NeoMech23

Course for Higher Technician for the production of integrated mechatronic systems

http://www.itsprime.it/corsi/nuovi-corsi/neomech23/

Type of course:
two-year course after 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 (IFTS) course.

Teaching location:
the course will take place mainly at the headquarters of **Assoservizi Formazione Srl, Viale XX Settembre n. 116/118 – Carrara** and at the headquarters of **Provincia di Massa Carrara, Via delle Carre, 55 - Massa**. Part 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 facilities of educational or scientific interest located elsewhere. The internships can take place in companies located in any part of the regional, national and/or European territory.

Registration deadline: November 20, 2023

Type of final Diploma:
Diploma in "HIGHER TECHNICIAN FOR AUTOMATION AND 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 **"COURSE FOR HIGHER TECHNICIAN FOR THE PRODUCTION OF INTEGRATED MECHATRONIC SYSTEMS" 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 or after the 4-year Diploma of Vocational Education and Training (VET) integrated by a one-year Higher Technical Education and Training (IFTS) course;

age between 18 to 35 years (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:
programmed number: 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: http://www.itsprime.it/corsi/nuovi-corsi/neomech23/

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 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.

Profile of the course
The “HIGHER TECHNICIAN FOR THE PRODUCTION OF INTEGRATED MECHATRONIC SYSTEMS” has the ability to use innovative materials and state-of-the-art technologies to improve the quality, productivity, flexibility, and competitiveness of mechanical and mechatronic companies in the development of industrial products and the maintenance of machines and plants.

Main expected learning outcomes
The **NeoMec23** graduate has the competence to

- combine different technologies, from mechanics to electronics to information technology, which enable him/her to intervene in the entire production chain: from the study of the project, to the use of representation and simulation software up to techniques for processing materials;

- know the design, prototyping and industrialisation techniques for mechanical products (CAD, CAD 3D, CAM, FEM, etc.); act in the construction, testing and documentation of production processes;
- be familiar with innovative materials and their processing procedures; can manage the production of mechanical components using additive manufacturing (AM) techniques;
- know how to programme industrial automation systems (PLC, CNC numerical control machines, etc.) and apply testing, commissioning and fault-prevention methods;
- manage production flows in their planning, control and cost-effectiveness (LEAN);
- researching and applying technical and safety regulations in the electrical, electronic and mechanical fields;
- intervene in the marketing phase by managing after-sales and system maintenance requirements.

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 (1100 hours),
internship, in Italy and abroad (700 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.

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 take the final exam. The exam consists 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 5st level of the European Qualifications Framework EQF

Course structure
Training Units and Didactic 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 - JOB AND BUSINESS ORIENTATION
2.1 The company and the employment relationship (contracts))
2.2 Business organization and organization charts
2.3 Techniques for managing orders
2.4 Supply Chain Management

UFC 3 - LANGUAGE SKILLS
3.1 English theory
3.2 English workshop
3.3 Technical English

UFC 4 - TECHNICAL DRAWING AND 3D MODELLING
4.1 Standards for mechanical technical drawing
4.2 Computer Aided Design (AutoCAD)
4.3 Parametric solid modelling

UFC 5 - MECHANICAL TECHNOLOGIES
5.1 Materials technology
5.2 Mechanical design
5.3 Mechanical measurement laboratory
5.4 Basic mechanics workshop (manual machines)

UFC 6 - PRODUCT DEVELOPMENT TOOLS
6.1 ISO programming
6.2 CAM
6.3 Rapid prototyping and reverse engineering
6.4 Advanced mechanical workshop (numerical control machines)

UFC 7 - QUALITY, SAFETY AND ENVIRONMENT
7.1 Quality policies in process utilisation (ISO 9001)
7.2 Safety and accident prevention in the workplace (high risk)
7.3 Green enterprise; iso 14000 and eco-compatibility of industrial production

UFC 8- INDUSTRIALISATION OF PROCESS AND PRODUCT
8.1 Production processes and costs of company structures
8.2 Lean Manufacturing
8.3 Digitalisation of industrial production (Industry 4.0)

UFC 9- SYSTEM OPERATION AND MAINTENANCE

9.1 Organisation of installation and maintenance service
9.2 Failure mode prediction techniques
9.3 Installation and maintenance of automated lines

UFC 10 - APPLIED COMPUTING AND IOT

10.1 Programming languages (C/C++)
10.2 IOT (Arduino)
10.3 Augmented reality systems (AR)
10.4 Applied computing laboratory (Arduino)

UFC 11 - INDUSTRIAL AUTOMATION

11.1 Electric, pneumatic and hydraulic actuators
11.2 Control systems and industrial automation
11.3 Programming of industrial automation systems (PLC)
11.4 I ndustrial automation laboratory

UFC 12 - INDUSTRIAL ROBOTICS

12.1 Classification of industrial robots
12.2 Mechanics of industrial robots
12.3 Robotic transport systems
12.4 Programming and control of robotic systems
12.5 Robotics workshop

