

## MENTORTRAIN – Higher Technician in Industrial Mechatronics

Learning outcomes	Technical Competences	Soft skills
<p>LO1</p> <p><b>Mechanical Systems</b></p>	<p>The apprentice:</p> <ul style="list-style-type: none"> <li>– Adjusts mechanical systems, interpreting blueprints, diagrams and procedures of assembly and disassembly.</li> <li>– Applies preventive maintenance techniques in mechanical systems, performing operations and interpreting maintenance plans.</li> <li>– Diagnoses breakdowns and malfunctions in mechanical systems, relating the dysfunction to the cause that produces it.</li> <li>– Carries out operations of corrective maintenance of mechanical systems, justifying the techniques and procedures of replacement or repair.</li> <li>– Diagnoses the status of machine elements, applying the measurement and analysis techniques described in the procedure.</li> <li>– Complies with the rules on labour risk prevention and environmental protection, identifying the associated risks and measures and the equipment to prevent them.</li> </ul>	<ul style="list-style-type: none"> <li>. Personal responsibility, resilience and ethics.</li> <li>- Compliance with health and safety guidance and procedures.</li> <li>--Being disciplined and having a responsible approach to risk, work diligently at all times.</li> <li>-Responsibility for managing time and workload and staying motivated and committed when facing challenges.</li> <li>- Compliance with any organisational policies/codes of conduct in relation to ethical compliance</li> <li>-Work effectively in teams. Integrate with the team, support other people, consider implications of their actions on other people and the business</li> <li>- Effective communication and interpersonal skills.</li> <li>- Open and honest communicator, communicating clearly using appropriate methods, listening to others and having a positive and respectful attitude</li> <li>-Quality and problem solving.</li> </ul>
<p>LO2</p> <p><b>Hydraulic and Pneumatic Systems</b></p>	<p>The apprentice:</p> <ul style="list-style-type: none"> <li>– Identifies the elements of sequential automatic systems of pneumatic/electro-pneumatic technology, attending to their physical and functional characteristics.</li> <li>– Identifies the elements of sequential automatic systems of hydraulic technology / electro-hydraulic, attending to their physical and functional features.</li> <li>– Configures automatic systems of pneumatic/electro-pneumatic or hydraulic/electro-hydraulic technologies, adopting the most suitable solution and fulfilling the established operating conditions.</li> </ul>	<ul style="list-style-type: none"> <li>-Following instructions and guidance, demonstrating attention to detail, following a logical approach to problem solving and seeking opportunities to improve quality, speed and efficiency</li> <li>-Personal development. Reflect on skills, knowledge and behaviours and seek opportunities to develop.</li> <li>-Adapt to different situations, environments or technologies and have a positive attitude to feedback and advice.</li> </ul>

	<ul style="list-style-type: none"> <li>– Assembles pneumatic/electro-pneumatic and hydraulic/electro-hydraulic automatism, interpreting the technical documentation and performing functional tests and adjustments.</li> <li>– Makes adjustments and mechanical set and measures of the magnitudes in hydraulic and pneumatic machinery, interpreting the general plans and schemes, and taking into account the adjustment data and established set.</li> <li>– Diagnoses the state of elements of pneumatic and hydraulic systems, applying measurement techniques and analysis.</li> <li>– Diagnoses and corrects breakdowns in hydraulic and pneumatic systems, defining and applying correction procedures.</li> </ul>	
<p>LO3</p> <p><b>Electrical and Electronic Systems</b></p>	<p>The apprentice:</p> <ul style="list-style-type: none"> <li>– Identifies the elements of electronic-electrical nature in a machine, industrial equipment or automated line, describing the function they perform and their relationship with the other elements.</li> <li>– Configures electronic automatism in a machine or automated installation, adopting the most appropriate solution and meeting the operating conditions established.</li> <li>– Assembles energy-supply systems and associated electronic automatism, interpreting diagrams and applying assembling techniques.</li> <li>– Diagnoses breakdowns and malfunctions in energy-supply systems and associated electronic automation, identifying the causes that produce them and relating them to the responsible elements.</li> <li>– Maintains energy-supply systems and associated electronic automation, replacing elements and verifying the operation of the installation.</li> <li>– Complies with the rules on labour risk prevention and environmental protection, identifying the associated risks, and the measures and the equipment to prevent them</li> </ul>	

