

PLANT OPERATIONS & MAINTENANCE SPECIALIST

HIGHER TECHNICIAN IN AUTOMATION AND ADVANCED MANAGEMENT OF COMPLEX INDUSTRIAL PLANT SYSTEMS

<https://www.itsprime.it/corsi-itsprime/plant-operations-maintenance-specialist/>

The course is fully funded by PNRR funds aimed at enhancing the educational provision of the 'ITS Academy' and is therefore **free of charge for participants**.

Course type: Two-year Higher Technical Education course

Teaching location: The course will take place at the ITS PRIME Tech Academy site in **Luc-ca**. Part of the activities may be held at the technological laboratories of universities, companies, and other organizations partnering with the ITS PRIME Tech Academy Foundation. Activities may also occasionally take place at facilities of particular educational or scientific interest located elsewhere. Internships (stages) may be carried out at companies located anywhere within the regional, national, and/or European territory.

Enrollment deadline: September 30, 2026.

Final diploma type

Diploma of "Higher Technician for Advanced Mechatronic Design and Production" (Area 6.1 - Process and Product Development and Innovation - Profile 6.1.1 of Annex 1 – Ministerial Decree 203 of 20.10.2023), specifying the course specialization as "**HIGHER TECHNICIAN IN AUTOMATION AND ADVANCED MANAGEMENT OF COMPLEX INDUSTRIAL PLANT SYSTEMS**", certifying competencies corresponding to Level V of the European Qualifications Framework for lifelong learning (EQF), and constituting a qualification for access to public competitive examinations pursuant to Art. 5, paragraph 7, of the D.P.C.M. of January 25, 2008.

Admission requirements:

Possession of a **Secondary School Diploma or a four-year Vocational Education and Training (leFP) pathway supplemented by a one-year Higher Technical Education and Training (IFTS) pathway**;

Age between **18 and 35** (not yet reached by the application deadline);

Basic knowledge of the English language and computer skills.



Female candidates and/or candidates belonging to disadvantaged categories who are found suitable during the selection process will be automatically admitted to the course as students, up to the reserved quota assigned to them (50% of places for women, 7% for disadvantaged categories in accordance with Law 68/1999). Admission requirements will be verified during the selection process.

Admission type: Classes may be formed with a **minimum of 20 students**, as required by current national regulations, and a **maximum of 25 students**.

Selection process

The selection process involves:

- curricular evaluation based on qualifications and prior experience: a) Secondary School Diploma b) Any third-party certifications (such as ECDL or Cambridge ESOL, PET, and FCE certificates);
- a written test with multiple-choice questions aimed at assessing: a) General and basic knowledge of the subject area to which the ITS course relates; b) Knowledge of the English language;
- a motivational interview to assess: a) Candidates' motivations, aptitudes, and technical knowledge.

Method of enrollment:

please refer to the link: <https://www.itsprime.it/corsi-itsprime/smart-machine-systems-specialist/>

Recognition of previous training pathways

Any requests for recognition of training credits must be submitted in writing, together with appropriate documentation, by the course start date at the latest. A committee will evaluate the knowledge and skills acquired in other formal and informal contexts and, if the outcome is positive, will award credits in terms of training hours. This will allow the student to be exempted from attending the relevant UFCs (Capitalizable Training Units).

Course Objectives

The “PLANT OPERATION & MAINTENANCE SPECIALIST” course trains technicians to view the plant as an integrated system. The programme combines mechanics, electrical engineering, automation, safety, maintenance and digital technologies to prepare professionals capable of contributing to operational continuity and performance improvement.

The work placement enables students to apply their skills in manufacturing companies, industrial process plants, maintenance departments, technical support firms, companies managing complex plants, or organisations involved in the digitalisation of maintenance.



Main job opportunities

Industrial maintenance technician.
Plant operations technician.
Electromechanical maintenance technician.
Plant automation technician.
Diagnostics and condition monitoring technician.
Junior maintenance planner.
Industrial plant service technician.

Didactic plan

The course will begin by November 2026 and end by August 2028. The actual start date of the course will be announced on the ITS PRIME Tech Academy Foundation website (www.itsprime.it). The training pathway will be structured into 4 semesters for a total of **2,000 hours**:

- **Classroom lessons and laboratory activities: 1,148 hours**
- **Internships, in Italy and abroad: 852 hours**

Most of the subject areas will be delivered in technological laboratories specifically equipped with state-of-the-art technology. Part of the internship may be carried out, on a voluntary basis, at foreign companies, subject to obtaining specific scholarships under the Erasmus+ program. Access to the program will be through participation in a dedicated call, which must be successfully passed as a prerequisite for participation.

