

WP4 DELIVERABLE 4.5 PRESENTATION OF MINIMUM REQUIREMENTS FOR

APPRENTISHIPS



METVET

JOINT HIGHER VET

COURSE IN THE METAL SECTOR

WP4 – Creation of Curriculum and Syllabus,
Qualification standard, evaluation & certification (Vol. C)



ABOUT METVET

Metal, machinery and related trades workers are engaged in a range of skilled activities. Those workers need to understand work organization, and the specialist materials and tools to be used in their jobs, as well as of the nature and purpose the final product they are engaged in making.

According to Cedefop's European skills and jobs survey (ESJS), the **5 key skills** for metal, machinery and related trades workers are job-specific skills, problem solving, teamwork, learning and communication. These skills will support employees in this occupation to also tackle anticipated future skill challenges.

METVET project aims at a competence-based professional generic profile served as a basis for designing competence-based training programs. The underlying idea is that vocational education should enable trainees to acquire the competences needed in their future professions. While working as professionals, they should continue to develop competences in order to be able to react to and anticipate future developments in their work.

The project specifically aims at one hand designing, for **Aluminium & Metal Constructions technicians** including:

- **a professional (qualification) profile & a core curriculum (EQF 5)**
- **a corresponding VET program, including innovative teaching methods**
- **a qualification standard (according to ISO/IEC17024) for evaluation & certification.**

All the above will be achieved through the strengthening of the exchange of knowledge and practice between education and training institutions and the labor market. The METVET consortium complementarity will ensure a strong collaboration between the labor market (sectoral organizations) and the education and training institutions. The role of the sectoral organizations will be of ensuring that the developed training is in total adequacy with the employer's needs, supporting the implementation of the training for workers. The role of VET providers will be to develop an adapted, attractive and innovative VET program. The EU umbrella organization will promote the training in the other EU countries.

The objective of this volume is to present METVET's Deliverable D4.5 "Minimum traineeship/apprenticeships Requirements", therefore guidelines and regulations for companies, in order to become proper training venues.

The Project Partners

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About

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Traineeships

1 D4.5 | INTRODUCTION

Skills mismatch and lack of employment opportunities for young people around the world constitute serious challenges. The global youth unemployment rate is nearly three times higher than the adult unemployment rate (ILO, 2018).

In response to these challenges, a range of active labor market policies and programs that focus on enhancing youth employability and on providing incentives to encourage enterprises to hire young people, have been developed in National, European and International level. There is increasing recognition of the key role that apprenticeships can play in enabling young people to acquire the relevant competencies to facilitate their transition from the world of education to the world of work. In their modern form, apprenticeships typically combine systematic and long-term workplace training with classroom instruction to enable apprentices to acquire the full range of competencies needed for a particular occupation.

More recently, the Global Commission on the Future of Work pointed out that **“the private sector has a particular role to play in offering young people quality apprenticeships and their first opportunity to work”** (ILO, 2019, page 32).

As quality apprenticeships have the potential to equip people with the relevant competencies to navigate the challenges in the world of work throughout their lives, they are considered to be an important element of the system of lifelong learning. **Quality apprenticeships also have the potential to improve the productivity and competitiveness of enterprises.** A glance around the world shows that an increasing number of countries are focusing on the development or improvement of apprenticeship systems and programs.

In parallel with increased interest in apprenticeships there has been an upsurge in other forms of work-based learning, whether as a formal component of educational programs, as part of active labor market programs designed to assist the unemployed, or as traineeships or internships established by businesses or not-for-profit organizations. Such schemes are widely considered to enhance employability for those who undertake them. However, the extent of this effect may depend on their form, while there are also concerns about the social and economic impacts of unpaid or poorly paid traineeships.

1.1 Understanding apprenticeships

The notion of an apprentice who learns a craft or occupation while in the service of a skilled practitioner, dates back many centuries. In pre-industrial times, apprenticeship was “a system of training in which young men, and much less often young women, entered contracts to work for established craftsmen and merchants for a lengthy period, generally of some years, in exchange for instruction in a craft or trade” (Wallis, 2008, page 834).

More recently, **apprenticeships** have evolved in many countries to become “**programs of learning that combine part-time formal education with training and experience at the workplace, and result in an externally recognized vocational qualification**” (Ryan, 2012, page 405). This reflects a dualist ideal: the synthesis of theory and practice, on the one hand, and of the classroom and the workplace, on the other.

The Council of the European Union (EU) Recommendation of 15 March 2018 on a European Framework for Quality and Effective Apprenticeships defines apprenticeships as formal vocational education and training schemes that:

- combine learning in education or training institutions with substantial work-based
- learning in companies and other workplaces;
- lead to nationally recognized qualifications;
- are based on an agreement defining the rights and obligations of the apprentice, the employer and, where appropriate, the vocational education and training institution; and
- with the apprentice being paid or otherwise compensated for the work-based.

