



Sustainable Modular Houses for People in Need
2021-1-EL01-KA220-VET-000025502

INTELLECTUAL OUTPUT 2

VET online course.
“Sustainable Modular Houses for
People in Need”

Job profile / **Technician**
Learning Units & Outcomes



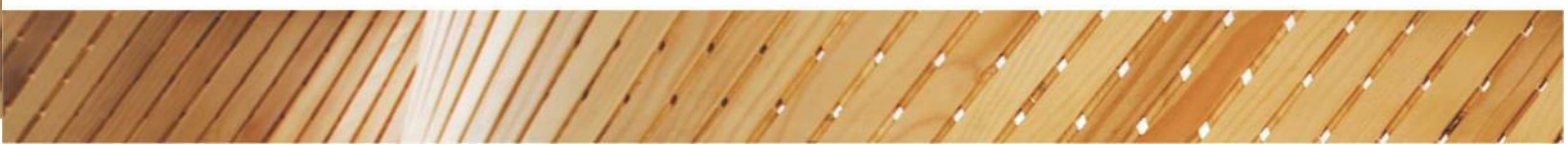
Job profile

Job Title	Technician for Sustainable Modular Houses for People in Need.
EQF Level	Level 3 Secondary Education
Job description	<p>The Technician is responsible for overseeing the off-site manufacturing of sustainable modular houses designed for people in need. They will work closely with architects, engineers, and construction teams to ensure that the modular houses are designed and manufactured to meet strict sustainability and quality control standards. The technician will also be responsible for ensuring compliance with fire safety regulations and implementing quality control procedures throughout the manufacturing process. They will need to have a strong understanding of sustainable design principles, off-site manufacturing methods, and construction techniques. Strong problem-solving skills and attention to detail are also essential for this role.</p>
Entry requirements	<p>EQF level 2 completed</p> <p>Basic MS office skills</p> <p>Interest in acquiring knowledge in the field of Sustainable Modular Houses</p>
Activities	



Activities	<ol style="list-style-type: none"> 1. Designing and engineering sustainable modular houses for people in need using software and modeling tools. 2. Coordinating with architects, construction managers, and other stakeholders to ensure design compliance and quality control. 3. Preparing detailed technical specifications, drawings, and plans for off-site manufacturing of modular houses. 4. Conducting regular inspections and quality control checks during the off-site manufacturing process and on-site installation of modular houses. 5. Collaborating with local communities and organizations to ensure that modular houses meet their needs and requirements. 6. Providing training and technical assistance to local construction teams and volunteers in the installation and maintenance of modular houses. 7. Continuously researching and identifying new sustainable materials, construction methods, and technologies for modular housing. 8. Monitoring and evaluating the performance and sustainability of modular houses in use and recommending improvements or upgrades as needed.
------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Level 3	Knowledge of facts, principles, processes, and general concepts, in a field of work or study following a secondary education.	A range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying basic methods, tools, materials, and information.	Operate in work-related contexts.
---------	-------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------





Learning Units

A Learning Unit consists of a coherent combination of learning outcomes, subject to evaluation and autonomous validation. Learning outcomes consist of knowledge, skills and competences that are mobilised in actions through which the individual shows / demonstrates mastery of the acquired learning outcome, in accordance with certain performance criteria and context conditions.

Learning Units	
Learning Unit (LU) 1	INTRODUCTION TO TIMBER FRAME MODULAR HOUSES (MICRO UNITS) FOR PEOPLE IN NEED
Learning Unit (LU) 2	CONSTRUCTION ELEMENTS AND MATERIALS FOR TIMBER UNITS
Learning Unit (LU) 3	TECHNICS FOR OFF-SITE MANUFACTURING
Learning Unit (LU) 4	ASSEMBLY AND DISASSEMBLY OF TIMBER HOUSE UNITS
Learning Unit (LU) 5	ENVELOPE DETAILS OF MICRO UNITS (LAYERS OF WALLS, IMPLEMENTATION STEPS)



Learning Outcomes

The Learning Outcomes break down into knowledge skills and competencies that are mobilised in actions/achievements through which the individual shows/ demonstrates the required field of competence, according to a certain performance criteria and context conditions.

