



**Advancing industrial digital and green innovations
in the advanced textile industry through
innovation in learning and training.**

STUDENTS AND TRAINERS HANDBOOK

**An implementation guide for ensuring a successfully
onboarding and effective knowledge sharing**



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Contents

Executive summary	
Recommendations for students and trainers	
1. Introduction	5
2. Smart, Digital and Green skills academy	8
3. MOOC training	28
4. E-learning platform	35
5. Abbreviations, definitions and boundaries	54

Executive summary

This e-book is a practical guide for students and trainers to successfully understand and complete the MOOC (Massive Open Online Course) of the Smart, Digital, Green Skills Academy. The book contains the following themes:

- context and goals of the Smart, Digital, Green Skills Academy
- course structure
- content structure of individual modules
- didactic procedures of inculcating knowledge and checking acquired knowledge
- technical implementation of learning modules – e-learning platform environment
- methods of practical verification by students – quizzes, case studies, study materials
- the microcredit system of their usability and applicability



Recommendations for students and trainers

These courses have been designed to be followed by different student profiles. We recommend reading this e-book carefully before starting the course to choose the path/level that best suits the student from the point of view of professional focus. Of course, this approach does not exclude the subsequent stage and other levels and topics at your own discretion.



Introduction

Smart – Digital – Green

3

YEARS

12

PARTNERS

10

COUNTRIES

1

**MASSIVE ONLINE OPEN
COURSE ON**

**GREEN
TRANSITION**

**DIGITAL
TRANSITION**

**SMART
TRANSITION**

- Waste mitigation, management & recycling
- Energy & resource consumption
- Sustainable fiber innovations - fibre processing & recycling
- LCA assessment & traceability
- Innovative projects on dyeing, finishing & water management

- Technologies linked to streamlining production
- Smart sensor technologies for data acquisition
- Tracking & authentication methods
- Database management & cyber security
- Design tools & software evolution

- Smart authentication methods
- Radio frequency identification RFID technologies
- Complex composites & integrated electronics
- Innovations linked to smart & intelligent textiles
- Smart sorting systems and AI
- B2B communications & marketing using VR & AR

ADDTEX consortium





2

Smart, Digital and Green Skills Academy



The Smart, Digital and Green Skills Academy created in the framework of the ADDTEX project, includes 9 short innovative training courses contributing to upskilling competencies in the green, digital, and smart transition in the textile industry.



Smart transition



Digital transition



Green transition

The courses, delivered virtually through a MOOC and completed by case studies, have been created to respond to the need of textile workers to update and improve their knowledge, skills, and competencies to fill the gap between their formal education and training and the needs of a fast-changing labour market as well as the current challenges in the textile sector.

The identification of the specific needs of the sector is based on a gap analysis. This research brought together 272 Textiles companies, 47 VET providers and 55 HEIs. Companies that participated in the research provided insights into the challenges and recognized opportunities relating to Smart, Digital & Green technologies, identifying areas in which innovations and impact can be achieved through learning and training.

As a result of the gap analysis, three training modules with 45 units of learning outcomes (ULOs) and a variety of educational resources were developed.

The learning outcomes and contents of each course are differentiated according to three main target groups corresponding to different job profiles within the textile industry. In each module, 3 different learning paths are foreseen; one for engineers and professionals, one for technicians and graduates and one for managers and mentors.



Technicians & Graduates



Engineers & Professionals



Managers & Mentors



Technicians & Graduates



Engineers & Professionals



Managers & Mentors



Smart transition



Smart transition



Smart transition



Digital transition



Digital transition



Digital transition



Green transition



Green transition



Green transition



Smart transition

- ULO1 Smart textiles: introduction and challenges
- ULO2 Innovations linked to smart/intelligent textiles
- ULO3 Integration of technologies to develop composites and electronic textiles
- ULO4 Resource efficient textile technologies for smart functional textiles
- ULO5 Innovations linked to functional textiles



Green transition

- ULO1 Understanding green transition
- ULO2 Raw material for green transition
- ULO3 Fiber-to-fiber textile recycling
- ULO4 Technologies for resource efficient manufacturing
- ULO5 Evaluating environmental impact of the textile industry



Digital transition

- ULO1 Digital maturity and new business models
- ULO2 Data acquisition, visualisation and analytics
- ULO3 Smart maintenance, smart industrial control systems
- ULO4 Collaborative robotic systems and digitalisation of production
- ULO5 Digital marketing and communication

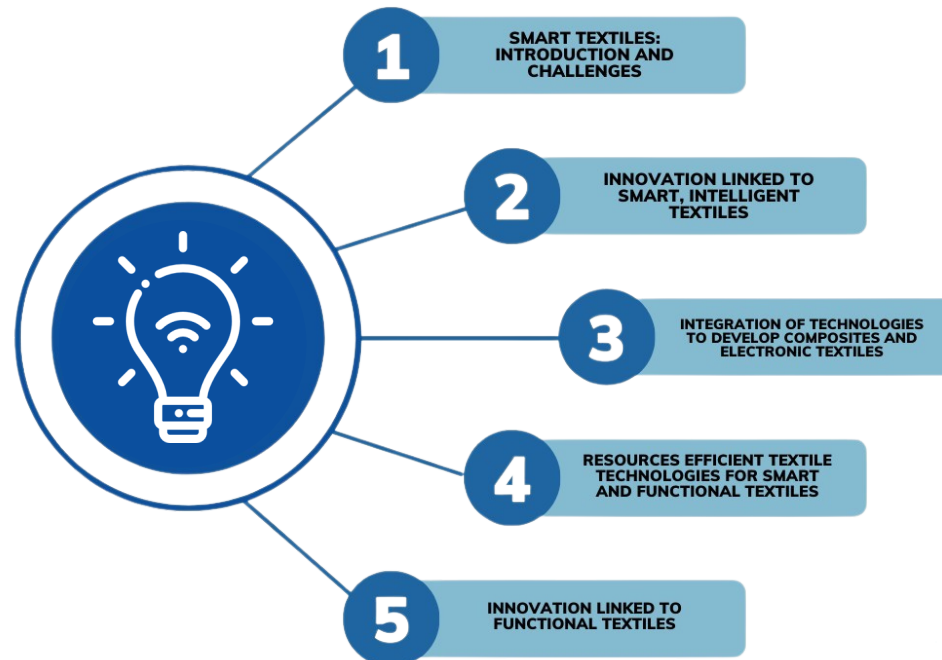
Smart transition

Prerequisites

To undertake the course, the learner should have some basic knowledge of textile fibres, processing techniques, and basic techniques and technologies of textiles. Familiarity with e-learning environments and computer-assisted courses as well as basic IT and digital skills are also desirable.

Modules

The short learning course will introduce terms and definitions of smart transition in the textile industry and their evolution in time and technologies.



Learning paths for SMART TRANSITION



Technicians and Graduates

Completing this module will be able to demonstrate fundamental processes and material development in the domain of smart textiles.

Engineers and Professionals

Completing this module will be able to demonstrate smart textile knowledge for advanced functional applications, challenges and opportunities.

Managers and Mentors

Completing this module will be able to embrace smart textiles and innovative processes with the scope of implement/adapt at the level to attain compatibility with the 2030 Agenda for Sustainable Development.

LEARNING PATH FOR **TECHNICIANS AND GRADUATES**



UNITS OF LECTURES	MAIN TOPICS	OBJECTIVES	DETAILED TOPICS
ULO1 Smart textile: Introduction and challenges	Smart textile trends Emergent technologies User experience challenges	Seek innovation in current textile practices	<ul style="list-style-type: none"> Smart textiles terms and definitions Common preparation methods Challenges for smart textiles related to technology
ULO2 Innovations linked to smart textiles	Medical, transport, energy, protection and communication application of smart textiles	Seek innovation in current practices associated to smart textile applications	<ul style="list-style-type: none"> Overview on different application of smart textiles Innovations in smart textiles
ULO3 Innovations linked to functional textiles	Textile materials Scientific and technological innovation for textile product development	Develop functional textiles	<ul style="list-style-type: none"> Overview on functional textiles Properties of functional textiles Innovation in functional textiles
ULO4 Resource efficient textile technologies for smart and functional textiles	Sustainable textile processing techniques Textile printing technologies	Use sustainable materials and components	<ul style="list-style-type: none"> Overview on sustainable technologies for smart and functional textiles Printing techniques for development of smart textiles
ULO5 Integration of technologies to develop composites and electronic textiles	Smart textile production technologies Internet Of Things for textiles	Identify the best practices to produce smart textiles	<ul style="list-style-type: none"> Overview on techniques of electronic textiles Brief description about fabrication methods: stitch, embroidery, adhesion, coating, crimping, functional finishing

LEARNING PATH FOR ENGINEERS AND PROFESSIONALS



UNITS OF LECTURES	MAIN TOPICS	OBJECTIVES	DETAILED TOPICS
ULO1 Smart textile: Introduction and challenges	Opportunities and challenges in the textile industry	Market needs and development of smart textiles	<ul style="list-style-type: none"> • Smart textiles markets and innovative processes • Emerging application areas • Challenges for smart textiles related to critical factors
ULO2 Innovations linked to smart/intelligent textiles	Research and innovation in smart textiles	Seek innovation in smart textiles	<ul style="list-style-type: none"> • Smart textile development and applications • Advances in smart textile applications
ULO3 Innovations linked to functional textiles	Advances in textile functionalities	Develop functional textiles and textile processes	<ul style="list-style-type: none"> • Development of functional materials and textiles • Needs and advances in development of functional textiles
ULO4 Resource efficient textile technologies for smart and functional textiles	Textile printing technologies development	Use eco-efficient techniques	<ul style="list-style-type: none"> • Manufacturing technology for sustainable development • Technology trends to develop smart and functional textiles
ULO5 Integration of technologies to develop composites and electronic textiles	Integrated techniques for design, development and manufacturing for smart textiles	Develop electronic and intelligent textiles	<ul style="list-style-type: none"> • Advances in techniques of electronic textile development • Methods and techniques for integration of technologies to develop e-textiles

