

SMART MACHINE SYSTEMS SPECIALIST

HIGHER TECHNICIAN FOR THE DESIGN AND INTEGRATION OF MECHATRONIC SYSTEMS FOR INDUSTRY

<https://www.itsprime.it/corsi-itsprime/smart-machine-systems-specialist/>

The course is free for participants. It is fully funded by the PR Toscana FSE+ 2021/2027, Priority 4, Activity 4.f.2 # ITS: allocation of resources to ITS training offer projects under DD 14894 of 02/07/2026, for pathways carried out by the ITS Academy Foundations of Tuscany starting in the 2026/2027 academic year, and is part of GiovaniSì (www.giovanisi.it), the Tuscany Region project for youth autonomy.

Course type: Two-year Higher Technical Education course

Teaching location: The course will take place at the ITS PRIME Tech Academy site in **Pistoia, Via Cellini 3B**. 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 FOR THE DESIGN AND INTEGRATION OF MECHATRONIC SYSTEMS FOR INDUSTRY**", 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 (IeFP) 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 "SMART MACHINE SYSTEM SPECIALIST" course trains technicians capable of collaborating in the design and integration of mechatronic systems for industry. The pathway offers a comprehensive view of the machine, from mechanical construction to automatic control, up to supervision and connection with other systems. The internship provides access to companies that design machines and plants, produce mechatronic components, develop industrial automation, or integrate systems for various production sectors.



Main job opportunities

Junior mechatronic design technician
Systems integration technician
Automation technician
Prototyping and testing technician
Commissioning technician
Machine design and production support 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 **1,800 hours**:

- **Classroom lessons and laboratory activities: 960 hours**
- **Internships, in Italy and abroad: 840 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 (in an outdoor setting)
- 1.2 Self-Empowerment and Team Building Workshop
- 1.3 Problem Setting and Solving – Decision Making – Time Management

UFC 2 - CAREER AND BUSINESS ORIENTATION

- 2.1 The Company and Employment Relationships (Contracts)
- 2.2 Business Organization and Organizational Charts
- 2.3 Supply Chain Management

UFC 3 - THINKING INNOVATION: PHILOSOPHY AND DESIGN THINKING

- 3.1 Philosophical Foundations of Design Thinking
- 3.2 Philosophy Workshop: The Agoras
- 3.3 Design Thinking and Critical Thinking
- 3.4 The Value of Innovation: Practical Workshops



UFC 4 - LANGUAGE SKILLS

- 4.1 English Theory
- 4.2 English Workshop
- 4.3 Technical English

UFC 5 - QUALITY, SAFETY, AND ENVIRONMENT

- 5.1 Quality Policies in Process Management (ISO 9000)
- 5.2 Workplace Safety and Accident Prevention (High Risk) ISO 18000
- 5.3 Total Quality Management

UFC 6 - FUNDAMENTALS OF MECHANICAL TECHNOLOGY

- 6.1 Materials Technology
- 6.2 Mechanical Technologies
- 6.3 Mechanical Measurements
- 6.4 Mechanics Workshop – CNC Programming

UFC 7 - FUNDAMENTALS OF CAD AND TECHNICAL DRAWING

- 7.1 Elements of Industrial Technical Drawing
- 7.2 Standards for Industrial Technical Drawing
- 7.3 2D and 3D CAD
- 7.4 Reverse Engineering Techniques

UFC 8 - FUNDAMENTALS OF ELECTRONICS AND ELECTRICAL ENGINEERING

- 8.1 Basics of Electrical Engineering and Electromagnetism
- 8.2 Analog and Digital Electronics
- 8.3 Control and Drive Systems – PLC
- 8.4 Electrical Measurements
- 8.5 Electrical Systems
- 8.6 Electronics Workshop

UFC 9 - INTEGRATED MECHATRONIC DESIGN

- 9.1 Production Processes and Company Structure Costs
- 9.2 Mechanical-Electronic Integration
- 9.3 Simulation and Prototyping
- 9.4 Integrated Design Software
- 9.5 Sensors and Actuators in Industrial Systems
- 9.6 Control of Mechatronic Systems
- 9.7 Mechatronic Design Workshop



UFC 10 - INDUSTRIAL AUTOMATION

- 10.1 Fundamentals of Automation
- 10.2 Industrial Programming
- 10.3 Programmable Logic Controller (PLC)
- 10.4 Automation of Complex Systems
- 10.5 Embedded Systems and Industrial IoT
- 10.6 Industrial Networks and Communication
- 10.7 Supervision and Control Software