Learning Unit 1

LU1 is about approaching the basic principles of sustainability and focuses on constructing a modular house for several and different needs. This is translated into viable engineering by adapting technologies, processes, and materials towards a smart use of natural resources as well as residue materials or reused ones.

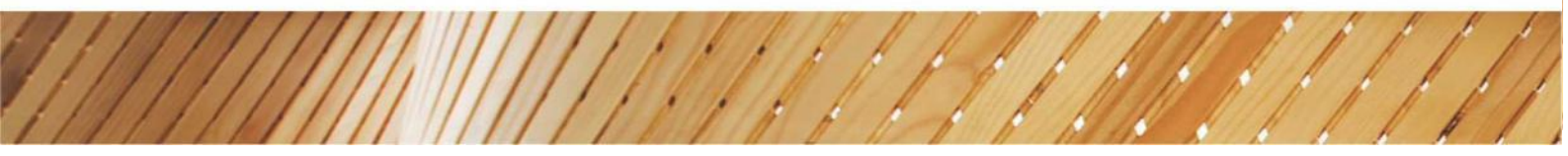
This LU is about creating not only a philosophy but also providing practical steps on how to design, prefabricate, transport, build-assembly, reprocess after the end of its use modular construction with timber as the primer material. Basic pillars through this procedure are to respect the natural resources, the people, and the places where these units will be temporarily placed. Small modular units are to be joined together to form a practical and comfortable modular micro building to host size-wise different ranges of people with dissimilar needs.

Learning Unit 1	INTRODUCTION TO TIMBER FRAME MODULAR HOUSES (MICRO UNITS) FOR PEOPLE IN NEED
Sub-Contents	<ul style="list-style-type: none"> ○ Basic sustainability principals ○ Modular construction from natural materials (timber) ○ Accommodating needs of displaced people ○ Assembly and disassembly key aspects for small house units



Learning Outcomes

Knowledge	Skills	Competences
<p>Describe the sustainability principals related to the housing needs.</p> <p>Know about How natural materials (timber) can assist in achieving an eco-friendly and sustainable house construction approach.</p> <p>Know about the needs for temporary accommodation of people in need.</p>	<p>Name the different natural materials that can be used to cope with an urgent housing need.</p> <p>Demonstrate knowledge and skills in prefabrication processes using timber as the primary material.</p>	<p>Manage the entire concept of a modular construction from natural materials to assist the need for an urgent accommodation of people in need</p>
<p>Main action / achievement:</p>		<p>Workload</p>
<p>The main achievement is the ability to manage the entire concept of a modular construction from natural materials to assist the need for urgent accommodation of people in need. This includes understanding the whole approach from using locally sourced resources which will be used as efficiently as possible to create modular micro units.</p>		<p>10 hours</p>





Co-funded by the



Co-funded by the
Erasmus+ Programme
of the European Union

2021-1-EL01-KA220-VET-000025502

Sustainable



Sustainable
Modular Houses for
People in Need



HOPE

Learning Unit 2

LU2 refers to the various components and substances used in the construction of timber modular buildings. These include timber frames, walls, roofs, floors, and cladding. The materials used for these elements may vary depending on factors such as design requirements, environmental factors, and building regulations. Common materials used for timber construction elements include laminated veneer lumber, cross-laminated timber, glued laminated timber, and engineered wood products. The selection of construction elements and materials is critical to ensure the durability, sustainability, and safety of the building.

Learning Unit 2	CONSTRUCTION ELEMENTS AND MATERIALS FOR TIMBER UNITS
Sub-Contents	<ul style="list-style-type: none"> ○ Types of timber commonly used in modular housing construction. ○ Characteristics and properties of different types of timber ○ Manufacturing processes and techniques for timber elements and materials ○ Structural components such as beams, trusses, and columns ○ Wall systems and components including studs, sheathing, insulation, and finishes. ○ Roof systems and components including rafters, decking, insulation, and finishes. ○ Flooring systems and components including joists, subflooring, and finishes. ○ Windows, doors, and other exterior components ○ Interior finishes and materials such as cabinetry, countertops, and flooring ○ Maintenance and upkeep of timber materials and components.





