

# CIRCULARTECH24

## HIGHER TECHNICIAN FOR CIRCULAR ECONOMY IN PROCESSES AND PRODUCTS

<https://www.itsprime.it/corsi-itsprime/circulartech24/>

**The course is fully funded under Mission 4 - Component 1 Investment 1.5 of PNRR - Strengthening the training offer of the "ITS Academy".**

**Free for participants.**

The ITS Prime Foundation has also provided for the award of **Scholarships** on the basis of merit and income. The terms and criteria for allocation and disbursement will be defined and communicated to students attending with appropriate notices and regulations.

### **Type of course:**

Two-year course in higher education.

### **Teaching location:**

the course will take place mainly at the ITS PRIME locations in **Lucca**. Some of the activities may be held in the technological laboratories of the Universities, Companies and Entities that collaborate with the ITS Prime Foundation. They may also be held occasionally in structures of educational or scientific interest located elsewhere. The internships may take place in companies located in any part of the regional, national and/or European territory.

**Registration deadline:** 18th October 2024, 11pm.

### **Type of final Diploma:**

Diploma in " HIGHER TECHNICIAN FOR DESIGN AND ADVANCED MECHATRONIC PRODUCTION" (Ambito 6.1 - Sviluppo e innovazione del processo e del prodotto - Figura 6.1.1 dell'allegato 1 – DM 203 del 20.10.2023) with indication of specialization of the course in "**HIGHER TECHNICIAN FOR CIRCULAR ECONOMY IN PROCESSES AND PRODUCTS**" with the certification of the competences corresponding to the **European Qualifications Framework for lifelong learning (EQF) level 5** and constitutes a qualification for access to public competitions pursuant to Art. 5, paragraph 7, of the D.P.C.M 25 January 2008.

### **Entry requirements:**

possession of secondary school diploma or after the 4-year Diploma of Vocational Education and Training (VET) integrated by a one-year Higher Technical Education and Training



(IFTS) course;

age between **18 to 35 years** old (not completed on the call deadline date);

basic skills in English and ICT.

Female candidates and/or candidates belonging to disadvantaged categories who have been successful in the selection process will be automatically admitted to participate in the course as trainees, up to the limit of the number of places allocated to them (50% of places to women, 7% to disadvantaged categories in accordance with the provisions of Law 68/1999).

**Type of access:**

classes can be made up of a **minimum number of 20 students** as required by current national regulations on the matter and a **maximum of 25 students**.

**Selection mode**

The selection of participants includes:

curricular evaluation by qualifications and experiences,  
a written test,  
a motivational interview.

**Method of enrollment:**

see link: <https://www.itsprime.it/corsi-itsprime/circulartech24/>

**Methods of recognition of previous training courses:**

The student at the time of enrollment may request the recognition of training courses, formal or non-formal, producing the documentation that attests them. The request is submitted to the Scientific Technical Committee that evaluates the coherence of the previous training courses with the Training Units and the modules of the course that the student is going to attend. On this basis the Scientific Technical Committee indicates which modules can be recognized as already learned by the student. Requests for recognition of training credits received after the selection date will not be evaluated.

**Course Objectives**

The course “CIRCULARTECH24 - SUPERIOR TECHNICIAN OF CIRCULAR ECONOMICS IN PROCESSES AND PRODUCTS” trains professionals specialized in the sustainable management of production processes, optimizing the use of resources, promoting recycling and reducing waste.



The skills acquired range from the application of innovative technologies to the design of eco-friendly processes and products.

### **Main job opportunities**

Environmental sustainability and quality control manager  
Designer of sustainable production processes  
Energy manager.

### **Didactic plan**

The two-year course, of 2000 hours in total, takes place in 4 semesters with a didactic articulation that provides:

classroom lessons and laboratory activities (1160 hours),  
internship, in Italy and abroad (840 hours). Any foreign internships are carried out with the European Erasmus+ programme.

Lesson time: **Monday to Friday with a weekly commitment of 35-40 hours**. Interruptions in teaching activities will be planned for holidays, summer and winter vacations.

The entire training course is carried out in close connection with the mechanic sector companies. The teaching team is composed of at least 70% of experts from the world of production, professions and work with a specific professional experience in the field. In particular is involved the staff of the companies, partners of ITS Prime Foundation.

Teachers from the School, University, Research Centres and Vocational Training will also be involved. Seminars, testimonies of key protagonists in the sector and visits to fairs, events, companies and installations of particular interest will complete the path of studies.

### **Possibility of access to further studies**

The diploma may be integrated into a subsequent university course, with recognition of university credits (CFU) on the basis of the didactic regulations of the individual universities. In this regard, please refer to the regulations in force.

### **Regulations for the conduct of exams and other forms of school profit assessment**

Each ITS PRIME course is biennial and consists of Training Units, divided into Didactic Modules.

