

AUTOMA20

Course for Higher Technician for Mechatronic Systems Management and Industrial Production Automation

<http://www.itsprime.it/corsi/nuovi-corsi/automa20/>

Type of course:

two-year course after secondary school diploma.

Teaching location: Florence

Type of final Diploma:

Diploma in "HIGHER TECHNICIAN FOR AUTOMATION AND INTEGRATED MECHATRONIC SYSTEMS " (Area 4.3 Mechanical system - Figure 4.3.2 of Annex D - Interministerial Decree 07/09/2011) **with indication of specialization of the course in "HIGHER TECHNICIAN FOR MECHATRONIC SYSTEMS MANAGEMENT AND AUTOMATION OF INDUSTRIAL PRODUCTION",, with the certification of skills corresponding to the fifth level of the European Qualifications Framework - EQF.**

In order to facilitate circulation at national and European level, the certificate is accompanied by EUROPASS certification.

Entry requirements:

possession of secondary school diploma;
age between 18 to 30 years (not completed on the call deadline date).

Type of access:

programmed number: 25 students

Selection mode:

The selection of participants includes a written test and a motivational interview.

Method of enrollment:

see link: <http://www.itsprime.it/corsi/iscriviti-ai-corsi/>

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 judgement of 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 will have to attend. On this basis the Scientific Technical Committee indicates which modules can be recognized as already learned by the student.

Profile of the course

The "HIGHER TECHNICIAN FOR MECHATRONIC SYSTEMS MANAGEMENT AND INDUSTRIAL PRODUCTION AUTOMATION" designs, develops, programs and manages mechatronic systems for flexible production (FMS) and industrial automation systems, identifying the mechanical, electromechanical, electronic, pneumatic and hydraulic components constitutive of the system in relation to the cycle of planned activities.

Main expected learning outcomes

The graduate of AUTOMA20 has the competence:

1. to perform the design of the automation model for the execution of the sequences of activities provided by the system, selecting the mechanical, electromechanical, electronic, pneumatic and hydraulic components;
2. to define the configuration of the integrated mechatronic system by identifying its hardware components, setting the architecture of the automatic control and establishing the topology, protocols and operating parameters of the industrial telecommunications network;
3. to define the configuration of the robotic system, choosing the type of End Effector to maximize functional performance and implementing the programming of the controllers;
4. to program the logic of the automation system based on PLC, setting the parameters of drive and control within specific development environments and realizing the descriptive diagram (Ladder Diagram);
5. to manage the technical representation of the mechatronic product, realizing 2D CAD drawing, 3D parametric CAD modeling of components and assemblies and integrating specific tools for electrical and electronic design;
6. to manage the operation of the integrated mechatronic system for production with different technological solutions (additive and subtractive) and the dimensional verification of mechatronic components, controlling the correct operation of the machines and intervening with maintenance procedures of the system in case of failure.

Possibility of access to further studies

The diploma can be integrated into a subsequent university course, with recognition of university credits.

Regulations for the conduct of examinations 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 1200 hours of lessons and at least 50% of the 800 hours of internship in the company, and having obtained in all the Didactic modules at least 60/100, are admitted to take the final exam. The exam con-

sists of a written test with multiple choice tests, a technical-practical test, an interview. The fundamental part of interview is the discussion of a work experience, designed and prepared during the internship period. By passing the exam, students acquire the Diploma of Higher Technician, a qualification corresponding to the 5th level of the European Qualifications Framework EQF.

Course structure

Training Units and Didactic Modules

First year

UFC 1 - EMPOWERMENT AND TEAM BUILDING

- A1.1 Outdoor Training (in outdoor environment)
- A1.2 Self Empowerment and Team Building Workshop
- A1.3 Problem setting and solving - decision making - time management

UFC 3 - THE COMPANY SYSTEM

- A3.1 Company organization and organization charts
- A3.2 Techniques for managing orders
- A3.3 Supply Chain Management
- A3.4 Digitisation of industrial production (Industry 4.0)

