



WP2 PEDAGOGY OF THE LEARNING FACTORIES FOR VET



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1. GLOSSARY AND/OR ACRONYMS

AR Augmented Reality
AGV - Automated Guided Vehicles
AR - Augmented Reality
ARI - Automation and Industrial Robotics
BI - Business Intelligence
CBL - Challenged-Based Learning
CLF - Collaborative Learning Factory
CNC - Computer Numerical Control
CoVE – Centres of Vocational Excellence
ERP - Enterprise resource planning
ESCO European Skills, Competences, Qualifications and Occupations
ENSAM - Ecole Nationale Superieure D'arts Et Metiers
EQF – European Qualification Framework
FHJ – FH Joanneum
HC-R-S - Human-centred, Resilience, and Sustainable
HVET High Vocational Education and Training
I4.0 - Industry 4.0
I5.0- Industry 5.0
IALF - International Association of Learning Factories
IoT - Internet of Things
IT - Information Technologies
LF - Learning Factory
SAT - Self Assessment Tool
SOP Standard Operating Procedures
SWOT – Strengths, Weaknesses, Opportunities, and Threats
TFCC – Teaching Factory Competence Center
VET - Vocational Education and Training
VR - Virtual Reality
WP - Work Package
WS - Workstation



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EXECUTIVE SUMMARY

This report analyses the labour context of advanced manufacturing in Greece, with a particular focus on the Region of Western Greece and its relevance for Vocational Education and Training (VET) and Learning Factory initiatives. It examines the regional economic structure, labour market trends, and the evolving demand for technical and digital skills driven by Industry 4.0 and Industry 5.0 transformations. Despite the continued importance of manufacturing for employment and regional development, the

This report examines the labour context of advanced manufacturing in Greece, with a particular focus on the Region of Western Greece and its implications for Vocational Education and Training (VET) and Learning Factory initiatives. It provides an overview of the regional economic structure, labour market trends, and the evolving skills requirements associated with digital transformation and advanced manufacturing technologies. Although the Greek economy is largely dominated by the service sector, manufacturing remains an important contributor to employment, regional development, and technological innovation. In recent years, national and European policies have increasingly emphasised digitalisation, automation, and sustainable production. However, the Greek labour market continues to experience significant skills mismatches, particularly in technical and digital competences required for Industry 4.0 and emerging Industry 5.0 environments.

Within this context, the Region of Western Greece presents a manufacturing sector mainly composed of small and medium-sized enterprises operating in areas such as food processing, construction materials, and metal products. While these industries play an important role in the regional economy, they face challenges related to productivity, technological adoption, and the availability of skilled personnel. These developments highlight the need for targeted upskilling and reskilling initiatives aligned with the evolving requirements of modern manufacturing.

The report also highlights the role of the Teaching Factory Competence Center (TF-CC) in supporting the development of advanced manufacturing skills through the Learning Factory paradigm. By combining hands-on training, industry collaboration, and real industrial challenges, TF-CC contributes to strengthening the connection between education and industry. Examples of training programmes and Teaching Factory pilot activities illustrate how such initiatives can support workforce development, promote the adoption of advanced technologies, and address regional skills gaps. Overall, the report underlines the importance of reinforcing the link between vocational education, technological innovation, and labour market needs. Learning Factories represent a valuable mechanism for equipping learners and professionals with the competences required to support the digital and sustainable transformation of manufacturing.



1. GEOGRAPHICAL AND LABOUR STRUCTURE CONTEXT

Greece is situated in Southeastern Europe and features a mixed economy where the service sector contributes the largest share of gross domestic product (GDP) (Statista, n.d.), but manufacturing and industrial activities remain strategically important for regional development and technological transformation (International Trade Portal, n.d.). In recent years, national strategies and European funding programmes (The Digital Europe Programme, n.d.) have made efforts to accelerate the digital transformation and competitiveness of Greek industry, placing emphasis on digital and advanced manufacturing technologies, as well as the development of the workforce to support these transitions (Digital Transformation Programme 2021-2027, n.d.).

