

2.4 Developing occupational profiles and curricula - Microcredentials



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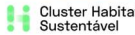
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2.4 Developing occupational profiles and curricula - Microcredentials

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Micro-credentials for carpentry (technology)

Section 2.4 of the Quality Apprenticeship Support Programme highlights the importance of occupational profiles and curricula. It also explains what companies can do if these documents are missing or incomplete, and how they can draw up their own curricula or equivalent documents.

An alternative to curricula are micro-credentials. These are particularly suitable for continuing professional development or adult education, as they usually consist of several small modules that can be undertaken independently of one another. This enables a step-by-step approach to completing the training, which can be easily undertaken alongside work.

This document sets out 10 micro-credentials for carpentry training (EQF 3/4), based on the competences listed in the supplementary document :‘2.3 Skills needs in carpentry (technology)’.

Thus, this content is also based on a combination of EQF-Timber – a project in which timber construction competences across Europe were defined according to EQF levels – and the Austrian apprenticeship system, as well as additional green and digital competences.

The first 8 micro-credentials form the carpenter’s training; for the training to become a carpentry technician, MC 9 and 10 are added (In Austria, the carpentry technician apprenticeship lasts four years, one year longer than the carpentry training.). The micro-credentials are structured as follows:

MC 1 – Business & wood construction laws, standards, and regulations

MC 2 – Wood technology, Processing & Material Science

MC 3 – Timber construction theory

MC 4 – Construction exercises

MC 5 – Timber construction practice

MC 6 – Applied mathematics

MC 7 – Construction site

MC 8 – Green & digital competencies, building removal & renovation

MC 9 (CT) – Customer service & operational organisation

MC 10 (CT) - Timber construction planning

Each micro-credential consists of individual modules; each module includes a detailed description, a reference to the training programme on which it is based, and the content, including the estimated time required. These are colour-coded for easier navigation (see below).

Title/name of the micro-credential

Title/name of the module within the micro-credential

Description of the module/micro-credential

EQF-Timber requirement (competence based on EQF-Timber)

Apprenticeship (competence based on Austrian apprenticeship system)

Estimated time and content

For each piece of content, the relevant section in the file '2.3 Skills needs in carpentry (technology)' is specified. If the content of the micro-credential is taken from curricula or the Federal Law Gazette but is not integrated into the file '2.3 Skills needs in carpentry (technology)', the content is marked with the source's abbreviation. For example, CC indicates that the content is taken from the carpentry curriculum.

This document is intended to serve as a template for how micro-credentials can be structured, how detailed they should be, and to provide guidance when creating micro-credentials within the company itself. This document is particularly relevant for businesses in the timber sector, but it can also be helpful in other sectors when creating micro-credentials.

The content of each module outlines potential topics that might be covered within the module. Unlike state curricula, these are not set in stone and are intended merely as a starting point.

What is missing from this list, as in the document "2.3 Skills needs in carpentry (technology)" are the company-specific skills that each company must integrate itself. These are the skills that are particularly important within the company, and which differ from the general content.

This document is primarily designed for adult/continuing education. The time frames are based on the duration of vocational school in Austria; as vocational school accounts for 20% of the

training period, the times would be correspondingly longer for a full-time apprenticeship, taking in-company training into account. The content would then be the same, but would need to be presented in a far more practical and detailed manner.

In Austria, there are publicly available training guides for businesses; the training guide for carpenters and carpentry technicians is available here:

Carpentry: https://www.ibisacam.at/wp-content/uploads/2023/01/Zimmerei_Print.pdf

Carpentry technology: https://www.ibisacam.at/wp-content/uploads/2023/01/Zimmereitechnik_print.pdf

Sources:

2.3 Skills needs in carpentry (technology)

EQF Timber:

<https://www.timber-construction.eu/berufsbildung/eqf-timber>

Curriculum carpentry: (CC)

<https://www.ris.bka.gv.at/NormDokument.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20009625&FassungVom=2025-07-17&Artikel=&Paragraf=&Anlage=164&Uebergangsrecht=>

Curriculum Carpentry technology: (CCT)

<https://www.ris.bka.gv.at/eli/bqbl/ii/2016/211/ANL165/NOR40256258>

Federal Law Gazette (Bundesgesetzblatt) – Carpentry apprenticeship: (FC)

<https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20009172>

Federal Law Gazette (Bundesgesetzblatt) – Carpentry technology apprenticeship: (FCT)

<https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20009173>

Micro-credential 1 – Business & wood construction laws, standards, and regulations (120h)

Introduction

This is the first part of the training. As an introductory unit, apprentices are taught everything they need to know about the education. This includes an overview of the training programme, setting out its general content, objectives, and structure, how the programme is delivered, and what further training opportunities are available after completion.

Apprentices should know further training opportunities. (A1.1)

Apprentices should know the content and aim of the apprenticeship training as well as the relevant further training opportunities after the apprenticeship. (A1.1)

Topics: (6-8 hours)

- Introduction
 - What is this programme about?
 - Content of the apprenticeship
 - Target/goal of the apprenticeship
 - Structure of the apprenticeship
 - What are micro-credentials?
 - Different forms of training in this programme
 - Classroom
 - Workshop
 - Hybrid
 - Online
 - Exams & performance assessments
- Job-related topics
 - Occupational profile of apprentice
 - Typical activities during and after apprenticeship
- Further training opportunities after apprenticeship
 - Building trade school
 - Foreman training
 - Higher education

Company organisation & Business basics

This section focuses primarily on the training company. This includes an overview of the company's structure, including key contacts, departments, and market position. In addition, various internal processes are explained, such as how performance recording, reporting and quality assurance are carried out within the company.

Apprentices should know the basics of the organisation (training company) (A1.2)

Apprentices should be familiar with the training company's responsibilities, market position, range of services and client base. Apprentices should also be familiar with the company's operating costs, the factors that influence them, and their implications. (A1.2)

The apprentice should be familiar with the legal form and structure of the training company. (A1.3)

Topics: (4-8 hours)

- Company organisation
 - Contact persons (apprentice trainers, management)
 - Departments and their tasks
 - Operating costs
 - Market position
 - Competing companies
 - Cooperation with other companies
 - Range of services & products
 - Order acceptance
 - Legal form & operating form
- Performance recording
- Reporting
- Quality assurance
 - Quality inspection
 - Quality assurance measures
 - Documentation

Rights & obligations of the employer and employee

This section deals with the rights and obligations of employees and employers in general and in relation to the apprenticeship. In addition to the theoretical input, the apprentices also learn how to inform themselves about the topics mentioned in case of uncertainty.

Apprentices should know the rights and obligations of the employer and employees. (A1.3)

Apprentices should know the obligations arising from the training/apprenticeship contract and the labour law regulations that must be displaced by the training company. (A1.3)

Topics: (4-6 hours)

- Rights and obligations of employees
- Rights and obligations of employers
- General conditions of employment law

- Income
- Working hours
- Rest periods
- Vacation entitlement
- (Premature) termination of apprenticeship
- School law provisions
- Social law provisions
- Other laws applying to apprenticeship

Wood construction ordinances and laws

This section deals with the laws, standards and guidelines that are relevant to timber construction. This includes both building regulations and safety guidelines, national and international standards as well as other laws and guidelines.

Apprentices should know all relevant laws for wood construction, including traffic laws and occupational safety regulations. (A1.3)

Apprentices should have thorough knowledge of profession-specific standards and legal regulations (e.g. technical building regulations, building codes). (A1.3)

Topics: (6-8 hours)

- Laws
 - Wood construction specific laws
 - Traffic laws
 - Occupational safety regulations
- Standards
 - ISO
 - EN
 - National norms
- Technical building regulations
- Building codes

Wood construction specific regulations (Fire, thermal, sound, moisture)

This section deals with (safety) regulations in the timber construction sector. This includes regulations, standards, test procedures, and institutions involved in fire, thermal, acoustics and moisture protection.

Apprentices should be able to apply regulations for fire, heat, sound, and moisture protection. Additionally, they should know the institutions that are involved in those areas. (A1.4)

Apprentices should have thorough knowledge of profession-specific standards and legal regulations (e.g. technical building regulations, building codes). (A1.3)

Apprentices should know the relevant safety regulations, especially fire protection, and other relevant regulations for the protection of life and health. (A1.4)

Topics: (8-12 hours)

- Safety regulations
- Fire protection
 - Regulations & Norms
 - Different ways of testing
 - Institutions involved
- Thermal insulation (heat and cold)
 - Regulations & Norms
 - Different ways of testing
 - Institutions involved
- Moisture protection
 - Regulations & Norms
 - Different ways of testing
 - Institutions involved
- Sound insulation
 - Regulations & Norms
 - Different ways of testing
 - Institutions involved

Construction site safety regulations

This part deals with the standards, regulations and laws relating to construction sites with a focus on construction site safety. Aspects such as potential hazards, fire protection and behaviour in an emergency are covered in theory.

Apprentices should be familiar with the relevant safety standards and regulations for the construction site. (A1.5)

Apprentices should be familiar with the relevant safety regulations, which includes construction site safety. (A1.5)

Topics: (6-8 hours)

- Standards for construction sites
- Regulations for construction sites
- Construction site safety
 - SiGe-Plan (GB: CPP / ES: ESS / PT: PSS / GR: ΣAY)

- Potential hazards
- Safety equipment
 - Personal protective equipment
- Fire protection (e.g. storage of flammable materials)
- Behaviour in an emergency & contact persons

Work and process planning

In this part, apprentices learn the basics of procurement, work and process planning and can apply them. This involves the planning of materials, personnel, and equipment as well as time management.

Apprentices should be familiar with the company's processes relating to project preparation and documentation, including order acceptance, preliminary work, work recording, reporting, and quality assurance. (A2.1)

Apprentices should know the basics of procurement, work and process planning and be able to apply them. (A2.3)

Apprentices should be familiar with the necessary steps involved in work planning and preparation. Additionally, apprentices should be able to carry out work planning and determine the work steps, tools, and methods. (A2.1)

Topics: (10-14 hours)

- Procurement
 - Logistics
 - Storage
 - Suppliers
- Work planning
 - Material
 - Tools/equipment
 - Personnel
- Process planning
 - Time management
 - Important/critical tasks
- Project planning
 - Creating a plan
 - Project idea
 - Targets
 - Milestones
 - Resources
 - Defining the project team
 - Individual tasks

- Creating a To-Do list
- Cross-references to other content
- Order acceptance
- Reporting/documentation
- Quality assurance

Logistics

This section focuses on logistics. It covers the interrelationship between logistics, health, safety, and other trades, as well as the impact of logistics on construction planning.

Apprentices should know the interrelationships of logistics with occupational health and safety and other trades (A2.3)

Apprentices should be able to understand the impact of transportation and storage on construction planning and explain the necessary occupational safety measures. (A2.3)

Topics: (4-6 hours)

- Logistics
 - In-company
 - External
 - Work site
 - Impact of logistics on construction planning (reference to previous section)
- Interrelationships of logistics with
 - Occupational health and safety
 - Other trades
 - Main construction trades
 - Finishing trades
 - Technical trades

Economic thinking and acting

In this section, apprentices learn financial skills, particularly for their personal lives. They learn how to check payslips, make sound financial decisions, explore various ways to save money and finance purchases, manage debt, and make use of banking services, including online services.

Apprentices should be able to check their payslips for legal and mathematical accuracy and take appropriate action in the event of discrepancies. They should also be able to complete their tax returns online. (CC)

Apprentices should be able to record income and expenditure, reflect on their own spending habits, and make and justify financial decisions. (CC)

Apprentices should be able to take steps to manage debt in the event of financial difficulties and to research and compare different forms of saving and financing. Additionally, they should be able to research and apply for various support schemes available to apprentices . (CC)

Apprentices should be able to use banking services for domestic and international payments, taking into account the terms and conditions and data security. (CC)

Apprentices should be able to research different types of accommodation. (CC)

Topics: (20-40 hours)

- Payroll accounting
 - Legal control
 - Mathematical control
 - Measures in the event of deviations
 - Tax return
- Income and expenditure
 - Consumer behaviour
 - Financial decisions
 - Forms of saving and financing
 - Researching and applying for support services for apprentices
- Banking services
 - National
 - International
 - Conditions
 - Data security
- Forms of housing
 - Legal implications
 - Financial implications

Documents and contracts

This section focuses on important documents and contracts. Apprentices learn how to handle documents correctly and what steps to take if they are lost. They also learn how to assess and conclude contracts, including how to respond appropriately in the event of any deviations from the terms of the contract.

