

GREENTECH24

HIGHER TECHNICIAN FOR THE DEFINITION OF THE PRODUCTION PROCESS FOR THE ENVIRONMENTAL SUSTAINABILITY OF THE PRODUCT

<https://www.itsprime.it/corsi-itsprime/greentech24/>

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 **Florence**. 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: 11th 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 THE DEFINITION OF THE PRODUCTION PROCESS FOR THE ENVIRONMENTAL SUSTAINABILITY OF THE PRODUCT**" 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 (IFTTS) 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/greentech24/>

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 "GREENTECH24 - Higher technician for the definition of the production process for the environmental sustainability of the product" trains professionals specialized in



the production of components and sub-assemblies of machines, guaranteeing maximum quality and sustainability.

Graduates will have skills in circular economy, materials technology, industrial processes, quality control and lean manufacturing.

Main job opportunities

Production technician

Sustainability manager

Quality control manager

Plant maintenance technician

Didactic plan

The two-year course, of 1800 hours in total, takes place in 4 semesters with a didactic articulation that provides:

classroom lessons and laboratory activities (1040 hours),

internship, in Italy and abroad (760 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 TO WORK AND ENTERPRISE

- 2.1 The enterprise and the employment relationship (contracts)
- 2.2 Business organization and organizational charts
- 2.3 Job order management techniques
- 2.4 Supply Chain Management

UFC 3 - LANGUAGE SKILLS

- 3.1 English theory
- 3.2 English laboratory
- 3.3 Technical English

UFC 4 - MECHANICAL DESIGN AND TECHNOLOGY

- 4.1 Basics of mechanical design
- 4.2 Design of mechanical equipment
- 4.3 Automatic machines
- 4.4 Standards for mechanical technical drawing
- 4.5 New machinery directive (2006/42/EC)
- 4.6 Technology of materials
- 4.7 Design for manufacturing
- 4.8 Basic mechanical measurements laboratory
- 4.9 Basic mechanical laboratory (manual machines)
- 4.10 Laboratory of advanced mechanics (numerical control machines)

UFC 5 - DIGITAL TOOLS FOR DESIGN AND VALIDATION

- 5.1 Computer Aided Design
- 5.2 Parametric Solid Modeling
- 5.3 3D scanning and reverse engineering
- 5.4 Fundamentals of Finite Element Analysis (FEA)
- 5.5 Elements of virtual and augmented reality for industry

UFC 6 - QUALITY, SAFETY AND ENVIRONMENT

- 6.1 Quality policies in the use of processes (ISO 9001)



- 6.2 Safety and accident prevention in the workplace (high risk)
- 6.3 Total Quality Management

UFC 7 - PRINCIPLES OF SUSTAINABILITY, CIRCULAR ECONOMY AND GREEN FACTORY

- 7.1 Fundamentals of sustainability in industry and circular economy
- 7.2 LCA: Life Cycle Assessment
- 7.3 Eco-Design: designing for environmental sustainability
- 7.4 Green Factory: the sustainability of production processes
- 7.5 Recycling, Upcycling, Downcycling

UFC 8 - PRODUCT LIFE CYCLE MANAGEMENT AND LEAN MANUFACTURING

- 8.1 Production processes and costs of business structures
- 8.2 Production technologies and machining
- 8.3 Documentation and technical manuals
- 8.4 Product Lifecycle Management (PLM)
- 8.5 Lean Manufacturing (Six Sigma)
- 8.6 Digitization of industrial production (Digital Twins)

UFC 9 - SYSTEMS OPERATION AND MAINTENANCE

- 9.1 Organization of installation and maintenance service
- 9.2 Techniques for predicting failure modes
- 9.3 Installation and maintenance of mechanical, pneumatic and electrical devices

UFC 10 - MEASUREMENT FUNDAMENTALS AND METROLOGY TECHNIQUES

- 10.1 Fundamentals of metrology and measuring instruments
- 10.2 Laboratory of geometric and dimensional measurements
- 10.3 Advanced geometric and dimensional measurements laboratory (CT, CMM, Optical Scanning, etc.).
- 10.4 Measurements applied to product validation

UFC 11 - MATERIALS SCIENCE AND ELEMENTS OF METALLURGY

- 11.1 Structure and properties of metallic materials
- 11.2 Structure and properties of polymeric materials
- 11.3 Structure and properties of ceramic materials
- 11.4 Structure and properties of composite materials



- 11.5 Concepts of metallurgy of metal alloys and heat treatments
- 11.6 Concepts of mechanics of materials and characterization of their properties: mechanical testing