Quality apprenticeships can confer a variety of benefits on different stakeholders, particularly apprentices, enterprises and government (ILO, 2017) component. Research undertaken by the European Commission has shown that **apprenticeships consistently lead to positive employment outcomes**. On average, 60–70 per cent (and up to 90 per cent in some cases) of apprentices, secure employment immediately upon completion of their apprenticeship, which has led a number of EU Member States to introduce similar schemes (European Commission, 2013, page 9).

Fast-paced technological progress is resulting in accelerated changes in skills needs. Consequently, apprenticeships can provide training using the latest technologies and require substantially less time to adjust training programs to changing needs.

The net cost of apprenticeships is much lower than the cost of a school-based training program for VET students (ILO, 2017). The main reason for the lower cost is that VET institutes incur huge building and equipment costs in order to provide practical training. Also, such costs are not one-off investments, as labor market needs can change rapidly, resulting in necessary updates to curricula and facilities, whereas under apprenticeships enterprises already have the facilities needed to impart training. Nevertheless, apprenticeships also involve costs that are generally shared by enterprises, apprentices and public authorities.

1.2 Other work-based learning forms

Work-based learning is a term used to denote all forms of learning that take place in a real work environment. Such learning can provide individuals with the skills needed to successfully obtain and keep jobs and to progress in their professional development. Apprenticeships and traineeships/internships are the most common types. These may – but do not always – combine elements of learning both on the job and off the job.

Traineeships – or internships, generally involve “**a limited period of work practice, whether paid or not, which includes a training component, undertaken in order to gain practical and professional experience with a view to improving employability and facilitating transition to regular employment**”. Today, and especially in higher-income countries, trainees or interns can be found in a wide range of industries and occupations, working for businesses, not-for-profit organizations and government agencies.

One factor that arguably distinguishes even the more formal kinds of traineeship/internship from apprenticeships is the scope of the training involved (Hadjivassiliou et al., 2012, page 52). Apprenticeships are more likely to operate over longer periods and they typically offer training in all of the competencies required to practice a particular trade or occupation. By contrast, most traineeships/internships tend to be for shorter periods and to be less comprehensive. Some traineeships/internships offer general experience, allowing students or jobseekers to experience what it is like to work in a certain type of job or workplace. Others may provide an opportunity to practice particular skills that have been acquired through previous work or study. However, they do not typically involve the same range and depth of training as an apprenticeship.



SMEs

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Role

2 D4.4 | THE ROLE OF SMEs IN APPRENTISHIPS

Small and medium-sized companies (SMEs) are Europe's motor for growth and employment and the backbone of the European economy. The availability of skilled labor is an important prerequisite to their prosperity.

Apprenticeships have the potential to bring many advantages to both the employer, and the apprentice. A well-functioning apprenticeship program improves the school-to-work transition and raises employability. At the same time, apprenticeship schemes increase the availability of medium level skills which are particularly valuable for SMEs. In fact, when the share of the labor force with secondary and upper secondary qualifications in vocational and advanced technical knowledge grows, so does employment in the SME sector (Annual Report on European SMEs 2014). The medium level skills are essential for the economy as a whole: by 2020, around 50% of labor demand will be for medium-level qualified people (Cedefop 2012).

Furthermore, apprenticeships are a cost-effective way for SMEs to handle recruitment processes. By providing initial vocational training, companies enable themselves to better select and train their future employees. This can have a significant effect on their skills. Small companies of less than 20 employees are in a particularly difficult situation in terms of skills. A recent study of eight European countries¹ showed that small companies are over-represented in the group that is the least satisfied with the skills in its organization, but the least likely to act to change the situation.

When hosting an apprentice, SMEs have the potential to gain:

- Potential young employees with an awareness of the reality of the job.
- A better match of skills and jobs, as they are able to train young apprentices according to their needs.
- An efficient mechanism for recruitment

The potential impact of apprenticeship schemes on the mismatch of skills and jobs is particularly significant for SMEs. Overall, 33% of employers leave vacancies open because they cannot find the skills they need (McKinsey 2014). Finding employees with the right skills is hardest for SMEs since they are not able to invest as much in recruitment as large companies.

2.1 Best practices of SME involvement in apprenticeship schemes

2.1.1 Germany

Vocational training advisers

In today's economy, companies cannot rely on university-educated leaders alone but need a broad range of skilled manpower. As new occupations and skills profiles arise, companies often have difficulties in finding people with the skills they need. For this reason, many companies opt for training the labor force themselves, through vocational training schemes. Small companies with up to 49 employees offer training for approximately 46% of the apprentices within the German dual system. VET schemes are organized by the companies and managed with the help of the Chamber "vocational training advisers".

All 80 Chambers of Industry and Commerce have vocational training advisers, around 450 all over Germany. They are the contact partners for around 204.000 companies providing initial vocational training and deal with more than 845.000 vocational training contracts.