<p>LO4</p> <p><b>Machine Elements</b></p>	<p>The apprentice:</p> <ul style="list-style-type: none"> <li>– Determines the function of the parts and the elements of a mechanical system and their relationship with other components, analyzing the technical documentation.</li> <li>– Obtains the data of machine materials and elements, relating their features to their functional, technical and economic requirements.</li> <li>– Selects commercial components of mechatronic elements, evaluating their operating conditions.</li> <li>– Calculates the magnitudes of the kinematic and dynamic operation of kinematic chains, basing on a given configuration.</li> </ul>	
<p>LO5</p> <p><b>Manufacturing Processes</b></p>	<p>The apprentice:</p> <ul style="list-style-type: none"> <li>– Recognizes the benefits of machinery, equipment and facilities used for mechanic manufacturing, analyzing their performance and relating them to the product that will be manufactured.</li> <li>– Determines manufacturing processes, analyzing and justifying the sequence and the variables of the process.</li> <li>– Selects the material to be mechanized, linking the technical and commercial characteristics with the product specifications to be obtained.</li> <li>– Controls dimensions, geometries and surfaces of product, comparing the measures with the product specifications.</li> <li>– Carries out manual machining operations, relating the procedures to the product to be obtained and applying operational techniques.</li> <li>– Operates swarf removal tools, relating their performance to the process conditions and the characteristics of the final product.</li> <li>– Operates with oxyfuel welding equipment, electrode and resistance as well as with manual oxyfuel welding projection and welding in a protective atmosphere, relating their performance to the process conditions and the characteristics of the final product.</li> </ul>	

	<ul style="list-style-type: none"> <li>– Complies with the rules on labour risk prevention and environmental protection, identifying the associated risks, and the measures and equipment to prevent them.</li> </ul>	
<b>LO6</b> <b>Graphical Representation of Mechatronic Systems</b>	<p>The apprentice:</p> <ul style="list-style-type: none"> <li>-Draws mechanical products, applying rules of graphic representation.</li> <li>– Establishes the characteristics of mechanical products, interpreting technical specifications according to applicable regulations.</li> <li>– Represents hydraulic, electric and pneumatic automation systems, applying rules of representation and specifying the basic information of equipment and elements.</li> <li>– Develops graphic documentation, using computer-aided drawing applications.</li> </ul>	
<b>LO7</b> <b>Configuration of Mechatronic Systems</b>	<p>The apprentice:</p> <ul style="list-style-type: none"> <li>-Determines the features of mechatronic systems or modifications to be carried out, analyzing the needs and the design conditions.</li> <li>– Configures the system or its modification, selecting equipment and element and justifying the choice.</li> <li>– Develops assembly and detail drawings, responding to the presented changes and selecting the most suitable systems and formats.</li> <li>– Sets budgets of systems or modifications, using computer applications and databases prices.</li> <li>– Develops the technical documentation of the configuration of a mechatronic system or its modifications, completing all its sections.</li> </ul>	
<b>LO8</b> <b>Processes Management and Maintenance and Quality</b>	<p>The apprentice:</p> <ul style="list-style-type: none"> <li>– Establishes the process phases of assemblage and maintenance of a machinery installation and industrial equipment, analyzing the technical documentation, the plan of quality and safety and the instruction manuals.</li> <li>– Develops plans of assembly and maintenance of installations, applying programming techniques and</li> </ul>	

	<p>establishing procedures for execution monitoring and control.</p> <ul style="list-style-type: none"> <li>– Prepares the catalogue of spare parts and the program of management and provisioning, establishing storage conditions of the components, tools, materials and equipment.</li> <li>– Prepares budgets of assembly and maintenance of facilities, assessing construction units and applying prices.</li> <li>– Determines actions for the implementation and maintenance of systems for quality assurance, for the continuous improvement of productivity in the maintenance and installation of facilities, performing basic concepts and requirements.</li> <li>– Applies plans for the establishment and maintenance of excellence business models, interpreting the regulation on which it is based and the qualifications required.</li> <li>– Prepares quality records, considering their features and importance for the control and improvement of the process and the product.</li> </ul>	
<p>LO9 <b>Integration Systems</b></p>	<p><b>of</b></p> <p>The apprentice:</p> <ul style="list-style-type: none"> <li>-Identifies the elements of the regulation loop of industrial systems, relating their role to the elements making up automation processes.</li> <li>– Integrates PLC in the assemblage of mechatronic systems of discrete and continuous processes, connecting and programming it as well as testing and maintaining its operation. – Integrates handlers and/or robots in mechatronic systems of discrete and continuous processes controlled by PLC, optimizing the system and verifying its operation.</li> <li>– Integrates industrial communications and monitoring systems in the global assembly of mechatronic systems of discrete and continuous processes controlled by PLC, verifying its operation.</li> </ul>	

	<ul style="list-style-type: none"> <li>– Starts-up mechatronic systems of discrete and continuous production, integrating technologies, optimizing cycles and complying with the operating conditions.</li> <li>– Diagnoses breakdowns in discrete and continuous simulated mechatronic systems, identifying the nature of the breakdown, making the necessary corrective interventions to eliminate the dysfunction and restore function.</li> </ul>	
<p>LO10  <b>Simulation of Mechatronic Systems</b></p>	<p>The apprentice:</p> <ul style="list-style-type: none"> <li>-Designs prototypes and mechanisms of mechatronic systems, using specific programs for three-dimensional simulation.</li> <li>– Simulates a robotic cell operation, designing it and carrying out control operations.</li> <li>– Simulates robotic cells and mechatronic prototypes, validating the design by using simulation software.</li> <li>– Integrates data acquisition systems in simulation environments, monitoring the status of the system and verifying its performance.</li> <li>– Simulates complex mechatronic processes, integrating subsystems and analyzing their performance.</li> </ul>	