Class schedule: Monday to Friday, with a weekly commitment of 35-40 hours. Teaching activities will be suspended for holidays and summer/winter breaks. The entire training program is developed in close coordination with companies in the sector. Over 70% of the teaching staff will be composed of experts from the production, professional, and labor sectors with specific professional experience in the field, giving particular value to staff from companies that are members of the ITS PRIME Tech Academy Foundation. Teachers from universities, research centers, vocational training institutions, and schools will also be involved. The pathway will be complemented by seminar activities, testimonials from industry professionals, and visits to trade fairs, events, companies, and installations of particular interest. Throughout the course, learning assessments are scheduled to verify the actual achievement of the training objectives.

Access to further studies

The diploma may be combined with a subsequent university pathway, with recognition of university training credits (CFU) based on the academic regulations of individual universities. Current legislation should be consulted in this regard.

Attendance benefits

Participants residing more than 50 km from the course location will be granted a contribution



toward reimbursement of expenses incurred for meals and accommodation. The contribution will be paid only if the participant successfully completes the ITS training pathway in which they are enrolled. The ITS PRIME Tech Academy Foundation has also arranged for the awarding of Scholarships. The methods and criteria for allocating reimbursements and scholarships will be defined and communicated to attending students through specific notices and regulations. It is possible to submit a request for a contribution or a Scholarship; however, the award is neither automatic nor guaranteed, but will be evaluated on a case-by-case basis according to the criteria established by current regulations.

Regulations for exams and other assessment methods

Each ITS PRIME Tech Academy course is two years long and consists of Capitalizable Training Units (UFC), each of which is divided into Teaching Modules. At the end of each teaching module, an assessment is scheduled, evaluated on a scale of 100. For modules with a high number of teaching hours, an interim assessment may also be scheduled. **Students who have attended at least 80% of the total teaching hours and have obtained a positive evaluation in all teaching modules are admitted to take the final ministerial exam, consisting of technical-practical tests and an interview.**

Course structure

Training Units and Teaching Modules

UFC 1 - EMPOWERMENT AND TEAM BUILDING

- 1.1 Outdoor Training (outdoor environment)
- 1.2 Self Empowerment and Team Building Lab
- 1.3 Problem setting and solving - decision making - time management
- 1.4 Time Management
- 1.5 Effective communication
- 1.6 Conflict management and negotiation

UFC 2 - WORK AND BUSINESS ORIENTATION

- 2.1 The company and employment relationships (contracts)
- 2.2 Company organization and org charts
- 2.3 Supply Chain Management

UFC 3 - LANGUAGE SKILLS

- 3.1 English theory
- 3.2 English lab
- 3.3 Technical English

UFC 4 - QUALITY, SAFETY AND ENVIRONMENT

- 4.1 Quality policies in process management (ISO 9000)
- 4.2 Workplace safety and accident prevention (high risk) ISO 18000
- 4.3 Specific electrical risk



- 4.4 Total Quality Management
- 4.5 ISO 45001 - Safety management system

UFC 5 - MECHANICAL TECHNOLOGIES AND PLANT ENGINEERING

- 5.1 Materials technology
- 5.2 Mechanical technologies
- 5.3 Machine mechanics
- 5.4 Process industry - Design - prototyping - testing - inspection
- 5.5 ISO language programming

UFC 6 - ELECTRONICS AND ELECTRICAL ENGINEERING

- 6.1 Fundamentals of electrical engineering and electromagnetism
- 6.2 Digital electronics
- 6.3 Control systems - PLC - DCS
- 6.4 Electrical measurements
- 6.5 Electrical equipment of machines
- 6.6 Digitalization of industrial production (Digital Twins - Machine Learning - AI)

UFC 7 - CAD AND TECHNICAL DRAWING (2D and 3D)

- 7.1 Elements of industrial technical drawing
- 7.2 Regulations for industrial technical drawing
- 7.3 AutoCAD 2D and 3D
- 7.4 Rapid prototyping
- 7.5 Fundamentals of mechanical design, including reverse engineering