Apprentices should be able to create a structure for a document collection and, in the event of acquisition or loss, carry out the necessary communication using e-government services. (CC)

Apprentices should be able to compare prices, rates and terms and conditions for purchases and assess value for money. (CC)

Apprentices should be able to conclude contracts in accordance with the relevant legal principles, assess the resulting consequences, and handle the necessary verbal and written communication. Additionally, they should be able to respond appropriately to contractual irregularities, make use of consumer protection bodies, and justify their actions. (CC)

Apprentices should be able to assess their insurance needs, evaluate the cost-benefit ratio, justify the insurance policies they take out, and submit a claim. (CC)

Topics: (10-20 hours)

- Document structure
 - Create document structure
 - Procurement of documents and reaction in case of loss
- Offer comparisons
 - Cost-benefit comparison
- Contracts
 - Concluding contracts
 - Assessing consequences
 - React appropriately to irregularities
- Insurance contracts
 - Cost-benefit comparison
 - Justifying decisions

Entrepreneurial thinking and acting

This part is about founding and managing a company. Topics such as necessary steps for founding a company, bookkeeping, annual financial statements, and price calculation are covered.

Apprentices should be able to identify the necessary steps for setting up a business and present their implementation as part of a project. (CC)

Apprentices should be able to identify and assess business processes on the basis of specific supporting documents and prepare them for further accounting processing. (CC)

Apprentices should be able to understand an industry-specific annual financial statement and draw conclusions from it. (CC)

Apprentices should be able to explain the operational cost factors involved in pricing, identify ways to improve productivity and draw up and justify an industry-specific cost estimate. (CC)

Apprentices should be able to research and describe staff development measures. (CC)

Topics: (12-20 hours)

- Founding a company

- Necessary steps
 - Implementation as part of a project
- Bookkeeping
 - Evaluate and prepare receipts
- Understanding annual financial statements
- Price calculation
 - Cost factors
 - Ways to improve productivity
- Personnel development

Micro-credential 2 – Wood technology, Processing & Material Science (107h)

This micro-credential deals with the basics of wood technology. The main topics are wood species identification, wood-based materials and other building materials, wood pests, drying, storage, treatment, and processing of wood. Topics such as surface coating and insulation as well as protective coatings are also covered.

Wood species

This section is about the different wood species used in timber construction and their properties. The apprentices learn about wood characteristics and how to distinguish between the different wood species on the basis of their properties.

Apprentices should be able to distinguish and assess wood species based on their properties and describe their various commercial forms. (B1.1)

Apprentices should be able to recognise different types of wood based on their specific properties. (C1.1)

Apprentices should be able to distinguish wood species based on their properties and know their commercial forms. (B1.1)

Topics: (12-16 hours)

- Wood species used for timber construction
- Characteristics
 - Density
 - Anisotropy
 - Strengths
 - Testing procedures
 - Flexural strengths
 - Tensile strengths
 - Compressive strengths
 - E-modulus
 - Other strengths
 - Machinability
 - Durability
- Distinguishing the different wood species based on properties
- Use case of different wood species

Wood-based materials & other building materials

This section deals with building materials used in timber construction. It covers both wood-based and non-wood-based materials. Their properties and areas of application are discussed, as are the test methods used to identify the properties.

Apprentices should be able to distinguish and assess wood-based materials based on their properties and describe their various commercial forms. (B1.1)

Apprentices should know the properties of building materials for wooden structures. (B1.1)

Apprentices should be able to recognise different types of wood based on their specific properties. (C1.1)

Apprentices should know the commercial forms of the different wood species. (B1.1)

Apprentices should have sufficient knowledge of wood and other building and construction materials, their properties, processing options, and possible uses. (B1.1)

Topics: (16-20 hours)

- Wood-based materials
 - Different types of wood-based materials
 - CLT
 - GLT
 - Particle boards
 - Fibreboards
 - Characteristics
 - Density
 - Strengths
 - Testing procedures
 - Flexural strengths
 - Tensile strengths
 - Compressive strengths
 - Machinability
 - Durability
 - Production
 - Intended use
- Other building materials
 - Different types of building materials
 - Metal
 - Mineral
 - Plastic
 - Characteristics
 - Density

- Strengths
- Machinability
- Durability
- Production
- Intended use
- Preparation of materials
- Classification
- Commercial forms

Protective layers and insulation

This section deals with insulating materials and protective layers. The apprentices learn about the purpose, properties and commercial forms of fire protection, thermal insulation, moisture protection, and sound insulation.

Apprentices should know the functions of protective layers and their structural properties. (B1.1)

Apprentices should be familiar with the properties of insulation materials (heat, sound, fire & possible combinations). (B1.1)

Apprentices should have knowledge of heat, cold, moisture, fire and sound insulation including connections and closures. (B1.1)

Topics: (8-12 hours)

- Functional/protective layers
- Types of insulation
 - Fire protection
 - Thermal insulation (heat & cold)
 - Moisture protection
 - Sound insulation
- Purpose
- Properties
 - Testing procedures/methods
 - Density
 - Flammability/burning behaviour
- Commercial forms

Wood pests and protection

This section deals with wood pests, their effects and how to recognise them. The apprentices learn about wood pests such as insects, bacteria as well as fungi and the appropriate preventive and control measures.

Apprentices should know wood pests and be able to select structural and chemical measures for wood protection. (B1.1)

Apprentices should be familiar with wood-destroying pests and be able to identify and select structural and chemical measures for wood preservation, as well as explain the rationale for their use. (B1.1)

Topics: (8-12 hours)

- Recognising wood pests and their effects
 - Types of wood pests
 - Insects
 - Fungi
 - Bacteria
 - Characteristics
 - Identification
 - Damage
- Preventative and control measures for wood pests
 - Constructive wood protection
 - Implementation
 - Functionality
 - Advantages and disadvantages
 - Chemical wood protection
 - Types of treatments
 - Functionality
 - Advantages and disadvantages
 - Physical/thermal wood protection
 - Types of treatments
 - Functionality
 - Advantages and disadvantages

Surface coating and finishing – theory

This section deals with the coating of wooden components. The apprentices learn about the various application methods and purposes of surface coatings as well as their advantages and disadvantages.

Apprentices should be able to properly apply liquid protective coatings and finishes according to the manufacturer's instructions. (D1.2)

Apprentices should be able to process wooden surfaces with hand-operated machines and protect wooden structures chemically. (D1.2)

Topics: (8-12 hours)

- Mechanical surface treatment
 - Purpose
 - Procedure
 - Types of mechanical procedures
 - Planing
 - Various kinds of planers
 - Advantages and disadvantages
 - Use case
 - Sanding
 - Various kinds of sanders
 - Advantages and disadvantages
 - Use case
- Liquid coating
 - Types
 - Protective coatings
 - UV-blocking
 - Weather resistant
 - Finishes
 - Penetrating finishes
 - Oils
 - Film-forming finishes
 - Lacquer
 - Application method
 - Liquid protective coatings
 - Spraying process
 - Brushing
 - Roller application
 - Finishes
 - Spraying process
 - Brushing
 - Roller application
 - Purpose

Drying of wood

This section deals with the drying of wood. The necessary steps are explained, possible drying errors are shown, and their causes and avoidance are described.

Apprentices can implement measures for the proper drying of wood. (B1.2)

Apprentices should be able to develop procedures for the proper drying of wood. (B1.2)

Topics: (8-12 hours)

- Purpose
- Various forms of drying
- Sequence
 - Stacking
 - Feeding
 - Drying capacity/arrangement in drying chamber
 - Drying scheme
 - Warm up & warm through
 - Drying until fibre saturation point
 - Drying below fibre saturation point
 - Equalising
 - Cooling down
- Energy requirement
- Drying quality & defects
- Costs

Storage of wood and other building materials

This part deals with the correct packaging and storage of wood, wood-based and other building materials. Possible errors and dangers are mentioned and the correct handling of the materials with regard to storage is explained.

Apprentices should be able to describe the storage of panel, building, and auxiliary materials. (B1.1)

Apprentices should be able to properly inspect, store, and protect timber, materials and building supplies. (B1.2)

Apprentices should be able to store and maintain wood and other building materials and construction supplies. (B1.2)

Topics: (6-8 hours)

- Types of materials
 - Sawn wood
 - Wood-based materials
 - Non-wooden building materials
 - Auxiliary building materials
- Stacking
- Packaging
- Manoeuvrability

- Protection from
 - Rain
 - Heat
 - Cold
 - UV
- Special properties
- Possible problems/dangers
 - Inflammable
 - Toxic

Wood construction fasteners

This part is about fasteners used for wood constructions. Apprentices are taught all possible forms of fasteners, from adhesives to bolts to screws, their uses, advantages, and disadvantages.

Apprentices should be able to select the appropriate fasteners. (C2.1)

Apprentices should be able to select fasteners according to the application. (D1.1)

Apprentices should have knowledge of the use of fastening and assembly aids such as dowels, anchors, spacers, sheet steel fasteners, etc. (C2.1)

Topics: (8-12 hours)

- Types of fasteners
 - Adhesives
 - Nails
 - Screws
 - Bolts & threaded rods
 - Dowels
 - Fittings
- Properties
- Use case
- Advantages & disadvantages

Woodworking tools & machines

In this part, apprentices are shown the different types of tools used for processing wood and wood-based materials. Apprentices are shown the function, purpose, and possible dangers of stationary and hand tools.

-CNC machines are only covered briefly for the sake of completeness; CNC machines are then described in more detail in the following section.-

Apprentices should be able to name woodworking tools and machines, explain and plan their use, taking into account occupational safety measures. (B2.1)

Apprentices should have knowledge of the construction, function, and use of carpentry tools, hand-held power tools, stationary woodworking machines, and CNC-controlled machines (such as joinery machines). (B2.1)

Topics: (6-10 hours)

- Types of tools/machines
 - Hand tools
 - Band saw
 - Circular saw
 - Sanders
 - CNC
- Function of the tools/machines
- Use of machines
 - Instructions from manufacturer
 - Regulations from manufacturer
 - Correct area of application
 - Correct use
 - Potential dangers and safety measures

CNC machines

This part is specifically about CNC machines. Apprentices are taught the theoretical basics of how CNC machines work, the individual parts and how to use them.

Apprentices should be able to describe the mode of operation and areas of application of various CNC machines. (B2.2)

Apprentices should know the main principles of operating numerically controlled machines. (B2.2)

Apprentices should have sufficient knowledge of the structure, function, and use of CNC-controlled machines (such as e.g. joinery machines). (B2.2)

Topics: (8-12 hours)

- Fundamentals
 - What are NC and CNC
- CNC basics
 - Structure/components

- Hardware
 - Frame
 - Axle systems
 - Drive systems
 - Tool management system
- Electronics & Software
 - Functionality
 - Types of CNC machines
 - Intended use
- Operation of CNC machines
 - Operating options
 - Safety devices

Micro-credential 3 – Timber construction theory (116h)

This micro-credential deals with the theoretical basics of timber construction. This includes common timber structures, the construction of walls, ceilings, roofs, stairs, floors, windows, and doors, etc. Common fasteners and non-wooden building materials are also discussed. The apprentices gain an initial insight into CAD/CAM/CNC programmes and working with CNCs.

Wall constructions

In this section, apprentices are given an overview of the various wall constructions, their structures, functions, and requirements. The different types are compared, and their advantages and disadvantages are discussed.

Apprentices should know wall constructions and be able to describe them. (C2.1)

Apprentices should be able to plan various wooden structures, such as walls. (C2.1)

Apprentices should be familiar with the methods and steps involved (marking out, working, fitting) in traditional, manual, mathematical and computer-aided joinery for the construction of a wide variety of timber structures including walls. (FC)

Topics: (6-10 hours)

- Types
 - Timber frame/framing construction
 - Internally insulated
 - Intermediate insulation
 - Externally insulated
 - Timber panel construction
 - Solid timber construction
 - Log construction
 - Dowel laminated timber
 - Cross laminated timber construction
- Requirements & functions
 - Component layers
 - Airtightness
 - Weather protection
 - Load transfer
 - Thermal insulation
 - Fire protection
 - Sound insulation
- Structure and specifications
- Advantages and disadvantages
- Application purpose

Ceiling constructions

In this section, apprentices are given an overview of the various ceiling constructions, their structure, functions, and requirements. The different types are compared, and their advantages and disadvantages are discussed.

Apprentices should know ceiling constructions and be able to describe them. (C2.1)

Apprentices should be able to plan and construct various wooden structures, such as ceilings. (C2.1)

Apprentices should be familiar with the methods and steps involved (marking out, working, fitting) in traditional, manual, mathematical and computer-aided joinery for the construction of a wide variety of timber structures including ceilings. (FC)

Topics: (6-10 hours)

- Types
 - Joist ceiling
 - Solid timber construction
 - CLT
 - GLT
 - Timber-concrete composite
- Requirements & functions
 - Component layers
 - Airtightness
 - Load transfer
 - Fire protection
 - Sound insulation
 - Vibration behaviour
- Structure and specifications
- Advantages and disadvantages
- Application purpose

Roof constructions

In this section, apprentices are given an overview of the various roof constructions, their structure, functions, and requirements. Various roof shapes, roof truss constructions, roof ellipses, and superstructures are also described. The different types are compared, and their advantages and disadvantages are discussed.