LEARNING PATH FOR MANAGERS OR MENTORS



UNITS OF LECTURES	MAIN TOPICS	OBJECTIVES	DETAILED TOPICS
ULO1 Smart textile: Introduction and challenges	Basics of smart textiles Preparation methods Technological challenges	Be able to explain smart textiles and identify the common methods of preparation and challenges	<ul style="list-style-type: none"> Smart textiles terms and definitions Common preparation methods Challenges for smart textiles related to technology
ULO2 Innovations linked to smart/intelligent textiles	Application area of smart textiles Recent innovation	Identifying application area and recognize recent innovation in smart textiles	<ul style="list-style-type: none"> Overview of smart textiles applications Innovations in smart textiles
ULO3 Innovations linked to functional textiles	Basics of functional textiles Common preparation methods Recent innovations	Explain functional textiles and their properties, identify recent innovations	<ul style="list-style-type: none"> Overview on functional textiles Properties of functional textiles Innovation in functional textiles
ULO4 Resource efficient textile technologies for smart and functional textiles	Textile printing technology	Use sustainable textile printing technologies	<ul style="list-style-type: none"> Overview of sustainable technologies for smart and functional textiles Printing techniques for smart textiles
ULO5 Integration of technologies to develop composites and electronic textiles	Techniques for design, development, and manufacturing of smart textiles	Evaluate best practices to produce smart textiles	<ul style="list-style-type: none"> Overview of electronic textiles techniques Brief description about fabrication methods: Stitch, embroidery, adhesion, coating, crimping and functional finishing

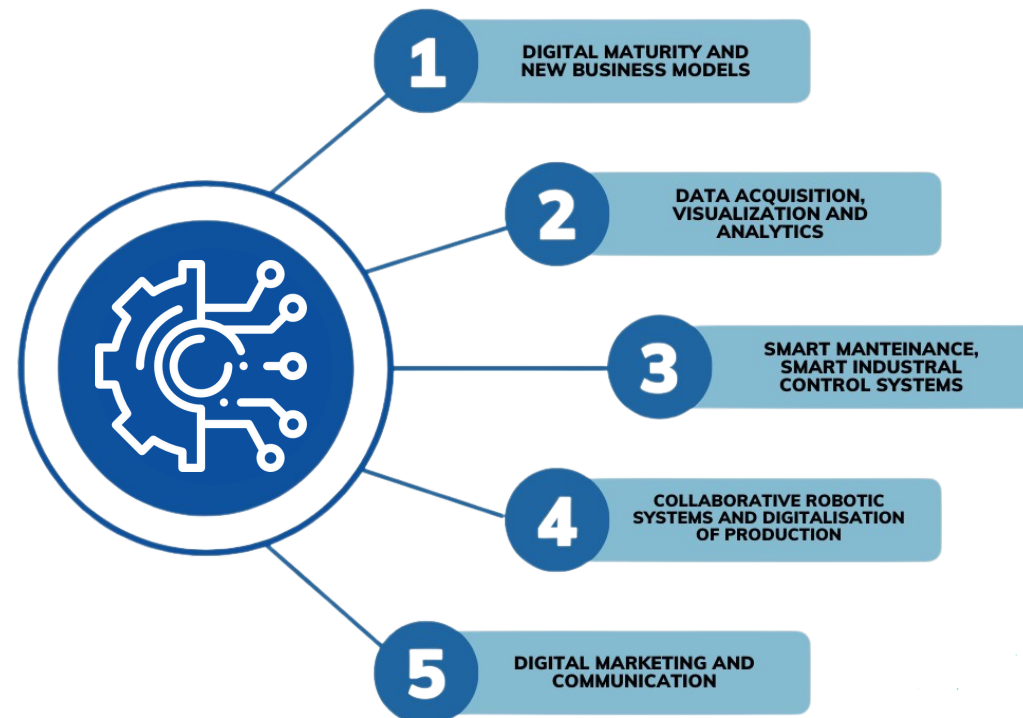
Digital transition

Prerequisites

This course can be undertaken by industry professionals from different levels of education/backgrounds, as well as students and industry workers. It should demand some basic knowledge of industry and business terminology, logistics, supply chains and related technologies. Familiarity with e-learning environments and computer assisted courses as well as basic IT and digital skills are also desirable.

Modules

This course covers, at different levels of complexity, key concepts of digitalisation in the textile industry and key technologies enabling this process.





Learning paths for DIGITAL TRANSITION

Technicians and Graduates

Completing this module will acquire operations-focused and practical concepts and skills with immediate applicability.

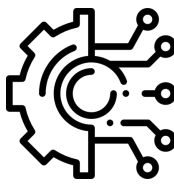
Engineers and Professionals

Completing this module will acquire in-depth technical concepts and skills able to impact current and future operations at the company level.

Managers and Mentors

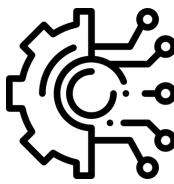
Completing this module will acquire core concepts and skills with a corporate and company-wide scope, with a potential impact on companies' cultures and policies.

LEARNING PATH FOR **TECHNICIANS AND GRADUATES**



UNITS OF LECTURES	MAIN TOPICS	OBJECTIVES	DETAILED TOPICS
ULO1 Digital Maturity and New Business Models	Drivers of digital transformation Business model innovation Data analytics Digital marketing	Analyse information systems, create Business Process Models, analyse Business Process	<ul style="list-style-type: none"> • Digitalization • New consumption trends • Business models innovation and risks
ULO2 Data Acquisition, Visualisation and Analytics	Basic concepts of data acquisition, data visualisation, and data analytics Ethical considerations	Analyse big data, use data processing techniques	<ul style="list-style-type: none"> • Data Acquisition and Preparation • Data Visualisation • Data Analytics • Ethics and Bias in Data Analytics
ULO3 Smart Maintenance, Smart Industrial Control Systems	Types of sensors and systems used Installation and maintenance How to collect and analyse sensor data	Explain functional textiles and their properties	<ul style="list-style-type: none"> • Data acquisition and preparation • Data analytics and machine learning • Ethics and bias in data analytics
ULO4 Collaborative Robotic Systems and Digitalisation of Production	Basic programming concepts for collaborative robotic systems Types of sensors used in collaborative robotic systems	Assemble robots, keep up with digital transformation of industrial processes	<ul style="list-style-type: none"> • Industry 4.0 • Digitalisation of Production & Collaborative Robotic Systems
ULO5 Marketing and Communication	Basic of digital marketing Audience and audience segmentation strategies Customer engagement and experience	Execute Marketing Plan, analysing and evaluating information and data	<ul style="list-style-type: none"> • Digital Marketing Fundamentals • Data Analytics and Metrics • Customer Orders Tracking Systems

LEARNING PATH FOR ENGINEERS AND PROFESSIONALS



UNITS OF LECTURES	MAIN TOPICS	OBJECTIVES	DETAILED TOPICS
ULO1 Digital Maturity and New Business Models	Digital transformation and its impact on business models Role of data analytics in driving business growth and innovation	Create Business Process Models and analyse Business Processes	<ul style="list-style-type: none"> Digital Transformation. New Consumption Trends, Business Models Innovation and Digital Customer Engagement.
ULO2 Data Acquisition, Visualisation and Analytics	Types of data and data sources, data acquisition, visualisation, and analytics in business decision making	Analyse big data, use data processing techniques	<ul style="list-style-type: none"> Data Acquisition and Preparation. Data Analytics and Machine Learning. Ethics and Bias in Data Analytics.
ULO3 Smart Maintenance, Smart Industrial Control Systems	Sensors and systems, data analytics and machine learning techniques to optimize maintenance and control processes	Carry out practical tasks with smart devices	<ul style="list-style-type: none"> Industrial Control Systems. Implementation and Management of Smart Maintenance and Smart Industrial Control Systems.
ULO4 Collaborative Robotic Systems and Digitalisation of Production	Technical principles behind collaborative robotic systems, including kinematics, dynamics, and control sensors Programming languages and software tools	Assemble robots, maintain robotic equipment	<ul style="list-style-type: none"> Industry 4.0: Principles and Implementation. Digitalisation of Production, Collaborative Robotic Systems.
ULO5 Digital Marketing and Communication	Digital marketing tools and techniques, including SEO, social media marketing, email marketing, and data analytics, Customer Order and Tracking Systems	Execute Marketing Plan, analysing and evaluating information and data	<ul style="list-style-type: none"> Audience Segmentation and Targeting Data Analytics and Metrics Customer Orders Tracking Systems

LEARNING PATH FOR **MANAGERS OR MENTORS**



UNITS OF LECTURES	MAIN TOPICS	OBJECTIVES	DETAILED TOPICS
ULO1 Digital Maturity and New Business Models	Digital transformation for organizational success and the role of managers in leading digital transformation initiatives	Analyse information systems, create and analyse Business Process Models	<ul style="list-style-type: none"> • Digital Maturity and Transformation Roadmap • Business Models Innovation, Risks and challenges
ULO2 Data Acquisition, Visualisation and Analytics	Data acquisition, visualisation, and analytics for organizational success	Analyse big data, use data processing techniques	<ul style="list-style-type: none"> • Data Acquisition and Preparation • Data Analytics and Machine Learning • Ethics and Bias in Data Analytics
ULO3 Smart Maintenance, Smart Industrial Control Systems	Business case for Smart Maintenance and Smart Industrial Control Systems to improve organizational efficiency and productivity	Lead technology development of an organisation	<ul style="list-style-type: none"> • Implementation and Management of Smart Maintenance and Smart Industrial Control Systems
ULO4 Collaborative Robotic Systems and Digitalisation of Production	Key technologies in digitalisation, types of collaborative robotic systems and their applications in industrial environments	Keep up with digital transformation of industrial processes, evaluate systems, programmes, etc.	<ul style="list-style-type: none"> • Industry 4.0: Principles and Implementation • Integration of Collaborative Robotic Systems and Digitalisation
ULO5 Digital Marketing and Communication	Digital marketing channels and tools, including SEO, social media marketing, email marketing, and data analytics	Analysing and evaluating information and data	<ul style="list-style-type: none"> • Audience Segmentation and Targeting • Data Analytics and Metrics • Customer data protection requirements

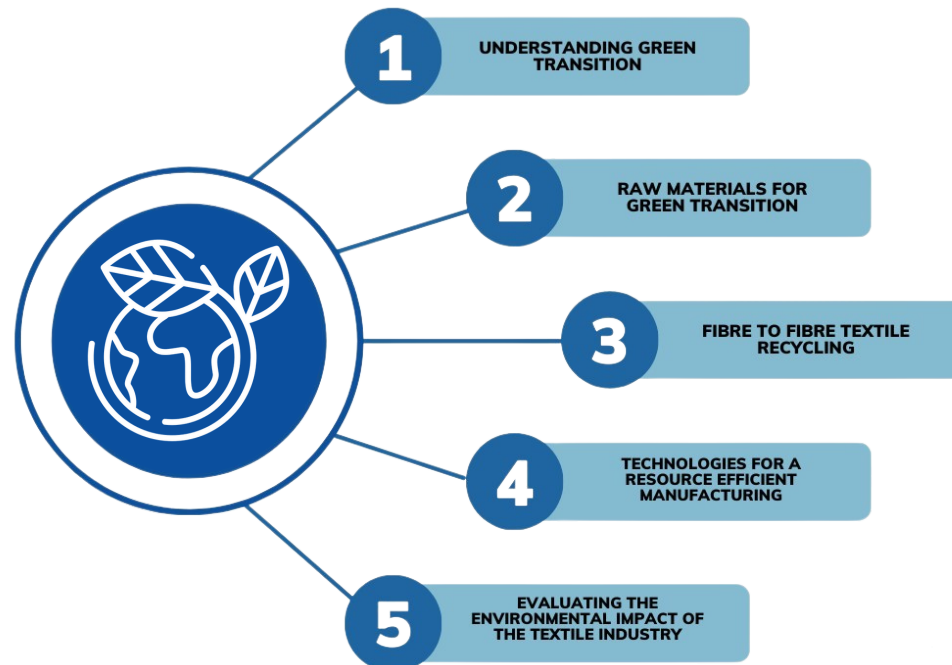
Green transition

Prerequisites

This course can be undertaken by industry professionals from different levels of education, as well as students and prospective industry workers. It should demand basic knowledge of the industry, supply chain and manufacturing processes.

