01.3 Curriculum

The “Woodworker 4.0”

Short Version - Final

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

WOODIGITAL

www.woodigital.eu

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Content

Introduction

This report finalizes and matches the results of the previous desk research "*O1.1 - Desk Research: The "Woodworker 4.0". Market needs, knowledges, skills, and competences required in the context of the Twin Transition (Green and Digital) of the furniture sector*" with the main findings of the related Validation Groups, carried out in all Project countries and reported in the report "*O1.2 – Focus Groups - The "Woodworker 4.0". Market needs, knowledge, skills and competences required in the context of the Twin Transition (Green and Digital) of the furniture sector".*

The professional Profile of the Woodworker 4.0 combines the traditional complex of Knowledge, Skills and Competences typical for the Woodworker in the furniture industry with the new ones required by the twin transition of the furniture sector towards new Circular Economy business models and their needed Green Skills and towards the digitization of the processes along the whole sectoral value chain.

The Curriculum of the Woodworker 4.0 defined below is based on the following principles:

- The "Woodworker 4.0" is a woodworker digitally competent and able to use the technologies already existent in the working environment.
- The "Woodworker 4.0" is a woodworker digitally competent and able to use the disruptive technologies emerging in the wood and furniture sector.
- The "Woodworker 4.0" is a woodworker able to work in a working environment affected by the transition to Circular Economy business models.
- The "Woodworker 4.0" is a woodworker aware of the sustainability principles.
- The Curriculum should be attractive for young people or unemployed people, in terms of content and career perspective.
- The scope of this Curriculum is to increase the digital competence and the knowledge of the fundamentals of the Circular Economy in the furniture sector for the new professional profile of the "Woodworker 4.0". The training related to the traditional profiles above mentioned is out of the scope of this project.

The following version is the update of the Woodworker 4.0 Curriculum Profile, after the Pilot of the training toolkit, including all the feedbacks collected during the onsite and online mobilities, both from the students/workers and from the teachers/trainers/tutors involved along the whole validation process.

According to the ECVET framework, each Learning Unit corresponds to 0.2 ECVET Points and the full training course will assign 1 ECVET Point.

1. Curriculum description

The proposed curriculum is designed and set up considering that VET providers can use it as a basis for building up the expected new qualification.

Furthermore, the proposed curriculum is useful for students, employees, unoccupied people willing to improve their traditional competence in the furniture sector with up-to-date skills and for employees or unoccupied people coming from other sectors – with a solid technical background - willing to reroute their career toward the furniture industries.

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2. Woodworker 4.0 – Content of the Curriculum

In this document we are going to present the definition of the Learning Units and their content, for the new professional profile "Woodworker 2.0".

The Curriculum is made up by 5 learning units with their related:

- Main topics
- Detailed topics
- Learning outcomes

The full version of this document - available in English on the website www.woodigital.eu – include also the complex of skills, knowledge and competences expected at the end of the training course.

3. Learning Units: main contents

Introduction

Learning outcomes are described in relation to the specific knowledge, skills, and competences, in order to ensure that the new curriculum properly matches the evolution of the market and the sectoral twin transition. The training pills that will be developed will follow and specify these defined learning outcomes.

To make it a more systematic tool, the identified general, technical, and transversal skills are divided into five learning units, according to a sensible training path starting from a general introduction about the revolution of Industry 4.0, to give to the learners a sound basis of knowledge and a proper jargon, until the last learning Unit devoted to the fundamentals of the CSR and the ethics principles adequate for a working environment.

Description of the Units

UNIT 1 – INDUSTRY 4.0
(0,2 ECVET Points)

1.1 Main Topics

- Introduction to Industry 4.0
- Transition of the wood and furniture sector towards the Industry 4.0: technologies and tools
- Examples of Industry 4.0 application for the Wood/Furniture industry

1.2 Detailed Unit's structure

- Introduction to Industry 4.0 and digitized workplaces
- Industry 4.0 for European SMEs: challenges and opportunities
- Industry 4.0 in practice
- Industry 4.0 – Case Studies

LEARNIG OUTCOMES

At the end of the Unit "Introduction to Industry 4.0" the learner should be able to:

- Understand the definition, development and impact of Industry 4.0
- Have a clear understanding of tools used within Industry 4.0 to optimize the value chain of production
- Describe the opportunities that industry 4.0 brings to SMEs in Europe
- Explain the application of Industry 4.0 in the wood and furniture industry
- Provide some concrete examples of Industry 4.0 practices in wood and furniture sectors
- Understand the real application of Industry 4.0 in the furniture sector
- Know how this real application allows adapting to new market expectations

