Funded by the European Union

ESTIA INSTITUTE OF TECHNOLOGY

Digital Training Resources (ESTIA)

Smarter Factories, Stronger Futures: AI and Sustainability in European Manufacturing

Project

TRANSFORM – Training and Re-skilling for Smart Manufacturing
Erasmus+ KA210-VET – Small-scale Partnerships in Vocational Education and Training
Project Reference: 2024-2-IE01-KA210-VET-000281740

Delivering Partner

ECOLE SUPÉRIEURE DES TECHNOLOGIES INDUSTRIELLES AVANCÉES (ESTIA), France

Activity Reference

Activity #2 – Collaborative Development

Resource Set Overview

This document presents **two complementary digital training resources developed by ESTIA**, derived from the ESTIA-led webinar:

"Smarter Factories, Stronger Futures: AI and Sustainability in European Manufacturing"

The resources are designed for reuse in vocational education, engineering education, and adult learning contexts, and contribute to the project's modular digital learning programme.

RESOURCE 1

Digital Training Resource – Hyperconnected architecture for highly cognitive production plant

Resource Type

Modular Digital Training Resource (Reusable Learning Module)

Target Group

- Adult learners and job seekers
- Manufacturing employees (SMEs)
- Engineering and VET trainers

EQF Level (indicative)

EQF Level 5–6 (Intermediate)

1. Purpose of the Resource

Based on the previous experienced from The HyperCoG project https://www.hypercog.eu/ several educational contents have been adapted to support the adoption of Industry 4.0 standards, with a particular focus on cyber-physical systems, within industrial contexts. To achieve this, the contens created for TRANSFORM addresses the common technological needs of distinct industrial sites by providing cyber solutions that integrate with their existing physical infrastructures.

Yet, the most valuable asset at these sites is the workforce. The introduction of any advanced technology must always take the human factor into account, particularly from an ergonomic perspective. This is the central focus of the content develpped;: understanding how operators will interact with the newly implemented technology, assessing the skills they possessed prior to implementation, and identifying the competencies required afterward to maximize the benefits of the Digitalization solutions.

The learning paths for operators consist of four modules. While each operator's learning path is unique in its overall structure, several modules are shared across paths, as illustrated in Figure 1:

- **Module 1** is common to all learning paths, including both students and operators.
- **Module 2** is shared exclusively among the operators' learning paths.
- **Module 3** differs according to the industrial partner but is consistent across all learning paths within the same partner.
- **Module 4** is customized for each job role within each learning path.

Based on this structure, a unified framework for the operators' courses has been developed to encompass all four modules (Figure 1).

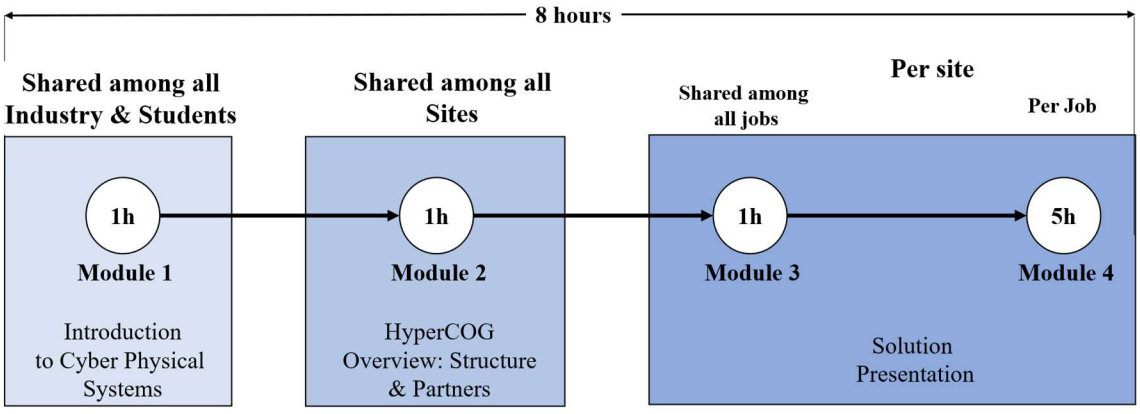

Figure 1: General Structure of the proposed course

2. Learning Objectives

Table 1, Table 2, Table 3, and Table 4 shows a detailed description of each module including its objectives, pre-requirements for peoples to get it, and the expected learning outcomes.

Table 1: Operators Module 1 description

Module No. 1	**Module title:** Introduction to Cyber Physical Systems			
Objectives	Understanding the general context of the course and be able to identify key words and dominant technologies in modern industry			
Requirements	Basic knowledge of English			
Learning outcomes	• Discover the history of induration and the timeline of industrialization generations • Understand the ideas behind the industry 4.0 and discover leading technologies • Be able to understand the structure of the Cyber physical system and analyze the interactions between its components. • Be familiar with terminology used in the domain.			
No. sessions	**Total volume (min)**	**Theoretical (min)**	**Written (min)**	**Practical (min)**
1	60	20	0	40

Table 2: Operators Module 2 description

Module No. 2	**Module title:** Industry4.0 Overview: Structure			
Objectives	• Familiarization with the Industry4.0 context: structure, partners and scope. • Understand the role of the site in which the course is taught			
Requirements	• Basic knowledge of Industry 4.0 • Basic understanding of the terminology used in the domain			
Learning outcomes	• Understand the objective of the project: problems & solutions • Understand the structure of the project: Partners, sites and inter-action between them.			
No. sessions	**Total volume (min)**	**Theoretical (min)**	**Written (min)**	**Practical (min)**
1	60	40	20	0

