Course title

Advanced technician for automation and packaging

Course profile

Advanced technicians for mechatronic systems work in the design and industrialization of the mechatronic system in agricultural machines, machines for lifting and moving earth, automatic systems, industrial robotic devices and in logistics. They combine different technologies for control, programming, regulation, as well as managing the continuous improvement of the efficiency of the system, the machine or an automatic device. They use representation and simulation software, identify electrical/electronic operations, IT, hydraulic, fluidic, pneumatic, and engine operations to optimize the performance of the mechatronic system and encourage the development of innovative solutions, and develop the prototyping and the production of innovative solutions. Technicians test, carry out installations and perform maintenance. They check the quality and efficiency of products with diagnostic and measuring instruments.

Organization (main teaching, training and verification methodologies)

The main learning activities include:

- General courses in linguistic, communicative, relational, scientific, technological, legal, economic, organizational and managerial fields;
- Teachings of a technical-professional nature both common to the reference area (Made in Italy Technologies - Mechanical System) and specialist/distinctive of the profile.

The course is carried out in 2 full-time annuities, which constitute a student workload total of 1,500 hours.

The workload includes all the training methods:

- In the classroom;
- In didactic laboratories in offices equipped with software, systems and tools for exercises and checks, also installed at member companies/partners;
- Project Work/Research Project;
- Internship;
- Individual study.

Most of the teaching hours are entrusted to member companies or partners, who provide experts and/or in the company setting with related technological equipment, laboratories, plants and technical documentation.

40% of the work takes place in the company through an internship and establishing a strong link in the production fields.

Guided visits are also provided to leading companies and to laboratories and research centres both in and outside the Region. Visits to events or fairs abroad may also be possible.

Methodologies and verification criteria

At the end of the course there will be a final exam for the release of the Advanced Technician diploma.

The assessment of learning outcomes is also carried out at the end of each training unit, with the following criterion:

- Practical exercises to verify and evaluate the learning outcomes of the training units which provide for the prevalence of active and laboratory teaching methodologies and/or learning focused on the technologies in use;
- Written exercises to verify and evaluate the learning outcomes in theoretical training units which involve the use of traditional teaching methods.

Disciplinary area of reference (ISCED - F)

0714 Electronics and automation

Job title (national classification/standard)

Advanced technician for automation and mechatronic systems

Level

QF - EHEA: short cycle qualification

EQF: level 5

Total ECTS credits

120

Learning outcomes of the study course

At the end of the training path the student will be able to:

- Manage communication and relational processes within and outside the organization both in Italian and in English;
- Master the linguistic tools and information and communication technologies to interact in the workplace;
- Arrange, negotiate and develop activities in working groups to tackle problems, propose solutions, help in production, order and evaluate collective results;
- Organize and use information, data and their aggregations;
- Use statistical tools and models in the description and simulation of the different scenarios of the reference area;
- Develop and implement design, prototyping and industrialization techniques;
- Intervene in all segments of the supply chain from production to marketing;
- Manage production flows in programming, control and cost-effectiveness, also in relation to the methods of industrialization and continuous improvement;
- Configure, calibrate, document and maintain automatic systems of different types;
- Know the layout and control components in modern automation systems;
- Industrial programming for automation systems;
- Know and configure robotic systems and vision systems for product handling;
- Apply methods of prevention, analysis and diagnostics of malfunctions and failures;
- Develop technical solutions to design, build, dismantle and test a complete automation system.