Apprentices should be familiar with roof shapes, roof truss constructions, roof ellipses as well as roof superstructures (e.g. dormers, etc.) and be able to describe, evaluate, draw, and manufacture them. (C2.1)

Apprentices should be able to identify and describe different roof shapes, roof edges, dormers, and roof cutouts. (C2.1)

Apprentices should be able to describe, compare, and evaluate different methods of roof measurement. (C2.1)

Apprentices should be able to name types of roof truss structures, describe their components, and explain their functions. (C2.1)

Topics: (6-10 hours)

- Requirements & functions of roofs
 - Component layers
 - Water drainage & diffusion
 - Airtightness
 - Weather protection
 - Thermal insulation
 - Fire protection
 - Sound insulation
- Roof constructions
 - Types
 - Rafter roof
 - Purlin roof
 - Collar beam roof
 - Flat roof
 - Descriptions
 - Advantages and disadvantages
- Roof shapes
 - Gable roof
 - Hip roof
 - Mono-pitched roof
- Roof truss constructions
 - Closed truss
 - King post truss
 - Queen post truss
 - Liegender Stuhl
 - Open truss
 - Arch-braced truss
 - Hammerbeam truss
 - Scissor truss

- Roof ellipses
- Roof superstructures

Floor constructions

In this section, apprentices are given an overview of the various floor constructions, their structure, functions, and requirements. Both indoor and outdoor flooring systems are covered. The different types are compared, and their advantages and disadvantages are discussed.

Apprentices should know different floor systems and other exterior wood structures. (C2.3)

Apprentices should know special features of floor cladding specific to wood construction. (D1.3)

Apprentices should be familiar with the installation of prefabricated components such as wooden flooring using various fixing and assembly methods. (FC)

Topics: (4-8 hours)

- Types of floor systems
 - Interior
 - Floated screed on timber joist floor
 - Dry screed system
 - Floor structure on CLT slab
 - Exterior
 - Wooden construction
 - Concrete
 - WPC
- Floor covering
 - Solid wood flooring
 - Engineered wood flooring
 - Laminate flooring
 - Vinyl
 - Linoleum
- Assembly
- Advantages & disadvantages
- Use case

Stair constructions

This section outlines the different types of staircase constructions. The (legal) requirements, advantages, and disadvantages as well as the individual components are described.

Apprentices should know different types of stairs as well as their components. (C2.3)

Apprentices should know different types of stairs and be able to assign suitable areas of application to them. (C2.3)

Topics: (4-8 hours)

- Different types of stairs
 - Single flight
 - Multi-flight
 - Spiral
- Materials & Components
 - Wood
 - Mineral
 - Metal
 - Special forms
- Structure
- Requirements & functions of stairs
 - Standards & rules
 - Step size rule
 - Minimum width
 - Landings
 - Railings
 - Fall protection
- Advantages and disadvantages
- Application purpose

Door & gate constructions

This section deals with the different types of doors and gates. It covers the different functions, types, and materials. The apprentices also gain a theoretical insight into the production and installation of doors and gates.

Apprentices should know carpenter-made gate and door structures. (C2.3)

Apprentices should be familiar with the installation of prefabricated components such as wooden doors and gates using various fixing and assembly methods. (FC)

Topics: (4-8 hours)

- Door constructions
 - Function
 - Front door/exterior door
 - Interior door
 - Fire-rated door
 - Soundproof door

- Types
 - Hinged door
 - Sliding door
 - Swinging door
- Material
 - Wood
 - Wood-based materials
 - Metal
 - Plastic
- Manufacturing
- Installation
- Gate constructions
 - Functions
 - Types
 - Up-and-over door
 - Roll-up door
 - Sliding gate
 - Material
 - Wood
 - Wood-based materials
 - Metal
 - Plastic
 - Manufacturing
 - Installation

Wood construction – Cladding & built-in parts

This section deals with various wall, floor and ceiling claddings as well as built in parts. Both interior and exterior constructions are covered. The apprentices also gain a theoretical insight into the production and installation of cladding and built-in parts.

Apprentices should know special features of wall, floor, and ceiling cladding specific to wood construction. (D1.3)

Apprentices should be familiar with the installation of prefabricated components such as wall and ceiling cladding using various fixing and assembly methods. (FC)

Topics: (4-8 hours)

- Types
 - Wall cladding
 - Interior
 - Exterior

- Ventilated
- Rear-ventilated
- Non-ventilated
- With and without siding
- Floor cladding
 - Interior
 - Exterior
- Ceiling cladding
 - Interior
 - Exterior
- Built-in parts
 - Interior
 - Exterior
- Special features
- Manufacturing
- Assembly

Terraces and Balconies

This section deals with the various design options for terraces and balconies, both on the basis of wood and other materials. It also provides an overview of protection and maintenance.

Apprentices should be familiar with the methods and steps (marking out, machining, fitting, and marking) involved in traditional, manual, mathematical and computer-aided (including joinery software) joinery for the construction of a wide variety of timber structures. (FC)

Topics: (4-8 hours)

- Types of construction
 - Terraces
 - Floating frame on pads
 - Ground-level placement on gravel base
 - Balconies
 - Load-bearing structure
 - Cantilevered reinforced concrete slab
 - Lightweight timber balcony
 - Substructure
 - Adjustable pedestal system
 - Joist system on rubber pads
- Decking material
 - Wood
 - WPC

- Concrete
- Protection
 - Structural wood protection
 - Surface coating
 - Maintenance
- Manufacturing
- Installation

Building services in timber constructions

This part is about the different types of building service installations. Apprentices are given a theoretical insight into installation, the procedure for penetrating component layers and subsequent sealing.

Apprentices should be able to professionally install simple building service installations in construction elements assembled on site or prefabricated. (D1.1)

Topics: (2-4 hours)

- Routing of installation and service shafts
 - Water
 - Electricity
 - Air
- Penetrations through building elements
- Sealing
 - Fire stopping systems
 - Waterproofing
 - Airtightness
- Moisture Monitoring

Bridge constructions

This part is about the different types of bridge constructions. It deals with the different types of materials, the applications, and the theory of the production as well as the assembly of wooden bridges.

Apprentices should know different construction types of wooden bridges. (C2.3)

Apprentices should be familiar with different bridge construction methods and be able to describe their components. (CC)

Apprentices should be familiar with the methods and steps (marking out, machining, fitting, and marking) involved in traditional, manual, mathematical and computer-aided (including joinery software) joinery for the construction of a wide variety of timber structures such as bridges. (FC)

Topics: (4-6 hours)

- Types of bridge constructions
 - Beam bridge
 - Arch bridge
 - Truss bridge
 - Suspension bridge
- Materials
 - Wood
 - GLT
 - CLT
 - Hybrid
 - Steel
 - Concrete
- Application
 - Pedestrian & cycle bridge
 - Hiking bridge
 - Historic
- Construction/manufacturing
- Installation/assembly

Fasteners & connections

This section deals with connections and fasteners in timber construction. This involves the various connections and the corresponding fasteners as well as their properties, advantages, and disadvantages

Apprentices should be able to select the appropriate fasteners and make a professional connection. (C2.1)

Apprentices should be able to select fasteners according to the application. (D1.1)

Apprentices should have knowledge of the use of fastening and assembly aids such as dowels, anchors, spacers, sheet steel fasteners, etc. (C2.1)

Topics: (6-10 hours)

- Connections
 - Connection between
 - Wall-Wall
 - Wall-Roof
 - Wall-Ceiling
 - Ceiling-Ceiling
 - Ceiling-Support

- Roof-Roof
 - Special connections
- Types of connections
 - Traditional wood connection
 - Mechanical connection
 - Modern fasteners
 - Special joints
- Joining
 - Force transmission (form fit, material connection, force fit)
 - Loading (normal force, shear force, moment)
 - Knot connection
- Fastener
 - Types of fasteners
 - Adhesives
 - Nails
 - Screws
 - Bolts & threaded rods
 - Dowels
 - Fittings
 - Properties
 - Advantages and disadvantages
 - Purpose of use

Prefabrication & layered structures

This section deals with component layers and the prefabrication of components. It is split into two parts. For the first part, the functions, properties, and requirements of the individual layers are discussed. Additionally, the second part focuses on the requirements and the theory of production as well as the connection of prefabricated components.

Apprentices should know the work processes and construction forms in the manufacture of prefabricated components and elements (walls, ceilings, roofs). (C2.3)

Apprentices should know the physical properties of layers and layer structures in timber constructions and prefabricated timber elements (walls, ceilings, roofs) and be able to calculate them. (C2.4)

Topics: (12-20 hours)

- Layered structures
 - Types of layered structures
 - Walls
 - Ceilings

- Roofs
- Requirements & functions
 - Component layers
 - Airtightness
 - Weather protection
 - Load transfer
 - Thermal insulation
 - Sound insulation
- Properties
- Materials
- Principles and correct sequence
- Prefabricated products and components
 - Degrees of prefabrication
 - Types of prefabricated elements
 - Walls
 - Ceilings
 - Roofs
 - Standards/requirements
 - Production/manufacturing
 - Assembly
- Connection of prefabricated elements
 - Standards/requirements
 - Procedure of assembly
 - Types of fasteners
 - Advantages & Disadvantages
 - Use cases

Wood construction – Structural principles

In this part, the structural principles of timber constructions and prefabricated timber components are described.

Apprentices should know structural principles for timber constructions and prefabricated timber elements. (C2.4)

Apprentices should have a basic understanding of building physics, including structural mechanics. (C2.4)

Topics: (6-10 hours)

- Timber constructions
 - Standards/regulations
 - Load types

- Load-bearing principles
- Material properties
 - Strength classes
 - E-modulus
- Prefabricated timber elements
 - Standards/regulations
 - Degree of prefabrication
 - Types of prefabricated components
 - Special structural features
 - Transportation
 - Connections

Material selection

This section deals with the different materials and their selection in the construction of building components such as walls, ceilings, and roofs. Apprentices learn to select materials based on the requirements and to justify their choice.

Apprentices should know the properties of building materials for wooden structures and can select and use them properly. (B1.1)

Apprentices should be able to select materials according to the application. (C1.1)

Apprentices should be able to select wood and other building and auxiliary building materials. (B1.1)

Topics: (4-8 hours)

- Types of materials
 - For walls
 - For ceilings & floors
 - For roofs
- Requirements
- Material choice
 - Based on
 - Requirements
 - Price
 - Workability
 - Visual appearance

Overview CAD/CAM/CNC

This part deals with the functionality of CNC machines, their structure, and individual parts as well as the procedure for using them appropriately. In addition, various CAD/CAM programmes are presented and their functions described.

-This part can be concluded with a practical project where the apprentices create a drawing of a small product (for example: board game like chess) using a CAD programme. Subsequently, the drawing is converted into a G-code (using a CAM programme) that can be read by and then produced on the CNC machine.-

Apprentices should know how CNC machines operate. (C2.2)

Apprentices should know the CAD/CAM programmes required to control CNC machines. (C2.2)

Apprentices should have sufficient knowledge of the structure, function, and use of CNC-controlled machines (such as e.g. joinery machines). (C2.2)

Topics: (12-20 hours)

- CNC basics
 - Structure
 - Basic elements
 - Tool management system
 - Software
 - Functionality
 - Types of CNC
 - Intended use
- Different types of CAD/CAM programmes
 - Functionality
 - Advantages and disadvantages
- Transfer from CAD to CNC
 - Procedure
 - Sources of error
- Small practical project
 - Creation of drawing
 - Conversion to G-code
 - Transfer to CNC
 - Production
 - Operating options
 - Safety

Micro-credential 4 - Construction exercises (115h)

This Micro-credential is about the graphic representation of (timber) structures. The focus is on the construction of walls, ceilings, and roofs as well as the connections between them. At the end there is a project where the apprentices have to plan a structure themselves.

Construction - Planning and production of timber structures – General

This section deals with the general creation of drawings. The main focus is on the creation, labelling and dimensioning of drawings as well as the creation of lists based on the drawings.