As the companies' privileged partners in matters of vocational training, the vocational training advisers establish the link between companies and young people and help to match supply and demand effectively. They advise training firms on all problems connected with training, e.g. the training occupations to be considered, how training should be structured, the use of training aids, and educational, psychological and legal questions. As an important legal task, the Chambers ensure that a suitable training place is offered to all young persons.

Train the trainers

To ensure the quality of training within the company, any employer wishing to engage apprentices must fulfil certain conditions as regards the suitability for his task. It is a legal requirement that every trainer has to complete the so-called instructor's competence examination (AEVO) of the "Instructors aptitude ordinance". In 2012, approximately 62,000 trainers passed the AEVO exams. Around 334,000 instructors working in companies were recently actively involved in training matters.

The Chamber initiative "Getting strong for VET" also gives special support to instructors working with young people lacking basic literacy and math skills. Due to demographic changes in Germany, taking on applicants that lack the minimum maturity and skills is becoming more and more important, especially for SMEs.

2.1.2 Italy

Apprenticeship schemes in Emilia Romagna Region

The IFOA (Istituto Formazione Operatori Aziendali), a training agency, develops local initiatives in order to encourage small businesses to give a real training value and certified competences to their young workers. The program is a public project co-funded by the Emilia Romagna Region, and the European Social Fund. It is implemented and directly co-funded by companies. IFOA is fine-tuning a web platform for the sharing of profiles and qualifications with client companies, and is adjusting the platform to be in line with a European partnership in the New Deal project (LLP Leonardo).

Through constant tutoring and the introduction of a personal portfolio, IFOA aims to change on the job training in acquisition and formalization of competences, which are afterwards certified together with the employer and the training center.

2.1.3 Belgium

Q Placements

Q-PLACEMENTS NETWORK is the European host companies' network for the promotion of international workplace training for IVET students and apprentices. Organizations from all over Europe started a database of companies interested in European IVET students. The network gathers Chambers of Commerce and Industry, Chambers of Crafts, innovation centers, Educational Centers related to business, and organizations supporting businesses in a very balanced proportion including all points of view; thus, ensuring a wide knowledge, good contacts and expertise of both the educational and the business world.

The network's members are coordinating organizations bringing a critical mass of high-quality host companies. This is the best way to put IVET schools and host companies from different and distant countries in contact, to raise awareness, to facilitate mobility, to ensure quality and to follow up, acting as coordinating organizations for both sending trainees and for receiving ones to be hosted at local companies.

To test the network, several IVET students were sent amongst partners. Based upon the quality manual, the focus of these mobilities was quality, follow up of student and company and an excellent match between students and companies. The project, which was co-funded by the Lifelong learning program, ended in September 2014.

2.1.4 Greece

INNO-APPRE-NET - Network of Vocational Schools and Very Small Enterprises in the Metal Construction Sector

The co-funded by Erasmus+ EU project, aimed at improving and reassuring the attractiveness, quality and effectiveness of the Greek and Cypriot apprenticeship system, through the transmission of know-how from countries having a tradition in properly operation of apprenticeship, mobilizing Greek and Cypriot companies to become involved in the apprenticeship model.

The model was especially based on partnerships (networks) between SMEs. The aim of the specific networks was the creation of clusters of enterprises in order to offer apprenticeship placements according to the tasks that each enterprise is registered to cover (rotation principle). The tasks undertaken by each enterprise are clearly defined in the apprenticeship contract. The specific model is closely related with the “Training Consortium model”, according to which “...several small and medium sized enterprises work together and take on apprentices. If one enterprise cannot obtain a specific content the apprentice goes to the other enterprise...”.

According to the specific model enterprises establish an organization for the purpose of the training, which is responsible for a number of organizational tasks (i.e. contracts), while participating enterprises are responsible for the training. In the aforementioned cooperative forms, the representatives of the sector can have a very prominent role by supporting the specific activities, through already existing networks. In the same vein the related stakeholders will undertake the task to evaluate the viability of each one of the proposed alternatives regarding cooperation between companies, based on the concrete characteristics of the sector by taking into consideration several issues (e.g. local market needs, new technologies).



Design

APPRENTISHIPS

Courses

3 D4.4 | APPRENTICESHIP COURSE DESIGN

This chapter was developed in order to guide the design of expectations, content, methods, and outcomes across differing settings for apprenticeship in small and very small enterprises. It also capitalizes the outcomes of INNO-APPRE-NET - Develop Innovative Apprenticeship Network of Vocational Schools and Very Small Enterprises in the Metal Construction Sector project.¹

It is based on METVET's deliverable 4.1 "**Curriculum for Aluminium & Metal Constructions technicians**", aimed to be adopted by relevant national authorities and social partners as the basis for a common high quality training. Representatives of the system of vocational schools and of public employment services may also benefit, by getting an impression of this alternative method. Curriculum's scope are companies, especially SMEs, in the metal construction sector and their facilitation to the entry of the practical part in a dual apprenticeship.