Year I

Area/ Range	Competence objectives for national classification/ standard	Module	Main contents	Learning outcomes of the unit	Methods and criteria for verifying results	Learning methodologies, contexts and related workload (hours)	ECTS credits
General linguistic, communicative and relational field	Use technical English (micro language), related to the technological area of reference to communicate correctly and effectively in the contexts in which is required. Manage the communication and relational processes inside and outside the organization both in Italian and in English.	Technical English I	Communication in English (written, oral) on technical-specialist subjects relating to the professional domain and the workplace.	Be able to communicate in English at both written and oral level using a specific language and terminology specific to the sector of work.	Method: Written test multiple choice and oral interview in foreign languages. Criteria: The student will have to correctly demonstrate technical terminology and grammatical and syntactic correctness, as well as fluency in language conversation	Classroom / laboratory: 30 hours Individual study: 45 hours	3
	Master the linguistic tools and information and communication technologies to interact in daily activities and in a work context.	Digital tools for collaborative work, presentation and communication	Fundamental assets of collaborative work tools: speed, accessibility, usability, sharing and security. E-mail as a contact and repository tool (risks and opportunities). Mobile and multi-channel work (access to content from PC, notebook, smartphone or tablet) Collaborative exchange applications (video collaboration platforms, Whatsapp, WeTransfer and Skype). Transparent and traceable management tools for company workflows: technological solutions for the convergence of office automation, document management and	Learn how to use online collaboration tools; how to use presentation and communication tools; how to intervene in digital communication activities: digital marketing, positioning and optimization on search engines (SEO).	Method: PC practice test. Criteria: The student must demonstrate the use of online collaboration tools and/or presentation and communication.	Classroom / laboratory: 16 hours Individual study: 12 hours	1

			management systems (co-editing, self-service analytics, personal archiving) Platforms and web promotion tools (Facebook Ads, Google AdWords) and organic positioning and search engine optimization (SEO).				
	Arrange, negotiate and develop activities in working groups to face problems, propose solutions, help produce, order and evaluate results.	Team Working, Soft skills	Life cycle of a team; motivation, role of team leader; team building; team management; management of critical issues and conflicts; performance management .	Identify the leadership style and interpret the main motivational dynamics that favour the active participation of members in a working group.	Method: Practice Test. Criteria: The student will have to demonstrate collaborative skills, listening and proposing solutions in a team working situation.	Classroom / laboratory: 33 hours Individual study: 24 hours	2,5
General Scientific and technological field	Use statistical tools and models in the description and simulation of the different phenomenologies of the work area, in the application and development of the appropriate technologies. Use tools and methodologies specific to experimental research for the applications of the technologies of the work area.	Machinery directive	The new Machinery Directive 2006/42 / EC and CE marking of electrical and electronic products, RED Directive (Radio Equipment Directive).	Apply the Machinery Directive and related standards.	Method: Laboratory exercises, written test. Criteria: The student must demonstrate knowledge of the Machinery Directive and CE marking of electrical and electronic product, RED Directive and related standards.	Classroom / laboratory: 12 hours Individual study: 20 hours	1

General organizational and management area	Organize and manage, with a good level of autonomy and responsibility, a working environment, workers relations and the reference technological system in order to achieve the expected production results.	Safety in the workplace	Consolidated law on Health and Safety in the company: general and sector-specific risks ATECO C28 - high level of risk.	Know and apply the legislation on mandatory safety in the workplace and in the technological-production system.	Method: Written test. Criteria: The student will have to demonstrate knowledge of the regulatory provisions on safety and health in the workplace.	Classroom / laboratory: 16 hours Individual study: 24 hours	1,5
	Recognize, evaluate and resolve conflicting situations and work problems of different nature: technical-operational, relational, organizational.	Understanding the company organization	Organizational planning, the corporate value chain, relationships and organizational actors. The organization: structure and coordination mechanisms. Compare organizational structures: hierarchical-functional; for processes; matrix, slender (flat). Organizational coordination procedures and logics: planning, system of objectives and management control. Organizational management systems: work and activity processes, roles and duties, managerial and professional skills.	Analysing company logics with a view to efficiency, innovation, optimization of the use of resources, creation of added value, alignment between strategic choices and operating methods.	Method: Written test through open question test. Criteria: The student must be able to identify and represent the various organizational models and to describe a management system for the optimization of processes.	Classroom / laboratory: 10 hours Individual study: 16 hours	1
	Know, analyse, apply and monitor, in specific contexts, management models of production processes of goods and services.						
	Manage relationships and collaborations within the organizational structure within the work contexts, evaluating their effectiveness.						
	Manage external relationships and collaborations - interpersonal and institutional - evaluating their effectiveness.						