Greece faces ongoing challenges related to skills mismatches between labour supply and industry needs (Skills Mismatch in the Greek Labour Market, 2021), particularly in technical and digital areas. Employer surveys indicate that a significant share of firms struggle to find workers with the required specialised skills, in manufacturing and production as well as in engineering roles, highlighting the need for improved upskilling and reskilling measures across the economy (EKathimerini.Com, n.d.).

1.1. GEOGRAPHICAL & LABOUR STRUCTURE CONTEXT - WESTERN GREECE

The Region of Western Greece is an administrative region in the western part of mainland Greece, composed of Achaia (with Patras as its capital), Aetolia-Acarnania and Ilia. It covers about 11,350 km² and has a regional population of roughly 640 000 inhabitants. Economically, Western Greece has traditionally relied on primary and tertiary sectors, with agriculture and services dominating value added and employment. The manufacturing sector exists but is relatively limited, concentrated in low- to medium-technology industries such as food and beverages, construction materials and basic chemical products. SMEs (micro, small, medium enterprises) make up over 97 % of the business base, yet productivity and innovation remain constrained (CTI, n.d.).

The labour market in Western Greece reflects broader Greek labour trends: employment rates sit around 45 % of working-age adults, slightly below the national average but with lower unemployment (\approx 9.8 % in 2023). Youth and female employment rates remain particularly low (EURES, 2025). Patras, the regional capital and third-largest city in Greece, functions as a commercial and transport hub due to its port and the Rio-Antirrio bridge, and hosts three universities contributing to a significant student population and scientific/technological activity.

While services dominate the city's economy, manufacturing persists in sectors such as cement, timber, paper, packaging, industrial equipment, and food processing (including breweries, soft drinks and dairy). Export-oriented firms like bike manufacturing and industrial equipment underscore Patras's industrial presence.



1.2. REGIONAL HISTORICAL & SOCIO-ECONOMIC CHARACTERISTICS

Historically, the region's economy has been less industrialized than other European regions, with much of the workforce employed in agriculture or services. The industrial base has struggled to scale up due to structural issues such as outdated infrastructure, skills gaps, and limited innovation integration. Economic strategies at the regional and national level have sought to reverse this by promoting digital transformation, innovation and smart specialization policies (e.g., Regional Smart Specialization Strategy "RIS3") focusing on agri-food & advanced manufacturing as priority sectors (Εθνική Στρατηγική Έξυπνης Εξειδίκευσης, 2024). Development programmes under the Greece 2.0 Recovery Plan and regional operational programmes have dedicated funds to support modernizing manufacturing, digitalization, automation and industry-oriented skills development, reflecting the perceived need to align regional employment with evolving technological demands ("Next Generation EU," n.d.).

1.3. CHOICE OF ECONOMIC SECTOR: MANUFACTURING

Given the regional context, the manufacturing sector is a critical choice for analysis, notably due to its role in socio-economic development, labour absorption and links to educational pathways such as vocational training and technical education. Manufacturing in Greece constitutes about 8% of national GDP, which is lower than the European average but still significant in terms of employment and economic impact. It has been identified as a vital sector that offers stable employment, higher salaries relative to some other sectors and strong multiplier effects in the wider economy (HELLENIC PRODUCTION, n.d.). Manufacturing, at national level, accounts for approximately 11-12% of total employment and remains one of the core productive sectors after trade and tourism.

In the Western Greece, the industrial base of the region is characterised primarily by food and beverage manufacturing linked to agricultural production (olive oil, wine, fruit processing and packaging), cement and construction materials, metal products, energy supply and oil refining. The sector's structure is also characterised by small and medium enterprises (SMEs), family-owned businesses, and some larger firms in strategic locations (BBioNets Platform, n.d.). A flagship industrial installation in the region is the Motor Oil Hellas refinery in Corinth, one of the largest industrial complexes in Greece and a major employer both directly and indirectly. Industrial representation and coordination are supported by organisations such as the Federation of Industries of Peloponnese and Western Greece, which promotes competitiveness, investment and innovation across the wider regional industrial ecosystem.

