

EUROPASS DIPLOMA SUPPLEMENT

TITLE OF THE DIPLOMA (ES)

Técnico Superior en Electromedicina Clínica

TRANSLATED TITLE OF THE DIPLOMA (EN)⁽¹⁾

Higher Technician in Clinical Electromedicine

(1) This translation has no legal status.

DIPLOMA DESCRIPTION

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

Managing and carrying out the assembly and maintenance of clinical electromedicine installations, systems and equipment, taking into account the manufacturer's recommendations, the appropriate quality and safety requirements and the current applicable regulations.

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

“Electrical systems”.

The holder:

- Obtains information from the technical documentation of the electrical system, interpreting the symbols and rules of representations it is based on.
- Calculates characteristic parameters of single-phase and three-phase alternating current lines, identifying typical values.
- Determines the operation of electric motors and transformers, identifying their field of application in the health setting.
- Assesses parameters in electrical systems, identifying the risks inherent to their operation and the associated protection systems.
- Assembles electrical systems, checking their operation.

“Electromechanical and fluid systems”.

The holder:

- Determines the characteristics of functional blocks in mechanical systems and equipment, interpreting drawings, schematics and circuit diagrams.
- Carries out assembly and disassembly operations of mechanical elements, interpreting technical documentation provided by the manufacturer.
- Determines the characteristics of the operation of sequential automatic systems with pneumatic/electropneumatic technology, identifying the physical and functional characteristics of the elements that form it.
- Determines the characteristics of the operation of sequential automatic systems with hydraulic/electrohydraulic technology, considering their physical and functional characteristics.
- Assembles pneumatic/electropneumatic and hydraulic/electrohydraulic automatisms, interpreting technical documentation and carrying out tests and functional settings.

“Electronic and photonic systems”.

The holder:

- Applies techniques for measuring and visualising electrical and optical signals, describing equipment and analysing the procedures used.
- Determines the characteristics and applications of the different types of analogue circuits, identifying their functional blocks and analysing the interrelation between their components.
- Determines the characteristics and applications of digital circuits, identifying their components and blocks and checking their operation.
- Determines the structure of instrumentation circuits, identifying their application and analysing the interrelation between their components.
- Determines the characteristics of photonic components and circuits, analysing their operation and identifying their applications.
- Checks the operation of electronic and optical circuits where the assembly of the installation will take place, interpreting diagrams and applying techniques for measuring/visualising signals.

“Radiodiagnosis, radiotherapy and medical imaging systems”.

The holder:

- Determines the characteristics of installations, systems and equipment, identifying their functionality and their technical characteristics.

- Receives equipment and elements of the system to be installed, checking that they are the ones indicated in the established assembly plan.
- Checks the physical space and the infrastructure where the assembly of the installation, system or equipment is going to be carried out, interpreting and applying the procedures established in the assembly plan.
- Carries out the assembly and disassembly of the installations, systems and equipment, applying the established assembly or disassembly plan.
- Starts up, prior to their clinical use, installations, systems and equipment, applying current regulations and the manufacturer's specifications.
- Carries out the preventive maintenance of installations, systems and equipment, applying the maintenance plan of the health centre, the manufacturer's recommendations and current regulations.
- Diagnoses breakdowns or malfunctions in installations, systems and equipment, identifying the type of cause of the incident and the possible solutions on her/his own or by someone else.
- Repairs breakdowns in installations, systems and equipment, applying specific techniques and procedures and checking the operation restoration.
- Complies with the rules on labour risk prevention and environmental protection, identifying the associated risks and the measures and equipment to prevent them.

“Monitoring, registration and critical care systems”.

The holder:

- Determines the characteristics of installations, systems and equipment, identifying their functionality and determining their technical characteristics.
- Receives equipment and elements of the system to be installed, checking that they are the ones indicated in the established assembly plan.
- Checks the physical space and the infrastructure where the assembly of the installation, system or equipment is going to be carried out, interpreting and applying the procedures established in the assembly plan.
- Carries out the assembly and disassembly of installations, systems and equipment, applying the established assembly and disassembly plan.
- Starts up, prior to their clinical use, installations, systems and equipment, applying current regulations and the manufacturer's specifications.
- Carries out the preventive maintenance of installations, systems and equipment, applying the maintenance plan of the health centre, the manufacturer's recommendations and current regulations.
- Diagnoses breakdowns or malfunctions in installations, systems and equipment, identifying the type of cause of the incident and the possibility for resolution on her/his own or by someone else.
- Repairs breakdowns in installations, systems and equipment, applying specific techniques and procedures and checking the operation restoration.
- Complies with the rules on labour risk prevention and environmental protection, identifying the associated risks and the measures and equipment to prevent them.