At the end of each Didactic module, a 100-scale assessment is planned. For the modules with many hours of lessons, intermediate verifications are foreseen. Students, after having attended the course for at least 80% of the total hours of lessons, and having obtained in all the Didactic modules at least 60/100, are admitted to the final exam. The exam consists of technical-practical tests and an interview.



## ***Course structure***

### ***Training Units and Teaching Modules***

#### **UFC 1 - EMPOWERMENT E TEAM BUILDING**

- 1.1 Outdoor Training (in ambiente esterno)
- 1.2 Laboratorio di Self Empowerment e Team Building
- 1.3 Problemsetting and solving - decision making - time management

#### **UFC 2 - ORIENTATION TOWARDS WORK AND ENTERPRISE**

- 2.1 The enterprise and the employment relationship (contracts)
- 2.2 Company organisation and organisation charts
- 2.4 Supply Chain Management

#### **UFC 3 - LANGUAGE SKILLS**

- 3.1 English Theory
- 3.2 English Laboratory
- 3.3 Technical English

#### **UFC 4 - QUALITY, SAFETY AND ENVIRONMENT**

- 4.1 Quality policies in the use of processes (ISO 9001)
- 4.2 Safety and accident prevention in the workplace (high risk)
- 4.3 Green enterprise; iso 14000, sustainability and eco-compatibility of industrial production

#### **UFC 5 - FUNDAMENTALS OF CIRCULAR ECONOMY**

- 5.1 Introduction to the Circular Economy
- 5.2 Principles and Key Concepts of the Circular Economy
- 5.3 Circular Business Models in the Paper Industry
- 5.4 Tools and Methodologies for Implementing the Circular Economy
- 5.5 Successful Case Studies in the Paper Industry

#### **UFC 6 - DESIGN FOR CIRCULARITY**

- 6.1 Principles of design for circularity
- 6.2 Eco-design techniques
- 6.3 Concepts and applications of reverse engineering in the paper industry
- 6.4 Materials and technologies for sustainable production in the paper industry
- 6.5 Life cycle assessment (LCA) in the paper industry
- 6.6 Using Product Lifecycle Management (PLM) for sustainable products
- 6.7 Design for Disassembly and Recycling (DfDR)



6.8 Case studies and analysis of success stories in the sector

### **UFC 7 - CAD MODELING AND DESIGN**

- 7.1 Introduction to CAD software in the paper industry
- 7.2 2D modeling for technical drawing
- 7.3 3D modeling for paper product design
- 7.4 Virtual process and product simulations
- 7.5 Shape optimization for sustainable production
- 7.6 Case studies and practical applications

### **UFC 8 - TECHNOLOGIES FOR SUSTAINABLE PRODUCTION**

- 8.1 Materials and technologies for sustainable production in the paper sector
- 8.2 Material Requirements Planning (MRP) in the paper sector
- 8.3 Additive technologies in the production of paper products
- 8.4 Subtractive technologies in the production process
- 8.5 Reuse of paper production waste
- 8.6 Eco-friendly printing technologies
- 8.7 Simulation of paper production processes
- 8.8 Case studies and practical applications

### **UFC 9 - QUALITY AND PERFORMANCE MANAGEMENT**

- 9.1 Total Quality Management (TQM) concepts in the paper industry
- 9.2 Quality control techniques and product testing
- 9.3 Implementation of Digital Twins and predictive analytics
- 9.4 Use of key performance indicators (KPIs)
- 9.5 Management of information processes and system relations
- 9.6 Case studies and practical applications

### **UFC 10 - MAINTENANCE AND OPTIMIZATION**

- 10.1 Preventive and corrective maintenance planning and implementation
- 10.2 Maintenance tools and techniques
- 10.3 Fault monitoring and diagnostics
- 10.4 Case studies and practical applications