Taking into consideration, the dual apprenticeship system (realized in Germany) and methods of company-based training, the European Qualifications Framework (EQF), as much as METVET's deliverable 3.3 "**Professional Profile for Aluminium & Metal Constructions technicians**", the content as well as the competences to be achieved during the company-based apprenticeship course, are described and complemented showing the knowledge, skills and competences referring to typical tasks of the occupation.

An important part of evaluation and quality assurance is the examination mechanism (D.4.6 **Creation of Examination / Evaluation Mechanism**) for the acquired technicians' competencies and the Qualification standard (D.4.7 **Qualification Standard**).

ECVET – The European Credit system in Vocational Education and Training is also explained, aiming to identify the Aluminium and Metal Constructions Technician occupation in level and weight. The ECVET system especially serves for communication about parts achieved in the training process and helps to communicate between different partners in an apprenticeship.

¹ Co-funded by the Erasmus+ Programme of the European Union (2014-1-EL01-KA202-001564).

3.1 Dual Apprenticeship

Dual means combining the practical training in a company with VET at school. The benefits of this training model are in practical relevance. Companies know best of future skills that employees need, and may align their education accordingly.

This prevents planning errors during training, which are always at the expense of the companies and the trainees. As they get much of the practice, teenagers/young adult find their way faster into the later everyday working life. The dual system is characterized by the interaction of the training companies and vocational schools.

Company-based training is the basis of VET. As a rule, the trainee is in the company at 3 to 4 days during the week and learns the practical bases of the desired profession there. It is generally directed to a training framework plan, a guide for the trainer to set up the company-based training plan according to the organizational and professional educational situation of each company. For the personal development of young people, it is especially important that the trainers in the company provide concrete work tasks and that the generation of skilled workers will increasingly be transferred responsibility.

School education on the other hand is held in vocational schools and includes 8 to 12 lessons a week. Lessons split into general content and professional theoretical knowledge, which is specifically tailored to the profession. The content is action-oriented mediated by learning fields.

The dual training system is recognized internationally. The coordination between the company-based and the school education is important. The school education is controlled politically by the federal states. However, the state is responsible for the regulation of company-based training under the Vocational Training Act (Vocational Training Act).

3.2 European Qualifications Framework (EQF)

To make apprenticeship's learning outcomes valuable nationally and internationally, there should be a common reference for the levels of knowledge, skills and competences achieved in this arrangement of education and training. A European system for evaluation and comparability is the European Qualifications Framework.

EQF acts as a translation grid which links countries' qualifications systems/frameworks. It covers qualifications at all levels and in all sub-systems of education and training (general and adult education, vocational education and training as well as higher education). Its main role is to make qualifications more readable and understandable across different countries and systems. In close cooperation with the European Commission, Cedefop provides analytical and coordination support for the implementation of the EQF and carries out a number of comparative studies and analysis on issues related to the implementation of the framework at EU, national and sectoral level².

The description of the levels in EQF (red) are the reference to which all other levels of qualification can be Compared, this is prerequisite for recognition, comparability and flexibility.

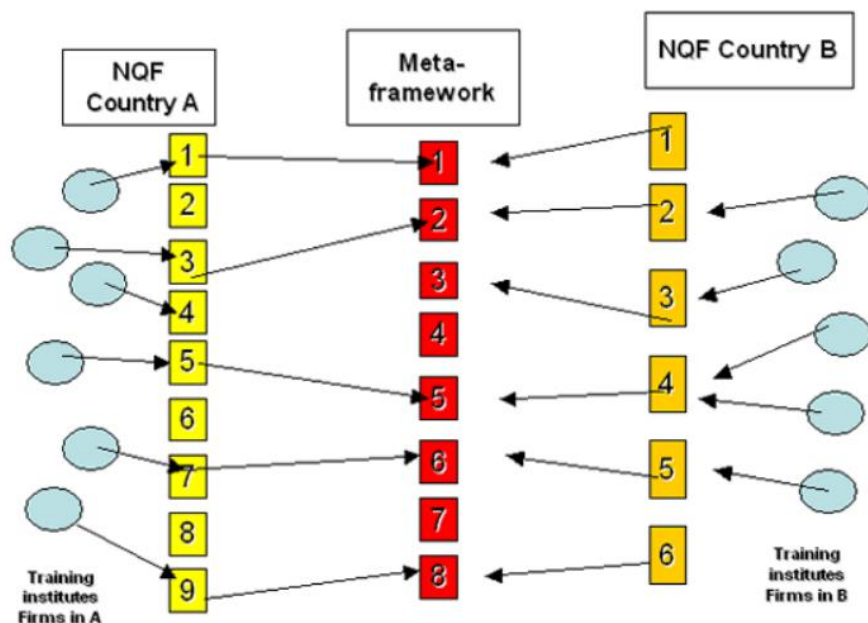


Figure 1. *BIBB - Federal Institute for Vocational Education and Training*

² <http://www.cedefop.europa.eu/de/events-and-projects/projects/european>

3.3 Company – based training teaching methods

“Demonstrate and copy” doesn’t work today. Mixed Methods and participatory forms of learning are required to allow a profitable apprenticeship for all participants. On these terms:

- Apprenticeship and further training should play an important role in the company,
- Apprenticeship should be seen as an investment into the performance of the company,
- The trainer should see and perceive education as one of his main tasks,
- The entrepreneur may not only see the trainee as a cost factor, but should regard him/her as an important investment,
- The trainer needs the support of the company,
- The training contract is not only an appeal to the obligations

Methodological and didactic approach must be matched individually to the trainee, following basic guidelines such as:

- Attachment to the everyday life of the trainee in the company
- Imparting of vivid mental images
- Giving clear and distinct statements
- Praise and feedback as a positive reinforcement
- Transferring of responsibility
- Individual adjustment of the size of the learning steps
- Memorizing by repetition and suitable examples

3.3.1 Multi-stage method / 4stage method

The multi-stage method, usually understood as a 4stage method, is the most common method among the coming into operational practice for application methods:

- Stage 1: Preparation
- Stage 2: Demonstration of an operation
- Stage 3: Execution by the trainee
- Stage 4: Practice.

In theory, it is assumed that both the workplace, the learning material as well as the trainee is prepared for a training unit during the first stage. This means that the working environment, the materials and tools are prepared in an orderly manner.

The trainee has to be prepared so that he/she is able to classify correctly the knowledge to be acquired on the basis of his/her previous knowledge, drop inhibitions and unreservedly approach the learning material.

The second stage is a gradual demonstrating and explaining of the different theoretical and practical contents and performances. This often requires an unusual approach of the trainer. The undivided attention of the trainees is here ultimately an essential foundation for success.

In the third stage the trainee comes into play by coping with previous demonstrated works, explaining them in his/her own words. Here the trainer has the role of the reviser and corrective.

In the fourth and final stage, the trainee shall exercise independently the acquired knowledge and skills. He/She is supervised by the trainer here. The performance should be evaluated together and recognized and possibly criticized professionally.

This mediating of knowledge base method plays an important role and has a high priority in company-based training (working place). When used in practice, a very good form of mediation of basic knowledge and basic skills occurs, in which the trainer as model, shows how something is to be done. This method is also suitable to practice manual skills and practical activities. It is one of the classical teaching methods which by transfer to the fourth stage, e.g. other material (for tapping first steel than aluminium) will lead to flexible application of skills.

Self-criticism, self-awareness, the possibility of distinguishing between a model and not worthy of emulation are certainly not the strengths of this method. Therefore, this method is ultimately only as good as the preparation and the trainer who brings this method of application. The method also stands and falls with the critical view and the commitment of the trainee. If the trainee is motivated and is not afraid to question processes critically, then this method is well-suited.

3.3.2 Project method

“A project is a factual and time-limited task, which has to be solved by the cooperation of several people”. In this method, trainees work on a particular task to be presented at the end, while on the same time:

- agree with each other on certain etiquette;
- organize in a limited time frame;
- manage the estimated or provided time for different activities
- keep each other informed and coordinate at certain intervals;
- deal with a relatively open task with usually quite a lot of creative leeway;
- deal with technical tasks and group processes to achieve projects' goal;
- help each other in different situations and
- deal with real operation situations, objects or issues.

A modern variety of active learning and training is the WebQuest-method. The method traces back to Mr. Bernie Dodge who developed it in 1995 at University of San Diego. WebQuest means a learning arrangement with the central element of solving tasks by using preferably information from the Internet.

3.3.3 WebQuest method

WebQuest promotes project-oriented, autonomous and cooperative learning and can be used in individual training as well as in groups. By the way learning with WebQuest trains media-competence and method-competence and follows the pedagogical theory of constructivism which means it trains a holistic point of view on learning and problem-solving competences. The trainee must construct knowledge and competence by himself and by presenting the result he makes his own internal representation of solutions.

WebQuests can be constructed on all degrees of difficulty and from very short to very complex tasks. It is an excellent method for exams' preparation.

3.4 Quality of company – based training

Several methods have been presented regarding their impact on the training process, shown possibility, limitation and applications. On the other hand, a great variety of other methods are also available to use (excursions, case studies, learning platforms, videos, demonstrating/observation, teaching conversation, self-study, lectures etc.). As the main goal is the trainees' preparation for the operational practice, answers to the following questions would be critical.

Trainer

- What is my relationship with the training contents?
- What can I do and can't do?
- Which method is appropriate for me?
- What are my limits (content, methods, timeframe)?
- What difficulties can I expect?
- Who is possibly better suited?