UFC 8 - MECHANICS AND ELECTRONICS LABS

- 8.1 Mechanics lab
- 8.2 Electrical engineering lab

UFC 9 - ORGANIZATION AND MANAGEMENT OF THE MAINTENANCE SERVICE

- 9.1 Technical/administrative management and control documentation
- 9.2 Maintenance contracts
- 9.3 Cost management in maintenance - fixed and variable costs
- 9.4 Scheduling techniques - cost centers
- 9.5 Lean Manufacturing

UFC 10 - TECHNICAL MAINTENANCE MANAGEMENT

- 10.1 Maintenance types and strategies - KPIs
- 10.2 Types of failures and/or breakdowns
- 10.3 Elements of reliability theory
- 10.4 Preventive and predictive maintenance techniques
- 10.5 Testing and inspection techniques (NDT), troubleshooting

UFC 11 - MAINTENANCE OF TECHNOLOGICAL SERVICE PLANTS

- 11.1 Types, components, maintenance and safety of water and fire-fighting systems
- 11.2 Types, components, maintenance and safety of heating and air conditioning systems



- 11.3 Types, components, maintenance and safety of electrical systems
- 11.4 Types, components, maintenance and safety of pneumatic and hydraulic systems
- 11.5 Types, components, maintenance and safety of steam, vacuum and compressed air systems

UFC 12 - MAINTENANCE OF INDUSTRIAL PRODUCTION MACHINES

- 12.1 Types of machines
- 12.2 Types, components, maintenance and safety of production machines
- 12.3 Practical exercises on machines

UFC 13 - MAINTENANCE AND OPERATION OF INDUSTRIAL PLANTS

- 13.1 Industrial plants
- 13.2 Maintenance of industrial plants (chemical, petrochemical, energy, food, pharmaceutical...)
- 13.3 Machinery safety (CE marking, technical standards, specific directives such as PED, ATEX)

UFC 14 - INDUSTRIAL AUTOMATION

- 14.1 Electric motors and drives
- 14.2 Pneumatic and hydraulic systems engineering
- 14.3 Industrial control and automation systems
- 14.4 Programming of industrial automation systems (PLC)
- 14.5 Industrial communication networks
- 14.6 Industrial automation lab

UFC 15 - DIGITAL TECHNOLOGIES FOR MAINTENANCE AND AUTOMATION

- 15.1 AI and Digital Twin for maintenance and automation
- 15.2 IoT in industrial processes
- 15.3 Augmented Reality and digital tools for technicians
- 15.4 Industrial Cybersecurity