Apprentices should be able to incorporate technical drawing rules into planning and manufacturing documents. (A1.4)

Apprentices should be able to create, label and dimension drawings, details, and lists in accordance with standards. (A2.2)

Apprentices should be able to model simple load-bearing structures and constructions by selecting suitable timber connections and observing wood preservation. (A2.2)

Apprentices should be able to plan products, individual components or assemblies for timber structures based on their own ideas or according to specifications, as well as draw up the necessary plans (joinery, production, and assembly plans). (A2.2)

Topics: (8-12 hours)

- Technical drawings
 - Standard-compliant creation of drawings
 - Labelling
 - Dimensioning
- Drawing/graphic representation of construction parts
 - Drawing connections & fasteners
- Types of constructions
 - Walls
 - Ceilings
 - Roofs
 - Stairs
- Structural measures for wood protection
- Creation of lists
 - Room list
 - Area & volume list

Construction - Planning and production of timber structures – Walls

This section deals with the creation of drawings of various wall structures. The apprentices learn to construct the various wall structures with all their details. The representation of insulation, functional layers and cladding is also integrated.

Apprentices should know wall constructions and be able to describe, evaluate and draw them. (C2.1)

Apprentices should be able to plan and construct various wooden structures, such as walls. (C2.1)

Topics: (15-25 hours)

- Types of wall constructions
 - Timber frame/framing construction
 - Internally insulated
 - Externally insulated
 - Timber panel construction
 - Solid timber construction
 - Log construction
 - Dowel laminated timber
 - Cross laminated timber construction
- Graphic representation of insulation and functional/protective layers
- Graphic representation of component layers
- Graphic representation of wall cladding

Construction - Planning and production of timber structures – Ceilings

This part is about creating drawings of different ceiling structures. The drawing of insulation, functional layers and cladding is also covered. In addition to the ceiling constructions, the apprentices also learn the graphic representation of floor constructions.

Apprentices should know wall and ceiling constructions and be able to describe, evaluate and draw them. (C2.1)

Apprentices should be able to plan and construct various wooden structures, such as ceilings. (C2.1)

Topics: (10-20 hours)

- Types of Ceilings
 - Joist ceiling
 - Solid timber construction
 - CLT

- GLT
 - Timber-Concrete Composite
- Graphic representation
 - Flooring
 - Component layers
 - Insulation and functional/protective layers
 - Ceiling cladding

Construction - Planning and production of timber structures – Roofs

This part is about the creation of drawings of various roof structures. The graphic representation of different roof shapes, roof truss constructions, roof ellipses, and roof superstructures are covered.

Apprentices should be familiar with roof shapes, roof truss constructions, roof ellipses as well as roof superstructures (e.g. dormers, etc.) and be able to describe, evaluate and draw them. (C2.1)

Apprentices should be able to identify and describe different roof shapes, roof edges, dormers, and roof cutouts. (C2.1)

Apprentices should be able to describe, compare, and evaluate different methods of roof measurement. (C2.1)

Apprentices should be able to name types of roof truss structures, describe their components, and explain their functions. (C2.1)

Topics: (10-20 hours)

- Roof constructions
 - Rafter roof
 - Purlin roof
 - Collar beam roof
 - Flat roof
- Roof shapes
 - Gable roof
 - Hip roof
 - Mono-pitched roof
- Roof truss constructions
 - Closed truss
 - King post truss
 - Queen post truss
 - Liegender Stuhl
 - Open truss
 - Arch-braced truss

- Hammerbeam truss
- Scissor truss
- Roof ellipses
 - Types
- Roof superstructures
 - Types
- Graphic representation of component layers
- Graphic representation of insulation and functional/protective layers

Construction - Planning and production of timber structures – Other structures

This part deals with the creation of drawings of the remaining components such as stairs, windows, doors, ... and their integration into existing components.

Apprentices should be familiar with the methods and steps involved (marking out, working, fitting) in traditional, manual, mathematical and computer-aided joinery for the construction of a wide variety of timber structures like stairs, doors, gates, towers, and bridges. (FC)

Topics: (8-12 hours)

- Timber structures
 - Stairs
 - Windows
 - Gates & Doors
 - Terraces & Balconies
 - Bridges
- Different types
- Steps in planning and production
- Graphical representation

Construction - Planning and production of timber structures – Connections & fasteners

This part is about drawing connections between different components. The apprentices learn the correct graphical representation of connections and fasteners with reference to the requirements.

Apprentices should be able to model simple load-bearing structures and constructions by selecting suitable timber connections and observing wood preservation. (A2.2)

Apprentices should be able to select the appropriate fasteners and make a professional connection. (C2.1)

Apprentices should have knowledge of the use of fastening and assembly aids such as dowels, anchors, spacers, sheet steel fasteners, etc. (C2.1)

Topics: (10-20 hours)

- Connections between
 - Wall-Wall
 - Wall-Roof
 - Wall-Ceiling
 - Ceiling-Ceiling
 - Ceiling-Support
 - Roof-Roof
 - Special connections
 - Stairs
 - Installations
 - Facades
- Graphic representation of fasteners
 - Types of fasteners
 - Nails
 - Screws
 - Bolts & threaded rods
 - Dowels
 - Fittings
- Graphic representation of component layers
- Graphic representation of insulation and functional/protective layers

Construction – Project

In this part, the apprentices are given a task for modelling a building, or parts of a building, which they carry out independently. In doing so, they must apply their knowledge of wall, ceiling and roof structures and their connections to each other and to other components.

Projects are an essential part of apprenticeship training. (CC)

Topics: (20-40 hours)

- Implementation of a project-specific work order
 - Modelling a construction (part) independently
 - Working independently
 - Application of technical knowledge

Micro-credential 5 – Timber construction practice (126h)

This micro-credential is about practical work in the carpentry business. Apprentices learn how to organise the workplace, use carpentry tools, the manufacturing of wooden components and other necessary skills.

In this micro-credential, apprentices can put all the knowledge they have acquired in the previous modules into practice.

Workplace organisation

This part deals with the organisation of the workplace in the carpentry business. The apprentices learn about work preparation, tool management, and ergonomics at the workplace.

Apprentices should be able to organise the workplace, including the control of tools and machines. (C1.2)

Apprentices should be able to design their workplace ergonomically. (C1.2)

Topics: (2-4 hours)

- Organisation of the workplace
 - Work preparation (at the workplace)
 - Tool management
 - Work environment
 - Cleaning of workplace
- Safety
 - Ergonomics
 - Personal protective equipment

Tools & machines

In this part, apprentices learn the correct and safe use of tools and machines in the workplace. This includes both hand tools and machines such as sanders, planers, and saws. The focus is also on practical work with CNC machines.

Apprentices should be able to operate machines and tools professionally, resource-efficiently and carefully. (B2.1)

Apprentices should be able to apply the manufacturers' specifications and the company's own safety regulations when working with CNC machines. (B2.2)

Apprentices should know the main principles of operating numerically controlled machines. (B2.2)

Apprentices should be able to use woodworking tools and machines with regard to occupational safety, ergonomics, and accident prevention. (C1.2)

Apprentices should understand the function and operation of conventional as well as CNC machines. (C1.2)

Apprentices should be able to safely perform processing techniques such as sawing, milling, planing, and grinding. (C1.3)

Apprentices should know the basics of factory assembly of wooden structures on CNC machines. (C2.2)

Apprentices should have sufficient knowledge of the structure, function, and use of CNC-controlled machines (such as e.g. joinery machines) and be able to use them safely. (B2.2)

Apprentices should be able to handle, maintain and service the tools, machines, devices, appliances, equipment, and work aids to be used, using the appropriate protective equipment. (C1.2)

Apprentices should know how to use carpentry tools, manual machines, stationary woodworking machines, and CNC-controlled machines. (C1.2)

Apprentices should be able to process wood by sawing, chiselling, slotting, planing, rasping, sanding, drilling, burring, chamfering, hewing manually and mechanically. (C1.3)

Topics: (12-20 hours)

- Correct way of working with tools
 - Safety
 - Personal protective equipment
 - Ergonomics
 - Intended use/correct application of tools and machines
 - Functionality/operation of tools and machines
 - Specifications of manufacturer
 - Working resource efficient
- Processing techniques & tools
 - Sawing
 - Circular saw
 - Band saw
 - Milling
 - Spindle moulder
 - Shaper
 - Planing
 - Surface planer
 - Thickness planer
 - Fully automated planer

- Grinding
 - Edge sanding machines
 - Surface sanding machines
- CNC
 - Structure
 - Basic elements
 - Tool management system
 - Software
 - Functionality
 - Types of CNC
 - Intended use
 - Loading/unloading
 - Transfer from CAD to CNC
 - Procedure
 - Sources of error

Measuring & marking out

This section is about the correct implementation and tools for measuring, the reading and understanding of plans as well as marking out in an operational environment.

Apprentices should be able to perform simple measurements and read plans as well as descriptions. (A2.2)

Apprentices should be able to measure and mark out and a plan for the work to be performed. (C1.3)

Apprentices should be able to transfer the dimensions required for carpentry to the structural timbers. (C2.1)

Apprentices should be able to carry out measurements using simple measuring instruments and specialist equipment such as lasers and spirit levels. (A2.2)

Apprentices should be proficient in the techniques of tying up timber structures, which includes marking out. (C1.3)

Topics: (4-8 hours)

- Measuring
 - Perform simple measurements
 - Devices
 - Simple devices
 - Meter stick
 - Measuring tape

- Special devices
 - Laboratory measuring instruments
 - Levelling device
- Reading plans
 - Knowing and understanding different types of plans
 - Understanding scale and dimensions
 - Knowing the meaning of symbols
 - Knowing the meaning of abbreviations
- Marking out
 - Transfer dimensions to structural timbers
 - Devices
 - Carpenter's square
 - Sliding bevel
 - Scriber

Construction & Assembly

The following sections deal with the prefabrication and assembly of different timber constructions in the carpentry workshop. This includes the production of prefabricated components, the handling of the components and the assembly into finished parts for delivery to the construction site.

For better clarity, the competencies that generally apply to all the following sections (Construction & Assembly) are set out below. The requirements specific to the individual timber structures (walls, ceilings, roofs, insulations, floors, gates & doors, stairs, claddings, bridges) are set out further below.

Apprentices should be able to assemble construction parts and create timber joints professionally. (C1.3)

Apprentices should be able to conventionally assemble and join timber and load-bearing structures. (C2.1)

Apprentices should know the work processes and construction forms in the manufacture of prefabricated components and elements. (C2.3)

Apprentices should be able to produce prefabricated components and elements. (C2.3)

Apprentices should be able to assemble prefabricated components and building products independently and professionally. (D1.1)

Apprentices should be able to install wooden constructions such as roof constructions, walls and ceilings using various fastening and assembly methods. (C2.1)

Apprentices should be able to construct various wooden structures. (C2.1)

Apprentices should be able to assemble prefabricated timber structures; this includes understanding the specific features of timber engineering and prefabricated timber construction and taking these into account during assembly. (D1.1)

Construction & Assembly – Walls

In this part, apprentices learn how to build wall structures in the carpentry workshop. They learn to build different types of constructions and their structure and functions. The focus is on the correct production & assembly process, pre-production, and error prevention.

Apprentices should know wall constructions and be able to describe, evaluate, draw, and manufacture them. (C2.1)

Apprentices should be able to plan and construct various wooden structures, such as walls. (C2.1)

Topics: (8-12 hours)

- Construction & Assembly
 - Type of wall
 - Timber frame/framing construction
 - Timber panel construction
 - Solid timber construction
 - Materials
 - Raw materials
 - Tools
 - Auxiliary materials
 - Requirements & functions
 - Load transfer
 - Component layers
 - Airtightness
 - Weather protection
 - Thermal insulation
 - Fire protection
 - Sound insulation
 - Assembly sequence
 - Connection between parts
 - Sources of errors

Construction & Assembly – Ceilings

In this part, apprentices learn how to build ceilings in a carpentry workshop. They learn how to build the different types of construction based on their structure and functions. The main focus is on the correct production & assembly process, pre-production, and error prevention.

Apprentices should know ceiling constructions and be able to describe, evaluate, draw, and manufacture them. (C2.1)

Apprentices should be able to plan and construct various wooden structures, such as ceilings. (C2.1)

Topics: (8-12 hours)

- Construction & Assembly
 - Type of ceiling
 - Joist ceiling
 - Solid timber construction
 - CLT
 - GLT
 - Timber-Concrete Composite
 - Structure
 - Materials
 - Tools
 - Auxiliary materials
 - Requirements & functions
 - Component layers
 - Airtightness
 - Load transfer
 - Fire protection
 - Sound insulation
 - Vibration behaviour
 - Assembly sequence
 - Connection between parts
 - Sources of errors

Construction & Assembly – Roofs

In this part, apprentices learn how to build roofs in a carpentry workshop. They learn how to build the different types of construction based on their structure and functions. The main focus is on the correct production & assembly process, pre-production, and error prevention.

