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01.3 Curriculum

The "Woodworker 4.0"

Short Version – 02/03/2022

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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 the **digitization of the processes** along the whole sectoral value chain and towards new **Circular Economy business models** and their needed **Green Skills**.

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.

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 4.0".

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 – INTRODUCTION TO INDUSTRY 4.0: history and cases histories

1.1 Main Topics
o   Introduction to Industry 4.0
o   Transition of the wood and furniture sector towards the Industry 4.0: technologies and toolsExamples of Industry 4.0 application for the Wood/Furniture industry

1.2 Detailed Unit's structure

o   Introduction to Industry 4.0 and digitized workplaces
o   Industry 4.0 for European SMEs: challenges and opportunities
o   Industry 4.0 application to manufacturing
o   Relevance to European SMEs competitive advantage
o   Industry 4.0 in practice
o   Examples and case histories of Industry 4.0 application for the Wood/Furniture industry

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
● Define challenges and opportunities related to Industry 4.0 for the wood and furniture SMEs in Europe   Explain the application of Industry 4.0 in the wood and furniture sectors
● Provide some concrete examples of Industry 4.0 practices in wood and furniture sectors

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UNIT 2 – 4.0 SOFTWARE

2.1 Main Topics
o   Introduction to software 4.0
o   Software solutions
o   Automated Manufacturing
o   System information management

2.2 Detailed Unit's structure

o   Different types of software   for the wood and furniture industry
o   Elements of Computer Aided Design
o   Elements of Computer Aided Manufacturing
o   Elements of Building Information Modeling
o   Elements of Augmented Reality / Virtual Reality

LEARNING OUTCOMES

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

●   Describe different types of software usable in the wood industry

●   Identify the benefits of using software in the furniture industry

●   Understand the basic principles of Computer Aided Design and Manufacturing

●   Describe the benefits of using CAD/CAM/BIM software

●   Understand the possibilities of AR/VR/BIM software in the sector

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UNIT 3 – 4.0 MACHINERY

3.1 Main Topics
o   CNC Routers
o   Finishing systems
o   Additive technologies

3.2 Detailed Unit's structure
o   Description of 3 axis/5 axis machines,
o   Description of finishing lines for flat panels and complex surfaces
o   Description of the main finishing products Description of Laser cutter
          technology
o   Elements of 3D printing

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 furniture sector

● Recognize the importance of automation in the wood and furniture sector

● 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

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UNIT 4 – MANUFACTURING MANAGEMENT

4.1 Main Topics
o Introduction to manufacturing management
o Manufacturing management systems
o Software systems for management
o Quality control

4.2 Detailed Unit's structure

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

LEARNING OUTCOMES

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

- Define the Manufacturing management approach
- Describe the new manufacturing processes that can be implemented in a company
- Describe the technologies that can be used in a company
- Define the main technologies and software used in Manufacturing Management
- Understand a real application of ERP system in a 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

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

5.2 Detailed Unit's structure

o Sustainability and lifecycle thinking
o Circular economy in the wood/furniture industry
o New circular business models
o Environmental Tools (carbon footprint)
o Life Cycle Analysis
o Ethical procurement

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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