Over the past years, the evolution of the sector has been shaped by three main dynamics. First, there has been gradual stabilisation and recovery following the financial crisis period, with renewed investments supported by European Structural Funds and national development programmes. Second, there is increasing integration of digital tools, automation systems and optimisation technologies within production processes. Third, the sector is progressively aligning with sustainability requirements, including energy efficiency improvements, environmental compliance and circular economy practices. Manufacturing labour demand in the region has experienced fluctuations due to broader economic trends, demographic shifts, and the ongoing digital transformation of production processes. Across Greece, employment in manufacturing



saw declines during the economic crisis period but has recently experienced relative stabilisation and modest growth, particularly in sectors aligned with export markets and industrial services.

From a labour skills perspective, manufacturing increasingly requires a combination of technical and digital competencies. Skills related to advanced production technologies, automation, quality control, supply chain management, and sustainability practices are becoming progressively more important, especially as firms adopt Industry 4.0 and Industry 5.0 paradigms. This trend underscores the importance of targeted training and education to bridge existing skills gaps within the regional workforce. Academic and policy literature emphasises the need for upskilling initiatives and integration of digital manufacturing curricula in vocational and higher education to enhance employability and firm competitiveness (Gwen, 2025).

1.4. INDUSTRY 4.0 AND DIGITAL SKILLS IN GREECE

Digital transformation has been identified as a key priority for economic competitiveness in Greece. According to data from the Digital Skills and Jobs Platform, Greece's share of individuals with basic digital skills remains slightly below the EU average, and the proportion of ICT specialists in employment is lower than the European benchmark, though there is gradual progress in digitalisation among SMEs (*Greece | Digital Skills and Jobs Platform*, n.d.). National initiatives such as the Greece National Digital Decade Strategic Roadmap seek to increase digital skill levels throughout the population and the workforce, underscoring the need to strengthen both basic and specialised digital competences to support industrial transformation (National Digital Decade Strategic Roadmap, n.d.).

At the policy level, the Greek Ministry of Labour has also introduced a national skills strategy aligned with European priorities, stressing the importance of improving digital skills, fostering innovation and supporting the circular economy. A key objective of this strategy is to reduce skills mismatches by addressing skills needs at sectoral and regional levels (CEDEFOP, 2024). Initiatives such as **Greece4.0**, a national excellence network for digital transformation in manufacturing, demonstrate ongoing efforts to promote the adoption of Industry 4.0 technologies, such as digital twins, industrial IoT, robotics and advanced data analytics, within Greek industry. These initiatives complement the skills development agenda by fostering collaboration between industry, research institutions and training providers to address the needs of modern manufacturing.

Overall, the Greek industrial and labour market context is characterised by **growing digitalisation**, an increasing demand for technical and digital skills, and **persistent mismatches** between the skills supplied through existing education and training pathways and those required by employers. These conditions underscore the importance of strengthening vocational education and training, especially in manufacturing-related fields, and aligning it more closely with real industrial needs.

1.5. LABOUR MARKET TRENDS AND DEMAND FOR TECHNICAL SKILLS





Forecasts for future employment patterns in Greece emphasise a growing demand for **medium- and high-level qualifications**. By 2035, a majority of job openings are expected to require at least medium-level technical and specialised skills, while demand for low-qualified roles continues to decline. This trend reflects structural changes in the economy that favour **technology-intensive and digital-enabled occupations**, reinforcing the need for targeted skills development pathways in technical education and training (CEDEFOP, 2025). In addition to high-level skills projections, surveys of Greek employers show that around one-third of companies have difficulty hiring employees with the right manufacturing, production and engineering skills, confirming a **persistent skills gap** in sectors directly linked to Industry 4.0 and advanced production environments.

The evolution of labour demand in the Region of Peloponnese is increasingly shaped by the dual pressures of digitalisation and sustainability, in alignment with the Regional Smart Specialisation Strategy (RIS3) (Οριζόντιοι Υποστηρικτικοί Τομείς – RIS3, n.d.). The Region prioritises the development and deployment of automation systems, optimisation tools, Life Cycle Assessment (LCA) methodologies, energy management systems, Building Energy Management Systems (BEMS), digital tools and value chain optimisation mechanisms to support the agro-food and tourism sectors. The adoption of these technologies directly reshapes occupational roles and required competences.