Apprentices should be familiar with roof shapes, roof truss constructions, roof ellipses as well as roof superstructures (e.g. dormers, etc.) and be able to describe, evaluate, draw, and manufacture them. (C2.1)

Topics: (8-12 hours)

- Construction & Assembly
 - Different roof structures
 - Type of roof
 - Rafter roof
 - Purlin roof
 - Collar beam roof
 - Flat roof
 - Roof shape
 - Roof truss construction
 - Roof superstructure
 - Structure
 - Materials
 - Tools
 - Auxiliary materials
 - Requirements & functions
 - Component layers
 - Water drainage & diffusion
 - Airtightness
 - Weather protection
 - Thermal insulation
 - Fire protection
 - Sound insulation
 - Assembly sequence
 - Connection between parts
 - Sources of errors

Construction & Assembly – Insulations

In this section, apprentices learn how to use insulation materials correctly in carpentry work. They learn the correct and safe handling of the various forms of insulation materials as well as the dangers and the combination of different insulation materials.

Apprentices should be familiar with the properties of insulation materials and install them in a manner appropriate to those properties (heat, sound, fire & possible combinations). (B1.1)

Apprentices should be able to install insulation layers correctly, taking into account basic principles of building physics. (D1.2)

Apprentices should have a sufficient understanding of thermal, moisture, fire, and sound insulation, and be able to install insulation and sealants. (B1.1)

Apprentices should be able to install insulation materials for heat, cold, moisture, fire, and noise protection as well as to use sealing materials. (D1.2)

Topics: (4-8 hours)

- Assembly
 - Types
 - Fire protection
 - Thermal insulation
 - Cold protection
 - Moisture protection
 - Sound insulation
 - Commercial forms
 - Insulation board
 - Insulation foils
 - Insulation mats & fleece
 - Blow-in insulation materials
 - Handling
 - Carrying & Lifting
 - Possible dangers & health problems
 - Combination of different insulations
 - Assembly sequence
 - Connection between parts
 - Sources of errors

Construction & Assembly – Floors

In this part, the apprentices learn the production and installation of floors (in prefabricated components) in the carpentry workshop. They learn the correct sequence of work in the production and installation of the different types of floors, both wood-based and made of other materials.

Apprentices should know different floor systems and other exterior wood structures and be able to manufacture them. (C2.3)

Apprentices should be able to produce exterior floors by using weather-resistant wood and joints. (C2.3)

Apprentices should be familiar with the various types of outdoor wood structures. (C2.3)

Topics: (6-10 hours)

- Production & Assembly
 - Type of floor
 - Interior
 - Floated screed on timber joist floor
 - Dry screed system
 - Floor structure on CLT slab
 - Exterior
 - Weather resistant joints
 - Wooden construction
 - Concrete
 - WPC
 - Floor covering
 - Solid wood flooring
 - Engineered wood flooring
 - Laminate flooring
 - Vinyl
 - Linoleum
 - Structure
 - Materials
 - Tools
 - Auxiliary materials
 - Assembly sequence
 - Connection to substructure
 - Sources of errors

Construction & Assembly – Gates & Doors

In this part, the apprentices learn the production and installation of gates and doors (in prefabricated components) in the carpentry workshop. They learn the correct sequence of work in the production and installation of the different types of gates and doors, both wood-based and made of other materials.

Apprentices should know and be able to make carpenter-made gate and door structures. (C2.3)

Topics: (4-8 hours)

- Door constructions & assembly
 - Function
 - Front door/exterior door
 - Interior door
 - Fire-rated door
 - Soundproof door

- Types
 - Hinged door
 - Sliding door
 - Swinging door
- Material
- Construction
- Installation & Handling
- Gate constructions
 - Types
 - Up-and-over door
 - Roll-up door
 - Sliding gate
 - Material
 - Construction
 - Installation & Handling
- Assembly sequence
- Connection to other structures
- Sources of errors

Construction & Assembly – Stairs

In this part, the apprentices learn the production and installation of stairs (in prefabricated components) in the carpentry workshop. They learn the correct sequence of work in the production and installation of the different types of stairs, both wood-based and made of other materials.

Apprentices should know different types of stairs as well as their components and be able to manufacture them. (C2.3)

Topics: (4-8 hours)

- Production & Assembly
 - Stair details
 - Types
 - Single flight
 - Multi-flight
 - Spiral
 - Material & Components
 - Wood
 - Mineral
 - Special forms
 - Functionality

- Structure
 - Materials
 - Tools
 - Auxiliary materials
- Assembly sequence
- Connection to other structures
- Sources of errors

Construction & Assembly – Cladding

In this part, the apprentices learn the production and installation of claddings (in prefabricated components) in the carpentry workshop. They learn the correct sequence of work in the production and installation of the different types of claddings for both the interior and exterior, and for walls, floors, and ceilings.

Apprentices should be able to properly install interior and exterior cladding as well as the necessary substructures on floors, walls, ceilings, and roofs. (D1.1)

Apprentices should know special features of wall, floor, and ceiling cladding specific to wood construction and be able to take these into account in the assembly process. (D1.3)

Apprentices should have sufficient knowledge of the production of formwork (e.g. for foundations, columns, walls). (D1.1)

Apprentices should be able to manufacture formwork, battens, and roofing. (D1.1)

Topics: (4-8 hours)

- Production & Assembly
 - Interior & Exterior
 - Type of cladding
 - Wall
 - Floor
 - Ceiling
 - Built in parts
 - Structure
 - Materials
 - Tools
 - Auxiliary materials
 - Assembly sequence
 - Connection to substructures
 - Sources of error

Construction & Assembly – Bridges

In this part, the apprentices learn the production of wooden bridge elements in the carpentry workshop. They learn the different production processes depending on the type of bridge construction including manufacturing, in-company-logistics, and assembly.

Apprentices should know different construction types of wooden bridges and be able to manufacture them. (C2.3)

Topics: (4-8 hours)

- Production and Assembly
 - Types
 - Beam bridge
 - Arch bridge
 - Truss bridge
 - Suspension bridge
 - Material
 - Wood
 - Combination with
 - Steel
 - Concrete
 - Application
 - Construction
 - Production
 - Handling
 - Transportation
 - Assembly sequence
 - Sources of error

Construction & Assembly – CNC

In this part, apprentices learn how to use the CNC correctly and how to join timber constructions on CNC machines. This involves the correct and safe loading & unloading of the machine as well as the correct sequence of process steps.

Apprentices should be able to load the CNC machine with tools and workpieces in the correct sequence (under supervision). (B2.2)

Apprentices should know the basics of factory assembly of wooden structures on CNC machines. (C2.2)

Apprentices should have sufficient knowledge of the structure, function, and use of CNC-controlled machines (such as e.g. joinery machines) and be able to use them safely. (B2.2)

Topics: (4-8 hours)

- Production & Assembly
 - Transfer from CAD to CNC
 - Procedure
 - Sources of error
 - CNC basics
 - Basic elements
 - Tool management system
 - Software
 - Functionality
 - Loading/unloading
 - Logistics
 - Sequence
 - Work safety
 - Assembly sequence
 - Sources of error

Construction & Assembly – Fasteners

This part is about the correct use of fasteners. Apprentices learn in practice how to correctly join wooden structures with the aid of fasteners, how to work safely with them and how to select fasteners accordingly.

Apprentices should be able to select the appropriate fasteners and make a professional connection. (C2.1)

Apprentices should be able to select and use fasteners according to the application. (D1.1)

Apprentices should be able to produce wooden joints using dowels, nails, screws, sheets, offsets and tenons as well as gluing. (C2.1)

Apprentices should have knowledge of the use of fastening and assembly aids such as dowels, anchors, spacers, sheet steel fasteners, etc and be able to use them during assembly of wood constructions. (D1.1)

Topics: (8-12 hours)

- Types of fasteners
 - Adhesives
 - Nails
 - Screws
 - Bolts & threaded rods
 - Dowels

- Fittings
- Connection between
 - Wall-Wall
 - Wall-Roof
 - Wall-Ceiling
 - Ceiling-Ceiling
 - Ceiling-Support
 - Roof-Roof
 - Special connections
 - Stairs
 - Installations
 - Facades
- Types of connections
 - Traditional wood connection
 - Mechanical connection
 - Modern fasteners
 - Special joints
- Joining
 - Force transmission (form fit, material connection, force fit)
 - Loading (normal force, shear force, moment)
 - Knot connection
- Properties
- Advantages and disadvantages

Lifting devices

In this part, the apprentices learn the correct use of lifting equipment, excluding those that require a certificate. They learn how to use this equipment safely and correctly.

Apprentices should be able to use lifting devices including those requiring approval (freight elevator, crane, etc.) in accordance with regulations. (B2.3)

Topics: (2-4 hours)

- Lifting devices
 - Freight elevator
 - Lift truck
 - Mobile lifts
 - Scissor lift tables
 - Work platforms
 - Vacuum lifters
 - Cranes (limited, requires crane license depending on load and design)

- Forklifts (requires forklift license)
- Intended use
- Regulations
- Safety
- Ergonomics

Finishing

In this section, the apprentices learn the correct surface treatment of wood-based materials. They learn in practice how to apply coatings correctly and safely using various application methods.

Apprentices should be able to protect wood products. (C1.3)

Apprentices should be able to properly apply liquid protective coatings and finishes according to the manufacturer's instructions. (D1.2)

Apprentices should be able to process wooden surfaces with hand-operated machines and protect wooden structures both structurally and chemically. (C1.3)

Topics: (6-8 hours)

- Application
 - Liquid protective coatings
 - Spraying process
 - Brushing
 - Roller application
 - Finishes
 - Spraying process
 - Brushing
 - Roller application
- Relevant other work steps
 - Safety
 - PPE
 - Regulations
 - Ergonomics
 - Storage and preparation
 - Surface treatment
 - Sanding
 - Dust removal
 - Disposal

Data management

This part is about the documentation of data, including the collection, summarising, and storage of data.

Apprentices should be able to take measurements, collect data during as-built surveys and document the data professionally. (D2.1)

Apprentices should be able to recognise, import, export, check, and process data in various formats. They should also be able to create databases and analyse data. (FC)

Topics: (4-6 hours)

- Type of data to be documented
 - Activities
 - Work progress
 - Material consumption
 - Stock management
- Using available templates
- Data collection
 - Recognising different data formats
 - Data banks
- Analysis
 - Summarising data
 - Creating charts
- Data storage
 - Data protection

Maintenance work

This part is about the maintenance work in the carpentry shop that is necessary to maintain a clean and productive workplace.

Apprentices should be able to perform maintenance work and carry out simple upkeeping tasks. (B2.1)

Apprentices should be able to handle, maintain and service the tools, machines, devices, appliances, equipment, and work aids to be used. (B2.1)

Topics: (1-3 hours)

- Maintenance
 - Checking the condition of tools and equipment
 - Cleaning tools, equipment, and workplace
 - Simple repair measurements

- Spare parts management
 - Documentation
- Upkeeping tasks
 - Cleaning
 - Storage order/organisation

Micro-credential 6 – Applied mathematics (124h)

This micro-credential is about timber construction-specific calculations. The content of this micro-credential includes material requirement calculations, length, area, and volume calculations as well as quotation calculations, all in the context of timber construction-specific applications.

Material requirements

This part is about the calculation of material demands. This involves simple calculations for volume and weight calculations as well as checking plausibility.

In this part, the material demand is only covered in the simplest form, in the micro-credential 10 – “Timber construction planning” in the course of the carpentry technician training, the material requirements are covered in more detail.

Apprentices should be able to determine material requirements and perform and interpret simple volume and weight calculations. (A2.4)

Apprentices should be able to calculate the amount of material required when planning products. (A2.4)

Topics: (8-12 hours)

- Calculations
 - Material demand
 - Area calculation
 - Volume calculation
 - Weight calculations
 - Density
- Checking for plausibility

Woodworking specific mathematics & geometry

This part is about mathematics and geometry, specifically for the timber construction sector. It includes length, area and volume calculations, angle calculations, weight calculations and calculations of shrinkage and swelling of wood.

Apprentices should be able to apply woodworking specific knowledge of mathematics and geometry to the fabrication of wall, roof, ceiling, and stair structures. (A2.2)

Apprentices should be proficient in the mathematical calculations involved in the construction of timber structures, including connections. (A2.2)

Topics: (20-30 hours)

- Length calculation
- Area calculation
 - Area of construction site
- Volume calculation
- Angle calculation
- Weight calculation
- Shrinkage calculations
 - Taking anisotropy into account

Structural calculations

This part focuses on the practical application of mathematics in the area of tasks specific to timber construction. Calculations are carried out in the areas of wall, ceiling, and roof construction as well as other constructions.

