics (32 hours)

Rectifier and inverter station Frequency inverter Switching power supplies USV-installations (uninterruptible power supply)
Programmable logic control systems (SPS) (88 hours)
Basics Hardware, outdoor technology Control technology with SPS Control types SPS Programming with SPS/S7
Data technical principles (32 hours)
Basics Structured wiring Active network technology WLAN
Hazard alarm technology /CAD (32 hours)
Burglar alarm systems Basics Mechanical safety Digital safety CAD applications Fire alarm systems Basics Guidelines Planning guidelines CAD applications Signalling technology Call systems

Frame curriculum part B1

Action field 1: **Determining corporate competitiveness** **84 units (hours)**	
Corporate goal system - analysing corporate goals - knowing your goals and goal relationships - establishing a target system	2 hours
Corporate culture and image - characteristics of corporate culture - motivating significance of corporate culture - communicating corporate social responsibility in the corporate image	2 hours
Market analysis - significance, procedure, areas of corporate planning - strengths and weaknesses analysis - estimating market opportunities and risks - motivating profit potential	8 hours

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)	30 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	16 hours
Cost and performance calculation - tasks and structuring of cost-type accounting, cost center accounting, cost unit accounting, profit and loss account, cost accounting systems	12 hours

Action field 1: **Determining corporate competitiveness** **84 units (hours)**	
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 **Commercial and corporate law** - definition of a merchant - company name - commercial register **Competition law** - law against restraints on competition - law against unfair practices - quotation of prices act - store closing law - copyright law	6 hours 4 hours 6 hours
Action field 1 - total	**84 hours**

Action field 2: **Preparing, completing and evaluating start-up and takeover activities** **86 units (hours)**

Requirements to be met by the entrepreneur - personality profile - family profile - subject-specific requirements	2 hours
Role of craft trades in the business world and in society - role of craft trades in national economy - economic, social and cultural relevance - craft trades organisation	2 hours
Start-up preparation - start-up consulting - financial and further support services - special offerings for craft trades and SMEs - market and location analysis - start-up planning	8 hours
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
Need for private provision for old age - social security systems - private personal and property insurance - pension/retirement provision	6 hours
Entrepreneurship / company start-up - purchase price calculation - conditions of the takeover agreement - corporate concept (corporate mission, product range)	12 hours
Financing / funding - quantifying capital requirements - investment plan and finance concept - financing rules - revenue model, liquidity planning	10 hours
Tax law - VAT, trade tax - assessed income tax - corporate tax, taxation procedure	12 hours
Legal forms - stock corporations, partnerships/unincorporated firms, individual companies - selection criteria - company agreement	10 hours
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
Action field 2 - total	**86 hours**
Action field 3: **Developing corporate government strategies** **98 units (hours)**	

Organisation - organisational structure - types of organisation, organisational development - workflow organisation, process analysis - use of modern communication tools	4 hours
Product development - sales and purchase market analysis - market research and market analysis techniques - clients, general public, suppliers - products, preparing decisions	8 hours
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
Capital requirements and financing - planning of investments, financial and liquidity planning - types of financing - alternative forms of financing - money transfer	8 hours
Human resources - personnel planning, staffing demand - recruitment and selection - personnel placement, staffing - work time models, human resources development, wages	8 hours
Inter-company co-operation - value chains - co-operation schemes	6 hours
Controlling - mission and objectives - weak point analysis - operating figures and performance indicator systems - costs and revenues management and control	16 hours
Action field 3 (continuation**):**	
Labour law and social legislation - 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

Claims management - accounts receivable management - dunning and legal actions - debt collection and compulsory execution	6 hours
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
Action field 3 - total	**98 hours**

Action field 4: **Basic computer skills, bookkeeping using commercial software** **60 units (hours)**	
Basic computer skills - basics of operating systems - file architecture - data security and protection	3 hours
Creating, checking and posting vouchers - assets accounting, accounts payable - cash accounting - payroll accounting - account assignment and posting	28 hours
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
Payroll procedures - entering employee information - recording of working times - payroll structure and elements - dates and deadlines	10 hours
Preparation of financial statements - inventory - recognition and valuation principles - asset accounting	12 hours
Action field 4 - total	**60 hours**

Curriculum framework part B2

Action field 1 (25 hours) **Review of training requirements and training planning**

▪ presenting and motivating the benefits and use of in-company training	▪ 2 hours
▪ participating in planning and decision-making with regards to specific training needs, to legal and operational conditions, and to the collective agreement	▪ 3 hours ▪ 2 Hours
▪ presenting the vocational training system structures and its liaising areas	▪ 2 hours ▪ 8 hours
▪ selecting training professions for a company and specifying their purpose	
▪ 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	▪ 2 hours ▪ 6 hours
▪ assessing chances for applying preparatory measures in vocational training	
▪ in a company – co-ordinating tasks of personnel involved in the training, in due consideration of their functions and qualifications	

Action field 2 (23 hours) **Training preparation and assisting in recruiting prospective trainees**	
▪ drawing up an operational training plan based on training regulations, in due consideration of job-specific work and business processes	▪ 5 hours
▪ taking into account prospective participation and co-participation in vocational training of involved occupational interest groups	▪ 2 hours
▪ 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
▪ applying criteria and procedures for selection of trainees, taking into consideration their diversity	▪ 4 hours
▪ preparing a vocational training contract and its registration with the competent body	▪ 6 hours
▪ examining chances of organising the vocational training program partly abroad	▪ 2 hours

Action field 3 (52 hours) **Conducting trainings**	
▪ creating learning-conductive conditions and a motivating learning culture, giving and receiving feedback	▪ 8 hours
▪ organising, designing and evaluating the probation period	▪ 4 hours
▪ developing and defining operational learning and work-related tasks, based on the in-company training plan and the typical occupational and business processes	▪ 6 hours
▪ selecting proper training methods and media for target groups, and applying them accordingly, if necessary	▪ 8 hours
▪ 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	▪ 6 hours
▪ 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 ▪ 8 hours
▪ promoting social and personal development of trainees, identifying problems and conflicts in good time, solution-oriented approach	▪ 8 hours

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

Action field 4 (15 hours) **Completion of training**	
▪ 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
▪ 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
▪ contributing in the issuing of a written certificate, on the basis of performance assessments	▪ 3 hours
▪ informing and advising trainees about inter-company development and career opportunities, and about occupational further training options	▪ 3 hours

4. Course implementation and other documents

4.1 Implementation notes[26]

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.

[26] Recommendations according to
a) Curriculum developed by Handwerkskammer Dresden (Dresden Chamber of Skilled Crafts).
b) Curriculum frameworkfor 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 frameworkfor preparation for Part III of the Master Craftsman Examination, 2011, Ludwig-Fröhler-Institute, Research Institute at the German Institute of Crafts (DHI).

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.

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 A1and A2 should always be planned and communicated together. Parts B1 and B2 can – to a certain extent - also be taught separately from A1and 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 resource 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

[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

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.

4.2 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 - PrüVOFortkfmBf), 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

A list of other teaching materials of the master craftsman training is available at http://master-bsr.eu/training-material/.

[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).