UFC 16 - INTERNSHIP

- 16.1 Company internship

Timetable and credits for teaching modules

Plant Operations & Maintenance Specialist							
Higher Technician for automation and advanced management of complex industrial plants							
Acronym							
Title							
Mod.	Subject	Module hours	UFC hours	First year	Second year	Training Credits First Year	Training Credits Second Year
	UFC 1 - EMPOWERMENT AND TEAM BUILDING		76	First year			
1.1	Outdoor Training (outdoor environment)	8		8		1	
1.2	Self Empowerment and Team Building Lab	16		16			
1.3	Problemsetting and solving - decision making - time management	16		16		1	
1.4	Time Management	12		12		1	
1.5	Effective communication	12		12		1	
1.6	Conflict management and negotiation	12		12			
	UFC 2 - WORK AND BUSINESS ORIENTATION		32		Second year		
2.1	The company and employment relationships (contracts)	8			8		2
2.2	Company organization and org charts	12			12		
2.3	Supply Chain Management	12			12		1
	UFC 3 - LANGUAGE SKILLS		64	First year			
3.1	English theory	32		32		2	
3.2	English lab	20		20		1	
3.3	Technical English	12		12		1	
	UFC 4 - QUALITY, SAFETY AND ENVIRONMENT		64	First year			
4.1	Quality policies in process management (ISO 9000)	12		12		1	
4.2	Workplace safety and accident prevention (high risk) ISO 18000	16		16		1	
4.3	Specific electrical risk	16		16		1	
4.4	Total Quality Management	8		8		1	
4.5	ISO 45001 - Safety management system	12		12			
	UFC 5 - MECHANICAL TECHNOLOGIES AND PLANT ENGINEERING		100	First year			
5.1	Materials technology	20		20		1	
5.2	Mechanical technologies	20		20		1	
5.3	Machine mechanics	20		20		2	
5.4	Process industry - Design - prototyping - testing - inspection	20		20		1	
5.5	ISO language programming	20		20		1	
	UFC 6 - ELECTRONICS AND ELECTRICAL ENGINEERING		114	First year			
6.1	Fundamentals of electrical engineering and electromagnetism	16		16		1	
6.2	Digital electronics	16		16		1	
6.3	Control systems - PLC - DCS	20		20		1	
6.4	Electrical measurements	20		20		1	
6.5	Electrical equipment of machines	30		30		1	
6.6	Digitalization of industrial production (Digital Twins - Machine Learning - AI)	12		12		1	
	UFC 7 - CAD AND TECHNICAL DRAWING (2D and 3D)		80	First year			
7.1	Elements of industrial technical drawing	8		8		1	
7.2	Regulations for industrial technical drawing	8		8		1	
7.3	AutoCAD 2D and 3D	28		28		2	
7.4	Rapid prototyping	20		20		2	
7.5	Fundamentals of mechanical design, including reverse engineering	16		16		1	
	UFC 8 - MECHANICS AND ELECTRONICS LABS		80		Second year		
8.1	Mechanics lab	40			40		2
8.2	Electrical engineering lab	40			40		2
	UFC 9 - ORGANIZATION AND MANAGEMENT OF THE MAINTENANCE SERVICE		60	First year	Second year		
9.1	Technical/administrative management and control documentation	12		12		1	
9.2	Maintenance contracts	12		12		1	
9.3	Cost management in maintenance - fixed and variable costs	8		8		1	
9.4	Scheduling techniques - cost centers	12		12		1	
9.5	Lean Manufacturing	16			16		2
	UFC 10 - TECHNICAL MAINTENANCE MANAGEMENT		64	First year			
10.1	Maintenance types and strategies - KPIs	8		8		1	
10.2	Types of failures and/or breakdowns	8		8		1	
10.3	Elements of reliability theory	8		8		1	
10.4	Preventive and predictive maintenance techniques	20		20		1	
10.5	Testing and inspection techniques (NDT), troubleshooting	20		20		1	
	UFC 11 - MAINTENANCE OF TECHNOLOGICAL SERVICE PLANTS		100	First year			
11.1	Types, components, maintenance and safety of water and fire-fighting systems	20		20		2	
11.2	Types, components, maintenance and safety of heating and air conditioning systems	20		20		2	
11.3	Types, components, maintenance and safety of electrical systems	20		20		2	
11.4	Types, components, maintenance and safety of pneumatic and hydraulic systems	20		20		2	
11.5	Types, components, maintenance and safety of steam, vacuum and compressed air systems	20		20		2	
	UFC 12 - MAINTENANCE OF INDUSTRIAL PRODUCTION MACHINES		52		Second year		
12.1	Types of machines	16			16		2
12.2	Types, components, maintenance and safety of production machines	16			16		2
12.3	Practical exercises on machines	20			20		2
	UFC 13 - MAINTENANCE AND OPERATION OF INDUSTRIAL PLANTS		58		Second year		
13.1	Industrial plants	28			28		3
13.2	Maintenance of industrial plants (chemical, petrochemical, energy, food, pharmaceutical...)	10			10		2
13.3	Machinery safety (CE marking, technical standards, specific directives such as PED, ATEX)	20			20		2
	UFC 14 - INDUSTRIAL AUTOMATION		148	First year			
14.1	Electric motors and drives	26		26		2	
14.2	Pneumatic and hydraulic systems engineering	20		20		1	
14.3	Industrial control and automation systems	24		24		1	
14.4	Programming of industrial automation systems (PLC)	30		30		1	
14.5	Industrial communication networks	8		8		2	
14.6	Industrial automation lab	40		40			
	UFC 15 - DIGITAL TECHNOLOGIES FOR MAINTENANCE AND AUTOMATION		56	First year			
15.1	AI and Digital Twin for maintenance and automation	16		16		1	
15.2	IoT in industrial processes	16		16		1	
15.3	Augmented Reality and digital tools for technicians	16		16		1	
15.4	Industrial Cybersecurity	8		8			
	UFC 16 - INTERNSHIP		852		Second year		
16.1	Company internship	852			852		38
	TOTAL HOURS		2000	910	1090	60	60



ECTS credit system

For each course, ITS PRIME Tech Academy 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 the lessons

Italian

