EUROPASS DIPLOMA SUPPLEMENT

TITLE OF THE DIPLOMA (ES)

Técnico Superior en Mecatrónica Industrial

TRANSLATED TITLE OF THE DIPLOMA (EN) [1]

Higher Technician in Industrial Mechatronics

(1) This translation has no legal status.

DIPLOMA DESCRIPTION

The holder of this diploma will have acquired the General Competence with regard to:

Configuring and optimizing industrial mechatronic systems, as well as planning, monitoring and/or executing the assembly and maintenance, following the protocols of quality, safety and for the prevention of occupational risks and environmental protection.

Within this framework, the PROFESSIONAL MODULES and their respective LEARNING OUTCOMES acquired by the holder are listed below:

"Mechanical Systems"

The holder:

- Adjusts mechanical systems, interpreting blueprints, diagrams and procedures of assembly and disassembly.
- Applies preventive maintenance techniques in mechanical systems, performing operations and interpreting maintenance plans.
- Diagnoses breakdowns and malfunctions in mechanical systems, relating the dysfunction to the cause that produces it.
- Carries out operations of corrective maintenance of mechanical systems, justifying the techniques and procedures of replacement or repair.
- Diagnoses the status of machine elements, applying the measurement and analysis techniques described in the procedure.
- Complies with the rules on labour risk prevention and environmental protection, identifying the associated risks and measures and the equipment to prevent them.

"Hydraulic and Pneumatic Systems"

The holder:

- Identifies the elements of sequential automatic systems of pneumatic/electro-pneumatic technology, attending to their physical and functional characteristics.
- Identifies the elements of sequential automatic systems of hydraulic technology / electro-hydraulic, attending to their physical and functional features.
- Configures automatic systems of pneumatic/electro-pneumatic or hydraulic/electro-hydraulic technologies, adopting the most suitable solution and fulfilling the established operating conditions.
- Assembles pneumatic/electro-pneumatic and hydraulic/electro-hydraulic automatisms, interpreting the technical documentation and performing functional tests and adjustments.
- 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.
- Diagnoses the state of elements of pneumatic and hydraulic systems, applying measurement techniques and analysis.
- Diagnoses and corrects breakdowns in hydraulic and pneumatic systems, defining and applying correction procedures.

"Electrical and Electronic Systems"

The holder:

- 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.
- Configures electronic automatisms in a machine or automated installation, adopting the most appropriate solution and meeting the operation conditions established.
- Assembles energy-supply systems and associated electronic automatisms, interpreting diagrams and applying assembling techniques.
- Diagnoses breakdowns and malfunctions in energy-supply systems and associated electronic automations, identifying the causes that produce them and relating them to the responsible elements.
- Maintains energy-supply systems and associated electronic automations, replacing elements and verifying the operation of the installation.

– Complies with the rules on labour risk prevention and environmental protection, identifying the associated risks, and the measures and the equipment to prevent them.

"Machine Elements"

The holder:

– Determines the function of the parts and the elements of a mechanical system and their relationship with other components, analyzing the technical documentation.
– Obtains the data of machine materials and elements, relating their features to their functional, technical and economic requirements.
– Selects commercial components of mechatronic elements, evaluating their operating conditions.
– Calculates the magnitudes of kinematic and dynamic of operation of kinematic chains, basing on a given configuration.

"Manufacturing Processes"

The holder:

– 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.
– Determines manufacturing processes, analyzing and justifying the sequence and the variables of the process .
– Selects the material to be mechanized, linking the technical and commercial characteristics with the product specifications to be obtained.
– Controls dimensions, geometries and surfaces of product, comparing the measures with the product specifications.
– Carries out manual machining operations, relating the procedures to the product to be obtained and applying operational techniques.
– Operates swarf removal tools, relating their performance to the process conditions and the characteristics of the final product.
– 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.
– Complies with the rules on labour risk prevention and environmental protection, identifying the associated risks, and the measures and equipment to prevent them.