Maintenance technicians are increasingly required to interact with automated production systems, condition monitoring technologies and digital dashboards. Their role now includes interpreting sensor data, supporting predictive maintenance strategies and contributing to system optimisation processes. Production operators are expected to understand quality analytics, operate digitally controlled machinery, and perform basic system configuration tasks within integrated cyber-physical production environments (CNN.Gr, 2025). The use of optimisation systems and digital performance monitoring tools requires a higher level of data literacy than in traditional production settings.

Technical staff must combine mechanical, electrical and digital competences, reflecting a transition toward hybrid mechatronic profiles. The implementation of energy systems, BEMS, environmental monitoring tools and LCA-based sustainability assessment frameworks requires personnel capable of understanding both technical infrastructure and environmental performance metrics. Moreover, the introduction of value chain optimisation tools and logistics optimisation systems expands skill requirements beyond production processes to include supply chain analysis, resource efficiency assessment and sustainability-oriented decision-making.

Beyond technical expertise, transversal competences are increasingly critical. The complexity of automation systems and cyber-physical infrastructures requires strong problem-solving abilities, adaptability to technological change, teamwork in interdisciplinary environments and continuous upskilling. Evidence from Eurofound and Cedefop (2025) indicates that SMEs across Europe identify skills shortages as a major barrier to investment and digital transformation. Given that the productive structure of Western Greece is dominated by SMEs, this challenge is particularly relevant for the region.

2. HISTORY OF LEARNING FACTORIES IN GREECE

In Greece, the concept of **Learning Factories** has gradually emerged over the past decade as part of broader efforts to modernise technical and vocational education and to better align it with the needs of industry. The Learning Factory paradigm builds on the idea of applied,





practice-oriented learning environments that simulate real industrial systems and processes, enabling learners to acquire hands-on experience with contemporary manufacturing technologies.

The **Teaching Factory** concept, in particular, has been introduced and discussed in the Greek educational and industrial ecosystem as an approach inspired by the “teaching hospital” model, aiming to bring students, educators and industrial stakeholders together around real production challenges. This approach has been highlighted as a means to strengthen the connection between education and manufacturing practice, especially in the context of Industry 4.0 and digital transformation (Business Daily, 2021).

Initial Learning Factory-related initiatives in Greece were primarily developed within **universities and applied research laboratories**, often supported by European funding instruments, where pilot manufacturing environments focusing on automation, robotics and digital production were integrated into engineering education. Over time, these initiatives evolved to include structured collaboration with industry and participation in European networks and projects addressing advanced manufacturing skills.

More recently, the establishment of dedicated structures such as the **Teaching Factory Competence Center (TF-CC)** has contributed to consolidating the Learning Factory framework in Greece. TF-CC operates as a competence centre explicitly oriented towards the Teaching Factory paradigm, facilitating collaboration between academia, industry and training providers and supporting the dissemination of advanced manufacturing technologies and skills through hands-on training and pilot activities (TeachingFactory-CC, n.d.). Overall, while Learning Factories in Greece are still evolving, there is a clear trajectory toward their increased adoption as effective tools for vocational and professional training.

2.1. ORGANISATION CONTEXT - TEACHING FACTORY COMPETENCE CENTER

Teaching Factory Competence Center (TF-CC) is a Greek competence center focused on strengthening the connection between education, research and industry in the field of manufacturing and advanced technologies. TF-CC operates as a **Teaching Factory**, a model designed to integrate **innovative Industry 4.0 technologies** into training and industrial practice by enabling knowledge exchange between academia and industry stakeholders and by exploiting research results towards industrial applicability in pilot settings.

Organisation Profile

TF-CC's core mission is to create **added value for services and products of manufacturing companies** through research-driven innovation and education. This is achieved by fostering collaboration between academic institutions and industrial partners, including end-users, manufacturers, machine builders, system integrators and software providers, which together form a broad ecosystem of expertise under the TF-CC umbrella. Its activities aim to promote technological adoption, problem-solving and workforce development in areas critical to the digital transformation of manufacturing.