Common professional technical skills - Made in Italy technologies - Mechanical system	Develop and implement design, manufacturing and prototyping techniques. Research and apply technical and safety regulations of the electrical, electronic and mechanical sector in the design and use of components.	Electrical design techniques	Electrotechnical bases for circuit design (laws and electrical quantities, electronic components inside the hardware used in automatic machines and their interfaces). Electrical circuit design using EPLAN electrical CAD.	Apply principles of electronics and electrotechnics to industrial plant control equipment.	Method: CAD practice test. Criteria: The student must be able to carry out the drawing of electrical circuits on CAD.	Classroom / laboratory: 68 hours Individual study: 58 hours	5
		Mechanical drawing I	2D and 3D AutoCAD: parts, drawings and assemblies. Creating a 2D drawing: lines, points, circles and arcs. The drawing of mechanical detail: dimensions, general manufacturing tolerances, surface, shape and position tolerances, couplings. 2D views of how products are manufactured and assembled. Dimension methods, tolerance and annotations based on ANSI, ISO, GD&T standards. 3D modelling of solids and surfaces: basic primitives, construction by extrusions and revolutions. Advanced constructions: sweep extrusion, loft construction, track revolution. Boolean operations; chamfers and fillets. Parametric solid modelling based on features of machining applied on solid models and construction trees. File management, libraries; rendering; simulation, control and validation of projects	Represent mechanical groups and make drawings using 2D and 3D CAD.	Method: CAD practice test. Criteria: The student must be able to perform 3D modelling of mechanical groups and to carry out 2D table setting.	Classroom / laboratory: 96 hours Individual study: 54 hours	6
		Mechanical design techniques.	Beam theory, dimensioning criteria for parts, fatigue stress for metallic materials, approaches to mechanical design.	Design mechanical components; know methods of sizing mechanical parts/ kinematic mechanisms and the main approaches to design.	Method: Exercise. Criteria: The student will have to demonstrate an ability to recognize different types of stress in the structural study of a beam model.	Classroom / laboratory: 46 hours Individual study: 36 hours	3

		Pneumatic design techniques	Drawing and simulation of pneumatic and vacuum schemes. Pneumatic actuators and control valves. Single and double acting control. Start, stop and memory status. Topographic and functional schemes. Legends library, import into drawings, development of technical schemes, bill of materials.	Read and represent pneumatic and hydraulic diagrams.	Method: Exercise. Criteria: The student must demonstrate an ability to carry out the study of a pneumatic circuit (describe the sequence, draw the piston motion diagrams, define the starting positions and carry out the analysis of the controls).	Classroom / laboratory: 16 hours Individual study: 15 hours	1
	Programming industrial automation systems (PLC, robots, CNC machines, communication networks, monitoring and diagnostics systems, etc.). Configure, calibrate, document and maintain automatic systems of different types.	Designs and configuration of industrial control systems	Control designs and components in automation systems, PLC design, sensors, and real-time and non-real-time communication networks in automatic machines.	Know design and control components in modern automation systems	Method: Exercise Criteria: Starting from the analysis of a case, the student must be able to understand the physical description of a control platform and the logical description of the control system.	Classroom / laboratory: 56 hours Individual study: 40 hours	4
		Industrial control software	The design of a computer and its operation. machine language and assembly. High level languages: interpreted or compiled. Algorithm concept. Languages for PLC and IEC 1131 standard. Overview of the 5 languages built for the program flow in structured text. Development environment. Development of simple applications.	Configure inputs (sensors) and outputs (actuators) of a PLC application and develop the control system software program.	Method: Exercise. Criteria: The student must be able to carry out the configuration and the software program of a PLC control system	Classroom / laboratory: 32 hours Individual study: 24 hours	2
		HMI design with operator panel.	HMI (Human Machine Interface) functions, ergonomics of the HMI, physical components: LCD touchscreen display, CPU, communication BUS with the PLC. Graphical interface: menus, virtual commands (buttons, selectors, knobs, sliders, etc.) and tools	Develop graphic interface devices between PLC and operator (HMI) to display information on an automated process.	Method: Exercise. Criteria: Starting from the analysis of a case, the student must be able to carry out a HMI	Classroom / laboratory: 20 hours Individual study: 16 hours	1,5

