

# INDUSTRIAL ROBOTICS SPECIALIST

## HIGHER TECHNICIAN FOR THE DEVELOPMENT AND INTEGRATION OF AUTOMATION AND ROBOTICS SYSTEMS FOR INDUSTRY

<https://www.itsprime.it/corsi-itsprime/industrial-robotics-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](http://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 **Firenze, Via Panciatichi 29**. 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.

### Tipo di Diploma finale:

Diploma in Higher Technician for Industrial Automation and Robotics (Area 6.2 – Process and Product Development and Innovation – Figure 6.1.2 of Annex 1 – Ministerial Decree 203 of 20 October 2023) specifying the course specialisation as “HIGHER TECHNICIAN FOR THE DEVELOPMENT AND INTEGRATION OF AUTOMATION AND ROBOTICS SYSTEMS FOR INDUSTRY”, with certification of competences corresponding to Level 5 of the European Qualifications Framework for Lifelong Learning (EQF) and constitutes a qualification for entry to public competitive examinations pursuant to Article 5, paragraph 7, of the Prime Ministerial Decree of 25 January 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/industrial-robotics-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 UFC (Capitalizable Training Units).

### **Course objectives**

The “INDUSTRIAL ROBOTICS SPECIALIST” course trains specialists to work on the design, programming, installation and testing of automated and robotic systems, collaborating with designers, programmers, maintenance technicians and production managers. The work placement enables students to apply their skills in companies that design automated machinery, integrate automation and robotics systems, use automated production lines or provide technical support for industrial plant.



### Main job opportunities

Industrial automation technician.

Robotics systems technician.

Junior PLC programmer.

Mechatronics systems integration technician.

Technician responsible for the installation, testing or maintenance of automated systems.

Designer and programmer of automation and robotics systems.

Specialist in the installation and testing of robotic and mechatronic systems.

Maintenance technician for automated systems and industrial robots.

### 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](http://www.itsprime.it)). The training pathway will be structured into 4 semesters for a total of **1,800 hours**:

- **Classroom lessons and laboratory activities: 1,040 hours**
- **Internships, in Italy and abroad: 760 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

#### **UFC 2 - CAREER AND BUSINESS ORIENTATION**

- 2.1 The company and the employment relationship (contracts)
- 2.2 Company 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 Lab: The Agoras
- 3.3 Design thinking and critical thinking
- 3.4 The value of innovation: hands-on labs



#### **UFC 4 - LANGUAGE SKILLS**

- 4.1 English theory
- 4.2 English Lab
- 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<sup>16</sup>

#### **UFC 6 - FUNDAMENTALS OF MECHANICAL TECHNOLOGY**

- 6.1 Materials technology
- 6.2 Mechanical technologies
- 6.3 Mechanical measurements
- 6.4 Mechanics Lab - CNC programming

#### **UFC 7 - FUNDAMENTALS OF CAD AND TECHNICAL DRAWING**

- 7.1 Elements of industrial technical drawing
- 7.2 Regulations for industrial technical drawing
- 7.3 2D and 3D CAD
- 7.4 Reverse engineering techniques

#### **UFC 8 - FUNDAMENTALS OF ELECTRONICS AND ELECTROTECHNICS**

- 8.1 Basics of electrotechnics and electromagnetism (electrical machines)
- 8.2 Analog and digital electronics
- 8.3 Control and drive systems - PLC
- 8.4 Electrical measurements
- 8.5 Electrical systems
- 8.6 Electronics Lab

#### **UFC 9 - PROCESS AND PRODUCT INDUSTRIALIZATION**

- 9.1 Production processes and environmental and economic sustainability
- 9.2 Lean Manufacturing and Lean Sustainability Management
- 9.3 Digitalization of industrial production (Digital Twins)

#### **UFC 10 - SYSTEM OPERATION AND MAINTENANCE**

- 10.1 Preventive and predictive maintenance
- 10.2 Installation and maintenance of automated lines
- 10.3 Technical/administrative management and control documentation
- 10.4 Elements of Project Management
- 10.5 Types and strategies of maintenance
- 10.6 Failure mode prediction techniques

#### **UFC 11 - APPLIED COMPUTER SCIENCE AND IOT**

- 11.1 Programming fundamentals



- 11.2 IOT
- 11.3 Augmented reality systems
- 11.4 Applied Computer Science Lab

#### **UFC 12 - INDUSTRIAL AUTOMATION**

- 12.1 Design of automatic systems
- 12.2 Electropneumatic and electrohydraulic actuators
- 12.3 Industrial control and automation systems
- 12.4 Programming of industrial automation systems
- 12.5 Industrial Automation Lab