TF-CC's strategic objectives include:

- **Enabling knowledge sharing** between academia and the national industry
- **Integrating Industry 4.0 technologies** such as Artificial Intelligence (AI), robotics, digital twins and Internet of Things (IoT) into manufacturing



- **Supporting upskilling and reskilling** of professionals to meet current and future industry demands
- **Translating research results into industrially applicable solutions** through pilot activities and consulting services.

TF-CC also engages actively in European talent and innovation ecosystems, for example, it has pledged support to the **EIT Deep Tech Talent Initiative**, which aims to boost deep tech competency and equip the workforce with advanced technological skills relevant to modern manufacturing.

2.2. TEACHING FACTORY PARADIGM AND ACTIVITIES

The **Teaching Factory paradigm** implemented by TF-CC combines theoretical education with real industrial challenges. It follows a model where training is structured around **industry-relevant problems, hands-on learning and hybrid modes of instruction (both in-person and remote)**. Through this approach, the centre delivers tailored training services, familiarises learners with advanced technologies, and supports implementation of solutions in real world contexts.

TF-CC provides a portfolio of services that includes:

- **Training Services** on digital manufacturing, automation, additive manufacturing and other Industry 4.0 technologies, certified to international quality standards (e.g., ISO 29993:2018). These courses are designed to enhance participants' technical competencies and support professional development.
- **Technical Services and Consulting** to help manufacturing firms upgrade processes, adopt new technologies, and improve production efficiency.
- **Knowledge-based Support** through access to technical documentation, studies, and practical demonstrations that support both learners and industry professionals.

2.3. TEACHING FACTORY FACILITIES

TF-CC's facilities are based on the **Teaching Factory concept originally developed by the Laboratory for Manufacturing Systems and Automation (LMS)** and include technology areas such as robotic assembly and handling cells, additive manufacturing cells, and digital twin platforms. These environments are used both for training and for conducting pilot activities that bridge education and industrial practice. Such facilities allow learners to gain **practical experience with real industrial equipment**, while enabling the centre to work closely with companies to identify technological needs and co-design solutions tailored to sectoral challenges.



3. SAMPLE OF STUDY PROGRAMMES

Below, four representative training programmes have been selected from the Teaching Factory Competence Center portfolio. The selected programmes address both technical and human-centric competences and respond to regional labour market needs in digital manufacturing, automation, and occupational safety.

3.1. INDUSTRY 4.0 TECHNOLOGIES FOR HEALTH AND SAFETY IN WORKPLACES

This programme focuses on the integration of advanced digital technologies into occupational health and safety practices within industrial environments. It addresses the growing need for engineers and technical staff capable of combining digitalisation strategies with ergonomic and safety-oriented workplace design. The training adopts a blended learning structure (20 hours theoretical instruction, 10 hours hands-on training, and 10 hours consultancy-oriented reflection). It introduces participants to Virtual Reality (VR) systems, IoT-based sensorial technologies, and digital monitoring tools that enable the simulation and optimisation of production environments before physical implementation.

A strong emphasis is placed on human-centred manufacturing principles. Participants analyse inefficient layouts, identify bottlenecks and congestion points, and evaluate safety risks using ergonomic assessment tools. Through human tracking systems and safety-distance calculation models, they develop competences in hazard identification and preventive system design. The programme primarily targets engineers, design engineers, and technically oriented students.

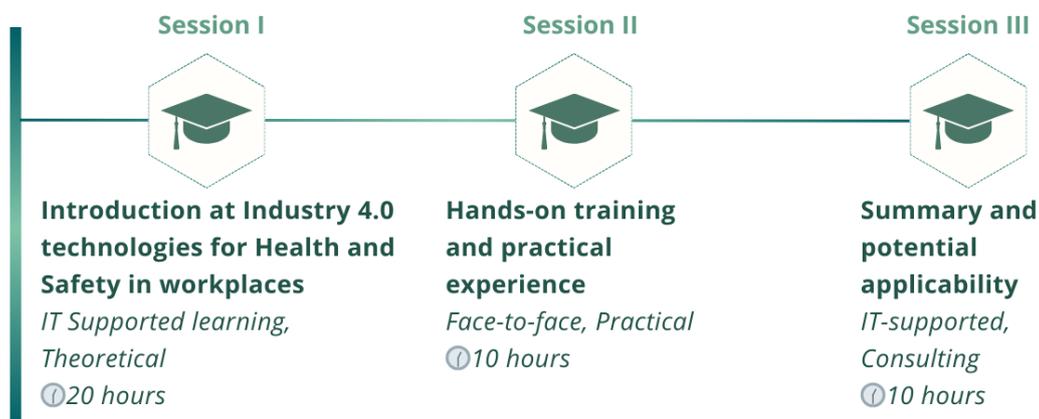


Figure 1. Training programme Industry 4.0 technologies for health and safety in workplaces