			(graduated scales, text messages, lights, etc.) for displaying information for process control and supervision. Insertion of HMI in a Tia Portal project: screen size, model and communication protocol (Profinet) with PLC and creation of the graphic interface (pages).		project in compliance with the functional and ergonomic requirements.		
	Identify the materials, the relative processes and the treatments suitable for various uses. Choose the processing technologies and the relative machines on the basis of technical-economic characteristics required.	Materials I	Mechanical, physical, chemical and technological characteristics of the main materials used in the automation field: Steel, Bronze, Brass, Copper, Cast Iron, Light alloys, Titanium, Plastic materials, Composite materials	Identify materials, their processes and treatments; choose the most suitable material for the construction of the machine and/or plant.	Method: Multiple choice test Criteria: The student will have to demonstrate an ability to recognize the characteristics and properties of the different materials	Classroom / laboratory: 28 hours Individual study: 24 hours	2
		Mechanical processing I	Lathes, cutters, grinders, EDM, drills, machining centres, adjustments, tracing, measuring instruments, assembly of parts.	Carry out manufacturing study of a mechanical part; choose the processing technologies.	Method: Exercise with case analysis Criteria: The student must demonstrate the correct processing technologies for the production of mechanical parts	Classroom / laboratory: 42 hours Individual study: 36 hours	3
		Electrical processing	Tin soldering techniques, wiring methods and flows in electrical systems, connection methods. Execution and testing of a simple electromechanical system.	Know operating methods for assembly, wiring and testing of electronic circuits / electromechanical systems.	Method: Exercise with case analysis. Criteria: The student must demonstrate the correct assembly and wiring techniques of an electrical system.	Classroom / laboratory: 28 hours Individual study: 32 hours	2,5

Skills common to the Technical-Professional Area		Assembly techniques for mechanical parts and testing of automation systems.	Electro-mechanical and pneumatic assembly of components and sub-groups and testing and testing procedures for complete machines; plant qualification and validation	Assemble mechanical parts; start up and test a system.	Method: Exercise. Criteria: The student must be able to correctly apply the assembly techniques of electro-mechanical and pneumatic components and sub-groups and the testing procedures of complete automatic machines.	Classroom / laboratory: 16 hours Individual study: 8 hours	1
		Elements of technological innovation in the mechanical and automation system.	Analysis of innovative aspects of the advanced automation and smart/digital manufacturing sector (through fairs, seminars, workshops, specialist interventions on the latest automated production systems): manufacturing Big Data, additive manufacturing (3D printing), Industrial Internet of Things, Cloud, advanced automation and advanced HMI (Human Machine Interface).	Know tools, enabling technologies and innovative approaches for production and management in automation companies.	Method: Debriefing and evaluation of significant learning by rubric. Criteria: The student must be able to recognize significant examples of advanced applications within the technological trajectory fields.	Classroom / laboratory: 31 hours Individual study: 40 hours	3

INTERNSHIP I	Curricular objectives: characterization of materials, processes and treatments; studying technical drawings and assembly of mechanical components for motorcycles transmissions; studying electrical, pneumatic and wiring diagrams; component reliability verification methods and use of control and regulation equipment.	Develop a greater awareness of their study path, consolidating the knowledge acquired in the classroom phase.	Method: Observation and verification of the intern's performance by evaluating their effective exercise of knowledge and skills. Self-evaluation and reworking of the experience by the student. Criteria: The chosen evaluation will include an evaluation judgment of the company tutor and subsequent feedback with the student's self-evaluation by the agency's educational. The result of the combination of hetero and self-evaluation constitutes the summary report of the experience, which will be one of the objects of the final exam.	Internship in the company: 320 hours Individual study: 60 hours	16

Total hours in classroom/laboratory in year I: 596
Total internship hours in year I: 320
Total sum of hours in year I: 916

Year II

Area/ Range	Competence objectives for national classification/ standard	Module	Main contents	Learning outcomes of the unit	Methods and criteria for verifying results	Learning methodologies, contexts and related workload (hours)	ECTS credits
General linguistic, communicative and relational field	Use technical English (micro language), related to the technological area of reference, to communicate correctly and effectively in the contexts of work. Manage the communication and relational processes inside and outside the organization both in Italian and in English. Master the linguistic tools and information and communication technologies to interact in daily activities and work contexts.	Technical English II	Communication in English (written, oral) on technical-specialist subjects relating to the professional domain and the workplace.	Be able to communicate in English at both written and oral level using a specific language and terminology specific to the sector of reference.	Method: Written test, multiple choice and oral interview in foreign languages. Criteria: The student will have to demonstrate mastery of sector technical terminology and grammatical and syntactic correctness, as well as fluency in language conversation.	Classroom / laboratory: 30 hours Individual study: 45 hours	3
	Prepare technical and regulatory documentation that can be managed through telematic networks.	Meta-competences and active job search	Employment market, self-marketing, regulations and contracts.	Manage external relations; produce a CV, practice a job interview.	Method: Simulation. Criteria: The student will have to write a CV and implement an effective active job search strategy.	Classroom / laboratory: 16 hours Individual study: 24 hours	1,5