"Graphical Representation of Mechatronic Systems"

The holder:

– Draws mechanical products, applying rules of graphic representation.
– Establishes the characteristics of mechanical products, interpreting technical specifications according to applicable regulations.
– Represents hydraulic, electric and pneumatic automation systems, applying rules of representation and specifying the basic information of equipments and elements.
– Develops graphic documentation, using computer-aided drawing applications.

"Configuration of Mechatronic Systems"

The holder:

– Determines the features of mechatronic systems or modifications to be carried out, analyzing the needs and the design conditions.
– Configures the system or its modification, selecting equipment and element and justifying the choice.
– Develops assembly and detail drawings, responding to the presented changes and selecting the most suitable systems and formats.
– Sets budgets of systems or modifications, using computer applications and databases prices.
– Develops the technical documentation of the configuration of a mechatronic system or its modifications, completing all its sections.

"Processes and Management of Maintenance and Quality"

The holder:

– 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.
– Develops plans of assembly and maintenance of installations, applying programming techniques and establishing procedures for execution monitoring and control.
– Prepares the catalogue of spare parts and the program of management and provisioning, establishing storage conditions of the components, tools, materials and equipment.
– Prepares budgets of assembly and maintenance of facilities, assessing construction units and applying prices.
– 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.
– Applies plans for the establishment and maintenance of excellence business models, interpreting the regulation on which it is based and the qualifications required.
– Prepares quality records, considering their features and importance for the control and improvement of the process and the product.

"Integration of Systems"

The holder:

– Identifies the elements of the regulation loop of industrial systems, relating their role to the elements making up automation processes.
– 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.
– Integrates industrial communications and monitoring systems in the global assembly of mechatronic systems of discrete and continuous processes controlled by PLC, verifying its operation.
– Starts-up mechatronic systems of discrete and continuous production, integrating technologies, optimizing cycles and complying with the operating conditions.
– 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.

"Simulation of Mechatronic Systems"

The holder:

– Designs prototypes and mechanisms of mechatronic systems, using specific programs for three-dimensional simulation.
– Simulates a robotic cell operation, designing it and carrying out control operations.
– Simulates robotic cells and mechatronic prototypes, validating the design by using simulation software.
– Integrates data acquisition systems in simulation environments, monitoring the status of the system and verifying its performance.
– Simulates complex mechatronic processes, integrating subsystems and analyzing their performance.

"Project on Industrial Mechatronics"

The holder:

– Identifies the needs of the production sector, relating them to similar projects that may satisfy them.
– Designs projects related to the competences described in the diploma, including and developing their constituting stages.
– Plans the project implementation, determining the intervention plan and the associated documentation.
– Defines the procedures to monitor and control of the project implementation, justifying the selection of the variables and the instruments used.

"Professional Training and Guidance"

The holder:

– Selects job opportunities, identifying the different possibilities of labour integration, and the alternatives of lifelong learning.
– Applies teamwork strategies, assessing their effectiveness and efficiency on the achievement of the company's goals.
– Exercises rights and complies with the duties derived from labour relationships, recognising them in the different job contracts.
– Determines the protective action of the Spanish Health Service in view of the different covered eventualities, identifying the different types of assistance.
– Assesses the risks derived from his/her activity, analysing the job conditions and the risk factors present in his/her labour setting.
– Participates in the development of a risk prevention plan for a small enterprise, identifying the responsibilities of all the agents involved.
– Applies protection and prevention measures, analysing risk situations in the labour setting of the Higher Technician in Industrial Mechatronics.

"Business and Entrepreneurial Initiative"

The holder:

– Recognizes skills related to entrepreneurial initiative, analysing the requirements derived from the different job positions and business activities.
– Defines the opportunity of creating a small enterprise, assessing the impact on the sphere of action and incorporating ethic values.
– Carries out the activities for the setting-up and implementation of a company, choosing its legal structure and identifying the associated legal obligations.
– Carries out basic administrative and financial management activities of an SME, identifying the main accounting and tax obligations and filling in documentation.