3.2. FIRST AID AT WORK

The “First Aid at Work” training programme is designed to strengthen emergency preparedness and safety culture within industrial and organisational environments. It is primarily addressed to companies wishing to train their employees in first aid provision, while individual participants may also attend upon group formation. The programme supports organisations in developing internal capacity to respond effectively to workplace incidents, contributing to safer and more resilient working environments.

The training follows a blended learning structure combining synchronous and asynchronous theoretical instruction with face-to-face practical application and consultancy support. Participants acquire essential competences in Basic Life Support (including CPR and AED use), bleeding control techniques, trauma management, safe immobilisation and transport of injured persons, and management of musculoskeletal injuries. Emphasis is placed on scene safety, rapid assessment, and appropriate response in industrial contexts.

Beyond technical first-aid procedures, the programme promotes situational awareness, responsibility, and confidence in emergency decision-making. By combining structured theoretical learning with hands-on practice using specialised equipment and guidance from qualified instructors, the training enhances both individual skills and organisational safety culture.

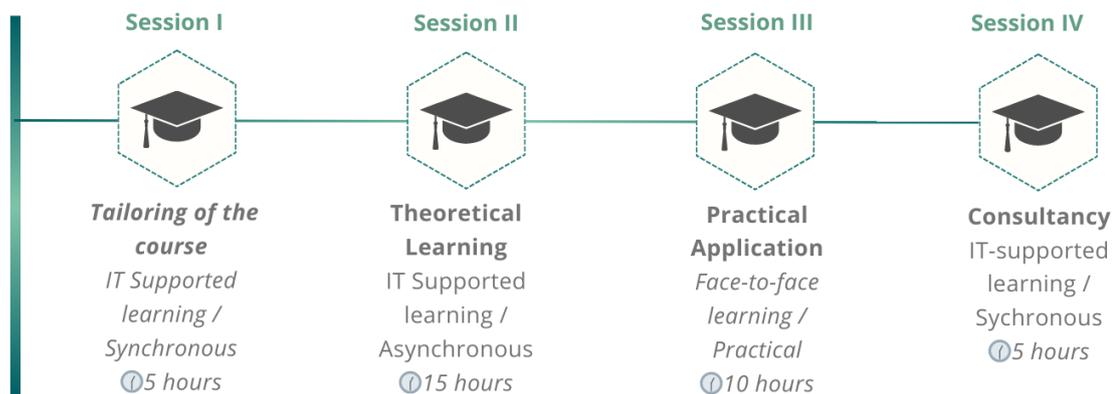


Figure 2. Training program first aid at work

3.3. AUTONOMOUS COLLABORATIVE ROBOTS

This training programme is designed to support industries seeking to advance their digitalisation strategies and lean manufacturing practices through the integration of collaborative robotic systems. It targets production engineers, operations managers, safety engineers, system integrators, and technically oriented students who are involved in automation projects or production system optimisation.

The programme combines theoretical instruction with hands-on practical training and consultancy-oriented sessions. It develops advanced competences in collaborative workplace design, task and motion planning, and safe human-robot interaction (HRI). Participants explore enabling technologies such as wearable devices, augmented reality, sensing systems, digital

twins, data management platforms, and AI-based vision systems, including deep learning applications for perception and object recognition.

A strong emphasis is placed on safety, risk reduction, and human-centric production environments. Through practical applications, participants design and evaluate collaborative workstations, integrate decision-making tools and control devices, and assess innovative HRI solutions such as speech recognition and force-sensitive interfaces. Overall, the programme equips learners with the analytical and technical capacity to implement collaborative robotic solutions in complex industrial contexts.