Learning Outcomes

Knowledge	Skills	Competences
<p>Identify the different types of timber elements used in construction, including beams, studs, and trusses.</p> <p>Name the various timber treatments and finishes available to increase durability and prevent decay.</p> <p>List the various types of connectors, fasteners, and adhesives used in timber construction.</p> <p>List the structural principles and best practices for timber construction, including load-bearing capacity and earthquake resistance.</p>	<p>Read and interpret technical drawings and specifications for timber units.</p> <p>Assembly and integrate structural components, wall systems, roof systems, flooring systems, windows, doors, and other exterior components in timber modular construction.</p> <p>Apply proper construction techniques to ensure the stability and functionality of each element.</p>	<p>Prepare for use the various tools and equipment needed while recognize troubleshoot issues during construction, attention to detail and quality control.</p>
Main action / achievement:		Workload
<p>The main achievement is the ability to select, handle and work with various materials and elements necessary for the construction of timber units. They must be able to read and interpret technical plans and blueprints, prepare, and assemble the necessary components, and ensure the overall quality of the construction process. Additionally, they must be knowledgeable about safety regulations and practices, as well as be able to communicate effectively with other members of the construction team.</p>		<p>25 hours</p>





Learning Unit 3

LU3 refers to producing building components or entire building modules in a controlled factory environment, which are then transported to the construction site for assembly. This method of construction offers several advantages, such as reduced construction time, improved quality control, and increased efficiency. The techniques for off-site manufacturing include designing for modular construction, advanced manufacturing technologies, digital fabrication, and automated production lines. The use of these techniques can improve productivity, reduce waste, and lower costs.

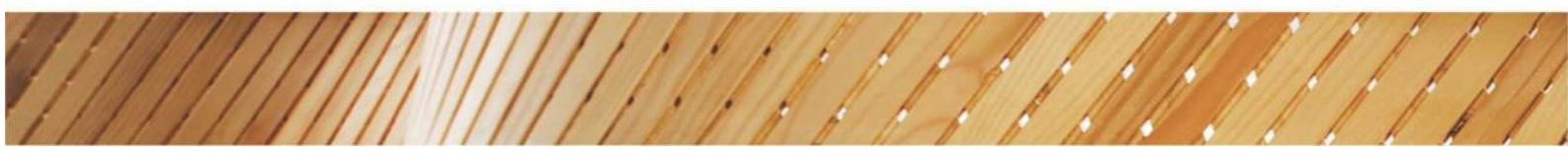
Learning Unit 3	TECHNICS FOR OFF-SITE MANUFACTURING
Sub-Contents	<ul style="list-style-type: none">○ Introduction to off-site manufacturing○ Types of off-site manufacturing techniques○ Comparison of off-site vs on-site manufacturing○ Factors influencing the choice of off-site manufacturing technique.○ Lean manufacturing principles and practices○ Quality control in off-site manufacturing○ Health and safety considerations in off-site manufacturing○ Sustainability aspects of off-site manufacturing○ Case studies of off-site manufacturing in the construction industry.





Learning Outcomes

Knowledge	Skills	Competences
<p>Have knowledge of the principles of off-site manufacturing and the benefits of the technique.</p> <p>Know about different types of off-site manufacturing techniques, such as panelization, volumetric, and hybrid.</p> <p>List the various materials used in off-site manufacturing, such as timber, steel, and concrete.</p> <p>Know about regulations and standards relating to off-site manufacturing, including building codes, fire safety regulations, and environmental regulations.</p>	<p>Ability to operate and maintain manufacturing equipment and machinery.</p> <p>Implement practices that streamline production, reduce waste, and enhance overall efficiency.</p> <p>Assessing and addressing health and safety considerations specific to off-site manufacturing.</p>	<p>Work effectively in a team environment and communicate with colleagues, supervisors, and other stakeholders in off-site manufacturing</p>
Main action / achievement:		Workload
<p>The main achievement is to be able to understand and implement efficient and sustainable manufacturing processes that can produce high-quality timber units in a cost-effective and timely manner. This includes mastering the use of advanced equipment and tools, optimizing production workflows, ensuring quality control, and maximizing resource utilization. The technician should also be able to identify and address potential issues in the manufacturing process to minimize waste and optimize efficiency. Overall, the main goal is to achieve a high level of productivity and quality while minimizing environmental impact.</p>		<p>25 hours</p>