#### **UFC 13 - INDUSTRIAL ROBOTICS**

- 13.1 Classification of industrial robots
- 13.2 Mechanics of industrial robots
- 13.3 Robotic transport systems
- 13.4 Programming, control and testing of robotic systems
- 13.5 Robotics Lab

#### **UFC 14 - INTERNSHIP**

- 14.1 Company internship



## Timetable and credits for teaching modules

| Acronym | Industrial Robotics Specialist                                                                        |              |                           |                   |                    |                             |                              |
|---------|-------------------------------------------------------------------------------------------------------|--------------|---------------------------|-------------------|--------------------|-----------------------------|------------------------------|
| Title   | Higher Technician for the development and integration of automation and robotics systems for industry |              |                           |                   |                    |                             |                              |
| Mod.    | Course                                                                                                | Module hours | Learning Unit (UFC) hours | First year        | Second year        | Training Credits First year | Training Credits Second year |
|         | <b>UFC 1 - EMPOWERMENT AND TEAM BUILDING</b>                                                          |              | <b>32</b>                 | <b>First year</b> |                    |                             |                              |
| 1.1     | Outdoor Training (outdoor environment)                                                                | 8            |                           | 8                 |                    | 2                           |                              |
| 1.2     | Self Empowerment and Team Building Lab                                                                | 12           |                           | 12                |                    |                             |                              |
| 1.3     | Problemsetting and solving - decision making - time management                                        | 12           |                           | 12                |                    |                             |                              |
|         | <b>UFC 2 - CAREER AND BUSINESS ORIENTATION</b>                                                        |              | <b>32</b>                 |                   | <b>Second year</b> |                             |                              |
| 2.1     | The company and the employment relationship (contracts)                                               | 8            |                           |                   | 8                  |                             | 1                            |
| 2.2     | Company organization and organizational charts                                                        | 12           |                           |                   | 12                 |                             | 2                            |
| 2.3     | Supply Chain Management                                                                               | 12           |                           |                   | 12                 |                             | 2                            |
|         | <b>UFC 3 - THINKING INNOVATION: PHILOSOPHY AND DESIGN THINKING</b>                                    |              | <b>48</b>                 | <b>First year</b> |                    |                             |                              |
| 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: hands-on labs                                                                | 16           |                           | 16                |                    | 1                           |                              |
|         | <b>UFC 4 - LANGUAGE SKILLS</b>                                                                        |              | <b>64</b>                 | <b>First year</b> |                    |                             |                              |
| 4.1     | English theory                                                                                        | 32           |                           | 32                |                    | 2                           |                              |
| 4.2     | English Lab                                                                                           | 20           |                           | 20                |                    | 1                           |                              |
| 4.3     | Technical English                                                                                     | 12           |                           | 12                |                    | 1                           |                              |
|         | <b>UFC 5 - QUALITY, SAFETY AND ENVIRONMENT</b>                                                        |              | <b>40</b>                 | <b>First year</b> |                    |                             |                              |
| 5.1     | Quality policies in process management (ISO 9000)                                                     | 8            |                           | 8                 |                    | 2                           |                              |
| 5.2     | Workplace safety and accident prevention (high risk) ISO 18000                                        | 16           |                           | 16                |                    |                             |                              |
| 5.3     | Total Quality Management                                                                              | 16           |                           | 16                |                    |                             |                              |
|         | <b>UFC 6 - FUNDAMENTALS OF MECHANICAL TECHNOLOGY</b>                                                  |              | <b>80</b>                 | <b>First year</b> |                    |                             |                              |
| 6.1     | Materials technology                                                                                  | 20           |                           | 20                |                    | 2                           |                              |
| 6.2     | Mechanical technologies                                                                               | 20           |                           | 20                |                    | 2                           |                              |
| 6.3     | Mechanical measurements                                                                               | 16           |                           | 16                |                    | 1                           |                              |
| 6.4     | Mechanics Lab - CNC programming                                                                       | 24           |                           | 24                |                    | 1                           |                              |
|         | <b>UFC 7 - FUNDAMENTALS OF CAD AND TECHNICAL DRAWING</b>                                              |              | <b>72</b>                 | <b>First year</b> |                    |                             |                              |
| 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                |                    | 3                           |                              |
| 7.4     | Reverse engineering techniques                                                                        | 20           |                           | 20                |                    | 2                           |                              |
|         | <b>UFC 8 - FUNDAMENTALS OF ELECTRONICS AND ELECTROTECHNICS</b>                                        |              | <b>132</b>                | <b>First year</b> |                    |                             |                              |
| 8.1     | Basics of electrotechnics and electromagnetism (electrical machines)                                  | 16           |                           | 16                |                    | 1                           |                              |
| 8.2     | Analog and digital electronics                                                                        | 16           |                           | 16                |                    | 1                           |                              |
| 8.3     | Control and drive systems - PLC                                                                       | 20           |                           | 20                |                    | 2                           |                              |