UFC 4 - LANGUAGE SKILLS

- A4.1 English theory
- A4.2 English workshop
- A4.3 Technical English

UFC 5 - 3D TECHNICAL DRAWING AND MODELLING

- A5.3 Regulations for mechanical technical drawing
- A6.1 Computer Aided Design (Autocad)
- A6.2 Parametric Solid Modeling (Solidworks)

UFC 6 - MECHANICAL TECHNOLOGIES

- A5.4.2 Material technology
- A.5.5 Laboratory of mechanical measurements
- A5.6 Basic mechanical laboratory (manual machines)

CFU 8 - QUALITY, SAFETY AND ENVIRONMENT

- A8.1 Quality policies in the use of processes (ISO 9001)
- A8.2 Safety and prevention of workplace accidents (high risk)
- A8.3 Ecological enterprise; iso 14000 and environmental compatibility of industrial production

UFC 9 - INDUSTRIALIZATION OF PROCESS AND PRODUCT

- A9.1 Production processes and costs of company structures
- A9.7 Lean Manufacturing

UFC 10 - SYSTEM OPERATION AND MAINTENANCE

- A10.1 Organisation of installation and maintenance services
- A10.2 Techniques for predicting failure modes
- A10.3 Installation and maintenance of mechanical, pneumatic and electrical equipment

UFC 11 - APPLIED INFORMATICS AND IOT

- A13.1 Programming languages (C/C++)
- A13.2 Microcontrollers (Arduino)
- A13.3 IOT
- A13.4 Augmented reality systems (AR)
- A14.5 Laboratory of applied computer science

UFC 12 - INDUSTRIAL AUTOMATION

- A11.2.1 Electrical, pneumatic and hydraulic actuators
- A11.1.1 Industrial control and automation systems
- A11.3.1 Programming of industrial automation systems
- A11.4.1 Industrial automation laboratory

Second year

UFC 2 - JOB ORIENTATION AND SELF-EMPLOYMENT

- A2.1 The enterprise and the employment relationship (contracts)
- A2.2 Self-entrepreneurship
- A2.3 Management of the profession (professional colleges)

CFU 7 - PRODUCT DEVELOPMENT TOOLS

- A7.4.2 ISO programming
- A7.5 CAM (Esprit)
- A14.1 Rapid prototyping and reverse engineering
- A7.8 Advanced mechanics laboratory (numerical control machines)

UFC 13 - INDUSTRIAL ROBOTICS

- A14.1 Mechanics of industrial robots
- A14.2 Robotic transport systems
- A14.3 Programming and control of robotic systems
- A14.4 Laboratory of robotics