UFC 12 - PROCESSES AND TECHNOLOGIES FOR THE PRODUCTION OF RAW AND SEMI-FINISHED METALLIC MATERIALS

- 12.1 Concepts of foundry and sand casting process
- 12.2 Concepts of foundry and lost-wax casting process
- 12.3 Forging and forming processes and technologies
- 12.4 Fundamentals of Additive Manufacturing and Additive Manufacturing technologies: powder bed, direct deposition, isostatic pressing

UFC 13 - JOINING PROCESSES AND TECHNOLOGIES

- 13.1 Fundamentals of welding metallurgy
- 13.2 Welding technologies and processes
- 13.3 Fundamentals and technologies of brazing
- 13.4 Quality management and international standards for joining processes
- 13.5 Virtual welding laboratory

UFC 14 - NONDESTRUCTIVE TESTING AND INSPECTION

- 14.1 Characteristic defects in major manufacturing processes
- 14.2 Principles and methods of nondestructive surface inspections: visual inspection, magnetic inspections, liquid penetrants
- 14.3 Principles and methods of volumetric nondestructive testing: ultrasonic, eddy current, and X-ray inspection
- 14.4 Laboratory of nondestructive testing (liquid penetrant and magnetic testing)

UFC 15 - MACHINING PROCESSES AND TECHNOLOGIES (CONVENTIONAL AND UNCONVENTIONAL)

- 15.1 Fundamentals of conventional machining technologies
- 15.2 Structure, operating principles and programming of conventional machines
- 15.3 Fundamentals of non-conventional chip removal technologies: EDM, surface functionalization treatments and LASER machining
- 15.4 Structure, operating principles and programming of non-conventional machines
- 15.5 Test plans for mechanical components
- 15.6 Definition and management of machining cycle for mechanical components: time and methods



15.7 Mechanical machining laboratory

UFC 16 - INTERNSHIP.