Apprentices should be able to perform simple structural calculations. (A2.2)

Apprentices should know structural principles for timber constructions and prefabricated timber elements and be able to calculate them. (C2.4)

Apprentices should be able to perform building physics calculations and interpret the results. (C2.4)

Topics: (20-40 hours)

- Walls
 - Physical building values
 - Material requirements
- Ceilings
 - Physical building values
 - Material requirements
- Roofs
 - Lengths of roof edges and roof intersection lines
 - Roof surface – area calculation
 - Roof truss construction
 - Lengths
 - Beam lengths
 - Heights
 - Angle/inclinations
 - Roof battens calculation
 - Material requirements
- Fastener & connectors
 - Mechanical/physical calculations

- Stairs
 - Walking line
 - Gradient
 - Tread
 - Stairwell length
 - Headroom of stairs
 - Material requirements

Layer structures

This part is about the use of mathematics to calculate the physical properties such as thermal, sound, moisture and fire protection of layers, layered structures, and prefabricated timber construction elements.

Apprentices should know the physical properties of layers and layer structures in timber constructions and prefabricated timber elements (walls, ceilings, roofs) and be able to calculate them. (C2.4)

Apprentices should be able to determine the material requirements for wall and ceiling structures, and calculate building physics parameters. (C2.4)

Topics: (16-20 hours)

- Calculation
 - Construction elements
 - Building component
 - Wall
 - Ceiling
 - Roof
 - Layered structures
 - Layers
 - Physical properties
 - Thermal insulation
 - Moisture protection
 - Sound insulation
 - Fire protection

Bidding and procurement

This part is about calculating the quantity and price of materials as a basis for preparing quotations. Apprentices are introduced to current market prices and methods for calculating costs.

Apprentices should know the most important building materials and building supplies for bidding and procurement. (A2.4)

Apprentices should be able to explain the operational cost factors involved in pricing, identify ways to improve productivity, and prepare and justify an industry-specific price calculation. (CC)

Topics: (12-20 hours)

- Building materials
 - Calculation of needed amount
 - Prize
- Quotation calculation
 - Explaining operational costs
 - Preparation and justification of price calculations
- Identifying ways to improve productivity

Practical project

In this part, the apprentices are given a project-related task. Using the methods they have learned, they carry out project-related calculations in the areas of geometry, material demand, physical properties, and prices.

Projects are an essential part of apprenticeship training. (CC)

Topics: (20-30 hours)

- Calculation of a building or parts of a building
 - For example: Creation and calculation of a roof construction
 - Geometric calculations:
 - Length of parts
 - Angle of the roof and individual parts
 - Area & Volume
 - Material demand
 - Components
 - Layers
 - Raw material (Shrinkage calculation)
 - Physical properties
 - Price

Micro-credential 7 - Construction site (131h)

This micro-credential is about the work on the construction site. It includes occupational safety, material management, assembly of prefabricated components and energy systems.

-It might be necessary to equip a workshop in such a way that work on a construction site can be simulated in order to teach apprentices practical work on a construction site in a safe and financially viable way.-

Construction site safety

The aim of this part is to teach apprentices how to implement the applicable standards and regulations of construction site safety in practice. It includes the relevant laws, the assessment of the workplace situation as well as safety restrictions and personal protective equipment.

Apprentices should be familiar with the relevant safety standards and regulations for the construction site. (A1.5)

Apprentices should be familiar with the relevant safety regulations, which includes construction site safety. (A1.5)

Topics: (4-8 hours)

- Essential construction site elements regarding safety
 - Hazards
 - Safety equipment
 - Personal protective equipment
 - Handling machines
 - Ergonomics & correct lifting and carrying
 - Scaffolding
 - Work scaffolding
 - Protective scaffolding
 - Support scaffolding
 - Assembling and dismantling scaffoldings
 - Fire protection (e.g. storage of flammable materials)
 - Behaviour in an emergency & contact persons
- Assessment of a work and site situation

Construction site organisation

This part is about the organisation of the construction site. Among other things, it deals with the preparation of work equipment as well as fencing off and cleaning the workplace.

Apprentices should be able to establish construction work areas. (A2.4)

Apprentices should be able to set up and secure construction sites and workplaces. (A2.4)

Topics: (6-10 hours)

- Establishment of construction work area
 - Preparation of the work equipment
 - Initial preparation of construction site logistics
 - Fencing off the work area
 - Cleaning the work area
 - Removing obstacles such as trees
- Erecting load-bearing structures

Material preparation

This part deals specifically with the preparation of materials such as tools, building materials and other necessary materials on the construction site.

Apprentices should be able to independently prepare hardware, materials, and tools for use. (B1.2)

Topics: (4-6 hours)

- Knowledge of necessary tools, building materials & other necessary materials
 - Type of tool/material
 - Storage location
 - Needed amount
 - Handling
- Preparation
 - Tools
 - Building materials
 - Other materials

Material management

In this part, apprentices are taught how to manage the stock of materials, equipment, and tools. They learn to control the consumption, orders, and deliveries of materials. Another aspect of this part is the correct storage of materials, equipment, and tools.

Apprentices should be able to manage the stock management of materials, equipment, and tools, which includes checking the consumption, orders, deliveries and filling out material purchase forms. (B1.2)

Apprentices should be able to properly inspect, store, and protect timber, materials and building supplies. (B1.2)

Apprentices should be able to store and maintain wood and other building materials and construction supplies. (B1.2)

Apprentices should be able to understand the impact of transportation and storage on construction planning. (B1.2)

Topics: (8-12 hours)

- Stock management
 - Checking Materials
 - Consumption
 - Orders
 - Deliveries
 - Filling out purchase forms
 - Equipment
 - Testing functionality
 - Checking availability
 - Having an overview of quantities
 - Tools
 - Testing functionality
 - Checking availability
 - Having an overview of quantities
- Inspection
 - Quality
 - Defects
 - Necessity of maintenance
 - Quantity
 - Stock levels and order requirements
- Storage
 - Space-saving storage
 - Safe storage
 - Protection from weather
 - Protection from stealing

Logistics

This part is about construction site logistics. The apprentices are taught how to prepare material transportation, how to load and unload vehicles and how to use lifting equipment (both machines that require a permit and those that can be used freely).

Apprentices should be able to check incoming goods and organise their transport. (B1.2)

Apprentices should be able to load and unload vehicles according to instructions. (B1.2)

Apprentices should be able to use lifting devices including those requiring approval (freight elevator, crane, etc.) in accordance with regulations. (B2.3)

Apprentices should be able to prepare material transport to match project requirements. (D1.1)

Apprentices should have basic knowledge of loading and transportation of timber components and timber constructions and be able to help with loading and transporting. (B1.2)

Topics: (8-12 hours)

- Material transport
 - Preparation of material transport
 - Checking incoming goods and deliveries
 - Loading vehicles
 - Unloading vehicles
- Usage of lifting devices
 - Freight elevator
 - Lift truck
 - Mobile lifts
 - Scissor lift tables
 - Work platforms
 - Vacuum lifters
 - Cranes (limited, requires crane license depending on load and design)
 - Forklifts (requires forklift license)

Reading plans

This part is about reading and understanding plans. The apprentices learn to work with the different types of plans and know their function, components, and characteristics. Apprentices are also taught to understand the interfaces to other trades in plans.

Apprentices should be able to read plans as well as descriptions. (A2.2)

Topics: (4-6 hours)

- Reading plans & descriptions
 - Knowing different types of plans
 - Understanding scale and dimensions
 - Knowing and understanding symbols
 - Knowing and understanding abbreviations
- Interfaces to other trades

Tool usage

This part is about the correct use of tools and machines on the construction site. Apprentices learn how to work safely and ergonomically with machines and tools used on the construction site.

Apprentices should be able to organise the workplace, including the control of tools and machines. (C1.2)

Apprentices should be able to handle, maintain and service the tools, machines, devices, appliances, equipment, and work aids to be used, using the appropriate protective equipment. (C1.2)

Topics: (2-4 hours)

- Types of tools & machines
 - Stationary
 - Hand-held
- Function of tools & machines
- Intended use
- Safety measures
 - Protective equipment
- Ergonomics

Installation & Assembly of prefabricated components

This part deals with the installation and assembly of prefabricated components on the construction site. The apprentices get to know the individual installation situations and can adapt to the prevailing requirements and situations.

Apprentices should be able to install the correct materials in the correct sequence based on building physics and recognise the contexts of building technology and the demands of property developers. (D1.1)

Apprentices should be able to erect load-bearing structures professionally while complying with occupational health and safety requirements. (D1.1)

Apprentices should be able to assemble prefabricated components and building products independently and professionally. (D1.1)

Apprentices should be able to select and use fasteners according to the application. (D1.1)

Apprentices should be able to install prefabricated components, building elements and building products professionally in accordance with the individual installation situation. (D1.3)

Apprentices should be able to assemble prefabricated timber structures; this includes understanding the specific features of timber engineering and prefabricated timber construction and taking these into account during assembly. (D1.1)

Topics: (10-30 hours)

- Types of constructions
 - Walls
 - Ceilings
 - Roofs
- Adaption to individual installation situations
 - Demands of property developers
 - Building physics
 - Correct sequence
 - Correct materials
 - Correct tools
- Assembly
 - Prefabricated components
 - Prefabricated building products
- Installation
 - Prefabricated components
 - Prefabricated building products
- Fasteners
 - Types of fasteners
 - Advantages and disadvantages
 - Intended use

Installation - Building services

This part is about the installation of building service installations. The apprentices learn how to install building services installations and therefore how to penetrate building layers and subsequently seal them afterwards.

Apprentices should be able to professionally install simple building service installations in construction elements assembled on site or prefabricated. (D1.1)

Topics: (4-6 hours)

- Routing of installation and service shafts
 - Heating
 - Sanitary
 - Electricity
 - Ventilation

- Penetrations through building elements
- Sealing
 - Fire stopping systems
 - Waterproofing
 - Airtightness
- Moisture Monitoring

Installation & Assembly – Sub-roofs

This part is about the installation of sub-roofs. Apprentices learn to adapt to individual situations and to use the right materials in the right order, considering the prevailing requirements.

Apprentices should be able to properly install sub-roofs and know the properties and requirements of water-bearing layers. (D1.2)

Topics: (4-6 hours)

- Installation of sub-roofs
- Adaption to individual installation situations
 - Demands of property developers
 - Building physics & water-bearing layers
 - Correct sequence
 - Correct materials
 - Correct tools

Installation & Assembly – Insulation and protective layers

This part deals with the installation and assembly of insulations and protective layers. Apprentices learn to adapt to individual situations and to use the right materials in the right order, considering the prevailing requirements.

Apprentices should be familiar with the properties of insulation materials and install them in a manner appropriate to those properties (heat, sound, fire & possible combinations). (B1.1)

Apprentices should be able to install insulation layers correctly, taking into account basic principles of building physics. (D1.2)

Apprentices should be able to properly install protective layers. (D1.2)

Apprentices should have a sufficient understanding of thermal, moisture, fire, and sound insulation, and be able to install insulation and sealants. (B1.1)

Topics: (6-10 hours)

- Adaption to individual installation situations

- Demands of property developers
- Building physics
- Correct sequence
- Correct materials
- Correct tools
- **Natural resource-saving installation**
- Installation of insulation layers
 - Thermal insulation
 - Insulation boards
 - Blow-in insulation
 - Sound insulation
- Installation of protective layers
 - Fire protection
 - Moisture protection

Installation & Assembly – Gates & doors

In this part, apprentices are taught how to install doors and gates on the construction site. They learn to use the correct sequence and materials depending on the situation.

Apprentices should be able to properly install doors, door frames, and door linings. (D1.3)

Apprentices should be able to install prefabricated components such as doors using various fastening and assembly methods. (D1.3)

Topics: (2-4 hours)

- Installation
 - Doors
 - Types
 - Front door/exterior door
 - Interior door
 - Fire-rated door
 - Soundproof door
 - Door frames
 - Door linings
 - Gates
 - Up-and-over door
 - Roll-up door
 - Sliding gate
- Adaption to individual installation situations
 - Demands of property developers
 - Correct sequence

- Correct materials
- Correct tools

Installation & Assembly – Stairs

This part covers the installation of prefabricated stairs and railings on the construction site. The apprentices learn to use the right materials in the right order, according to the prevailing situation.

Apprentices should be able to properly install prefabricated stairs and railings. (D1.3)

Apprentices should be able to install prefabricated components such as stairs using various fastening and assembly methods. (D1.3)

Topics: (2-4 hours)

- Installation
 - Prefabricated stairs
 - Prefabricated railings
- Handling of the prefabricated materials
- Adaption to individual installation situations
 - Demands of property developers
 - Correct sequence
 - Correct materials
 - Correct tools
 - Correct fasteners

Installation & Assembly – Windows and shading elements

This part deals with the installation and assembly of windows and shading elements on the construction site. The apprentices learn to use the correct sequence and materials depending on the situation. An important factor of this part is the execution of the connection of windows and shading elements to building components and component layers.