UFC 12 - STAGE

- A12.1 Internship in the company

Diagram of the structure of the course with the relative credits

Automa20						
Acronym						
Title	"HIGHER TECHNICIAN FOR MECHATRONIC SYSTEMS MANAGEMENT AND AUTOMATION OF INDUSTRIAL PRODUCTION",,					
Modules code	Teaching	Hours UFC	Hours First year Modules	Hours Second year Modules	Credits First year	Credits Second year
	UFC 1 - EMPOWERMENT AND TEAM BUILDING	40	First year			
A1.1	Outdoor Training (in outdoor environment)		8		2	
A1.2	Self Empowerment and Team Building Workshop		16			
A1.3	Problemsetting and solving - decision making - time management		16			
	UFC 2 - JOB ORIENTATION AND SELF-EMPLOYMENT	24		Second year		
A2.1	The enterprise and the employment relationship (contracts)			8		1
A2.2	Self-entrepreneurship			12		2
A2.3	Management of the profession (professional colleges)			4		1
	UFC 3 - THE COMPANY SYSTEM	44	First year			
A3.1	Company organization and organization charts		16		1	
A3.2	Techniques for managing orders		8		1	
A3.3	Supply Chain Management		12		1	
A3.4	Digitisation of industrial production (Industry 4.0)		8		1	
	UFC 4 - LANGUAGE SKILLS	72	First year			
A4.1	English theory		40		3	
A4.2	English workshop		20		1	
A4.3	Technical English		12		1	
	UFC 5 - 3D TECHNICAL DRAWING AND MODELLING	136	First year			
A5.3	Regulations for mechanical technical drawing		16		1	
A6.1	Computer Aided Design (Autocad)		40		2	
A6.2	Parametric Solid Modeling (Solidworks)		80		4	
	UFC 6 - MECHANICAL TECHNOLOGIES	104	First year			
A5.4.2	Material technology		32		3	
A.5.5	Laboratory of mechanical measurements		32		1	
A5.6	Basic mechanical laboratory (manual machines)		40		2	
	CFU 7 - PRODUCT DEVELOPMENT TOOLS	140		Second year		
A7.4.2	ISO programming			20		3
A7.5	CAM (Esprit)			60		5
A14.1	Rapid prototyping and reverse engineering			20		3
A7.8	Advanced mechanics laboratory (numerical control machines)			40		2
	CFU 8 - QUALITY, SAFETY AND ENVIRONMENT	44	First year			
A8.1	Quality policies in the use of processes (ISO 9001)		16		2	
A8.2	Safety and prevention of workplace accidents (high risk)		20		2	
A8.3	Ecological enterprise; iso 14000 and environmental compatibility of industrial production		8		1	
	UFC 9 - INDUSTRIALIZATION OF PROCESS AND PRODUCT	64	First year			
A9.1	Production processes and costs of company structures		32		3	
A9.7	Lean Manufacturing		32		3	
	UFC 10 - SYSTEM OPERATION AND MAINTENANCE	52	First year			
A10.1	Organisation of installation and maintenance services		20		2	
A10.2	Techniques for predicting failure modes		8		1	
A10.3	Installation and maintenance of mechanical, pneumatic and electrical equipment		24		2	
	CFU 11 - APPLIED INFORMATICS AND IOT	148	First year			
A13.1	Programming languages (C/C++)		40		3	
A13.2	Microcontrollers (Arduino)		32		3	
A13.3	IOT		20		2	
A13.4	Augmented reality systems (AR)		16		1	
A14.5	Laboratory of applied computer science		40		2	
	UFC 12 - INDUSTRIAL AUTOMATION	200	First year			
A11.2.1	Electric, pneumatic and hydraulic actuators		40		2	
A11.1.1	Industrial control and automation systems		40		2	
A11.3.1	Programming of industrial automation systems		60		3	
A11.4.1	Laboratory of industrial automation		60		2	
	UFC 13 - INDUSTRIAL ROBOTICS	132		Second year		
A14.1	Mechanics of industrial robots			28		4
A14.2	Robotic transport systems			24		2
A14.3	Programming and control of robotic systems			40		3
A14.4	Laboratory of robotics			40		2
	UFC 14 - INTERNSHIP	800		Second year		
A12.1	Internship in the company			800		32
	TOTAL HOURS	2000	904	1096	60	60

ECTS credit system

For each course, ITS PRIME has adopted the credit calculation according to the credit system used in the European Higher Education Area ECTS (European Credit Transfer System). For one-year credits, 60 credits are provided, as for most Higher Education Institutions. For each Didactic Module, the workload required by the students to achieve the expected learning outcomes has been evaluated by evaluation experts and modules teachers. The hours of lessons were considered 30% or 50% of the hours of the workload according to the theoretical or theoretical-practical nature of the different modules. The time spent on the internship in the company and for the laboratory activities was considered 100% of the workload.

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 (1200 hours),
internship, in Italy and abroad (800 hours). Any foreign internships are carried out with the European Erasmus+ programme.

Lesson time: from a minimum of 4 to a maximum of 8 hours per day.

The entire training course is carried out in close connection with the mechanic sector companies. The teaching team is composed of at least 50% 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..

Language of lessons

Italian

Course calendar

Start-up	october	2020
Preliminary Lessons on fundamental topics to the understanding of the course	october	2020
End of first year	july	2021
Second-year start	september	2021
Early stage italia	march	2022
Start of foreign internship (if any)	june	2022
End of the course	september	2022
Final examination	october	2022

Course manager	Mirko Del Grande
Tutor	Anna Semeraro