Table 3: Operators Module 3 description

Module No. 3	**Module title:** Solution Presentation (Per site)			
Objectives	Identifying the problem on the site and understanding the proposed solution			
Requirements	• Basic understanding of the terminology used in the domain • Knowledge of the site			
Learning outcomes	• Basic understanding of the problem and the proposed solution • Understanding of the existing roles, the chain of command and how discussion are to be made. • Understand the interactions between jobs on the field: who do what & how			
No. sessions	**Total volume (h)**	**Theoretical (min)**	**Written (h)**	**Practical (min)**
1	1	15	0	45

Table 4: Operators Module 4 description

Module No. 4	**Module title:** Solution Presentation (per job)			
Objectives	Understand the task to be accomplished and practice on using the proposed solution			
Requirements	• Basic understanding of the terminology used in the domain • Basic understanding of Industry4.0 solution • Knowledge of the site			
Learning outcomes	• Complete understand of the Industry4.0 solution proposed. • Be able to read and understand outputs of the interface used by devices implement the proposed solution. • Be able to make decision based on information obtained from devices that implement the proposed solution.			
No. sessions	**Total volume (h)**	**Theoretical (h)**	**Written (h)**	**Practical (h)**
5	5	1.25	1.5	2.25

4. Learning Activities

The tables above also indicate the number of sessions required for each module, along with their distribution across three learning modes:

- **Theoretical:** Participants attend classroom sessions where the instructor presents and explains concepts and ideas related to the course.
- **Written:** Participants work independently in the classroom on a set of written tasks or questions. The instructor takes a passive role, intervening only if the written materials are unclear.
- **Practical:** Participants engage in hands-on activities with the instructor, such as training on specific software or taking part in educational games. These practical sessions emphasize interaction and collaborative learning.

Table 5 presents the operators' course modules in chronological order, showing the sequence in which the training is designed to be delivered.

Table 5: Proposed program for operator course

			Structure of the sessions	Training materials
Course Day	Intro		**15m:** Check-in & Structure of the day	
	Module 1	Session 1	**Introduction to Cyber Physical Systems** **20 min:** Timeline of the industrial development and brief introduction to the 7 dominant technologies. **40 min:** Social game on the 7 dominant technologies	
	5 m pause			
	Module 2	Session 2	**Indsutry4.0 Overview: Structure** **20 min:** Slides on the HyperCOG **20 min:** Documentary Video **20 min:** Written Q & A	
	5 m pause			
	Module 3	Session 3	**Solution Presentation (Per site)** **15 min:** Slides on the Site & its problem **30 min:** Division to groups & social game on the problem **15 min:** Discussion on the solution	
	Module 4	**5 m pause**		
		Session 4	**Scenario 1: Getting to know the solution (Per job)** **15 min:** Slides explaining scenario **45 min:** Practical session on the solution.	
		1h launch break		
		Session 5	**Scenario 2: Hands on the solution1: Reading HMI (Per job)** **30 min:** Slides explaining scenario **60 min:** Practical session on how to read the HMI. **30 min:** Written Q&A on reading the HMI	
		15 m pause		
		Session 6	**Scenario 3: Hands on the solution 2: Interacting with HMI (Per job)** **30 min** Slides explaining scenario **60 min:** Practical session on how to Interact with the HMI **30 min:** Written Q&A on reading the HMI	
	Closing		**15m:** Check-out & Summary of the day	

5. Format and Accessibility

This resource delivered and reused in multiple digital formats, including:

- Slide deck with trainer notes
- PDF learning pack

All formats support reuse, adaptation, and dissemination in line with Erasmus+ open-access principles.

Course is available online on following link: https://w.wiki/HXNh.

RESOURCE 2

Recorded Webinar Learning Module – AI & Sustainability in European Manufacturing

Resource Type

Recorded Webinar Learning Module (Digital Training Resource)

Delivery Context

Derived from the **ESTIA-led webinar**:

"Smarter Factories, Stronger Futures: AI and Sustainability in European Manufacturing"

1. Purpose of the Resource

This resource transforms the ESTIA-led live webinar into a **structured, reusable digital learning module**, enabling learners to engage with AI and sustainability concepts on demand and independently of the live session.

2. Learning Objectives

After completing this learning module, learners will be able to:

1. Describe how AI supports sustainable manufacturing strategies.
2. Identify AI-driven solutions presented during the webinar.
3. Understand links between AI adoption and European sustainability goals.
4. Reflect on practical implementation challenges in industrial contexts.

3. Core Learning Content

3.1 Recorded Webinar

- Format: Video recording (webinar replay)
- Duration: Approx. 45–60 minutes
- Delivery mode: Online / on-demand

3.2 Webinar Slides

- AI concepts and manufacturing examples

- Sustainability-focused use cases
- Engineering and applied perspectives

4. Structured Learning Guide

Key Topics Covered

- Smart factories and AI integration
- Data-driven sustainability approaches
- Engineering perspectives on implementation

Reflection Questions

1. Which AI application offers the greatest sustainability benefit in your context?
2. What data would be required to support this application?
3. What organisational challenges might arise?

5. Learning Activities

- **Individual reflection:** Identify one AI-driven sustainability opportunity.
- **Group discussion (optional):** Trainer-led discussion using webinar examples.
- **Practical task (optional):** Map AI inputs and sustainability outcomes for a process.

6. Alignment with Erasmus+ Commitments

Alignment with Approved Application

- Addresses AI and data usage priorities
- Supports digital transformation and sustainability
- Contributes to the modular digital learning programme

Alignment with Partnership Agreement (Annex IV)

- Supports collaborative development of digital training content
- Contributes to dissemination and reuse of project outputs

7. Licensing and Reuse

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This document constitutes digital training resources developed by ESTIA under the Erasmus+ KA210-VET project TRANSFORM and may be used as evidence of project outputs in interim and final reporting.