Learning Unit 4

LU4 refers to the process of putting together prefabricated components off-site and then assembling them on-site, while disassembly involves dismantling the components for reuse or recycling. The process requires technical skills, knowledge of construction methods, and the use of specialized tools and equipment. The assembly process involves erecting the structural frame, installing the insulation, cladding, roofing, and other finishing materials, and connecting the mechanical, electrical, and plumbing systems. Disassembly involves the careful removal of components without causing damage, labeling and storing the components for future use or recycling. Proper assembly and disassembly are essential for ensuring safety, durability, and sustainability of the timber house units.

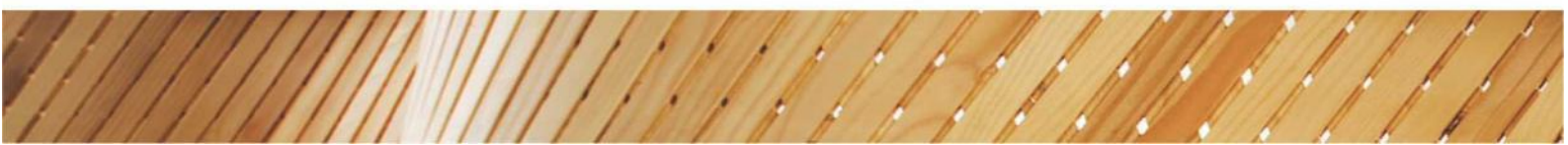
Learning Unit 4	ASSEMBLY AND DISASSEMBLY OF TIMBER HOUSE UNITS
Sub-Contents	<ul style="list-style-type: none"> ○ Overview of assembly and disassembly procedures for timber house units ○ Identification and use of tools and equipment for assembly and disassembly ○ Preparation of the site for assembly and disassembly ○ Connection and securing of different elements of the house unit (walls, roof, floors, etc.) ○ Handling and lifting of heavy materials and components. ○ Safety measures and precautions during assembly and disassembly ○ Inspection and testing of the assembled unit for quality control. ○ Disassembly procedures and techniques for future reuse or recycling.





Learning Outcomes

Knowledge	Skills	Competences
<p>Have knowledge of the procedures involved in the assembly and disassembly of timber house units.</p> <p>Identify and list the tools and equipment required for the assembly and disassembly of timber house units.</p> <p>Comprehend the steps involved in preparing the site for assembly and disassembly, including site assessment, leveling, and safety measures.</p>	<p>Connecting and securing different elements of timber house units, including walls, roofs, and floors.</p> <p>Measuring and cutting materials to precise dimensions.</p> <p>Safe handling and lifting of heavy materials and components during assembly and disassembly.</p>	<p>Apply the right methods, with attention to detail, in assembly and disassembly procedures and techniques for future reuse or recycling timber house units</p>
Main action / achievement:		Workload
<p>Upon completion of training in assembly and disassembly of timber house units, the technician should be able to demonstrate skills in safely and efficiently constructing, disassembling, and transporting modular housing units. The technician should also have a thorough understanding of the assembly process, including the use of appropriate tools and equipment, as well as the ability to troubleshoot and make necessary repairs. Additionally, they should be knowledgeable about relevant regulations and safety standards in the industry.</p>		<p>25 hours</p>