UFC 11 - ADVANCED MECHANICS

- 11.1 ISO Language Programming
- 11.2 CNC Machining

UFC 12 - ORGANIZATION AND MANAGEMENT OF INDUSTRIAL PROCESSES

- 12.1 Technical/Administrative Management and Control Documentation
- 12.2 Failure Mode Prediction Techniques
- 12.3 Elements of Project Management
- 12.4 Organization of Installation and Maintenance Services

UFC 13 - INTERNSHIP

- 13.1 Company Internship



Timetable and credits for teaching modules

Acronym	Smart Machine Systems Specialist						
Title	Higher Technician for the design and integration of mechatronic systems for industry						
Module	Course	Module Hours	UFC Hours	First Year	Second Year	Training Credits First Year	Training Credits Second Year
	UFC 1 - EMPOWERMENT AND TEAM BUILDING		32	First Year			
1.1	Outdoor Training	8		8		2	
1.2	Self Empowerment and Team Building Lab	12		12			
1.3	Problem Setting and Solving - Decision Making - Time Management	12		12			
	UFC 2 - JOB AND BUSINESS ORIENTATION		32	First Year			
2.1	The company and the employment relationship (contracts)	8		8		3	
2.2	Company organization and organizational charts	12		12			
2.3	Supply Chain Management	12		12			
	UFC 3 - THINKING INNOVATION: PHILOSOPHY AND DESIGN THINKING		48	First Year			
3.1	Philosophical foundations of Design Thinking	16		16		1	
3.2	Philosophy Lab: The Agoras	8		8		1	
3.3	Design thinking and critical thinking	8		8			
3.4	The value of innovation: practical workshops	16		16		1	
	UFC 4 - LANGUAGE SKILLS		64	First Year			
4.1	English Theory	32		32		2	
4.2	English Lab	20		20		1	
4.3	Technical English	12		12		1	
	UFC 5 - QUALITY, SAFETY AND ENVIRONMENT		40	First Year			
5.1	Quality policies in process management (ISO 9000)	8		8		1	
5.2	Safety and accident prevention in the workplace (high risk) ISO 18000	16		16		1	
5.3	Total Quality Management	16		16		1	
	UFC 6 - FUNDAMENTALS OF MECHANICAL TECHNOLOGY		80	First Year			
6.1	Materials technology	20		20		2	
6.2	Mechanical technologies	20		20		1	
6.3	Mechanical measurements	16		16		1	
6.4	Mechanics Lab - CNC programming	24		24		1	
	UFC 7 - FUNDAMENTALS OF CAD AND TECHNICAL DRAWING		72	First Year			
7.1	Elements of industrial technical drawing	8		8		1	
7.2	Regulations for industrial technical drawing	8		8			
7.3	2D and 3D CAD	36		36		2	
7.4	Reverse engineering techniques	20		20		2	
	UFC 8 - FUNDAMENTALS OF ELECTRONICS AND ELECTROTECHNICS		132	First Year			
8.1	Basics of electrical engineering and electromagnetism	16		16		1	
8.2	Analog and digital electronics	16		16		1	
8.3	Control and drive systems - PLC	20		20		1	
8.4	Electrical measurements	20		20		1	
8.5	Electrical systems	20		20		1	
8.6	Electronics Lab	40		40		2	
	UFC 9 - INTEGRATED MECHATRONIC DESIGN		188	First Year			
9.1	Production processes and costs of company structures	32		32		2	
9.2	Mechanical-electronic integration	20		20		1	
9.3	Simulation and prototyping	24		24		2	
9.4	Integrated design software	24		24		2	
9.5	Sensors and actuators in industrial systems	20		20		1	
9.6	Control of mechatronic systems	24		24		2	
9.7	Mechatronic design Lab	44		44		2	
	UFC 10 - INDUSTRIAL AUTOMATION		168	First Year			
10.1	Fundamentals of automation	24		24		1	
10.2	Industrial programming	32		32		2	
10.3	Programmable Logic Controller (PLC)	24		24		1	
10.4	Automation of complex systems	16		16		1	
10.5	Embedded systems and industrial IoT	16		16		1	
10.6	Industrial networks and communication	24		24		1	
10.7	Supervision and control software	32		32		2	
	UFC 11 - ADVANCED MECHANICS		56	First Year			
11.1	ISO language programming	16		16		1	
11.2	CNC machining	40		40		2	
	UFC 12 - ORGANIZATION AND MANAGEMENT OF INDUSTRIAL PROCESSES		48	First Year			
12.1	Technical/administrative management and control documentation	20		20		1	
12.2	Failure mode prediction techniques	8		8		1	
12.3	Elements of Project Management	8		8		1	
12.4	Organization of the installation and maintenance service	12		12		1	
	UFC 13 - INTERNSHIP		840		Second Year		
13.1	Company internship	840			840		60
	TOTAL HOURS		1800	960	840	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