Modules

This course covers, at different levels of complexity, key concepts of green transition in the textile industry and key elements enabling this process and measurement of environmental impact.





Learning paths for GREEN TRANSITION

Technicians and Graduates	Engineers and Professionals	Managers and Mentors
<p>Completing this module will be able to demonstrate knowledge of practical concepts of sustainable textile materials and technologies and tools to evaluate textiles' environmental impact.</p>	<p>Completing this module will be able to demonstrate deep knowledge of sustainable textile materials, technologies and tools to evaluate textiles' environmental impact to develop new textile products or processes that fulfil EU green policies.</p>	<p>Completing this module will be able to lead the implementation/adaptation of the textile materials and processes used in the textile industry to reduce the environmental impact and contribute to the green transition.</p>

LEARNING PATH FOR **TECHNICIANS AND GRADUATES**



UNITS OF LECTURES	MAIN TOPICS	OBJECTIVES	DETAILED TOPICS
ULO1 Understanding green transition	<ul style="list-style-type: none"> • Concepts of sustainability, circular economy and design for sustainability 	Design sustainable textile strategies	<ul style="list-style-type: none"> • Green transition concept • Basic terminology • EU Strategy for Sustainable and Circular Textiles
ULO2 Raw materials for green transition	<ul style="list-style-type: none"> • Types and main characteristics of sustainable textile materials 	Select sustainable textile materials	<ul style="list-style-type: none"> • Overview on new sustainable textile materials
ULO3 Fibre-to-fibre textile recycling	<ul style="list-style-type: none"> • Basics of the existing technologies for fibre-to-fibre recycling • Equipment for fibre-to-fibre recycling 	Identify the machinery and the main parameters to control for textile recycling	<ul style="list-style-type: none"> • Fibre-to-fibre recycling • Thermal recycling • Mechanical recycling • Chemical recycling
ULO4 Technologies for a resource-efficient manufacturing	<ul style="list-style-type: none"> • Emergent sustainable textile technologies 	Identify the machinery used for plasma, ozone and supercritical carbon dioxide technologies	<ul style="list-style-type: none"> • New technologies for a resource-efficient manufacturing • Plasma, ozone and supercritical carbon dioxide technologies applied to textile processes
ULO5 Evaluating environmental impact of the textile industry	<ul style="list-style-type: none"> • Most relevant environmental impacts along the value chain of the textile industry 	Conduct collecting and reporting input data for environmental assessment Use data visualisation tools	<ul style="list-style-type: none"> • Tools for environmental analysis • LCA and data gathering

LEARNING PATH FOR ENGINEERS AND PROFESSIONALS



UNITS OF LECTURES	MAIN TOPICS	OBJECTIVES	DETAILED TOPICS
ULO1 Understanding green transition. Concepts related with sustainability and circular economy	<ul style="list-style-type: none"> Eco-design strategies Environmental regulations and policies 	Apply eco-design strategies Use textile processes that align with the EU green policies	<ul style="list-style-type: none"> Green transition concept Design for sustainability EU Strategy for Sustainable and Circular Textiles Legislation & regulations
ULO2 Raw materials for green transition	<ul style="list-style-type: none"> Sustainable fibres Sustainable dyes and pigments, finishing and auxiliary products 	Use sustainable materials	<ul style="list-style-type: none"> Fibres Dyes & Pigments Finishing products Auxiliary products
ULO3 Fibre-to-fibre textile recycling	<ul style="list-style-type: none"> Technologies for fibre-to-fibre recycling 	Identify the best practices for fibre-to-fibre recycling	<ul style="list-style-type: none"> Fibre-to-fibre recycling Thermal recycling Mechanical recycling Chemical recycling
ULO4 Technologies for a resource-efficient manufacturing	<ul style="list-style-type: none"> Eco-friendly solvents and chemicals Plasma, ozone and supercritical carbon dioxide technologies 	Seek innovation in current textile processes	<ul style="list-style-type: none"> Wet processes avoiding harmful solvents or chemicals Plasma, ozone and supercritical carbon dioxide technologies applied to textile processes
ULO5 Evaluating environmental impact of the textile industry	<ul style="list-style-type: none"> Environmental impacts related to textile materials and processes LCA for textiles 	Identify the best practices for measuring environmental impact Use LCA for textiles	<ul style="list-style-type: none"> Environmental impact of raw materials and textile processes LCA and Life Cycle Inventories

LEARNING PATH FOR MANAGERS AND MENTORS



UNITS OF LECTURES	MAIN TOPICS	OBJECTIVES	DETAILED TOPICS
ULO1 Understanding green transition	<ul style="list-style-type: none"> Eco-design strategies EU strategies, regulations and legislation 	Seek innovation in the textile activity for its alignment with the EU policies	<ul style="list-style-type: none"> Green transition Design for sustainability EU Strategy for Sustainable and Circular Textiles Legislation & Regulations
ULO2 Raw materials for green transition	<ul style="list-style-type: none"> Advances on sustainable textile materials 	Use sustainable materials	<ul style="list-style-type: none"> Trends on sustainable fibres, dyes & pigments, finishing products and auxiliary products
ULO3 Fibre-to-fibre textile recycling	<ul style="list-style-type: none"> Existing technologies for fibre-to-fibre recycling 	Identify new recycling opportunities for textile products	<ul style="list-style-type: none"> Fibre-to-fibre recycling Thermal recycling Mechanical recycling Chemical recycling
ULO4 Technologies for a resource-efficient manufacturing	<ul style="list-style-type: none"> New trends in sustainable textile processes 	Promote sustainable textile processes	<ul style="list-style-type: none"> Trends on wet processes avoiding harmful solvents or chemicals Trends on plasma, ozone and supercritical carbon dioxide technologies
ULO5 Evaluating environmental impact of the textile industry	<ul style="list-style-type: none"> Environmental impacts of textile materials and processes LCA for optimisation of textile manufacturing 	Identify the processes with higher impacts to propose alternative solutions	<ul style="list-style-type: none"> Environmental impact of raw materials and textile processes LCA reports Traceability



3 MOOC training

In an era of continuous changes and adoption of new technologies and concepts, there is an increasing need for the textile sector to fill their educational gaps and improve their knowledge and skills. The courses developed in the framework of ADDTEX are an excellent tool to improve these skills.

Each course comprises 5 units/lectures for each profile of trainees. All lectures are based on video tutorials (accessible through smartphone, computer or tablet) equivalent to 1h student study time (average 15 mins video lectures, 15 mins course materials and 30 mins self-study) which result in learning outcomes in terms of skills and knowledge. They are completed with quizzes and case studies. Each course may be stand alone or combined into larger credentials. They can easily be aligned to National Qualification Frameworks (NQFs) and the European Qualifications Framework (EQF) thanks to the defined level standards for describing learning outcomes. Each module has a knowledge acquisition assessment test which leads to certification.



Technicians & Graduates

Technicians & Graduates - Smart, digital and green paths

Identification of the learner

Technical VET or Bachelor students, graduates or workers with basic knowledge in textile technology, engineering or design, garment production, chemical engineering and processes, process technology or similar.

Prerequisites needed to enroll in the learning activity

Basic knowledge of industry and business terminology, logistics, supply chains and related technologies. Familiarity with e-learning environments and computer assisted courses. Basic IT and digital skills.

National workload needed to achieve the learning outcomes (in ECTS credits, where possible)

The short course consists of 5 lessons for a total of 5 hours of learning. Each lesson lasts 1 hour student time:
15 mins video lectures / 15 mins course materials / 30 mins self-study
Multiple Choice Quizzes (MCQ) after each unit + Case study as final assessment
Lecture – Video based (MOOC) - Online supporting materials

Occupations related / Work / professional environment

Textile industry technical occupations like textile chemist, textile dyer, textile printer, textile designer, textile technologist, textile colorist, textile quality technician, textile dyeing technician, clothing technologist, clothing CAD patternmaker or similar.

Estimated EQF level associable

Level 4-5



Engineers & Professionals

Engineers & Professionals - Smart, digital and green paths

Identification of the learner

Engineer students, graduates or workers with advanced knowledge in textile technology, engineering or design, garment production, chemical engineering and processes, process technology and similar.

Prerequisites needed to enroll in the learning activity

Advanced knowledge of industry and textile materials and processes.

National workload needed to achieve the learning outcomes (in ECTS credits, where possible)

The short course consists of 5 lessons for a total of 5 hours of learning. Each lesson lasts 1 hour student time:
15 mins video lectures / 15 mins course materials / 30 mins self-study
Multiple Choice Quizzes (MCQ) after each unit + Case study as final assessment
Lecture – Video based (MOOC) - Online supporting materials

Occupations related/
Work/professional environment

Textile industry occupations like textile engineer, textile researcher, textile product developer, textile designer or similar

Estimated EQF level associateable

Level 5-6



Managers & Mentors

Managers & Mentors - Smart, digital and green paths

Identification of the learner

Industrial, Bachelor or MBA students or graduates or experienced workers in textile manufacturing or textile technology and processes.

Prerequisites needed to enroll in the learning activity

Experience in textile industry management.

