

Innova21

Course for Higher Technician for Mechanical Design and industrialization of processes and products

<http://www.itsprime.it/corsi/nuovi-corsi/innova21/>

Type of course:

two-year course after secondary school diploma

Teaching location:

Florence

Registration deadline: 1st October 2021

Type of final Diploma:

Diploma in "HIGHER TECHNICIAN FOR DESIGN AND ADVANCED MECHANICAL PRODUCTION " (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 MECHANICAL DESIGN AND INDUSTRIALISATION OF PROCESSES AND PRODUCTS", with certification of the competencies corresponding to level V of the European Qualifications Framework - EQF.**

In order to facilitate circulation at national and European level, the certificate shall be supplemented by the 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:

curricular evaluation by qualifications and experiences,

a written test,

a motivational interview.



Method of enrollment:

see link: <http://www.itsprime.it/corsi/nuovi-corsi/innova21/>

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 evaluation of the Evaluation Commission that assesses 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 Commission indicates which modules can be recognized as already learned by the student.

Profile of the course

The "HIGHER TECHNICIAN FOR MECHANICAL DESIGN AND INDUSTRIALIZATION OF PROCESSES AND PRODUCTS" specializes in the design of machines and systems and in the industrialization of their production, in compliance with the design standards required, using the main enabling technologies of Enterprise 4.0 .

Main expected learning outcomes

The graduate of INNOVA20 has the competence:

1. to carry out the design development of the mechanical product using methods and techniques for inventive design, integrated and adaptive, based on the business needs of customization of the product and cost containment;
2. to realize the 2D CAD representation and the 3D CAD modeling of the mechanical product to develop technical tables of description of the project, to set up analysis of static type and kinematic and fluid dynamic simulations;
3. to support the simulation of the production process, in order to choose the materials most suitable for the realization of the components and to optimize the topology for the functional prototyping, the additive and/or subtractive production and the reverse engineering;
4. to manage the manufacturing technologies of the components, programming at CAM the machining paths of the part with subtractive technology and developing the code for their execution (CNC) or implementing the procedures for industrial 3D printing (Additive manufacturing);
5. to define maintenance procedures for production technologies to limit downtime;
6. to manage the production and assembly of mechanical components and products, adapting the configuration of specific operating equipment to better perform the required operations;

7. to collaborate in the definition of a plan of continuous improvement on the business processes (LEAN), realizing interventions of constant refinement of the productive cycle in order to optimize the quality of the products (TQM)

Possibility of access to further studies

The diploma can be integrated with a subsequent university course, with recognition of university training credits (CFU) on the basis of the didactic regulations of the individual universities. In this regard, reference should be made to the current legislation.

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 1040 hours of lessons and at least 50% of the 760 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 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 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 2 - JOB AND BUSINESS ORIENTATION

- A2.1 The company and the employment relationship (contracts)
- A2.2 Business organization and organization charts
- A2.3 Order management techniques
- A2.4 Supply Chain Management

UFC 3 - LANGUAGE SKILLS

- A3.1 English theory
- A3.2 English workshop
- A3.3 Technical English

UFC 4 - MECHANICAL DESIGN

- B4.1 Bases of mechanical design
- B4.2 Machine design
- B4.3 Automatic machines
- B4.4 Regulations for mechanical technical drawing
- B4.5 Material technology
- B4.6 Laboratory of basic mechanical measurements
- B4.7 Basic mechanical laboratory (manual machines)

UFC 5 - MECHANICAL DESIGN TOOLS

- B5.1 Computer Aided Design (Autocad)
- B5.2 Basic Parametric Solid Modeling (Solidworks)
- B5.3 Laser scanning and reverse engineering

UFC 7 - QUALITY, SAFETY AND ENVIRONMENT

- A7.1 Quality policies in the use of processes (ISO 9001)
- A7.2 Safety and prevention of workplace accidents (high risk)
- A7.3 Ecological enterprise; iso 14000 and environmental compatibility of industrial production

UFC 8 - INDUSTRIALIZATION OF PROCESS AND PRODUCT

- B8.1 Production processes and costs of company structures
- B8.2 Production technologies and mechanical processing
- B8.3 New machinery directive (2006/42/EC)
- B8.4 Design for the production
- B8.5 Documentation and technical manuals
- B8.6 Product Lifecycle Management (PLM)
- B8.7 Lean Manufacturing (Six Sigma)
- B8.8 Digitization of industrial production (Industry 4.0)

UFC 9 - SYSTEM OPERATION AND MAINTENANCE

- A9.1 Organisation of installation and maintenance services
- A9.2 Techniques for predicting failure modes
- A9.3 Installation and maintenance of mechanical, pneumatic and electrical equipment

Second year

UFC 6 - PRODUCT DEVELOPMENT TOOLS

- B6.1 Topological optimization of structures (Additive manufacturing)
- B6.2 Additive manufacturing (Printers and processes)
- B6.3 Advanced Parametric Solid Modeling (Solidworks)
- B6.4 ISO programming
- B6.5 CAM (Esprit)
- B6.6 Static and dynamic structural analysis with FEM methodology
- B6.7 Advanced mechanical measurement laboratory (TAC, CMM, Optical Scanning, etc.)
- B6.8 Advanced mechanics laboratory (numerical control machines)