“Laboratory and haemodialysis systems”.

The holder:

- Determines the characteristics of installations, systems and equipment, identifying their functionality and determining their technical characteristics.
- Receives equipment and elements of the system to be installed, checking that they are the ones indicated in the established assembly plan.
- Checks the physical space and the infrastructure where the assembly of the installation, system or equipment is going to be carried out, interpreting and applying the procedures established in the assembly plan.
- Carries out the assembly and disassembly of installations, systems and equipment, applying the established assembly and disassembly plan.
- Starts up, prior to their clinical use, installations, systems and equipment, applying current regulations and the manufacturer's specifications.
- Carries out the preventive maintenance of installations, systems and equipment, applying the maintenance plan of the health centre, the manufacturer's recommendations and current regulations.
- Diagnoses breakdowns or malfunctions in installations, systems and equipment, identifying the type of cause of the incident and the possibility for resolution on her/his own or by someone else.
- Repairs breakdowns in installations, systems and equipment, applying specific techniques and procedures and checking the operation restoration.
- Complies with the rules on labour risk prevention and environmental protection, identifying the associated risks and the measures and equipment to prevent them.

“Restoration systems and functional testing”.

The holder:

- Determines the characteristics of installations, systems and equipment, identifying their functionality and determining their technical characteristics.
- Receives equipment and elements of the system to be installed, checking that they are the ones indicated in the established assembly plan.
- Checks the physical space and the infrastructure where the assembly of the installation, system or equipment is going to be carried out, interpreting and applying the procedures established in the assembly plan.
- Carries out the assembly and disassembly of installations, systems and equipment, applying the established assembly and disassembly plan.

- Starts up, prior to their clinical use, installations, systems and equipment, applying current regulations and the manufacturer's specifications.
- Carries out the preventive maintenance of installations, systems and equipment, applying the maintenance plan of the health centre, the manufacturer's recommendations and current regulations.
- Diagnoses breakdowns or malfunctions in installations, systems and equipment, identifying the type of cause of the incident and the possibility for resolution on her/his own or by someone else.
- Repairs breakdowns in installations, systems and equipment, applying specific techniques and procedures and checking the operation restoration.
- Complies with the rules on labour risk prevention and environmental protection, identifying the associated risks and the measures and equipment to prevent them.

“Health technology in the clinical field”.

The holder:

- Recognises human body systems, describing their structures, function, operation, location and signals generated at physiological level.
- Locates clinical services inside the hospital organization, as well as their particular active non-implantable medical devices, describing the structure of the Spanish health system.
- Determines the characteristics of the clinical electromedicine service in a hospital/health institution and its relation to technical care services, recognising the importance and implications of its appropriate management.
- Applies communication techniques, analysing their characteristics and possibilities in a clinical setting.
- Recognises the main risks of the patient's environment in a health centre, describing their characteristics and effects.
- Determines the characteristics of the different elements involved in the creation process of a Health Information System (HIS), relating them to the key factors of the health/care activity.

“Planning for the acquisition of electromedicine systems”.

The holder:

- Develops a plan for renewing or acquiring new clinical electromedicine systems and equipment, analysing the clinical needs of the centre and the obsolescence and condition of the technology park available.
- Determines the technical characteristics of the new equipment to be acquired, considering the compatibility and connectivity to other installations and infrastructures of the health centre and the latest technological innovations.
- Sets out clinical electromedicine installations and systems, outlining the location of the equipment and the elements.
- Analyses the cost of the different equipment options to be acquired, breaking down the corresponding budget batches and using price lists.
- Determines the equipment to be acquired, identifying the most appropriate method of acquisition for the health centre.
- Develops an inventory plan, defining the update process of the new equipment acquired.
- Plans information actions addressed to clinical and technical staff, checking their development and result.