National workload needed to achieve the learning outcomes (in ECTS credits, where possible)

The short course consists of 5 lessons for a total of 5 hours of learning. Each lesson lasts 1 hour student time:
15 mins video lectures / 15 mins course materials / 30 mins self-study
Multiple Choice Quizzes (MCQ) after each unit + Case study as final assessment
Lecture – Video based (MOOC) - Online supporting materials

Occupations related/
Work/professional environment

Textile industry manager, textile quality manager, textile development manager, product owner, textile specialist and similar occupations.

Estimated EQF level associable

Level 5-6



Assessment

Quizzes

Multiple-choice tests are included at the end of each video lecture. Fulfilment of these tests is required to obtain the certification in the form of micro-credential. A minimum of 80% correct answers need to be completed to achieve the certification.

Case studies

Case studies complement the video lectures. Each case study presents a description of the case; an activity for the learner and some questions to evaluate the fulfilment of the task. Work on case studies is also a requirement to obtain the certification (micro-credential).

Course materials

Each module has its own course materials. The course materials include extra information, links and resources related to the main topic of the lesson. The certification doesn't include this part.

Micro-credentials

The concept of micro-credentials

Micro-credentials certify the learning outcomes of short-term learning experiences, for example a short course or training. They offer a flexible, targeted way to help people develop the knowledge, skills and competences they need for their personal and professional development.

On 16 June 2022, the Council of the European Union (EU) adopted a recommendation on a [European approach to micro-credentials](#) for life long learning and employability. The recommendation seeks to support the development, implementation and recognition of micro-credentials across institutions, businesses, sectors and borders.

Micro-credentials in ADDTEX

In the Smart, Digital and Green Skills Academy, the approach of micro-credentials has been introduced to make the learning experience flexible and modular. Micro-credentials make possible the targeted acquisition of knowledge, skills and competences to tackle current challenges and allow textile professionals to fill the skill gaps they need to succeed in a fast-changing environment, while not replacing traditional qualifications.

Micro-credentials will be released to the users upon completion of each module and related assessment test.



4 E-learning platform



Introduction

The e-learning platform developed for the ADDTEX project is based on a market-leading Learning Management System (LMS). It enables the complete management of all aspects of an online learning environment, such as lessons, videos, reading material, assessment, scores and certification. It is a standalone and autonomous learning system, in the sense that it does not need any manual assessment and marking from instructors, so learners get their results as quickly as they progress in the courses. It also integrates seamlessly with the ADDTEX website, following the same visual identity and structure.

All courses in ADDTEX are made available for free, only demanding the creation of a user login and password from the learner. Users will have lifetime access to the courses, so they have no deadline to complete a course once they have started it, as well as keeping their access to all the available material even after completion.

Contents

The ADDTEX e-learning platform hosts the nine courses proposed by the ADDTEX project: the three topics (Smart, Digital and Green) aimed at the three target groups each, as explained in Chapter 4. Each course has a main page, where the most relevant information about them are gathered. The learner can access a short overview of the course, the complete curriculum and the list of instructors for the course on this main page.

The screenshot shows the main page of the 'Smart Transition for Technicians and Graduates' course on the ADDTEX platform. The page features a blue header with the ADDTEX logo and navigation links (Home, About, Resources, Courses, HUBS, Contact us). Below the header, there is a breadcrumb trail: Home > All Courses > Technicians and Graduates > Smart Transition for Technicians and Graduates. The main content area has a blue background with the course title 'Smart Transition for Technicians and Graduates' and a sub-header 'Smart Transition | Technicians And Graduates'. A progress bar shows 'Lifetime Access', 'All Levels', '5 Lessons', '3 Quizzes', and '4 Students'. A 'Continue' button is visible, along with progress indicators: 'Lessons completed: 0/5', 'Quizzes finished: 0/5', and 'Course progress: 0%'. The 'Overview' tab is selected, displaying an 'IMPORTANT!' notice and a list of topics: 'Smart textile: Introduction and challenges', 'Innovations linked to smart/intelligent textiles', 'Integration of technologies to develop composites and electronic textiles', 'Resource efficient textile technologies for smart and functional textiles', and 'Innovations linked to functional textiles'. A note at the bottom states: 'After each module (ULO) there will be a short quiz. You must get a score of 80% or higher on the quizzes to earn your certificate. Enjoy!'

Figure 1: The main page for the "Smart Transition for Technicians and Graduates" course, where the "Overview" tab can be seen.

The “Curriculum” tab on this page will show the titles of the units of that course, as well as the titles for the items in each unit, such as videos, quizzes, or any other material. Any item that is not accessible yet, either because the learner is not registered or because they have not reached this stage of the course yet, will show up as still locked in this page.

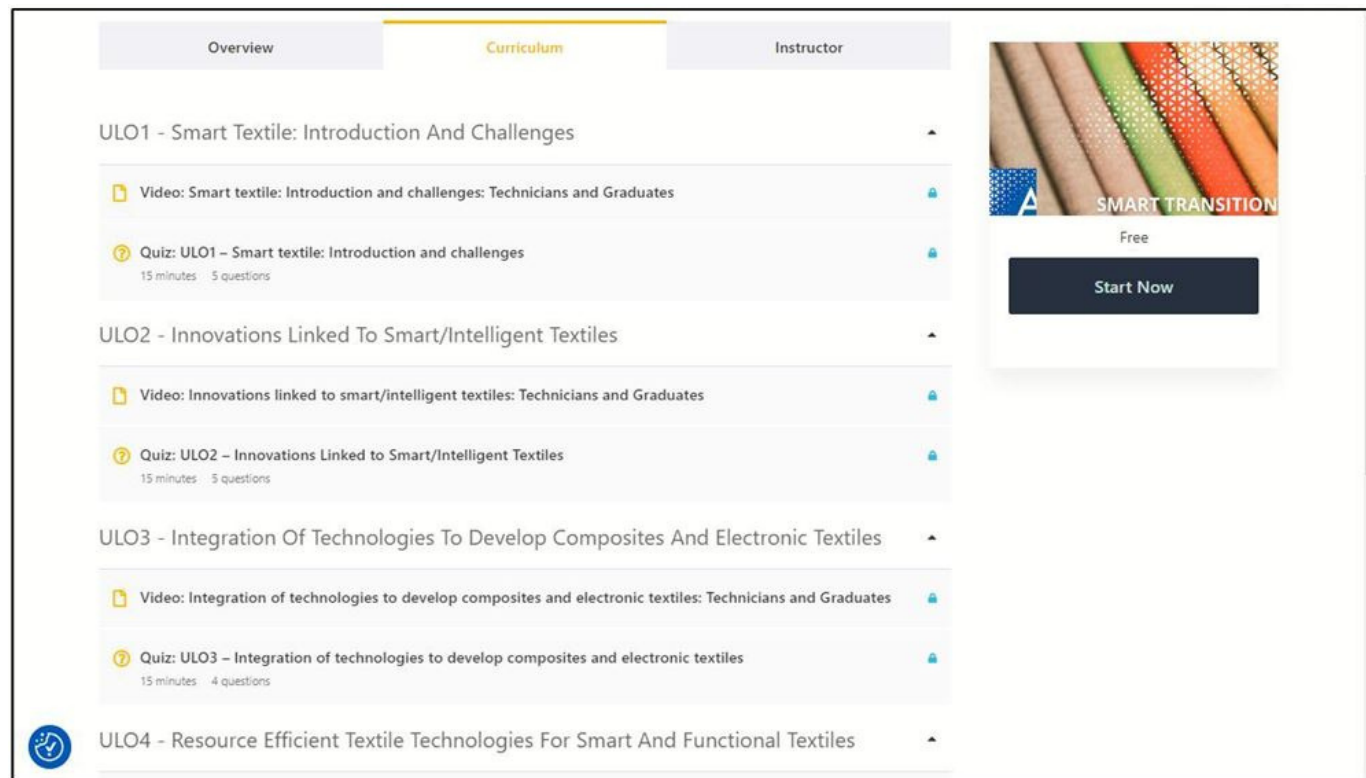


Figure 2: An example of the “Curriculum” tab, where all the contents are still locked, since the user is not registered yet.

The next tab, "Instructor", will bring the information about the instructors that have developed or presented each one of the courses. The learner will be able to see a picture of each instructor, as well as a short bio.

The screenshot displays the 'Instructor' tab of a course interface. At the top, there are three tabs: 'Overview', 'Curriculum', and 'Instructor', with 'Instructor' being the active tab. Below the tabs, the 'Addtex Learning' logo is visible. The main content area is divided into two columns. The left column features a profile for Mohammad Neaz Morshed, including a circular portrait and a detailed biography. The right column features a profile for Rosa Maria Silva, including a circular portrait and a detailed biography. To the right of these profiles is a course card for 'SMART TRANSITION', which includes a colorful image of fabric, the text 'SMART TRANSITION', the word 'Free', and a 'Start Now' button. A small circular icon is located in the bottom left corner of the interface.

Overview Curriculum **Instructor**

Addtex Learning

Mohammad Neaz Morshed
Dr. Mohammad Neaz Morshed is a researcher in Textile Materials Technology, currently affiliated with the Swedish School of Textiles at the University of Borås. Dr. Morshed also serves as the program coordinator for the WE-TEAM international master's program in Textile Technology at the University of Borås, demonstrating his commitment to advancing education in this field. His teaching responsibilities encompass a range of subjects, including Textile Chemistry and Textile Biotechnology for master's students, as well as Textile Fibers and Circular Textiles for bachelor's students. Dr. Morshed is an expert in functional and smart textiles involves the modification and enhancement of textile surfaces to confer specific properties, such as catalytic activity, water repellency, flame resistance, and antimicrobial activity. Dr. Morshed excels in the integration of advanced technologies and biocatalysts (enzyme) into fabrics.

Rosa Maria Silva
Has a degree in Chemistry from Oporto University (1986-1990), and 30 years of textile dyeing and finishing experience in consultancy, training, and R&D projects (national and European) as coordinator or team member namely Multicoated Textile, 2nd DERMIS, Functional textiles as a way of preventing and controlling diseases; DERMATERRY - Development terry towel functional textiles, ALGO.NATURE and PICASSO -natural dyes extracted from plants, vegetables and mushrooms , GOBLUE, ON-LINE COLOUR and TEXBOOST. She has also participated in several working groups dedicated to standardization, colorimetric and sustainable issues

SMART TRANSITION
Free
Start Now

Figure 3: An example of the "Instructor" tab, where information about the instructors for each course can be seen.