UFC 10 - STAGE

- B10.1 Internship in the company

Diagram of the structure of the course with the relative credits

Acronimo	Innova21					
Titolo	Tecnico Superiore per la progettazione meccanica e l'industrializzazione dei processi e dei prodotti					
Codice Moduli	Insegnamento	Ore UFC	Ore Moduli	Ore Moduli	Crediti Formativi	Crediti Formativi
	UFC 1 - EMPOWERMENT E TEAM BUILDING	40	Primo anno	Secondo anno	Primo anno	Secondo anno
A1.1	Outdoor Training (in ambiente esterno)		8			
A1.2	Laboratorio di Self Empowerment e Team Building		16		2	
A1.3	Problemsetting and solving - decision making - time management		16			
	UFC 2 - ORIENTAMENTO AL LAVORO E ALL'IMPRESA	40	Primo anno			
A2.1	L'impresa e il rapporto di lavoro (contratti)		8		1	
A2.2	Organizzazione aziendale e organigrammi		12		1	
A2.3	Tecniche di gestione delle commesse		8		1	
A2.4	Supply Chain Management		12		1	
	UFC 3 - COMPETENZE LINGUSTICHE	68	Primo anno			
A3.1	Teoria inglese		40		3	
A3.2	Laboratorio inglese		20		1	
A3.3	Inglese tecnico		8		1	
	UFC 4 - PROGETTAZIONE MECCANICA	228	Primo anno			
B4.1	Basi di progettazione meccanica		40		4	
B4.2	Progettazione di macchine		40		4	
B4.3	Macchine automatiche		20		2	
B4.4	Normativa per il disegno tecnico meccanico		16		2	
B4.5	Tecnologia dei materiali		40		4	
B4.6	Laboratorio di misure meccaniche base		32		1	
B4.7	Laboratorio di meccanica base (macchine manuali)		40		1	
	UFC 5 - STRUMENTI PER LA PROGETTAZIONE MECCANICA	140	Primo anno			
B5.1	Computer Aided Design (AutoCAD)		40		2	
B5.2	Modellazione solida parametrica base (SolidWorks)		80		5	
B5.3	Laserscanning e reverse engineering		20		2	
	UFC 6 - STRUMENTI PER LO SVILUPPO DEL PRODOTTO	276		Secondo anno		
B6.1	Ottimizzazione topologica delle strutture (Additive manufacturing)			20		2
B6.2	Additive manufacturing (Stampanti e processi)			32		3
B6.3	Modellazione solida parametrica avanzata (SolidWorks)			40		4
B6.4	Programmazione ISO			40		4
B6.5	CAM (Esprit)			60		6
B6.6	Analisi strutturali statiche e dinamiche con metodologia FEM			20		2
B6.7	Laboratorio di misure meccaniche avanzato (TAC, CMM, Optical Scanning, ecc.)			24		1
B6.8	Laboratorio di meccanica avanzato (macchine controllo numerico)			40		2
	UFC 7 - QUALITÀ, SICUREZZA E AMBIENTE	40	Primo anno			
A7.1	Politiche di qualità nell'utilizzo dei processi (ISO 9001)		16		1	
A7.2	Sicurezza e prevenzione degli infortuni nei luoghi di lavoro (rischio elevato)		16		2	
A7.3	Impresa ecologica; iso 14000 e ecocompatibilità della produzione industriale		8		1	
	UFC 8 - INDUSTRIALIZZAZIONE DEL PROCESSO E DEL PRODOTTO	164	Primo anno			
B8.1	Processi produttivi e costi delle strutture aziendali		32		3	
B8.2	Tecnologie produttive e lavorazioni meccaniche		20		2	
B8.3	Nuova direttiva macchine (2006/42/CE)		12		1	
B8.4	Progettazione per la produzione		20		2	
B8.5	Documentazione e manualistica tecnica		20		2	
B8.6	Product Lifecycle Management (PLM)		20		1	
B8.7	Lean Manufacturing (Six Sigma)		32		2	
B8.8	Digitalizzazione della produzione industriale (Industria 4.0)		8			
	UFC 9 - CONDUZIONE E MANUTENZIONE DEI SISTEMI	44	Primo anno			
B9.1	Organizzazione del servizio di installazione e di manutenzione		12		2	
B9.2	Tecniche di previsione delle modalità di guasto		8		1	
B9.3	Installazione e manutenzione di dispositivi meccanici, pneumatici ed elettrici		24		2	
	UFC 10 - STAGE	760		Secondo anno		
B10.1	Stage in azienda			760		36
	TOTALE ORE	1800	764	1036	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 1800 hours in total, takes place in 4 semesters with a didactic articulation that provides:

classroom lessons and laboratory activities (1040 hours),
internship, in Italy and abroad (760 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	2021
Preliminary Lessons on fundamental topics to the under-standing of the course	october	2021
End of first year	july	2022
Second-year start	september	2022
Start of internship in Italy	march	2023
Start of foreign internship (if any)	june	2023
End of the course	september	2023
Final examination	october	2023

Information on the organisation of mentoring and accompanying 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		48	48
Additional training			
English conversation	4		100
Laboratory of production synthesis		60	60
Stage alignment			
Collective orientation internship		4	4
Individual orientation internship	1		25
Accompaniment			
Collective accompaniment		16	16
Individual accompaniment	1		25
Totale	8	130	330

Calculation based on the number of students = 25

Course manager	Mirko Del Grande
Tutor	Anna Semeraro