	Assess the implications of information flows with respect to the effectiveness and efficiency of the management of production or service processes, also identifying alternative solutions to ensure quality.	Analysis, use and protection of digital data	Introduction to complex predictive models (inferential statistics and nonlinear systems) based on nonlinear data sets, raw data and large amounts of data to reveal relationships and dependencies and make predictions of results and behaviours. Presentation of analysis and data mining tools with emerging technologies based on cloud computing and distributed computing: Hadoop, MapReduce and NoSQL databases. Data protection: general regulation for the protection of personal data n. 2016/679 and the data protection organizational structure. Corporate network and data protection plan: device configuration, backup and cybersecurity processes against the dangers of device theft and cryptolocker virus.	Analyse, manage, interpret big data and open data. Know and apply the right level of protection to the data (Reg. EU 679/2016 - GDPR). Know and adopt different copyright and license rules to apply to data, digital information and content. Apply different behavioural rules and know-how in the use of digital technologies and in the interaction with digital environments.	Method: Open-ended questionnaire Criteria : The student must describe the application potential of complex predictive models based on large amounts of non-linear data and the use function of data protection systems in the company.	Classroom / laboratory: 16 hours Individual study: 12 hours	1
General legal and economic field	Find the sources and apply the regulations that regulate the life of the company and its external relations at national, European and international level. Know the relevant rules governing the company and the impact for the company in a territorial context. Use negotiation strategies and techniques with reference to the market in which companies in the sector also operate to strengthen their image and competitiveness.	Company and Project Management	Key business functions in the automation sector; international principles and standards of Project Management; patenting and intellectual property protection.	Organize and manage work for projects within the company's processes; apply PM techniques; know the process of awarding an industrial patent.	Method: Exercise. Criteria: The student must demonstrate to apply working techniques for projects within the sector organizations and in accordance with the legislation on the protection of intellectual property.	Classroom / laboratory: 20 hours Individual study: 20 hours	1,5

		Quality assurance and documentation	Application of the UNI EN ISO 9001: 2015 standard; quality policy and concept; Certification process; Monitoring	Understand the ISO EN 9001-2015 standard and the requirements for implementing a QMS	Method: Written multiple choice test. Criteria: The student must demonstrate knowledge of the requirements of ISO EN 9001-2015 standard	Classroom / laboratory: 12 hours Individual study: 8 hours	1
General organizational and management area	Know and help to manage the quality organizational models that encourage innovation in companies in the sector. Know, analyse, apply and monitor, in specific contexts, management models of production processes of goods and services. Analyse, monitor and control the production processes in order to formulate proposals/ identify solutions and alternatives to improve the efficiency and performance of technological and workers resources used with a view to continuous improvement.	Environmental management and sustainability	ISO 14001 standard; EMS and environmental impact; waste management, LCA. Environmental focus: reduction of energy and raw materials consumption and of the environmental impacts of the production processes; recovery, reuse, recycling and disposal of parts and components at the end of their useful life; digital revamping of machines and systems.	Know the environmental protection systems at industrial production level; apply techniques for the sustainable management of the life cycle of automatic machines.	Method: Exercise. Criteria: Starting from the analysis of a business case, the student must demonstrate the life cycle approach to sustainable management of automatic machines and the circular economy approach to recovery, reuse, recycling and disposal of parts and components at the end of their useful life.	Classroom / laboratory: 12 hours Individual study: 10 hours	1