16.1 In-company internship

Timetable and credits for teaching modules

GREENTECH24								
Higher technician for the definition of the production process for the environmental sustainability of the Product								
Acronym	Title	Teaching	Hours Module	Hours UFC	Hours First year	Hours Second year	Credits First year	Credits Second year
UFC 1 - EMPOWERMENT E TEAM BUILDING								
1.1	Outdoor Training (in ambiente esterno)		8	8	8			
1.2	Laboratory of Self Empowerment e Team Building		8	8	8		2	
1.3	Problemsetting and solving - decision making - time management		12		12			
UFC 2 - ORIENTATION TO WORK AND ENTERPRISE								
2.1	The enterprise and the employment relationship (contracts)		8	8	8		1	
2.2	Business organization and organizational charts		12	12	12		2	
2.3	Job order management techniques		8	8	8		1	
2.4	Supply Chain Management		12	12	12		2	
UFC 3 - LANGUAGE SKILLS								
3.1	English theory		32	32	32		2	
3.2	English laboratory		20	20	20		1	
3.3	Technical English		8	8	8		1	
UFC 4 - MECHANICAL DESIGN AND TECHNOLOGY								
4.1	Basics of mechanical design		32	32	32		2	
4.2	Design of mechanical equipment		32	32	32		2	
4.3	Automatic machines		20	20	20		1	
4.4	Standards for mechanical technical drawing		16	16	16		1	
4.5	New machinery directive (2006/42/EC)		12	12	12		1	
4.6	Technology of materials		24	24	24		1	
4.7	Design for manufacturing		20	20	20		1	
4.8	Basic mechanical measurements laboratory		32	32	32		1	
4.9	Basic mechanical laboratory (small machines)		32	32	32		1	
4.10	Laboratory of advanced mechanics (numerical control machines)		32	32	32		1	
UFC 5 - DIGITAL TOOLS FOR DESIGN AND VALIDATION								
5.1	Computer Aided Design		32	32	32		2	
5.2	Parametric Solid Modeling		64	64	64		3	
5.3	3D scanning and reverse engineering		20	20	20		2	
5.4	Fundamentals of Finite Element Analysis (FEA)		16	16	16		1	
5.5	Elements of virtual and augmented reality for industry		8	8	8		1	
UFC 6 - QUALITY, SAFETY AND ENVIRONMENT								
6.1	Quality policies in the use of processes (ISO 9001)		16	16	16		1	
6.2	Safety and accident prevention in the workplace (high risk)		16	16	16		1	
6.3	Total Quality Management		8	8	8		1	
UFC 7 - PRINCIPLES OF SUSTAINABILITY, CIRCULAR ECONOMY AND GREEN FACTORY								
7.1	Fundamentals of sustainability in industry and circular economy		12	12	12		1	
7.2	LCA: Life Cycle Assessment		8	8	8		1	
7.3	Eco-Design: designing for environmental sustainability		8	8	8		1	
7.4	Green Factory: the sustainability of production processes		12	12	12		1	
7.5	Recycling: Upcycling, Downcycling		4	4	4		1	
UFC 8 - PRODUCT LIFE CYCLE MANAGEMENT AND LEAN MANUFACTURING								
8.1	Production processes and costs of business structures		32	32	32		1	
8.2	Production technologies and machining		20	20	20		1	
8.3	Documentation and technical manuals		20	20	20		1	
8.4	Product Lifecycle Management (PLM)		20	20	20		1	
8.5	Lean Manufacturing (Six Sigma)		20	20	20		1	
8.6	Digitalization of industrial production (Digital Twins)		8	8	8		1	
UFC 9 - SYSTEMS OPERATION AND MAINTENANCE								
9.1	Organization of installation and maintenance service		12	12	12		1	
9.2	Techniques for predicting failure modes		8	8	8		1	
9.3	Installation and maintenance of mechanical, pneumatic and electrical devices		20	20	20		1	
UFC 10 - MEASUREMENT FUNDAMENTALS AND METROLOGY TECHNIQUES								
10.1	Fundamentals of metrology and measuring instruments		12	12	12		1	
10.2	Laboratory of geometric and dimensional measurements		12	12	12		1	
10.3	Advanced geometric and dimensional measurements laboratory (CT, CMM, Optical Scanning, etc.)		12	12	12		1	
10.4	Measurements applied to product validation		4	4	4		1	
UFC 11 - MATERIALS SCIENCE AND ELEMENTS OF METALLURGY								
11.1	Structure and properties of metallic materials		16	16	16		1	
11.2	Structure and properties of polymeric materials		12	12	12		1	
11.3	Structure and properties of ceramic materials		12	12	12		1	
11.4	Structure and properties of composite materials		6	6	6		1	
11.5	Concepts of metallurgy of metal alloys and heat treatments		12	12	12		1	
11.6	Concepts of mechanics of materials and characterization of their properties: mechanical testing		12	12	12		1	
UFC 12 - PROCESSES AND TECHNOLOGIES FOR THE PRODUCTION OF RAW AND SEMI-FINISHED METALLIC MATERIALS								
12.1	Concepts of foundry and sand casting process		10	10	10		1	
12.2	Concepts of foundry and lost-wax casting process		10	10	10		1	
12.3	Forging and forming processes and technologies		16	16	16		1	
12.4	Fundamentals of Additive Manufacturing and Additive Manufacturing technologies: powder bed, direct deposition, selective pressing		22	22	22		2	
UFC 13 - JOINING PROCESSES AND TECHNOLOGIES								
13.1	Fundamentals of welding metallurgy		16	16	16		2	
13.2	Welding technologies and processes		24	24	24		2	
13.3	Fundamentals and technologies of brazing		12	12	12		1	
13.4	Quality management and international standards for joining processes		8	8	8		1	
13.5	Virtual welding laboratory		12	12	12		1	
UFC 14 - NONDESTRUCTIVE TESTING AND INSPECTION								
14.1	Characteristic defects in major manufacturing processes		8	8	8		1	
14.2	Principles and methods of nondestructive surface inspections: visual inspection, magnetic inspections, liquid penetrants		16	16	16		2	
14.3	Principles and methods of volumetric nondestructive testing: ultrasonic, eddy current, and X-ray inspection		16	16	16		2	
14.4	Laboratory of nondestructive testing (liquid penetrant and magnetic testing)		12	12	12		1	
UFC 15 - MACHINING PROCESSES AND TECHNOLOGIES (CONVENTIONAL AND UNCONVENTIONAL)								
15.1	Fundamentals of conventional machining technologies		16	16	16		1	
15.2	Structure, operating principles and programming of conventional machines		18	18	18		1	
15.3	Fundamentals of non-conventional chip removal technologies: EDM, surface functionalization treatments and LASER machining		24	24	24		2	
15.4	Structure, operating principles and programming of non-conventional machines		18	18	18		1	
15.5	Test plans for mechanical components		8	8	8		1	
15.6	Definition and management of machining cycle for mechanical components: time and methods		12	12	12		1	
15.7	Mechanical machining laboratory		8	8	8		1	
UFC 16 - INTERNSHIP.								
16.1	In-company internship		840	840	840		34	
TOTALE ORE				2000	874	1126	60	60



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 October 2026. The actual start date of the course will be communicated via the ITS Prime Foundation website (www.itsprime.it).