User tutorial

This section will provide a tutorial on how to use the e-learning platform, from registration to obtaining a certificate for the course.

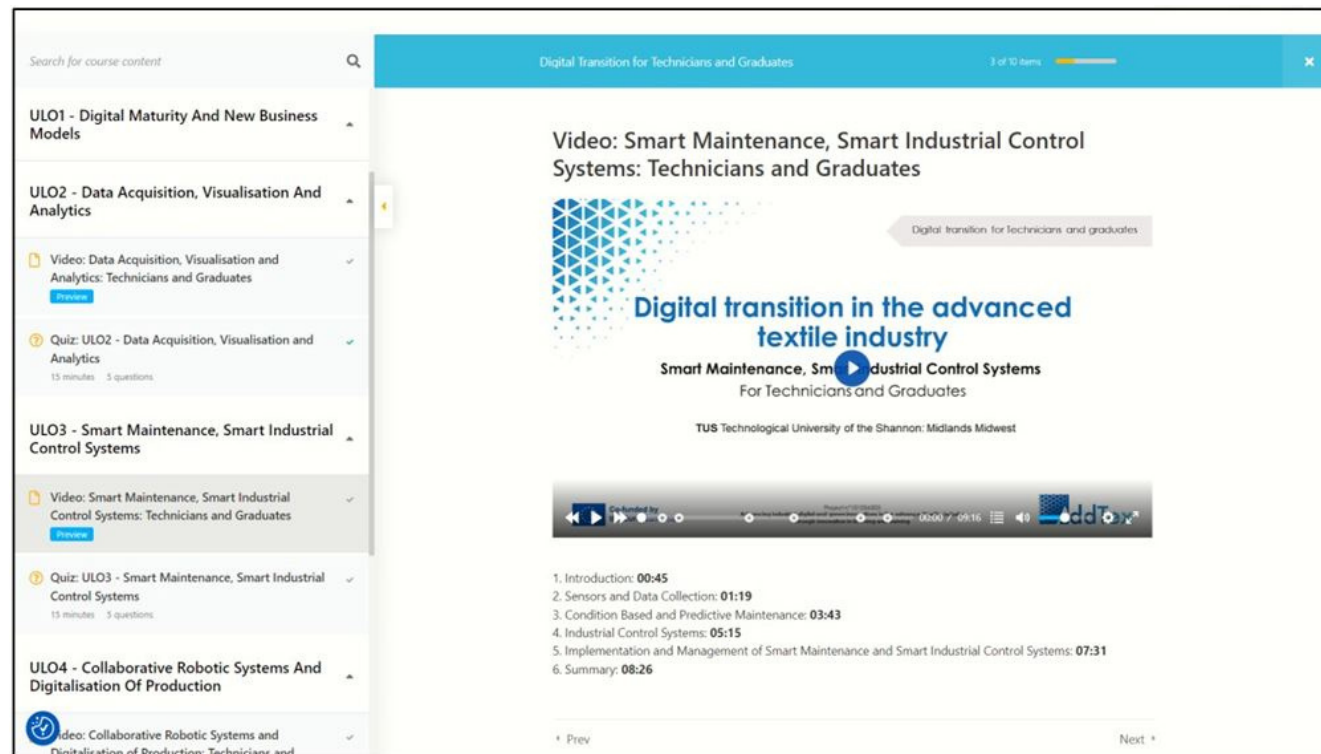


Figure 4: The interface of the e-learning platform showing a video lesson, as well as the content menu on the left.

Choosing a course

The learner is able to choose a course from the ADDTEX learning platform by clicking on the “Courses” tab on the main menu, at the top of the main page. From this main landing page, the learner will be able to pick any of the three learner profiles that best suits them, and then one of the three major topics within their expertise level: Smart, Digital or Green Transition.

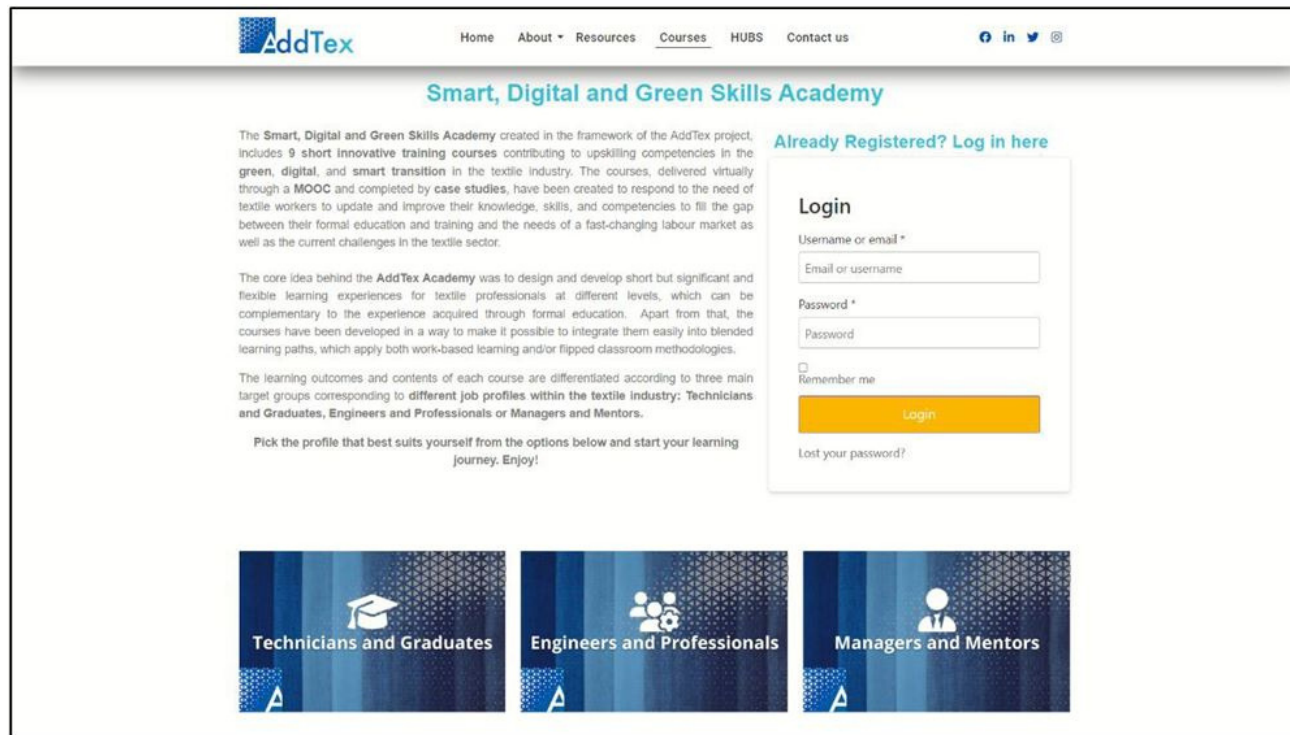


Figure 5: The landing page for the courses, where the learner can choose their profile.

Subsequently, clicking on any of the icons will bring them to the main page of the chosen course.

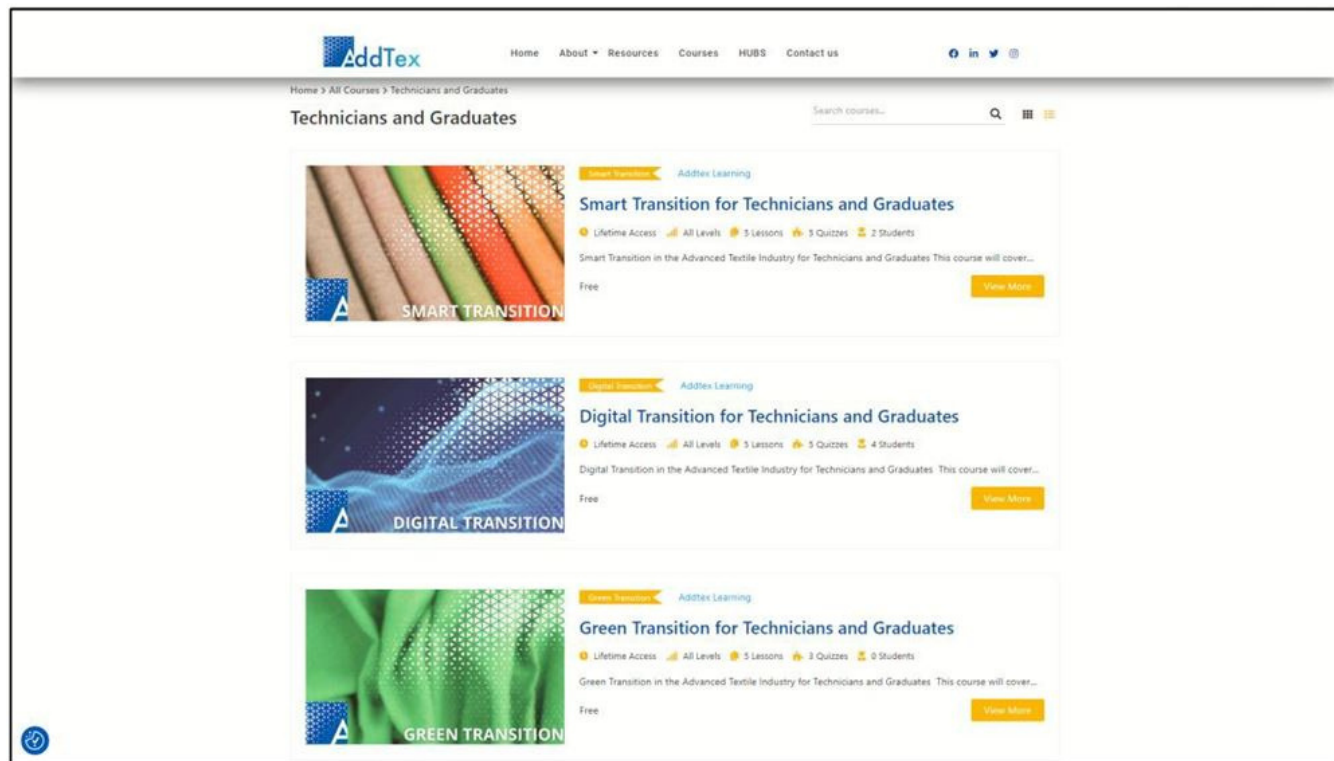
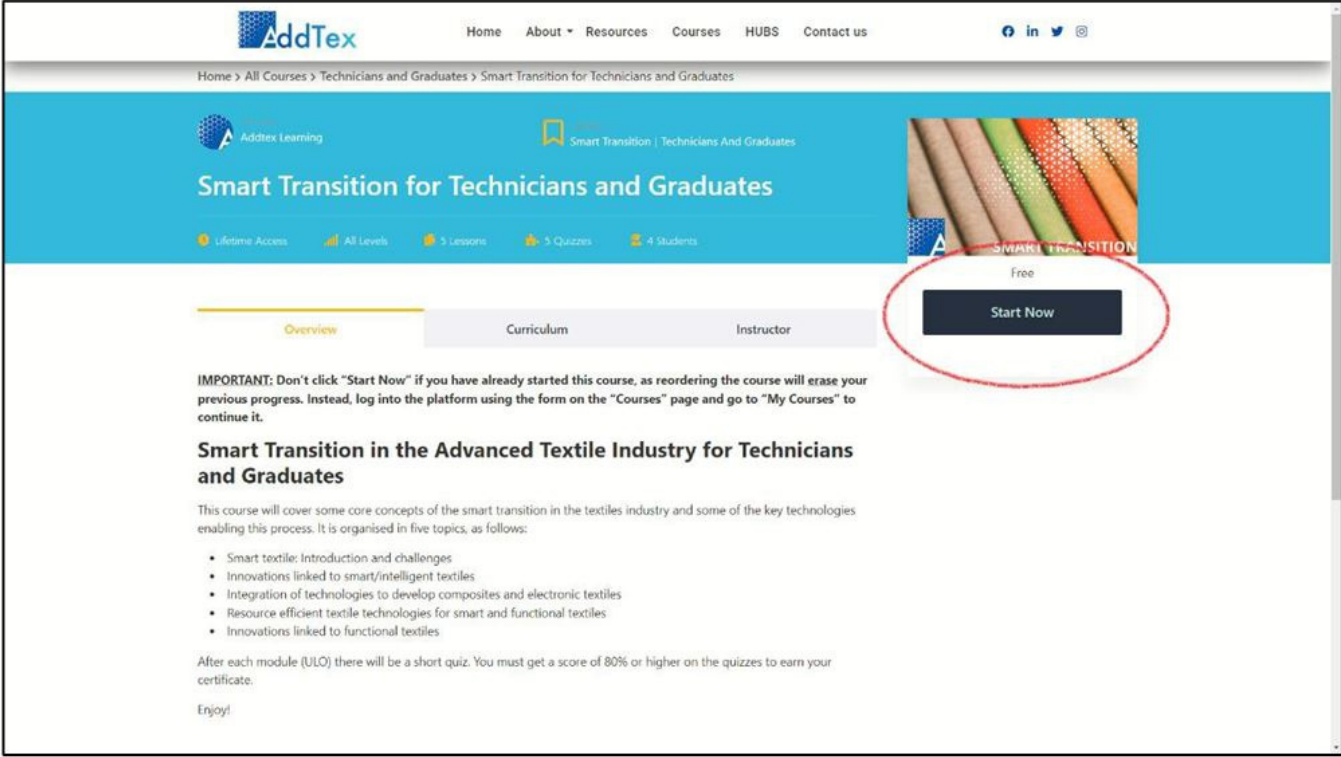