Common professional technical skills - Made in Italy technologies - Mechanical field	Develop and implement design, manufacturing and prototyping techniques. Research and apply technical and safety regulations of the electrical, electronic and mechanical sector in the design and use of components.	Electrical design techniques II	Design of industrial electrical systems through the use of EPLAN, sizing and choice of the components of an electrical system. Testing in electrical systems.	Apply electrical principles to design techniques; develop and implement design techniques.	Method: CAD practice test. Criteria: The student must be able to carry out the configuration and sizing of an electrical system at CAD.	Classroom / laboratory: 72 hours Individual study: 32 hours	4
		Mechanical drawing II	Pro/Engineer 3D, technical tables, advanced functions for creating assemblies and drawing tables.	Represent mechanical groups and make component drawings.	Method: CAD practice test. Criteria: The student must be able to perform 3D modelling of mechanical groups and to carry out the design of components.	Classroom / laboratory: 50 hours Individual study: 24 hours	3
		Mechanical design techniques II	Mechanical elements applied to machines, calibrating criteria for commercial elements, fatigue stress for metal materials, hygienic design and additive manufacturing.	Design mechanical components; identify solutions and choose components; develop and implement the design, prototyping and industrialization techniques of the machines for the suitable and safe packaging of the food, pharmaceutical and cosmetic products.	Method: Exercise. Criteria: The student must demonstrate an ability to apply the principles of hygienic design and construction of equipment for the suitable and safe packaging of food, pharmaceutical and cosmetic products.	Classroom / laboratory: 52 hours Individual study: 24 hours	3
		Pneumatic design techniques II	Pneumatic components, calibrating and choice of pressure and vacuum components. Pressure tanks and other pressure components (pipes, vessels and valves). Types of vacuum and vacuum pumps: wall-shifting, momentum transfer, trapped. Vacuum pump characteristics: speed, pressure range and flow rate. Energy saving.	Use pneumatic design tools and vacuum technology.	Method: Exercise. Criteria: The student will have to demonstrate an ability to select and calibrate the pressure and vacuum components of a pneumatic system.	Classroom / laboratory: 16 hours Individual study: 8 hours	1

	Programming industrial automation systems(PLC, robots, CNC machines, communication networks, monitoring and diagnostics systems, etc.). Configure calibrate, , document and maintain automatic systems of different types.	Design and configuration of industrial control systems II	Configuration of control systems and communication networks in automation, design and programming languages for motion control systems and implementation of electronic cams.	Program systems for the control, cyclic synchronization of the axes and the management of complex movements of an automatic system.	Method: Exercise. Criteria: Starting from the analysis of a case, the student must be able to configure and program a controlled handling system.	Classroom / laboratory: 64 hours Individual study: 30 hours	4
		Control and application of robots to industrial automation and vision systems	Industrial manipulators, mechanical characteristics and their applications. Environments and programming languages and configuration of industrial robots. Sensors for vision systems, integration with industrial robots.	Know, configure and program robotic systems and vision systems for product handling.	Method: Exercise. Criteria : Starting from the analysis of a case, the student must be able to configure and program a robotic system integrated by a vision system.	Classroom / laboratory: 48 hours Individual study: 24 hours	3
		Plant supervision with SCADA	Characteristics of a basic SCADA, configuration of SCADA, network and alarm services. Driver installation. Database management. Graphic objects. Writing a basic application.	Know how to recognize the main characteristics of SCADA and manage its basic applications.	Method: Exercise. Criteria : Starting from the analysis of a case, the student must be able to configure a supervision system (SCADA.)	Classroom / laboratory: 24 hours Individual study: 12 hours	1,5
		Industrial control software II	Structured text language. Finite state machines. Motion Control. The design of control software of an automatic machine. Fieldbuses and remote I / O components. Operator interfaces. Interaction with robots.	Know and maintain the design of the control software of an automatic machine, solving its malfunctions.	Method: Exercise. Criteria : Starting from the analysis of a case, the student must be able to maintain the control software of an automatic machine.	Classroom / laboratory: 40 hours Individual study: 16 hours	2