Trainee

- What is brought to knowledge/prior experience?
- What are the strengths and weaknesses of the trainee?
- What tendencies/interests does the trainee bring along?
- How can the trainee learn best?
- What methods have proven best with the trainee?
- What has the trainee not faced yet?
- How many trainees are taking part in this training project?

Issue

- What training content is it about?
- How does the issue restrict the choice of methods?
- What is the scope for promoting?
- What aspects need to be considered?
- What links to other issues are available?

Goal

- What do I want to achieve (content or/and methodological and behavioral)?
- How is the goal compatible with the content?
- How is the goal compatible with the educational regulations?
- Can the goal be achieved realistically?
- Is it a repetition or a first step?

Time

- Is the selected time suitable?
- Is sufficient time available?
- How much time do I have to plan overall?
- How is the time structured usefully?
- To what extent is a loss of time to be expected e.g. by disturbances?
- Is the training project to be separated in parts or in one piece?
- What are the simultaneously mediated contents at the vocational school and do they possibly complement with my training projects?
- Is the expenditure of time economically justifiable?

Place

- Which training location is suitable for my project?
- Can the apprenticeship be carried out elsewhere in adverse weather influences?
- Is enough space available and is this realistic in practice?

Training resources

- What training resources are available to me?
- Which training resources do I need in the ideal case?
- Am I familiar with the handling of these training resources?
- What training resources do I have to obtain?
- Are the training resources necessary or is there another/easier way?

3.5 Company – based training content

Company – based training content is strictly related to METVET’s deliverable 4.1 “Curriculum for Aluminium & Metal Constructions technicians”. The curriculum for higher VET-course is aiming in upgrading skilled experienced workers from European Qualifications framework (EQF) level 4 to EQF level 5. A qualification EQF level 4 implies, that this person is a skilled worker with the capacity to act autonomously in a range of situations and tasks, supervising persons in their work. EQF Level 5 implies deepened knowledge, skills and competences combined with more autonomy and responsibility in one or more fields on his workplace.

In particular, knowledge will be upgraded to horizontals, green and vertical skills and given the impetus to change culture and assimilate a new way of organizing, working and implementing new practices and tools, which are essential for both environmental protection and adaptation of Enterprises in the new conditions of international competition.

The 5 learning modules training course of 1015 hours (theory & practice), already described in D4.1 and meant to be delivered by VET providers, have to be accompanied by a 4 day/36 weeks company apprentice.

3.5.1 Main professional Functions per learning module

LM 1 Materials technology & applications in constructions

- Identify metal Alloys & profiles
- Read technical specifications of filling materials
- Identify applications for aluminium constructions
- Identify applications in metal constructions and interaction with aluminium structures

LM2 Production facilities and equipment

- Handle and maintain mechanical equipment.
- Work efficiently in production area
- Work efficiently with personnel - machines
- Apply health and safety good practices in production & storage

LM3 Production of aluminium constructions

- Communicate efficiently
- Perform basic technical drawings, energy performance calculations, costing and offering tasks
- Plan and supply necessary raw materials, cutting and machining profiles
- Assemble profiles for various typologies & types of aluminium construction products
- Implement quality control
- Monitor and evaluate the implementation of the work
- Implement health and safety good practices

LM4 Production of metal constructions

- Cost individual metal construction or combination of metal and aluminium
- Plan and supply necessary raw materials
- Cut and weld all types of metal constructions, also for architectural use
- Assemble profiles in different typology of metal constructions as well as with steel-aluminium
- Implement quality control and health and safety good practices
- Archive and monitor

LM5 Installation of constructions

- Apply building components properly. Understand and implement building regulation requirements. Uninstall and repair old constructions
- Place and fit aluminium and metal constructions in building components
- Apply proper insulation
- Demonstrate products
- Archive and monitor

3.5.2 Training Activities

Activity No	1
Title	Material Selection / Construction “Recipe”
Purpose	Choose the right materials for each construction and create the right combination for profiles and accessories
Possible correlation with subsequent and previous activities	Precedes Activity No. 4

Activity No	2
Title	Optimal arrangement of machinery / personnel in the production area
Purpose	Work in production line
Possible correlation with subsequent and previous activities	It precedes Activity No. 4,5,6,7,8,9,10

Activity No	3
Title	Communication / sales
Purpose	Understand customer requirements, select the optimal techno-economic solution for a construction, based on energy efficiency, taking the correct measures and imprint on paper.
Possible correlation of activity with subsequent and previous activities	Subsequent Activity No. 1

Activity No	4
Title	Cost calculation and offer writing
Purpose	Use cost calculation methods and create a technical – economical quotation
Possible correlation with subsequent and previous activities	Follows Activity No. 1,3

Activity No	5
Title	Production Organization - Production Order
Purpose	Issue production order, progress monitoring and possible corrective actions, complete forms.
Possible correlation with subsequent and previous activities	Subsequent Activity No. 2