UFC 13 - INTERNSHIP

13.1 Company internship

Timetable and credits for teaching modules

Acronym	NeoMec23					
Title	Higher Technician for the production of integrated mechatronic systems					
Modules Code	Teaching	Hours UFC	Hours First year	HoursSecond year	Credits First year	Credits Second year
	UFC 1 - EMPOWERMENT E TEAM BUILDING	40	First year	Second year	First year	Second year
1.1	Outdoor Training (in ambiente esterno)		8			
1.2	Laboratorio di Self Empowerment e Team Building		16		2	
1.3	Problemsetting and solving - decision making - time management		16			
	UFC 2 - JOB AND BUSINESS ORIENTATION	40		Second year		
2.1	The company and the employment relationship (contracts))			8		
2.2	Business organization and organization charts			12		
2.3	Techniques for managing orders			8		4
2.4	Supply Chain Management			12		
	UFC 3 - LANGUAGE SKILLS	68	First year			
3.1	English theory		40		3	
3.2	English workshop		20		2	
3.3	Technical English		8			
	UFC 4 - TECHNICAL DRAWING AND 3D MODELLING	124	First year			
4.1	Standards for mechanical technical drawing		12		2	
4.2	Computer Aided Design (AutoCAD)		32		3	
4.3	Parametric solid modelling		80		5	
	UFC 5 - MECHANICAL TECHNOLOGIES	128	First year			
5.1	Materials technology		24		3	
5.2	Mechanical design		40		4	
5.3	Mechanical measurement laboratory		24		1	
5.4	Basic mechanics workshop (manual machines)		40		2	
	UFC 6 - PRODUCT DEVELOPMENT TOOLS	140		Second year		
6.1	ISO programming			20		2
6.2	CAM			60		3
6.3	Rapid prototyping and reverse engineering			20		2
6.4	Advanced mechanical workshop (numerical control machines)			40		3
	UFC 7 - QUALITY, SAFETY AND ENVIRONMENT	40	First year			
7.1	Quality policies in process utilisation (ISO 9001)		16			
7.2	Safety and accident prevention in the workplace (high risk)		16		3	
7.3	Green enterprise; iso 14000 and eco-compatibility of industrial production		8			
	UFC 8- INDUSTRIALISATION OF PROCESS AND PRODUCT	72	First year			
8.1	Production processes and costs of company structures		32		3	
8.2	Lean Manufacturing		32		3	
8.3	Digitalisation of industrial production (Industry 4.0)		8			
	UFC 9- SYSTEM OPERATION AND MAINTENANCE	44	First year			
9.1	Organisation of installation and maintenance service		12		3	
9.2	Failure mode prediction techniques		8			
9.3	Installation and maintenance of automated lines		24		3	
	UFC 10 - APPLIED COMPUTING AND IOT	128	First year			
10.1	Programming languages (C/C++)		40		3	
10.2	IOT (Arduino)		32		3	
10.3	Augmented reality systems (AR)		16		1	
10.4	Applied computing laboratory (Arduino)		40		2	
	UFC 11 - INDUSTRIAL AUTOMATION	180	First year			
11.1	Electric, pneumatic and hydraulic actuators		40		2	
11.2	Control systems and industrial automation		40		2	
11.3	Programming of industrial automation systems (PLC)		60		3	
11.4 I	ndustrial automation laboratory		40		2	
	UFC 12 - INDUSTRIAL ROBOTICS	96		Second year		
12.1	Classification of industrial robots			8		
12.2	Mechanics of industrial robots			16		4
12.3	Robotic transport systems			8		
12.4	Programming and control of robotic systems			32		4
12.5	Robotics workshop			32		4
	UFC 13 - INTERNSHIP	700		Second year		
13.1	Company internship			700		34
	TOTAL HOURS	1800	824	976	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. 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 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.

Language of lessons

Italian

Course calendar

Start-up	**September**	**2023**
Preliminary Lessons on fundamental topics to the under-standing of the course	**October**	**2023**
End of first year	**June**	**2024**
Second-year start	**September**	**2024**
Early stage italia	**February**	**2025**
Start of foreign internship (if any)	**May**	**2025**
End of the course	**September**	**2025**
Final examination	**October**	**2025**

Information on the organisation of tutoring and mentoring services

For each course a coordinator and a tutor will be appointed, who will follow and monitor the didactic activities and solve any collective or personal problems of the students.

Accompanying activities to achieve the best learning outcomes will be:

Accompanying activities	Individual hours	Group hours	Total hours
Initials			
Presentation and training agreement		2	2
Individual analysis	2		50
Preliminary Lessons on fundamental topics to the understanding of the course		32	32
Additional training			
English conversation	4		100
Laboratory of production synthesis		48	48
Stage alignment			
Collective orientation internship		4	4
Individual orientation internship	1		25
Accompaniment			
Collective accompaniment		20	20
Individual accompaniment	1		25
Totale	**8**	**106**	**306**

Calculation based on the number of students = 25