"On the Job Training"

The holder:

– Identifies the structure and the organization of the company, relating both to the production and marketing of the products obtained.
– Applies ethical and work habits in the development of their profession, according to the characteristics of the job and the procedures established by the company.
– Determines the characteristics of mechatronic systems from a draft or given conditions, enforcing the applicable provisions and standards.
– Plans assembly of mechatronic systems, establishing stages and distributing resources, based on the technical documentation project.
– Supervises the assembly of mechatronic systems, working in their execution and respecting the safety and quality protocols established by the company.
– Performs the start-up or the implementation of service of mechatronic systems, supervising them and assisting in its implementation, following established procedures.
– Controls the maintenance interventions of mechatronic systems, working in their execution, verifying fulfilment of the programmed objectives and optimizing the available resources.
– Supervises the repair of breakdowns and malfunctions in equipment and systems, collaborating in the execution and verifying the implementation of techniques and of corrective maintenance procedures.

RANGE OF OCCUPATIONS ACCESSIBLE TO THE HOLDER OF THE DIPLOMA

The Higher Technician in Industrial Mechatronics works in companies, mostly private, engaged in project development, management and supervision of the installation and maintenance of mechatronic systems or installations of machinery, industrial equipment and automated lines, either as an employee or self-employed person.

The most relevant occupations or jobs are the following:

- Technician in planning and programming processes of maintenance of machinery installations and industrial equipment.
- Head Manager of assembly team of machinery installations and industrial equipment.
- Head Manager of maintainers of machinery installations and industrial equipment.

AWARD, ACCREDITATION AND LEVEL OF THE DIPLOMA

Name of the body awarding the diploma on behalf of the King of Spain: Spanish Ministry of Education or the different Autonomous Communities according to their areas of competence. The title has academic and professional validity throughout Spain.

Official duration of the education/ training leading to the diploma: 2000 hours.

Level of the diploma (national or international)

- NATIONAL: Non-University Higher Education
- INTERNATIONAL:
  - Level 5 of the International Standard Classification of Education (ISCED5).
  - Level 5 of the European Qualifications Framework (EQF5).

Entry requirements: Holding the Certificate in Post-Compulsory Secondary Education (Bachillerato) or holding the corresponding access test.

Access to next level of education/training: This diploma provides access to university studies.

Legal basis: Basic regulation according to which the diploma is established:

- Minimum teaching requirements established by the State: Royal Decree 1576/2011, of 4 November, according to which the diploma of Higher Technician in Industrial Mechatronics and its corresponding minimum teaching requirements are established.

Explanatory note: This document is designed to provide additional information about the specified diploma and does not have any legal status in itself.

COURSE STRUCTURE OF THE OFFICIALLY RECOGNISED DIPLOMA

PROFESSIONAL MODULES IN THE DIPLOMA ROYAL DECREE	CREDITS ECTS
Mechanical Systems	9
Hydraulic and Pneumatic Systems	8
Electrical and Electronic Systems	9
Machine Elements	6
Manufacturing Processes	10
Graphical Representation of Mechatronic Systems	8
Configuration of Mechatronic Systems	9
Processes and Management of Maintenance and Quality	7
System Integration	13
Simulation of Mechatronic Systems	5
Project on Industrial Mechatronics	5
Professional Training and Guidance	5
Business and Entrepreneurial Initiative	4
On the Job Training	22
	TOTAL CREDITS
	120
OFFICIAL DURATION (HOURS)	***2000***

* The minimum teaching requirements shown in the table above comprise 55% official credit points valid throughout Spain. The remaining 45% corresponds to each Autonomous Community and can be described in the **Annex I** of this supplement.

INFORMATION ON THE EDUCATION SYSTEM