Activity No	6
Title	Assemble sliding windows
Purpose	Weld / glue glazing according to the technical manuals and instructions, select and use suitable machine tools and measuring equipment for the assembly of sliding frames
Possible correlation with subsequent and previous activities	Subsequent Activities No. 1,2,3,4,5

Activity No	7
Title	Assemble opening windows
Purpose	Glaze shimming / glue panel, according to the technical manuals and instructions, select and use suitable machine tools and measuring equipment, for the assembly of opening windows
Possible correlation with subsequent and previous activities	Subsequent Activities No. 1,2,3,4,5

Activity No	8
Title	Assemble aluminium curtain walls
Purpose	Pre-treat columns and sleepers according to the technical manuals and instructions, select and use suitable machine tools and measuring equipment, for the assembly of aluminium curtain walls.
Possible correlation of activity with subsequent and previous activities	Subsequent Activities No. 1,2,3,4,5

Activity No	9
Title	Outdoor assembly
Purpose	Machining of parts according to the technical manuals and instructions, select and use suitable machine tools and measuring equipment for Outdoor assembly
Possible correlation of activity with subsequent and previous activities	Subsequent Activities No. 1,2,3,4,5

Activity No	10
Title	Construct parts and assemble metal structures
Purpose	Bending and weld parts according to the technical manuals and instructions of the system creator-constructor, select and use suitable machine tools and measuring equipment for the assembly of metal structures
Possible correlation of activity with subsequent and previous activities	Subsequent Activities No. 1,2,3,4,5

Activity No	11
Title	Quality control
Purpose	Implement methods and quality control points in construction, capture critical control points and their documentation
Possible correlation of activity with subsequent and previous activities	Subsequent Activities No. 1,6,7,8,9,10

Activity No	12
Title	CE marking
Purpose	Issue the Declaration of Performance and affix the CE mark.
Possible correlation of activity with subsequent and previous activities	Subsequent to Activities No. 6,7,8,9,10

Activity No	13
Title	Installations
Purpose	Install, uninstall and repair frames and metal structures, on the structural element.
Possible correlation of activity with subsequent and previous activities	Subsequent to Activities No. 1,6,7,8,9,10

Activity No	14
Title	Occupational health and safety
Purpose	Identify and assess risks during work, resolve issues.
Possible correlation of activity with subsequent and previous activities	Correlation with activities 1,2,5,6,7,8,9,10, 13

3.5.3 Conveyance of skills, knowledge and competencies

Skills, knowledge and competencies		Position Conveyed
<p>Materials technology & applications in constructions</p> <ul style="list-style-type: none"> • Choose the appropriate alloys and equipment for processing according to technical specifications • Select the appropriate materials based on mechanical-qualitative materials behavior • Continuous improvement mindset. • Apply good practices for raw materials • Sheet metal forming cutting and elaboration process for all categories of metal shapes • Understand basic circular economy aspects • Implement the appropriate profile for elaboration based on technical needs • Apply different soldering techniques • Implement the appropriate glazing in quality and thickness in relation to the dimensional requirements • Choose the right materials combinations (profiles, glass, etc.) • Understand basic circular economy aspects • Optimize different application techniques for each covering • Select the best combination of materials, taking into consideration energy saving and efficiency • Synthetic panel applications in all kinds of aluminium or steel construction • Recycle • Apply typology to customer needs and available space • Select the best combination of materials and typology type according to building specifications and energy saving and efficiency • Selection and implementation of the appropriate system • Understand basic circular economy aspects • Implementation of the ideal system for collaboration with neighboring structures and landscape architecture • Selection and manufacture of typology according to the client's needs with the ideal metal alloy • Selection and construction of typology in relation to place and fire safety requirements • Apply good practices for raw materials and final products storage • Ideal metal profile cross sections for static reinforcement & support of aluminium cross sections 	2 weeks	<input type="checkbox"/>