| 8.4     | Electrical measurements                                                                               | 20           |                           | 20                |                    | 2                           |                              |
| 8.5     | Electrical systems                                                                                    | 20           |                           | 20                |                    | 2                           |                              |
| 8.6     | Electronics Lab                                                                                       | 40           |                           | 40                |                    | 2                           |                              |
|         | <b>UFC 9 - PROCESS AND PRODUCT INDUSTRIALIZATION</b>                                                  |              | <b>60</b>                 | <b>First year</b> |                    |                             |                              |
| 9.1     | Production processes and environmental and economic sustainability                                    | 20           |                           | 20                |                    | 1                           |                              |
| 9.2     | Lean Manufacturing and Lean Sustainability Management                                                 | 24           |                           | 24                |                    | 2                           |                              |
| 9.3     | Digitalization of industrial production (Digital Twins)                                               | 16           |                           | 16                |                    | 1                           |                              |
|         | <b>UFC 10 - SYSTEM OPERATION AND MAINTENANCE</b>                                                      |              | <b>76</b>                 | <b>First year</b> |                    |                             |                              |
| 10.1    | Preventive and predictive maintenance                                                                 | 20           |                           | 20                |                    | 2                           |                              |
| 10.2    | Installation and maintenance of automated lines                                                       | 20           |                           | 20                |                    | 2                           |                              |
| 10.3    | Technical/administrative management and control documentation                                         | 12           |                           | 12                |                    | 1                           |                              |
| 10.4    | Elements of Project Management                                                                        | 8            |                           | 8                 |                    | 1                           |                              |
| 10.5    | Types and strategies of maintenance                                                                   | 8            |                           | 8                 |                    |                             |                              |
| 10.6    | Failure mode prediction techniques                                                                    | 8            |                           | 8                 |                    |                             |                              |
|         | <b>UFC 11 - APPLIED COMPUTER SCIENCE AND IOT</b>                                                      |              | <b>108</b>                | <b>First year</b> |                    |                             |                              |
| 11.1    | Programming fundamentals                                                                              | 32           |                           | 32                |                    | 2                           |                              |
| 11.2    | IOT                                                                                                   | 24           |                           | 24                |                    | 2                           |                              |
| 11.3    | Augmented reality systems                                                                             | 20           |                           | 20                |                    | 2                           |                              |
| 11.4    | Applied Computer Science Lab                                                                          | 32           |                           | 32                |                    | 1                           |                              |
|         | <b>UFC 12 - INDUSTRIAL AUTOMATION</b>                                                                 |              | <b>144</b>                | <b>First year</b> |                    |                             |                              |
| 12.1    | Design of automatic systems                                                                           | 32           |                           | 32                |                    | 2                           |                              |
| 12.2    | Electropneumatic and electrohydraulic actuators                                                       | 24           |                           | 24                |                    | 2                           |                              |
| 12.3    | Industrial control and automation systems                                                             | 24           |                           | 24                |                    | 2                           |                              |
| 12.4    | Programming of industrial automation systems                                                          | 24           |                           | 24                |                    | 2                           |                              |
| 12.5    | Industrial Automation Lab                                                                             | 40           |                           | 40                |                    | 2                           |                              |
|         | <b>UFC 13 - INDUSTRIAL ROBOTICS</b>                                                                   |              | <b>152</b>                |                   | <b>Second year</b> |                             |                              |
| 13.1    | Classification of industrial robots                                                                   | 12           |                           |                   | 12                 |                             | 1                            |
| 13.2    | Mechanics of industrial robots                                                                        | 32           |                           |                   | 32                 |                             | 3                            |
| 13.3    | Robotic transport systems                                                                             | 20           |                           |                   | 20                 |                             | 2                            |
| 13.4    | Programming, control and testing of robotic systems                                                   | 40           |                           |                   | 40                 |                             | 3                            |
| 13.5    | Robotics Lab                                                                                          | 48           |                           |                   | 48                 |                             | 2                            |
|         | <b>UFC 14 - INTERNSHIP</b>                                                                            |              | <b>760</b>                |                   | <b>Second year</b> |                             |                              |
| 14.1    | Company internship                                                                                    | 760          |                           |                   | 760                |                             | 44                           |
|         | <b>TOTAL HOURS</b>                                                                                    |              | <b>1800</b>               | <b>856</b>        | <b>944</b>         | <b>60</b>                   | <b>60</b>                    |

### **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 lessons**

Italian