Apprentices should be able to properly install window jambs/window linings and connect them to adjoining components in walls and roofs. (D1.1)

Apprentices should be able to properly install windows and shading elements (e.g. shutters, etc.) in walls and roofs. (D1.3)

Apprentices should be able to install prefabricated components such as windows using various fastening and assembly methods. (D1.1)

Topics: (6-10 hours)

- Windows

- Installation of window jambs
- Installation of window linings
- Connection to adjoining components
 - Walls
 - Connection to building components
 - Connection to component layers
 - Roofs
 - Connection to building components
 - Connection to component layers
- Shading elements
 - Connection to adjoining components
 - Walls
 - Connection to building components
 - Connection to component layers
 - Roofs
 - Connection to building components
 - Connection to component layers
- Adaption to individual installation situations
 - Demands of property developers
 - Correct sequence
 - Correct materials
 - Correct tools

Installation & Assembly – Cladding

This part is about the installation of interior & exterior cladding and the corresponding substructures on the construction site. The apprentices learn to use the right materials in the right order, according to the prevailing situation.

Apprentices should be able to properly install interior and exterior cladding as well as the necessary substructures on floors, walls, ceilings, and roofs. (D1.1)

Apprentices should have sufficient knowledge of the production of formwork (e.g. for foundations, columns, walls). (D1.1)

Apprentices should be able to manufacture formwork, battens, and roofing. (D1.1)

Topics: (6-10 hours)

- Installation of interior & exterior cladding
 - Floors
 - Walls
 - Ceilings

- Roofs
- Installation of the necessary substructures
 - Floors
 - Walls
 - Ceilings
 - Roofs
- Adaption to individual installation situations
 - Demands of property developers
 - Correct sequence
 - Correct materials
 - Correct tools

Installation & Assembly - Energy systems & roof weathering

This part deals with the installation and assembly of energy systems such as solar and photovoltaic systems as well as roof weathering on the construction site. Apprentices learn to adapt to the individual situation and to use the right materials in the right order depending on the requirements and situation.

Apprentices should be able to install substructures for roofing as well as solar and photovoltaic systems. (D1.1)

Apprentices should be familiar with various borders of the roof, including borders of the roof for solar systems, and be able to install them properly. (D1.1)

Apprentices should be able to properly install energy system components on roofs and walls. (D1.3)

Apprentices should be able to install or assemble energy systems (without connection work) such as photovoltaic and solar systems taking into account the such systems dangers. (D1.1)

Topics: (6-10 hours)

- Energy systems
 - Substructures
 - Roofs
 - Walls
 - Solar systems
 - Photovoltaic systems
- Roof weathering
- Adaption to individual installation situations
 - Demands of property developers
 - Underlying functional layers
 - Correct sequence

- Correct materials
- Correct tools

Coating & finish

This section is about the application of liquid protective coatings and finishes on the construction site. Apprentices learn how to apply protective coatings and finishes based on situational requirements and conditions.

Apprentices should be able to properly apply liquid protective coatings and finishes according to the manufacturer's instructions. (D1.2)

Apprentices should be able to process wooden surfaces with hand-operated machines and protect wooden structures chemically. (D1.2)

Topics: (4-6 hours)

- Application
 - Liquid protective coatings
 - Spraying process
 - Brushing
 - Roller application
 - Finishes
 - Spraying process
 - Brushing
 - Roller application
- Adaption to individual installation situations
 - Demands of property developers
 - Requirements
 - Correct sequence
 - Correct materials
 - Correct tools

Data management

This part deals with the collection, management, and storage of data on the construction site as part of the documentation. The apprentices learn to carry out measurements on the construction site and to analyse, summarise and appropriately store the data obtained.

Apprentices should be able to take measurements, collect data during as-built surveys and document the data professionally. (D2.1)

Apprentices should be able to recognise, import, export, check, and process data in various formats. They should also be able to create databases and analyse data. (FC)

Topics: (6-8 hours)

- Taking measurements
 - Types of data
 - Deviations
 - Building construction
 - Time management
 - Activities
 - Work progress
 - Material consumption
 - Stock management
- Data collection
- Analysing/summarising data
- Data storage
- Documentation

Maintenance

This part is about the maintenance work on the construction site that is necessary to maintain a clean and productive workplace. Apprentices learn to check tools and machines for damage, safety concerns and defects and can act accordingly.

Apprentices should be able to perform maintenance work and carry out simple upkeeping tasks. (B2.1)

Apprentices should be able to maintain and service the tools, machines, devices, appliances, equipment, and work aids to be used. (B2.1)

Topics: (2-4 hours)

- Maintenance
 - Checking tools & machines
 - Cleaning tools & machines
 - Repairing tools & machines
- Upkeeping tasks
 - Cleaning
 - Lubricating

Micro-credential 8 - Green & digital competencies, building removal & renovation (110h)

This micro-credential is about green & digital competencies as well as renovation and deconstruction of buildings. Apprentices learn how to include sustainability in the production process and how to use digital technologies safely and efficiently. Additionally, the micro-credential covers the correct approach to the maintenance and renovation of buildings as well as the correct handling of waste materials when dismantling buildings.

Green knowledge & skills

This part deals with sustainability, providing apprentices with basic knowledge about sustainability and teaching them how to apply this knowledge (in a business context).

Sustainability should be treated as a cross-cutting theme across all subjects, with particular emphasis on addressing and highlighting the 'green skills' required within specific sectors. Furthermore, apprentices should be guided to acquire the skills necessary to live in, develop and support a sustainable and resource-efficient society. (CC)

Topics: (12-16 hours)

- General knowledge
 - Sustainability basics
 - Renewable energy sources and technologies
 - Circular economy
- Technical knowledge
 - Sustainable material science
 - Sustainable wood sourcing
- Sustainable tools and methods
 - Lean management & sustainable products
 - Life cycle assessment
 - Social impact analysis
- Soft skills
 - Critical thinking
 - Creativity
 - Future/strategic thinking
 - Process thinking
 - Flexibility

Digital knowledge & skills

In this part, the focus is on digital technologies, their dangers, and applications. Apprentices learn how to use these technologies safely and efficiently.

Digital competencies are one of the teaching principles. (CC)

Topics: (12-16 hours)

- Digital safety
 - Data protection
 - Possible threats (Phishing, malware, etc.)
 - Effects of digital media on psychological health
- Information literacy
 - Locating and retrieving information online
 - Knowing and using relevant sites and services (for example: dataholz.eu)
 - Judging the relevance and trustworthiness of the source
- Digital Tools & processes
 - Measuring technologies
 - Production technologies (CAD, CAM, CNC, Simulation tools, robotics, etc.)
 - Innovative technologies (Augmented Reality, AI, etc.)
- Communication/collaboration through digital technologies
- Digital content creation
 - Creating and editing digital content
 - Giving understandable instructions for a computer system

Maintenance & Renovation – Sequence

This part is about the correct procedure for the maintenance and renovation of buildings. Apprentices learn to recognise and rectify possible defects. The focus is on the maintenance & renovation of wooden buildings; mineral buildings are also included for the sake of completeness.

Apprentices should be able to plan and describe the proper sequence of maintenance and renovation measures on wooden structures. (D2.1)

Apprentices should be able to recognise wooden load-bearing structures in need of repair and can plan and apply appropriate repair measures. (D2.4)

Apprentices should be able to describe and plan the proper procedures for maintenance and repair work on wooden structures. (D2.1)

Apprentices should be able to identify and rectify defects. (D2.4)

Topics: (20-30 hours)

- Maintenance
 - Planning & describing the correct sequence
 - Checking for damage & maintenance
 - Roofs
 - Moisture control
 - Pest infestation
 - Waterproofing
 - Roof covering
 - Walls and facades
 - Surface treatment
 - Ventilation openings
 - Painting
 - Mineral components
 - Cracks
 - Moisture damage
 - Windows & doors
 - Lubricating fittings
 - Maintaining the surface
 - Checking air tightness
 - Balconies & terraces
- Renovation & Reparations
 - Planning & describing the correct sequence
 - Planning repair measures
 - Applying repair measures
 - Wooden constructions
 - Modern buildings
 - Damage rectification & repair measures like
 - Replacement of rotten components
 - Sanding and sealing wooden floors
 - Historical constructions
 - Ceiling
 - Missing beam ceiling
 - Dimple beam ceiling
 - Traverse ceiling
 - Wall
 - Classic log construction
 - Classic half-timbered construction
 - Mineral structures
 - Masonry drying
 - Building analysis and renovation concept
 - Subsequent horizontal sealing

- Subsequent drainage
- Renovation plaster (application possibilities and limits)

Maintenance & Renovation – Superstructures

This part deals with the construction of timber structures and layered structures for conversion and renovation work. The apprentices learn to make connections to existing buildings while considering the building physics.

Apprentices should be able to erect timber structures and layered superstructures in a professional manner during conversion and renovation work and to form connections to existing buildings. (D2.3)

Apprentices should be able to carry out maintenance and repair work on wooden structures. (D2.3)

Topics: (12-18 hours)

- Conversion & Renovation
 - Timber structures
 - Erection
 - Types
 - Walls
 - Ceilings
 - Roofs
 - Standards
 - Requirements & functions
 - Properties
 - Materials
 - Connection to existing building
 - Building physics
 - Sealings
 - Layered superstructures
 - Erection
 - Types of layered structures
 - Walls
 - Ceilings
 - Roofs
 - Standards
 - Requirements & functions
 - Properties
 - Materials
 - Connection to existing building

- Building physics
 - Sealings

Maintenance & Renovation – Insulation & functional layers

This part deals with the installation of insulation and functional layers in conversion and renovation measures. Apprentices learn how to install the different types of insulation and functional layers in existing buildings.

Apprentices should be able to professionally install insulation and functional layers as part of conversion and renovation measures. (D2.3)

Apprentices should be able to carry out maintenance and repair work on wooden structures. (D2.3)

Topics: (8-12 hours)

- Conversion & Renovation
 - Installation of insulation layers
 - Thermal insulation
 - Insulation boards
 - Blow-in insulation
 - Sound insulation
 - Installation of protective/functional layers
 - Fire protection
 - Moisture protection

Maintenance & Renovation – Energy systems

This part deals with the installation and assembly of energy systems such as solar and photovoltaic systems in conversion and renovation measures.

Apprentices should be able to properly install and assemble energy system elements into existing buildings. (D2.3)

Apprentices should be able to install or assembly of energy systems (without connection work) such as photovoltaic and solar systems taking into account the such systems dangers. (D2.3)

Topics: (4-6 hours)

- Installation & assembly
 - Substructures
 - Roofs
 - Walls

- Solar systems
- Photovoltaic systems
- Possible dangers
- Special considerations for renovation

Maintenance & Renovation – Coatings

This section is about the application of protective layers and coatings in conversion and renovation measures.

Apprentices should be able to apply liquid and solid functional coatings to protect existing wood structures. (D2.4)

Apprentices should be able to process wooden surfaces with hand-operated machines and protect wooden structures chemically. (D2.4)

Topics: (2-4 hours)

- Application & Insertion
 - Liquid coating
 - Function
 - Types
 - Application
 - Spraying process
 - Brushing
 - Roller application
 - Solid coating
 - Function
 - Types

Dismantling

This part deals with the dismantling of timber constructions, considering occupational health and safety.

Apprentices should be able to dismantle different timber constructions and layered structures professionally. (D2.2)

Topics: (12-16 hours)

- Health & safety measures
- Dismantling
 - Types of timber constructions
 - Types of layered structures

- Correct sequence
- Possible dangers
- Material separation

Disposal & Recycling

This part deals with the correct disposal and recycling of waste materials when dismantling timber construction buildings.

Apprentices should be able to properly dispose of or recycle materials generated during deconstruction. (D2.2)

Apprentices should have a basic understanding of the waste materials generated in their field of work, as well as their separation, recycling, and disposal. (D2.2)

Topics: (8-12 hours)

- Operating regulations
- Legal regulations
- Types of materials
 - Material separation
- Correct disposal
 - Types of waste
 - Size requirements
- Correct recycling
 - Types of waste
 - Reuse purpose

Extra: Crane operator course (16h) & Forklift license course (24h)

Micro-credential 9 (CT) - Customer service & operational organisation (134h)

This micro-credential is a mixture of customer service with the topics customer advice, guarantee/warranty as well as current trends in the timber construction sector and operational organisation with work planning, order monitoring, logistics, documentation, and presentation. In the course of this micro-credential, apprentices learn to carry out their own internet research, work with databases, and use IT-supported programmes in a business environment.