Figure 6: The list of courses available for the "Technicians and Graduates" profile.

Enrolling the first course

Once the learner has chosen one of the courses, the next step is to create login credentials and enrol themselves in that course. This can be done by clicking on the “Start Now” button at the top right corner of the main page of a given course.



The screenshot shows the AddTex website interface for a course titled "Smart Transition for Technicians and Graduates". The page features a blue header with the AddTex logo and navigation links (Home, About, Resources, Courses, HUBS, Contact us). Below the header, there is a blue banner with the course title and a "Start Now" button. The button is highlighted with a red circle. Below the banner, there is a section with tabs for "Overview", "Curriculum", and "Instructor". The "Overview" tab is selected. The main content area contains an "IMPORTANT" notice, the course title, a brief description, and a list of bullet points. The "Start Now" button is located in the top right corner of the main content area.

Home > All Courses > Technicians and Graduates > Smart Transition for Technicians and Graduates

Smart Transition for Technicians and Graduates

Free

Start Now

IMPORTANT: Don't click "Start Now" if you have already started this course, as reordering the course will erase your previous progress. Instead, log into the platform using the form on the "Courses" page and go to "My Courses" to continue it.

Smart Transition in the Advanced Textile Industry for Technicians and Graduates

This course will cover some core concepts of the smart transition in the textiles industry and some of the key technologies enabling this process. It is organised in five topics, as follows:

- Smart textile: Introduction and challenges
- Innovations linked to smart/intelligent textiles
- Integration of technologies to develop composites and electronic textiles
- Resource efficient textile technologies for smart and functional textiles
- Innovations linked to functional textiles

After each module (ULO) there will be a short quiz. You must get a score of 80% or higher on the quizzes to earn your certificate.

Enjoy!

Figure 7: Course main page, with the “Start Now” button highlighted.

When it is the first time a learner is enrolling in a course, they should click the “Sign up” link right below the login form, highlighted in the following screenshot:

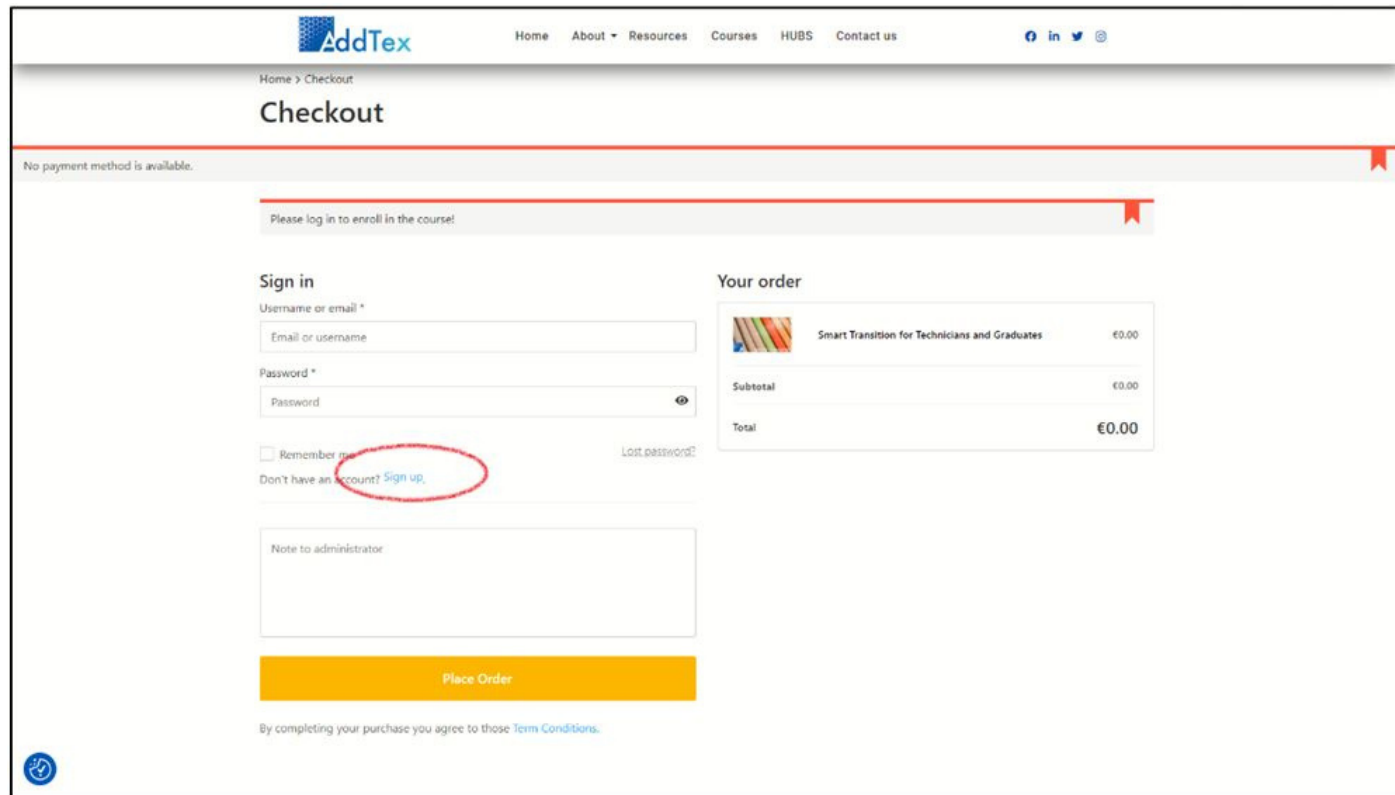
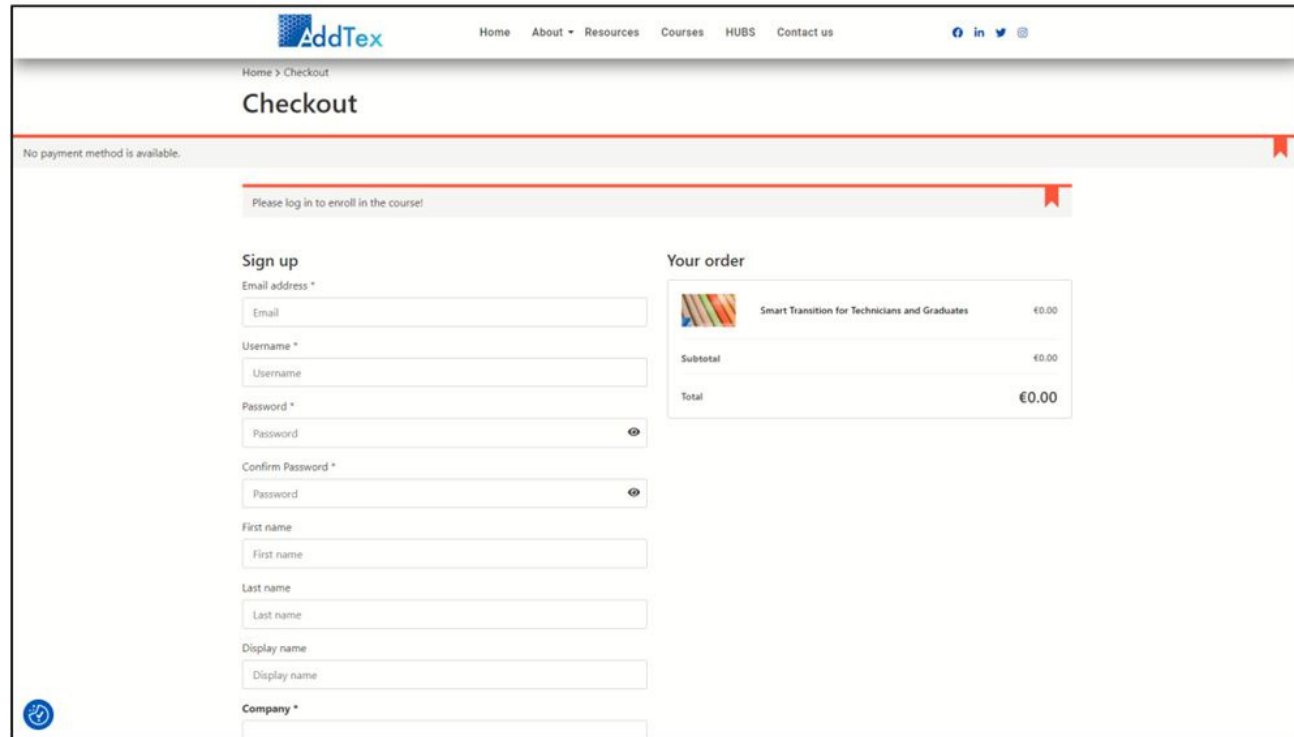


Figure 8: The “Checkout” screen when enrolling into a course, with the “Sign up” option highlighted for first-time users.