UNIT 2 – 4.0 SOFTWARE
(0,2 ECVET Points)

2.1 Main Topics

- Introduction to software 4.0
- Software solutions: CAD / CAM / BIM / VR / AR
- Automated Manufacturing
- System information management

2.2 Detailed Unit's structure

- Different types of software for the wood and furniture industry
- Elements of Computer Aided Design
- Elements of Computer Aided Manufacturing
- Elements of Building Information Modelling
- Elements of Augmented Reality / Virtual Reality
- 4.0 Software Case-Studies

LEARNING OUTCOMES

At the end of the Unit "4.0 Software" the learner should be able to:

- Describe different categories of softwareused in the furniture industry
- Identify the benefits of using software in the furniture industry
- Understand the basic principles of Computer Aided Design and Manufacturing (CAD/CAM)
- Describe the benefits of using CAD/CAM and Bulinding Information Modeling BIM software
- Understand the basic principles of Computer Aided Design and Manufacturing
- Understand the possibilities of AR/VR/BIM software in the sector
- Understand the benefits of using software in the design process

UNIT 3 – 4.0 MACHINERY
(0,2 ECVET Points)

3.1 Main Topics

- 4.0 Machinery
- CNC Routers
- Finishing systems
- Additive technologies

3.2 Detailed Unit's structure

- Description of 3 axis/5 axis machines,
- Description of finishing lines for flat panels and complex surfaces
- Description of the main finishing products
- Description of Laser cutter technology
- Elements of 3D printing
- 4.0 Machinery – Case studies

LEARNING OUTCOMES

At the end of the Unit "4.0 machinery" the learner should be able to :

- Recognize the importance of machinery in the wood and furnitureindustry
- Recognize the importance of automation in the wood and furniture industry
- Recognize the importance of automated finishing lines
- Identify the most important finishing products used in furniture manufacturing
- Recognize the benefits of using additional technologies in the wood and furniture sector
- Have an understanding of the practical uses of 3D printing in the furniture industry

UNIT 4 – MANUFACTURING MANAGEMENT
(0,2 ECVET Points)

4.1 Main Topics

- Introduction to manufacturing management
- Manufacturing management systems
- Software systems for management
- Quality control

4.2 Detailed Unit's structure

- Project Management principles
- Lean Manufacturing principles
- Operation Management
- Quality and standard of the products
- Enterprise resource planning and related systems (ERP)
- Product Lifecycle Management
- Cybersecurity
- Cloud Computing
- Internet of Things
- Manufacturing management: Case studies

LEARNING OUTCOMES

At the end of the Unit "Manufacturing Management" the learner should be able to:

- Describe the main typical management practices to support optimization of processes
- Define the main principles of total quality management and the methods and tools usedDefine the main technologies and software used in Manufacturing Management
- Understand the application of ERP system in a real SME
- Describe the principles of the quality and standards of the products
- Recognize the main advantages and obstacles of implementation of data management system in a real context

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UNIT 5 – CIRCULAR ECONOMY AND SUSTAINABILITY
(0,2 ECVET Points)

5.1 Main Topics

- Introduction to Circular Economy
- Eco-design (design for re-use, repair, remanufacture, end of life and durability)
- Sustainable and eco-materials

5.2 Detailed Unit's structure

- Sustainability and lifecycle thinking
- Circular economy in the wood/furniture industry
- New circular business models
- Environmental Tools (carbon footprint)
- Life Cycle Analysis
- Ethical procurement
- Ecodesign approaches: Case Studies

LEARNING OUTCOMES

At the end of the Unit "Circular Economy and Eco-design" the learner should be able to:

- Understand the principles of the circular economy and why there is a need for it
- Describe how circular economy relates to the design and production of modern furniture
- Understand the principles of ecodesign and why it is needed for a circular economy
- Know how ecodesign relates to the reduction of the environmental impact of products in their complete life cycle
- Understand the principles of sustainable materials as an ecodesign approach
- Knowing how the use of sustainable materials can reduce the environmental impact of products in their complete life cycle
- Understand the real application of ecodesign in the furniture sector
- Know how this real application could bring competitive advantage to the companies, by reducing the environmental impact of their products/services

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