<p>Production facilities and equipment</p> <ul style="list-style-type: none"> • Ensure operational readiness of machines and plants • Handle equipment properly (machine tools, presses, pantographs, hand tools) with health & safety • Read, understand and apply CAD-produced and presented descriptions and work orders • Apply regulations relating to data protection and information security • Plan and control work processes, check, protocol and evaluate work results • Understand and use 3D-Equipment for production of tools, parts etc • Use IT systems, including in digitized processes • Implement good working practices (working field, equipment, etc.) • Handle the measuring equipment • Use and application of tools and consumables, ideal for the equipment with health & safety • Implementation of the maintenance instructions of the manufacturer of mechanical equipment • Carry out required maintenance work on systems, machines and tools • Arrange mechanical equipment for saving time. • Create auxiliary structures, devices, templates and flat patterns • Plan coordinate and agree work with line managers, with colleagues and with other work divisions using technical terminology • Updating timetables for cost accounting • Isolate the treatment of metals from aluminium • Create auxiliary structures, devices, templates and flat patterns • Plan coordinate and agree work with line managers, with colleagues and with other work divisions using technical terminology • Document work and initiate quality assurances measures and measures for health and safety at work and environmental protection • Implement health and safety rules at work • Carry out work assignments autonomously and work as part of a team according due consideration to the relevant regulations and safety provisions and on the basis of technical documentation and work orders • Implement logistics and warehouse good practices • Secure loads, transport components and sub-assemblies and use lifting gear • Load on a truck and transport the construction in safety 	4 weeks	<input type="checkbox"/>
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<p>Production of aluminium constructions</p> <ul style="list-style-type: none"> • Communicate & inform engineers and clients on the various construction types & the selected ones. • Organize collaboration with external partners • Implement good working practices • Apply the relevant European and national legislation • Plan and organize autonomously within the timetable and the cost constraints • Read technical drawings and extract dimensions of the construction, blueprints, drawings, sketches etc • Draw and provide sketches, and blueprints based on the building's blueprint • Recommend the optimal solution in terms of materials and their materials combinations, based on the project specifications and design • Plan, coordinate and agree work with line managers, colleagues and other work divisions • Organize and select the appropriate legal and regulatory requirements for each construction • Make quality control of the raw materials, hardware and supplementary materials, considering the technical datasheets, and the quality system • Calculate the cost and the time schedule • Handle software for calculating thermal properties. • Calculate thermal properties (e.g. U-value) for various construction products by using software tools. • Handle technical manuals • Recognize and apply the requirements of the system designer's technical manuals when cutting and machining profiles, in order to achieve maximum energy outcomes when assembly • Make logistics on incoming materials, e.g. fill in the appropriate forms, safely store them etc • Group the cutting by type production to avoid errors • Measure and test mechanical and physical values • Dismantle & assemble components & sub-assemblies • Check, monitor & remedy errors and malfunctions • Carry out routine repairs to control systems and components and document results • Apply all stages of production, cutting, processing, assembly of all types of frames, fenestrations and outdoor, fencing, railing systems etc • Treat and protect surfaces • Machine or drill the appropriate holes for water drainage, ventilation etc • Handle recyclable materials • Write, implement and check work orders • Safely package the products for transport 	16 weeks	<input type="checkbox"/>
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<p>Production of metal constructions</p> <ul style="list-style-type: none"> • Handle software for calculating the weight and the constructions cost • Make quality control of raw materials, hardware and supplementary materials, considering the technical datasheets and the quality system • Make logistics on the incoming materials, • Choose the ideal profile for metal construction based on required loads • Identify corrosion problems • Make separable and inseparable connections • Select & operate machinery according to manufacturer's specifications • Apply all production stages, cutting, processing & assembly, of frame types • Organize and apply appropriate measurement & construction techniques • Treat and protect surfaces • Manufacture parts, assemblies, and metal constructions from sheets, tubes or profiles by means of manual and mechanical production methods • Position and assemble steelwork for reinforcement points • Carry out welding processes (MMA, MIG-MAG, TIG) • Apply appropriate technique to the joints of steel structures based on the drawings of the construction • Apply all production stages for assembling all types of fenestrations & outdoor, fencing, railing systems etc. • Processing procedure appropriate to the material used • Realize workmanships on metal sheets • Process material appropriate procedure • Communicate and share information with the building engineer, e.g. the architecture engineer for the big constructions • Apply tools and consumables for perfect aesthetic restoration of glued joints • Apply welding finishing techniques • Check the functionalities of the construction, and the proper treatment of the joints • Make oxidation test • Safely package the products for transport • Load on a truck and transport the construction in safety • Load and fasten the packages on the appropriate truck • Organize the file of each completed project 	8 weeks	<input type="checkbox"/>
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<p>Installation of constructions</p> <ul style="list-style-type: none"> • Install the construction to the appropriate points, interpreting the designs correctly • Prepare the field for installation • Set up workplaces at building sites • Recognize and apply the requirements of technical guidelines during product installation, in order to achieve maximum energy outcomes • Install and affix the construction on the right place, correctly taking into account the peculiarities of the building thermal insulation • Uninstall the construction to the appropriate way without damaging the construction and the component. Damage walls repair • Apply leveling inside, outside, diagonally, up & down • Apply the shimming, according to the typology of the construction to the building block • Apply the anchors to the correct construction position • Select the appropriate materials and materials combinations based on the technical specifications and guidelines • Apply the instructions in the anchor dimension table • Apply intermediate protective materials when joining / fastening mixed construction • Apply waterproofing products • Seal the construction to achieve maximum energy efficiency • Apply insulation products • Install all necessary supporting elements taking into account minimization of thermal losses and avoidance of thermal bridges • Clean the field and leave the place uncluttered, and to clear up and tidy up his/her tools • Check the functionalities and regulates the mechanisms • Keep files with the project details, the technical details of the projects and any particularities 	6 weeks	<input type="checkbox"/>
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About

APPRENTISHIPS

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