Customer service & advice

In this part, apprentices learn how to deal with customers correctly when giving advice. They can advise customers on the advantages and disadvantages of different designs and products in the areas of maintenance, servicing, and design.

Apprentices should be able to advise customers. (EQF 6/7).

Apprentices should be able to advise customers on timber construction (e.g. upkeep, maintenance, construction, etc.). (FCT)

Apprentices should be able to provide customers with professional advice on load-bearing structures and building components/layers. (CCT)

Topics: (12-16 hours)

- Advising customers
 - Dealing correctly with customers
 - Correct behaviour
 - Different types of customers
 - Topics
 - Types of timber constructions
 - Construction/implementation
 - Insulation
 - Maintenance
 - Advantages and disadvantages

Guarantee & Warranty

In this section, the topics of guarantee, warranty and compensation are discussed. Apprentices learn the differences between guarantee and warranty as well as the deadlines to be complied with.

Apprentices should have a basic understanding of guarantees, warranties, and compensation. (FCT)

Topics: (8-12 hours)

- Difference between guarantee and warranty
- Guarantee
 - General legal situation
 - Company-specific situations
 - Deadlines
- Warranty
 - General legal situation
 - Company-specific situations
 - Deadlines
- Compensation
 - General legal situation
 - Company-specific situations
 - Deadlines

Timber construction trends

This part deals with the current trends in the operational product area. New and emerging products, design types, and technologies are discussed.

-This part can also be partly carried out through research work (+ presentations) by the apprentices.-

Apprentices should be aware of the latest trends in the company's product range. (FCT)

Topics: (6-10 hours)

- Trends in the operational product area
 - Examples:
 - Timber construction systems used
 - CLT
 - GLT
 - New products

Work planning & preparation

In this part, apprentices learn the principles of work preparation for materials, personnel, tools, and machines. This part includes both theoretical knowledge and practical assistance with work preparation.

-The practical part can be simulated through practical work.-

Apprentices should know the basics of work and process planning and be able to apply them. (A2.3)

Apprentices should be able to identify and plan the stages of work preparation. (CCT)

Topics: (12-16 hours)

- Planning and preparation
 - Materials
 - Personnel
 - Tools
 - Machines
 - Construction site organisation
- Stages of work preparation

Orders (Organisation, implementation, and monitoring)

In this part, apprentices learn the basics of order processing with regard to the organisation, execution, and monitoring of the order. This part also includes practical assistance with order processing.

-The practical part can be simulated through practical work.-

Apprentices are able to prepare order confirmations and to process work contracts. (EQF 5/6)

Apprentices should be able to identify and plan the stages of order processing. (CCT)

Topics: (8-12 hours)

- Order organisation
- Execution
- Order monitoring
- Examples
 - Cooperation between production and design
 - Monitoring the construction site organisation
 - Monitoring deadlines
 - Quality control

Coordination with other trades

This part is about working with other trades. This includes knowledge of the other trades involved and their tasks as well as communication and coordination with the other trades.

-This part focuses on the theory but also includes practical exercises.-

Apprentices should know the existing trades in the construction company and their peculiarities. (EQF 4/5)

Apprentices should be able to communicate with the different trades and take them into account in their own work. (EQF 4/5)

Apprentices should be able to integrate other trades into site and time planning. (EQF 4/5)

Apprentices should be able to assist with coordinating with other trades. (FCT)

Topics: (12-16 hours)

- Knowing other relevant trades
 - Areas of responsibility
- Communication with other trades
 - Contact person
- Coordination
 - Work sequence
 - Lead times
 - Example: preliminary work for tinsmiths and roofers

Operational logistics

In this part, apprentices learn the basics of operational logistics. This includes procurement, warehousing, and transportation.

Apprentices should be able to organise transport for the construction site. (EQF 4/5)

Apprentices should be able to organise workplace logistics. (FCT)

Topics: (12-16 hours)

- Knowledge of operational logistics
 - Procurement
 - Warehousing
 - Available storage space
 - Transportation
 - Organisation of transport
 - Technical possibilities and limits

- Organisation of operational logistics
 - Example: Transportation of building components to construction site

Operational IT

In this part, apprentices learn the correct use of company-specific IT programmes and the application of various information technologies. This part covers both the theoretical basics of and the practical work with operational IT.

Apprentices should have knowledge of job-specific IT and be able to use company-specific IT systems and various information technologies (e.g. the internet, databases). (FCT)

Topics: (12-16 hours)

- Knowledge and use of operational IT
 - Job-specific
 - Company-specific
- Application of information technology
 - Internet
 - Example: Search by manufacturer or materials
 - Databases
 - Example: www.dataholz.eu

Word processing and spreadsheet programmes

This part is about the creation of technical documents using word processing and spreadsheet programmes. The apprentices get to know the various programmes and their functions and learn how to use them.

Apprentices should be able to use word processing and spreadsheet software to create technical documents such as parts lists and documentation. (FCT)

Word processing and spreadsheets using appropriate software are regarded as areas of competence. (CCT)

Topics: (8-12 hours)

- Preparation of technical documents
- Word processing programmes
 - Functions
 - Application
 - Example: adding pictures to documents for documentation
- Spreadsheet programmes
 - Functions

- Application
- Example: parts lists with stored formulas

Documentation

This part is about documentation. The apprentices learn to document work processes, working hours and material consumption.

Apprentices should be able to write construction site, material, and government reports. (EQF 4/5)

Apprentices should be able to compile documentation on work processes, working hours and material consumption (such as specifications, handover reports, quantity surveys, measurement tables, and site diaries), including through the use of computer-based systems. (FCT)

Topics: (12-20 hours)

- Documentation of
 - Workflows
 - Working hours
 - Material consumption
 - Examples
 - Specification sheets
 - Completion certificates
 - Measurement-based invoicing
 - Measurement tables
 - Daily construction records
- Includes computer-aided systems

Presentation

In this part, apprentices learn to present the results of their work using presentation aids. The apprentices get to know the various programmes and learn how to use them.

Apprentices should be able to present their work using presentation aids. (FCT)

Apprentices should be able to create meeting and presentation materials using various software programmes as well as visualisation and structuring techniques. (CCT)

Topics: (8-12 hours)

- Presentation of work results
 - Knowledge of various presentation aids
 - Functions

- Application
- Use of presentation aids
- Examples:
 - Presentation of the progress of a construction site with PowerPoint
 - Creation of a handout

Micro-credential 10 (CT) - Timber construction planning (149h)

In this micro-credential, apprentices learn the theory of timber construction engineering and building physics. The apprentices then go through the entire production process from planning using a CAD programme, material selection, calculations, plan creation, and cost accounting. They are then expected to apply what they have learned and plan their own project. Finally, the apprentices should independently manufacture products/components.

Timber engineering theory & prefabrication

In this part, apprentices learn about the special features of timber engineering. The focus is particularly on processing and assembly technology. Apprentices also learn about the special features of prefabrication, with a focus on production processes, logistics and assembly preparations.

-In this part, prefabrication in particular, but also engineered timber construction, is explained in more detail based on the principles in Micro-credential 3.-

Apprentices should have knowledge of timber engineering, particularly of machining and assembly techniques (fasteners). (FCT)

Apprentices should be familiar with the specific features of prefabricated building construction, in particular the production processes, logistics and assembly preparations. (FCT)

Topics: (12-24 hours)

- Special features of timber engineering
 - Processing technology
 - Assembly technology
 - Fasteners
 - Examples:
 - DIN EN 1995-1-1
 - Roof covering
 - Fastening of components for hall constructions
- Special features of prefabrication
 - Production process
 - Logistics
 - Preparations for assembly
 - Examples
 - Preparing facades
 - Assembly of corner details
 - Finishing of wall elements for extensions or new buildings

Industry-specific building physics (U-value & Energy performance certificate)

In this part, apprentices are introduced to detailed knowledge of industry-specific building physics.

- The basics of building physics are already covered in the carpentry section; this is an advanced module.-

Apprentices should have knowledge of industry-specific building physics, such as U-values and energy performance certificates. (FCT)

Topics: (12-16 hours)

- Industry-specific building physics
 - U-value
 - SD-value
 - Energy performance certificate

CAD and other computer-aided programmes

In this part, apprentices learn about the various timber construction programmes and their functions. The apprentices are then introduced to the use of selected programmes.

- This part can be completed with a project in which the apprentices create a building or part of a building using a CAD programme (guided). This construction can then be used for the upcoming parts, in which the material selection as well as the calculations are done.-

Apprentices should be familiar with the most important digital tools for timber construction planning and be able to use them. (EQF 4/5)

Apprentices should be familiar with the possibilities offered by the use of computers (timber construction software) when designing products, individual components, or assemblies for timber structures. (FCT)

Topics: (16-32 hours)

- CAD programmes
 - Types of programmes
 - ArchiCAD
 - AutoCAD
 - SEMA
 - Functions
 - Use
- Other programmes

Material selection

In this part, apprentices learn to independently select suitable building materials for timber engineering based on the requirements and properties of the building materials.

-It is possible to use the construction of the previous part to better teach the material selection. (based on specific technical specifications)-

Apprentices should be able to select and combine materials and consumables. (FCT)

Topics: (8-12 hours)

- Material selection
 - Construction materials
 - Auxiliary materials
 - Dimensioning
 - Taking requirements and properties into account
- Combining materials based on their compatibility

Calculations (material demand & static calculation, drawing force progressions)

In this part, the focus is on calculations specific to timber construction. Apprentices learn the basics of statics and the fundamentals of strength theory. They also learn how to carry out calculations in relation to product planning such as the calculation of material demands. Another part is the graphic representation of force progressions.

-It is possible to use the construction of the previous parts for the calculation.-

Apprentices should be able to calculate required materials. (EQF 4/5)

Apprentices should be able to carry out calculations relating to the design of products, individual components, or assemblies for timber structures (e.g. calculating material consumption). (FCT)

Topics: (16-24 hours)

- Calculations in relation to the planning of products
 - Material demand
- Fundamentals of statics
 - Loads
 - Dead load
 - Snow load
 - Cutting forces
- Fundamentals of strength of materials
- Drawing force progressions

Creating plans (assembly, production and installation plans, parts list)

This part is about creating plans. The apprentices learn to draw joinery, production, and assembly plans and to create parts lists for calculations and logistics.

-It is possible to use the construction of the previous parts for the creation of the plans.-

Apprentices should be able to plan and manufacture products, individual components or assemblies for timber structures based on their own ideas or according to specifications, as well as draw up the necessary plans (joinery, production, and assembly plans). (FCT)

Topics: (12-16 hours)

- Planning and manufacturing
 - Products
 - Individual components
 - Assemblies of timber structures
- Drawing up plans
 - Joinery plans
 - Production plans
 - Assembly plans
 - Parts list

Cost accounting and material costs

In this part, the focus is on company-specific cost accounting and calculation. Apprentices learn the basics of cost accounting and can apply them.

-It is possible to use the construction of the previous parts for the cost accounting.-

Apprentices should be familiar with company-specific cost accounting and costing, and be able to assist with calculations. (FCT)

Topics: (12-16 hours)

- Calculation
 - Personnel costs
 - Wages and salaries
 - Incidental personnel costs
 - Material costs
 - Material cost
 - Incidental costs
 - Overhead costs
 - General information
 - Consideration in calculation
- Allocation to cost bearer

Project – Planning, creating plans, material selection & calculation (material demand, static, costs)

In this project, the apprentices should apply all the knowledge from the previous parts independently. They go through the entire planning process, starting with the planning of a building/part of a building, the selection of materials, the creation of plans and the subsequent calculations.

Projects are an essential part of apprenticeship training. (CCT)

Apprentices should be able to plan products, individual components or assemblies for timber structures based on their own ideas or according to specifications, as well as draw up the necessary plans (joinery, production, and assembly plans). (FCT)

Topics: (20-30 hours)

- Planning a project/building/part of a building
- Material selection and dimensioning
- Creation of plans
 - Joinery plan
 - Production plan
 - Assembly plan
- Creation of a parts list
- Calculations
 - Material demand
 - Costs
- Example: Planning of canopy construction

Independent Manufacturing

In this part, apprentices learn to independently manufacture products, parts, or modules for timber constructions.

-This part can be combined with the previous project. The apprentices could produce the components that they have planned themselves. -

Apprentices should be able to manufacture products, individual components or assemblies for timber structures based on their own ideas or according to specifications. (FCT)

Topics: (8-12 hours)

- Manufacturing
 - Products
 - Parts
 - Modules

- Independent working
- Time management