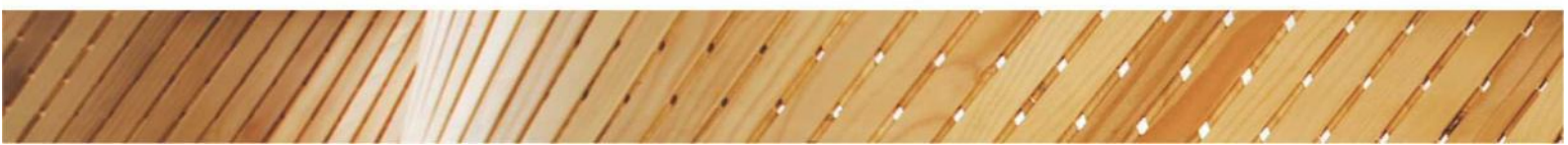




Learning Unit 5

Learning Unit 5	ENVELOPE DETAILS OF MICRO UNITS (LAYERS OF WALLS, IMPLEMENTATION STEPS)
Sub-Contents	<ul style="list-style-type: none"> ○ Introduction to envelope details in modular construction. ○ Basic elements of envelope details - walls, roof, and floor. ○ Layering and implementation steps for walls. ○ Layering and implementation steps for roof and floor. ○ Insulation, vapor barriers, and air sealing. ○ Best practices for achieving a high-performance envelope. ○ Quality control and testing of envelope details.

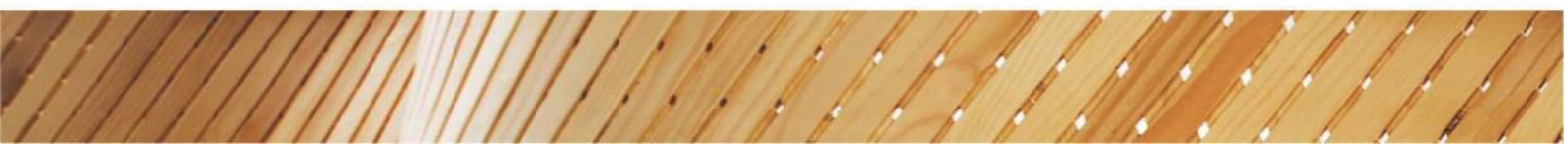
LU5 refers to the external layer of the building that separates the interior from the exterior environment. In modular construction, the envelope is made up of several layers, including insulation, structural sheathing, and exterior cladding. The insulation helps to maintain a comfortable interior temperature, while the structural sheathing provides stability and rigidity to the unit. The exterior cladding is the visible layer that provides protection from weather elements and can be made from a variety of materials, including wood, metal, or fiber cement. The implementation steps involve the installation of the various layers in a particular sequence, ensuring a tight and efficient envelope. This process includes the installation of the insulation, sheathing, flashing, and cladding in a manner that prevents air infiltration, thermal bridging, and water penetration. Proper implementation of these steps is essential in ensuring the durability, energy efficiency, and comfort of the micro unit.





Learning Outcomes

Knowledge	Skills	Competences
<p>Have knowledge of the different types of wall systems, such as panelized and modular, and their advantages and disadvantages.</p> <p>List the various materials used in building envelope construction, such as insulation, vapor barriers, and air barriers.</p> <p>Recognize the importance of moisture management in building envelope construction and the risks associated with moisture damage.</p> <p>Have knowledge of building codes and regulations related to building envelope construction.</p>	<p>Properly handle and install materials used in envelope construction, including selecting and using appropriate tools.</p> <p>Proper use of tools and equipment for cutting, measuring, and installing materials.</p> <p>Assess and troubleshoot potential issues in envelope construction and make necessary repairs or adjustments.</p>	<p>Work collaboratively with architects, engineers, and other professionals to ensure successful implementation of envelope construction and carefully removing components of timber house units</p>
Main action / achievement:		Workload
<p>The main achievement would be to gain the skills and knowledge necessary to construct a well-insulated, airtight, and moisture-resistant building envelope using sustainable materials. This would include understanding the different layers of walls, implementing proper insulation techniques, and selecting appropriate materials for each layer of the envelope. The technician would also need to understand the importance of air and vapor barriers, as well as the proper installation of windows and doors to ensure a high-performing and durable building envelope. Ultimately, the main achievement would be to create a comfortable and healthy living space while also minimizing energy consumption and reducing the environmental impact of the building.</p>		<p>15 hours</p>





Sustainable Modular Houses for People in Need

2021-1-EL01-KA220-VET-000025502