The sign-up form will show up for the user, where they can enter their personal details.



The screenshot shows the AddTex checkout page. At the top, there is a navigation bar with the AddTex logo and links for Home, About, Resources, Courses, HUBS, and Contact us. Below the navigation bar, the page title is "Checkout". A red banner at the top of the main content area reads "No payment method is available." Below this, another red banner says "Please log in to enroll in the course!". The main content area is divided into two sections: "Sign up" and "Your order".

Sign up

Email address *

Email

Username *

Username

Password *

Password

Confirm Password *

Password

First name

First name

Last name

Last name

Display name

Display name

Company *

Company

Your order


	Smart Transition for Technicians and Graduates	€0.00
Subtotal		€0.00
Total		€0.00

Figure 9: The sign-up form, to be filled when the learner is enrolling in a course for the first time.

IMPORTANT: Make sure to fill in your First Name, Last Name and Display Name properly in the form, as these will be used in the certificate of completion for the course. "Display Name" should be your full name (first name followed by surname(s)).

Once the form is filled, the learner should click on the “Place Order” button at the bottom of the page to submit their details. This will lead them to a confirmation page, depicted in the following figure.

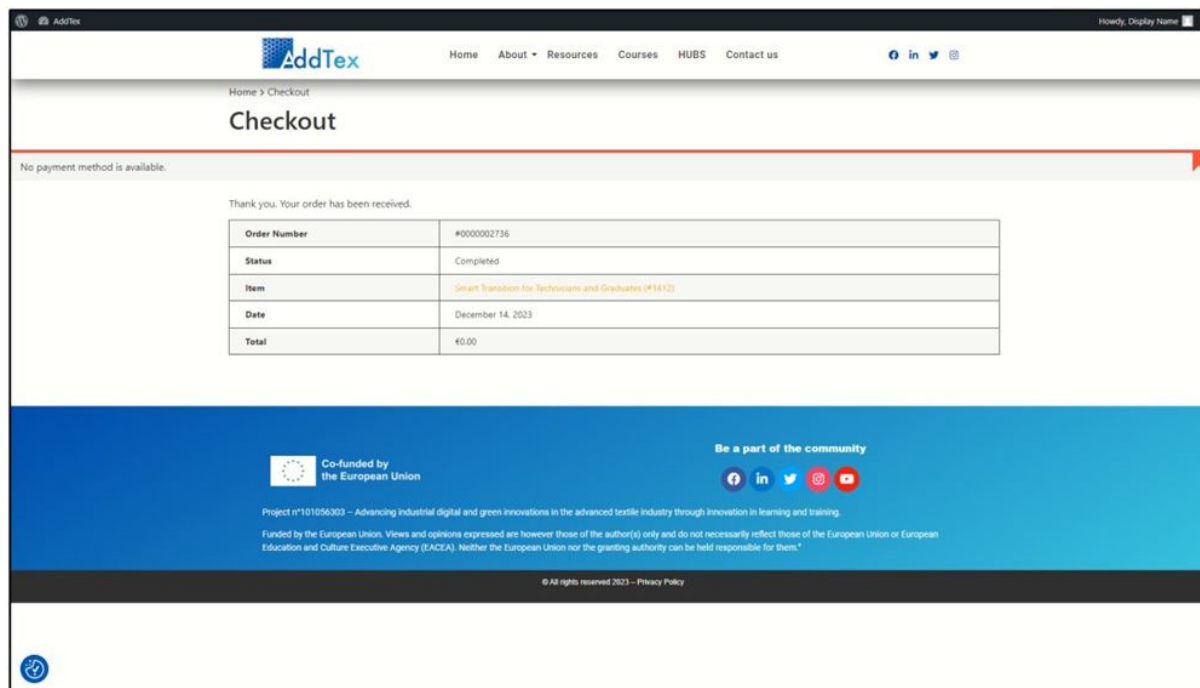


Figure 10: The confirmation page for the course enrolment.

Clicking on the name of the course (in orange) on this page will bring the learner to its main page. Now that the learner is logged in, and enrolled into that course, the “Start Now” button is gone and a “Continue” button takes its place, as well as statistics about their course progress. A black bar can also be seen at the top of the screen, meaning that the user is logged in. Clicking on the “Howdy <Display Name>” will show the “Edit Profile” and “Log Out” options.

The screenshot shows the AddTex website interface. At the top, there is a navigation bar with the AddTex logo, a user profile dropdown (Howdy, Display Name), and links for Home, About, Resources, Courses, HUBS, and Contact us. Below the navigation bar, a breadcrumb trail reads: Home > All Courses > Technicians and Graduates > Smart Transition for Technicians and Graduates. The main content area features a blue header with the course title 'Smart Transition for Technicians and Graduates' and a 'Continue' button. To the right of the header, there is a progress summary box showing: Lessons completed: 0/5, Quizzes finished: 0/5, and Course progress: 0%. Below the header, there are three tabs: Overview (selected), Curriculum, and Instructor. The Overview tab contains an important notice: 'IMPORTANT: Don't click "Start Now" if you have already started this course, as reordering the course will erase your previous progress. Instead, log into the platform using the form on the "Courses" page and go to "My Courses" to continue it.' The main heading is 'Smart Transition in the Advanced Textile Industry for Technicians and Graduates'. The text below states: 'This course will cover some core concepts of the smart transition in the textiles industry and some of the key technologies enabling this process. It is organised in five topics, as follows:'. A bulleted list follows: 'Smart textile: Introduction and challenges', 'Innovations linked to smart/intelligent textiles', 'Integration of technologies to develop composites and electronic textiles', 'Resource efficient textile technologies for smart and functional textiles', and 'Innovations linked to functional textiles'. At the bottom of the overview, it says: 'After each module (ULO) there will be a short quiz. You must get a score of 80% or higher on the quizzes to earn your certificate. Enjoy!'

Figure 11: The main page of a course when the learner is logged in.



Continuing a course after enrolment

When a learner has already enrolled themselves in a course, the path to access its contents is slightly different, since now they can just use the platform login form. They can do so by clicking the “Courses” tab on the main menu, and the login form will be available in case they are not logged in yet (see Figure 5). Logging into the platform brings them to the profile page, where they can see and edit their personal information, as well as the list of courses they are currently enrolled in.

Clicking in any of the courses on the “My Courses” list will allow the learner to continue their progression that course. They can also browse all the other courses available by clicking on the link to the “Courses” page at the top.