	Identify materials, the relative processes and the treatments suitable for the various uses.	Materials II	Aluminium and its alloys, polymeric materials, composite materials, use of materials in automatic machines. Cost of the different materials.	Choose the most suitable material for the construction of the machine/plant.	Method: Multiple choice test. Criteria: The student will have to demonstrate an ability to recognize the characteristics and properties of the different materials.	Classroom / laboratory: 20 hours Individual study: 10 hours	1
	Choose the processing technologies and the relative machines on the basis of the technical-economic characteristics required.	Mechanical processing II	Mechanical implementation or adjustments; use of laboratory instruments, improvement of precision in mechanical processing.	Know the manufacturing technologies for industrialization and production of mechanical components; choose the processing technologies and related machines.	Method: Exercise with case analysis. Criteria : The student will have to demonstrate the correct way to select processing techniques for the production of metal components.	Classroom / laboratory: 36 hours Individual study: 16 hours	2
	Intervene in all segments of the supply chain from production to marketing. Manage production flows in their programming, control and cost-effectiveness, also in relation to the logic of industrialization and continuous improvement.	Production planning and logistics	Production planning, internal orders, product logistics, component management, types of logistics costs, lean production.	Manage production flows in their programming, control and economy.	Method: Exercise with case analysis. Criteria : The student will have to demonstrate the correct way to set up a production schedule based on cost configurations.	Classroom / laboratory: 8 hours Individual study: 8 hours	0,5
	Apply fault prevention, analysis and diagnostics methodologies on systems and plants and propose possible solutions Manage post-sales and maintenance needs.	Diagnostics of repairs and maintenance and after sales management	Maintenance techniques, tools and research methods and solutions of functional anomalies; after sales assistance.	Apply methods of prevention, analysis and diagnostics.	Method: Exercise with case analysis. Criteria : The student will have to demonstrate the correct way to set up a preventive and predictive maintenance program.	Classroom / laboratory: 8 hours Individual study: 8 hours	0,5

Specific technical and professional skills for the job		Teamwork cross module (design, assembly, disassembly and testing of a complete automation)	Reconstruction of a production cycle, from design to final testing, Virtual commissioning and 3D printing.	Develop technical solutions to design, build, dismantle and test a complete automation system.	Method: Evaluation of team work outputs. Criteria: The student must demonstrate an ability to complete the production cycle (from design to testing) of a complete automation system.	Classroom / laboratory: 60 hours Individual study: 25 hours	3,5
INTERNSHIP II			Curriculum objectives in areas of: a) design and prototyping; b) production and industrialization; c) automatic systems and industrial automation. Individual or small group participation in the development of an existing company project or assignment of an ad hoc project on automation applied to automatic machines.	Consolidate the technical-specialist knowledge acquired in the course.	Method: Observation and verification of the work performance of the intern with evaluating their effective exercise of knowledge and skills. Self-evaluation and reworking of the experience by the student. Criteria: The chosen evaluation approach foresees the evaluation judgment of the company tutor and the subsequent feedback with the student's self-evaluation by the educational tutor of the agency. The result of the combination of hetero and self-evaluation constitutes the summary report of the experience, which will be one of the objects of the final exam.	Internship in the company: 480 hours Individual study: 60 hours	22

Total classroom/laboratory hours year II: 604
Total internship hours in year II: 480
Total sum of hours in year II: 1,084

Progression rules (prerequisites)

Successful completion of the first year is necessary to access the second year of the course and only upon obtaining 60 credits.

At the end of the course in year II, the diploma of Advanced Technician is obtained after passing a final test. The diploma stipulates the technological field and the national classification/standard, which allows access to public competitions and universities with the recognition of university credits. The EUROPASS certificate is also issued in Italian and English.

Internship abroad

Participants are given the opportunity to carry out part or the entire internship period in foreign companies. Credits are recognized without any further activity or learning verification being requested from the student.

Flexibility / customization

Preparatory modules of REALIGNMENT, specifically for the topics of Technical Drawing and Mechanical Drawing Reading (40h), Electrical Engineering and Electronics (40h). Realignment is mandatory for all participants who do not pass the initial technical assessment. These hours are to be considered additional to the expected course hours. There's a possibility an extracurricular training course in English.

Credit calculation criteria

The calculation criterion applied is the following:

1 credit = total sum of classroom hours / laboratory / enterprise / internship + individual study hours / 25 hours (except for rounding up).

Course location

ITS MAKER Foundation

Bologna office

Via S. Bassanelli 9/11 - 40129 Bologna