### **UF 11 - INTERNSHIP**

- 11.1 Company internship



## Timetable and credits for teaching modules

Acronym	<b>CIRCULARTECH24</b>					
Title	Higher technician for circular economy in processes and products					
Modules Code	Teaching	Hours UFC	Hours First year	Hours Second year	Credits First year	Credits Second year
	<b>UFC 1 - EMPOWERMENT E TEAM BUILDING</b>	<b>40</b>	First year	Second year	First year	Second year
1.1	Outdoor Training (in ambiente esterno)		8			
1.2	Laboratorio di Self Empowerment e Team Building		16		2	
1.3	Problemsetting and solving - decision making - time management		16			
	<b>UFC 2 - ORIENTATION TOWARDS WORK AND ENTERPRISE</b>	<b>32</b>		Second year		
2.1	The enterprise and the employment relationship (contracts)			8		1
2.2	Company organisation and organisation charts			12		2
2.4	Supply Chain Management			12		1
	<b>UFC 3 - LANGUAGE SKILLS</b>	<b>68</b>	First year		First year	
3.1	English Theory		40		2	
3.2	English Laboratory		20		1	
3.3	Technical English		8		1	
	<b>UFC 4 - QUALITY, SAFETY AND ENVIRONMENT</b>	<b>52</b>	First year		First year	
4.1	Quality policies in the use of processes (ISO 9001)		16		1	
4.2	Safety and accident prevention in the workplace (high risk)		20		2	
4.3	Green enterprise; iso 14000, sustainability and eco-compatibility of industrial production		16		1	
	<b>UFC 5 - FUNDAMENTALS OF CIRCULAR ECONOMY</b>	<b>96</b>	First year		First year	
5.1	Introduction to the Circular Economy		16		1	
5.2	Principles and Key Concepts of the Circular Economy		16		1	
5.3	Circular Business Models in the Paper Industry		16		2	
5.4	Tools and Methodologies for Implementing the Circular Economy		32		2	
5.5	Successful Case Studies in the Paper Industry		16		2	
	<b>UFC 6 - DESIGN FOR CIRCULARITY</b>	<b>208</b>	First year		First year	
6.1	Principles of design for circularity		16		1	
6.2	Eco-design techniques		32		2	
6.3	Concepts and applications of reverse engineering in the paper industry		28		2	
6.4	Materials and technologies for sustainable production in the paper industry		28		2	
6.5	Life cycle assessment (LCA) in the paper industry		28		2	
6.6	Using Product Lifecycle Management (PLM) for sustainable products		28		2	
6.7	Design for Disassembly and Recycling (DfDR)		32		2	
6.8	Case studies and analysis of success stories in the sector		16		1	
	<b>UFC 7 - CAD MODELING AND DESIGN</b>	<b>172</b>	First year		First year	
7.1	Introduction to CAD software in the paper industry		28		2	
7.2	2D modeling for technical drawing		32		3	
7.3	3D modeling for paper product design		32		2	
7.4	Virtual process and product simulations		28		2	
7.5	Shape optimization for sustainable production		24		2	
7.6	Case studies and practical applications		28		2	
	<b>UFC 8 - TECHNOLOGIES FOR SUSTAINABLE PRODUCTION</b>	<b>224</b>	First year		First year	
8.1	Materials and technologies for sustainable production in the paper sector		28		2	
8.2	Material Requirements Planning (MRP) in the paper sector		32		2	
8.3	Additive technologies in the production of paper products		28		2	
8.4	Subtractive technologies in the production process		28		2	
8.5	Reuse of paper production waste		28		2	
8.6	Eco-friendly printing technologies		32		2	
8.7	Simulation of paper production processes		32		2	
8.8	Case studies and practical applications		16		1	
	<b>UFC 9 - QUALITY AND PERFORMANCE MANAGEMENT</b>	<b>156</b>		Second year		Second year
9.1	Total Quality Management (TQM) concepts in the paper industry			24		2
9.2	Quality control techniques and product testing			32		3
9.3	Implementation of Digital Twins and predictive analytics			28		2
9.4	Use of key performance indicators (KPIs)			28		2
9.5	Management of information processes and system relations			28		2
9.6	Case studies and practical applications			16		1
	<b>UFC 10 - MAINTENANCE AND OPTIMIZATION</b>	<b>112</b>		Second year		Second year
10.1	Preventive and corrective maintenance planning and implementation			32		3
10.2	Maintenance tools and techniques			32		3
10.3	Fault monitoring and diagnostics			32		3
10.4	Case studies and practical applications			16		2
	<b>UF 11 - INTERNSHIP</b>	<b>840</b>		Second year		Second year
11.1	Company internship			840		33
	<b>TOTAL HOURS</b>	<b>2000</b>	<b>860</b>	<b>1140</b>	<b>60</b>	<b>60</b>



### **ECTS credit system**

For each course, ITS PRIME has adopted the calculation of credits according to the credit system used in the European Higher Education space ECTS (European Credit Transfer System). For the credits of an annuity there are, as for most Higher Education annuities, 60 credits. Typically 1 credit is equivalent to 25 hours of work between classroom (or laboratory for practical activities) and individual study. For each Didactic Module, the workload necessary for students to achieve the intended learning outcomes was assessed by assessment experts and module teachers. Lecture hours were considered 30% or 50% of the total workload hours according to the theoretical or theoretical-practical nature of the different modules. Time spent on company internship and laboratory activities was considered 100% of the workload.

### **Language of lessons**

Italian

### **Course calendar**

**The course will start by October 30, 2024 and will end by June 2026.** The actual start date of the course will be communicated via the ITS Prime Foundation website ([www.itsprime.it](http://www.itsprime.it)).