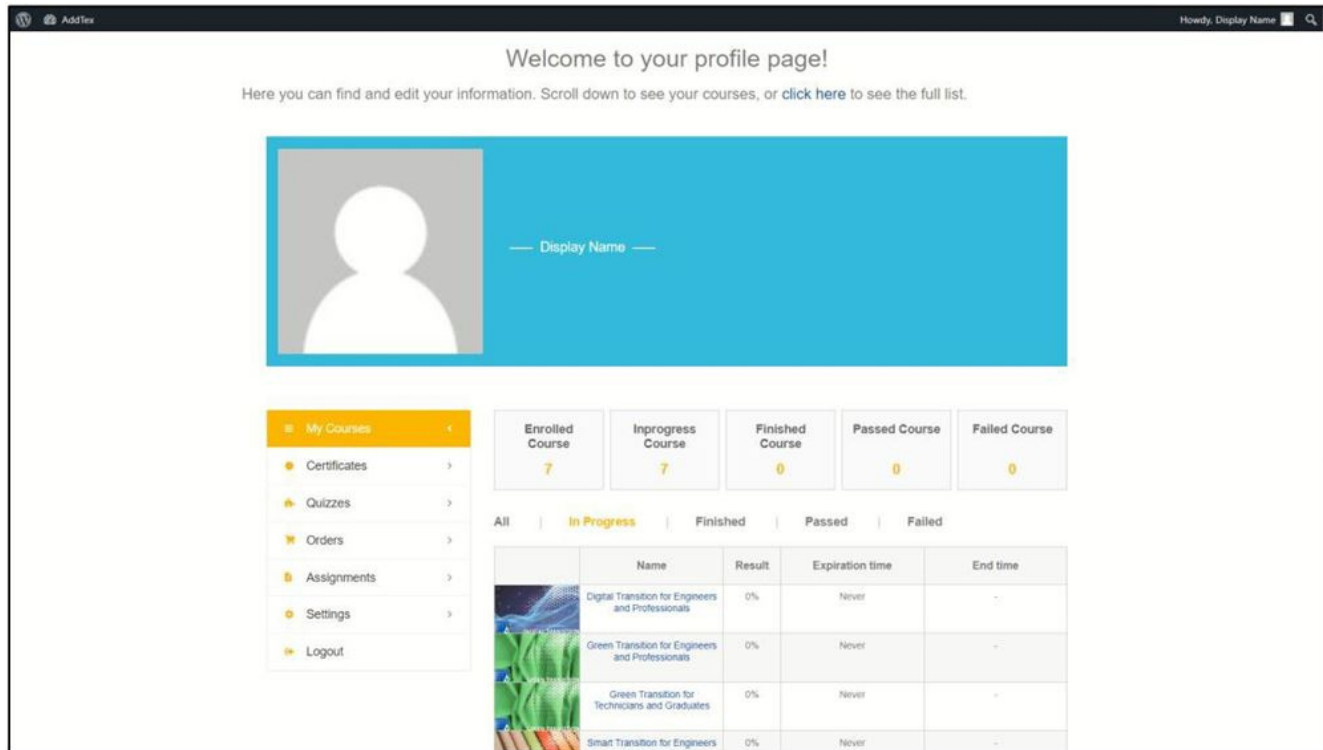
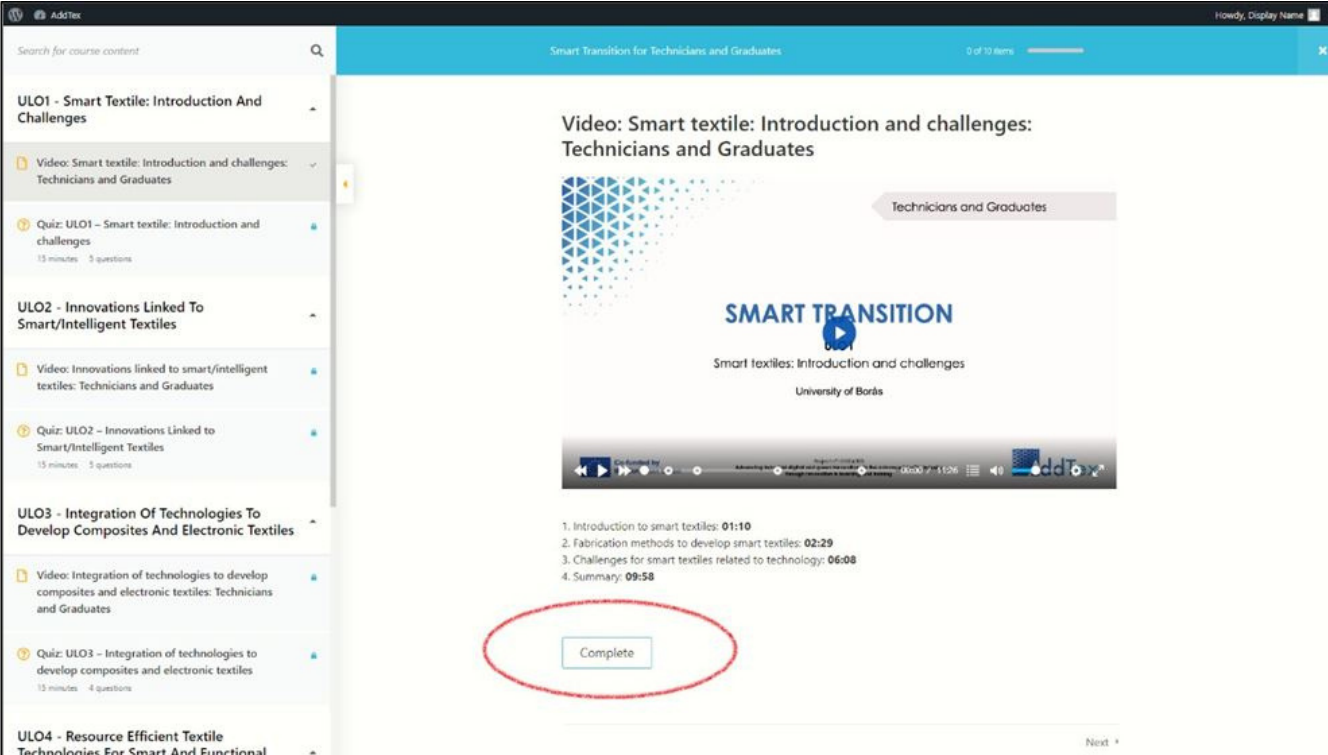


Figure 12: A screenshot from the user profile page.

IMPORTANT: Don't click "Start Now" in a course that you have already started, as reordering the course will erase your previous progress. Instead, log into the platform using the form on the "Courses" page and go to "My Courses" to continue it.

Watching video lessons

Once the learner is logged in and enrolled in the course, they can start watching the video lessons and taking the quizzes in sequence. The following topic or content in the course will not be available unless the current one is finished. All courses have at least one video lesson and one quiz for each ULO.



The screenshot shows the 'Smart Transition for Technicians and Graduates' course interface. The sidebar on the left lists four ULOs (ULO1 to ULO4) with their respective video lessons and quizzes. The main content area displays the video player for 'Video: Smart textile: Introduction and challenges: Technicians and Graduates'. Below the video player, there is a list of video segments with their durations: 1. Introduction to smart textiles: 01:10, 2. Fabrication methods to develop smart textiles: 02:29, 3. Challenges for smart textiles related to technology: 06:08, 4. Summary: 09:58. At the bottom of the page, a 'Complete' button is highlighted with a red oval.

Figure 13: The video lesson interface, with a highlight on the "Complete" button.

IMPORTANT: After finishing watching a video, the learner should click the "Complete" button at the bottom of the page, so they can have access to the next piece of content in the course.

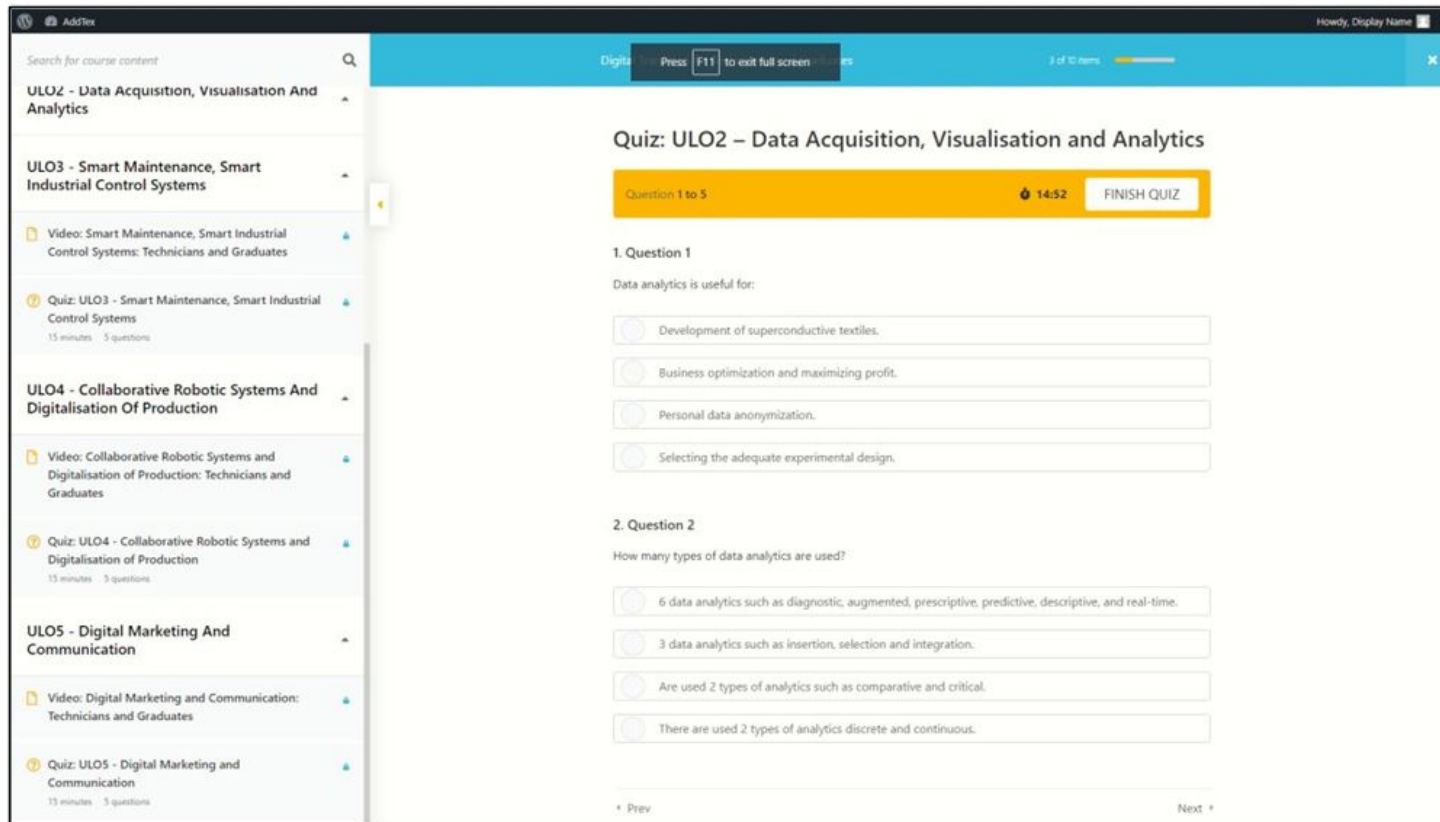


Figure 14: Example of a quizz interface.

The screenshot displays the AddTex learning management system interface. On the left, a sidebar lists four units: ULO1 - Digital Maturity And New Business Models, ULO2 - Data Acquisition, Visualisation And Analytics, ULO3 - Smart Maintenance, Smart Industrial Control Systems, and ULO4 - Collaborative Robotic Systems And Digitalisation Of Production. Each unit includes a video and a quiz. The main content area shows the results for the 'Quiz: ULO1 – Digital Maturity and New Business Models'. A large yellow circle indicates a 100% completion rate, with 80% of the circle filled. Below this, a green bar says 'Passed' with a checkmark. A table of statistics is shown:

Time spent	00:01:42
Points	5 / 5
Questions	5
Correct	5
Wrong	0
Skipped	0
Minus points	0

Buttons for 'Retake (2)' and 'Review' are visible below the table. At the bottom, there are 'Prev' and 'Next' navigation arrows.

Figure 15: Example of the quizz interface once the quizz is successfully done.

Completing the course

After the mandatory parts of the quizz are completed, a certificate is automatically issued, certifying that the student has finished the MOOC.



Figure 16: Example of certificate.



5

ANNEX 1: abbreviations and boundaries

Abbreviations

HEIs	Higher Educational Institutes
MOOC	Massive Open Online Courses
ULO	Unit Learning Outcomes
VET	Vocational Education and Training
VUCA	Volatile, uncertain, complex, and ambiguous
WP	Work Package

Boundaries

Limitation and boundaries of the contents discussed in the e-book

The range of methodologies employed, successfully unearthed complex challenges facing the textile industry in relation to sustainable practices and circularity, smart systems and digital tools and technologies innovating the sector. The knowledge imparted in the training courses is based on the findings from 2022.

This e-book has been designed using images from Flaticon.com





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