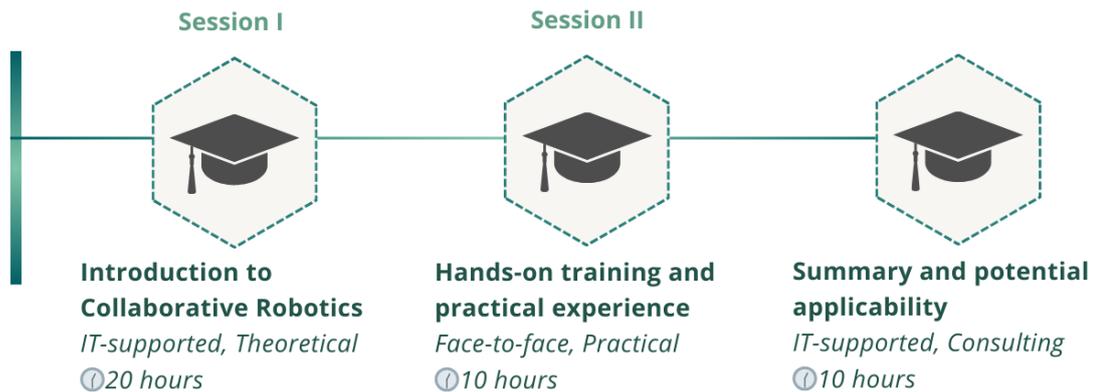


Figure 3. Training programme Autonomous collaborative robots

3.4. ADDITIVE MANUFACTURING

The Additive Manufacturing (AM) training programme provides a comprehensive introduction to advanced, non-conventional manufacturing technologies, combining theoretical knowledge with practical application. Structured in progressive modules, the programme guides participants from fundamental AM principles and process groups to design optimisation and real-world industrial implementation. It is addressed to production engineers, design engineers, industry professionals, and students seeking to strengthen their competences in digital and flexible manufacturing systems.

Participants are introduced to AM technologies, materials, post-processing techniques, and the business perspective of additive manufacturing. Emphasis is placed on Design for Additive Manufacturing (DfAM), simulation of part quality issues, and optimisation of process parameters. Through a hands-on pilot case, learners design, prepare, and manufacture a component using AM equipment, consolidating both technical and analytical skills. Overall, the programme equips participants with the capacity to evaluate and implement AM solutions within industrial contexts.

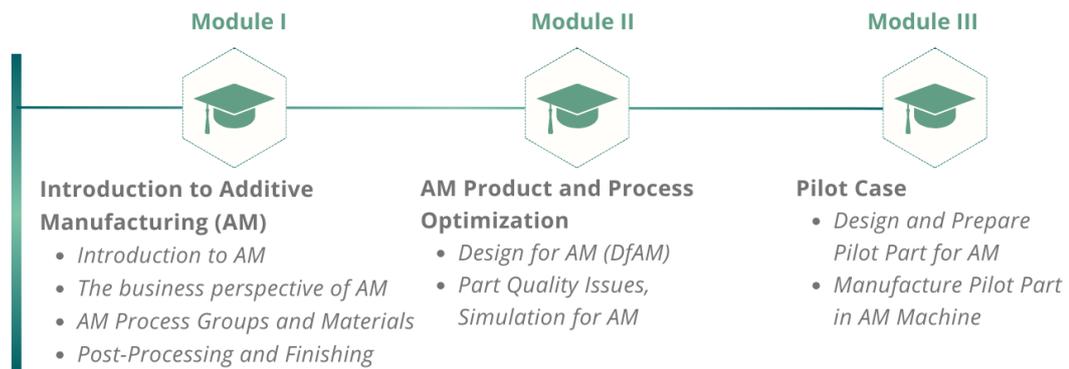


Figure 4. Training programme additive manufacturing

4. WORKPLACE SITUATIONS

4.1. HEALTH AND SAFETY IN THE CONTEXT OF INDUSTRY 4.0

The “Health and Safety in the Context of Industry 4.0” course is designed for engineers, operators, and safety professionals, seeking to incorporate or extend the digitalization and lean manufacturing concept, by enriching industrial equipment and services with cutting-edge technologies. This course focuses on the utilization of advanced technologies, such as Virtual Reality (VR) and the Internet of Things (IoT), to enhance health and safety in industrial settings. Participants gain both theoretical knowledge and practical experience, familiarizing themselves with these technologies and their potential applications. As main learning goals, learners familiarize themselves with Industry 4.0 technologies through demonstration and hands-on training of three applications: a) ergonomics-based workplace design, b) ergonomics analysis in production station using IoT sensorial system and, c) human tracking for enabling zero access areas and notify human in high-risk zones. The participants:

- gain expertise in the use of Virtual Environment for production design and training
- gain a deeper understanding of ergonomic assessment
- familiarize with technologies for human tracking for enabling zero access areas and notification in high-risk zones
- get prepared for practical, tailored solutions for specific pilot cases, that improve product design and manufacturing efficiency
- explore and evaluate solutions to innovate towards reducing working accidents, minimizing and efficiently addressing risks (especially new and emerging)

The course is conducted in hybrid mode, with online sessions for the theoretical and consulting part, and the opportunity of hands-on experience in Teaching Factory Competence Center facilities. Through the hands-on session and in-depth technical discussions, this course empowers participants to drive innovation and improve safety in their workplace, while cultivating a strong Safety Culture. This hybrid approach that Teaching Factory Competence





Center provides, aims to facilitate the integration of technologies in the real industrial environment and ensure a higher impact of training.

4.2. TF PILOT – COLLABORATIVE MACHINE TOOL DESIGN

A "factory-to-classroom" operating scheme was envisioned involving the adoption of an industrial-driven project. The goal of this pilot was to implement a Teaching Factory between an academic and an industrial partner. The Teaching Factory pilot involved a "real-life" engineering challenge which was elaborated by engineering students. Two teams, each with four young engineers, were formed. The Teaching Factory pilot consisted of five sessions in which student teams used video conferencing equipment to communicate with expert engineers. The Teaching Factory pilot topic was the design of a Multi-Technology-Platform (MTP) machine tool, consisting of a 5-axis milling center "Mill 2000," which is equipped with a milling spindle, and two identical and simultaneously utilized working spaces "WS1" and "WS2" on either side of the milling center. Industrial work is approached through a weekly cycle of sessions, which includes support classes, project work and live interactions with the factory. A weekly cycle of sessions is used to approach industrial activity, which includes support classes, project work, and live contact with the factory. A strong interaction with the factory characterizes each work session. Depending on the problem's topic, this interaction may involve discussions, presentation sharing, live production videos, and other knowledge delivery mechanisms. Students should undertake project work in between live sessions, which may include experimenting or analysing data to come up with conclusions and new solutions. An academic supervisor oversees the support courses and is also responsible for initiating talks and offering directions for finding solutions. The pilot consisted of five collaborative cycles in which students worked with industry engineers to advance their designs while following the design cycle of the particular industrial practice.

The real-life industrial problem was given to both student teams at the first session, in an interactive session that included a remote video connection with the production plant so that the students could understand that concept, operation, and obstacles involved. In addition, the experts and the student teams discussed various design considerations. The second cycle focused on the definition of design specifications based on the first cycle's requirements. Both teams used specifications, which were followed throughout the design process and are given. Over the third cycle of the pilot, the student teams incorporated the feedback they got from WZL/IPT engineers during the first two cycles to produce an initial design. Each team took a very different approach. The fourth cycle focused on the selected design's detailed dynamic and thermal analysis. For mechanical and thermo-elastic study of their preliminary designs, both teams used finite element analysis techniques. Finally, both student teams presented their iterative design process based on the dynamic and thermal analysis results, resulting in their final solution as a result of this collaborative design process during the fifth cycle. The completion of the Teaching Factory pilot proved to be mutually beneficial for all parties: young engineers gained real-world product design experience, while the industrial partner gained vital knowledge and guidance at various levels. Furthermore, the approaches, methods, and solutions presented by the participating teams were vastly different, demonstrating the value of the Teaching Factory paradigm for both parties: young engineers are challenged to improve their creativity and problem-solving abilities in order to generate novel solutions, while industry gains access to novel ideas, approaches, and solutions.



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