“Assembly and maintenance management of electromedicine systems”.

The holder:

- Develops assembly programmes, defining the start-up testing of installations, systems and equipment for clinical electromedicine on the basis of the technical documentation available and the current regulations.
- Prepares the maintenance plan of installations, systems and equipment for clinical electromedicine, defining tasks, timings, human resources and materials according to the manufacturer's recommendations and the current regulations.
- Develops a supply plan and a replacement catalogue, establishing the storage conditions for the components, tools, materials and equipment.
- Plans and manages the treatment of the residues generated, identifying contamination agents and describing their effects on the environment.
- Defines the supervision plan for the assembly, start-up and maintenance of installations, systems and equipment for clinical electromedicine, guaranteeing the compliance of security measures and labour risk prevention.
- Develops and files documents regarding the assembly, start-up and maintenance management of installations, systems and equipment for clinical electromedicine, interpreting the procedures established.
- Provides basic information about the use and maintenance of installations, systems and equipment for clinical electromedicine, as well as the security measures to be considered, to clinical and technical staff, applying the most appropriate communication techniques.
- Applies quality plans in every process carried out and supervised, describing the regulations on quality assurance and management.

“Project on Clinical Electromedicine”.

The holder:

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

“Vocational 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 risks derived from his/her activity, analysing job conditions and risk factors present in his/her labour setting.
- Participates in the development of a risk prevention plan in a small enterprise, identifying the responsibilities of all agents involved.
- Applies protection and prevention measures, analysing risk situations in the labour setting of the Higher Technician in Clinical Electromedicine.

“Business and Entrepreneurial Initiative”.

The holder:

- Recognises skills related to entrepreneurial initiative, analysing the requirements derived from job positions and business activities.
- Defines the opportunity of creating a small enterprise, assessing the impact on the performance setting and incorporating ethic values.
- Carries out the activities for the setting-up and implementation of a company, choosing the 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 company's structure and organization, relating them to the type of service provided.
- Applies ethical and work habits in the development of his/her professional activity, according to the characteristics of the job and the procedures established by the enterprise.
- Carries out typical operations for the assembly, start-up or maintenance of installations, systems or equipment for radiodiagnosis, radiotherapy or medical imaging.
- Carries out typical operations for the assembly, start-up or maintenance of installations, systems or equipment for monitoring, registration or critical care.
- Carries out typical operations for the assembly, start-up or maintenance of installations, systems or equipment for haemodialysis, laboratory, restoration or functional testing.
- Carries out typical tasks to plan the acquisition of new electromedical equipment or the restoration of the technology park associated to a type of health centre.
- Carries out typical tasks of the assembly or maintenance plan of installations or systems of clinical electromedicine, as well as the development of the associated supply or training plans.

RANGE OF OCCUPATIONS ACCESSIBLE TO THE HOLDER OF THE DIPLOMA

The Higher Technician in Clinical Electromedicine works in technical services dedicated to the assembly and/or maintenance of installations, systems and equipment of clinical electromedicine belonging to public or private health centres, and in the departments of technical care or customer service dedicated to guidance and/or implementation of the assembly and/or maintenance of installations, systems and equipment for clinical electromedicine belonging to manufacturing companies, distributors or suppliers of those services, public or private entities, regardless of their legal form and size, either on his/her own or working for third parties.

The most relevant occupations or jobs are the following:

- Team Manager of electromedicine systems' installers.
- Coordinator and Supervisor of electromedicine system maintenance.
- Electromedical applications Specialist.
- Product Specialist on electromedicine systems.
- Technical Advisor in electromedicine systems.
- Electronic Technician, with the specialty in electromedicine.
- Electromedicine Equipment Installer-Repairer.

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 (EQF 5).

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 838/2015, according to which the diploma of Higher Technician in Clinical Electromedicine 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
Electrical systems.	6
Electromechanical and fluid systems.	6
Electronic and photonic systems.	7
Radiodiagnosis, radiotherapy and medical imaging systems.	14
Monitoring, registration and critical care systems.	14
Laboratory and haemodialysis systems.	8
Restoration systems and functional testing.	6
Health technology in the clinical field.	4
Planning for the acquisition of electromedicine systems.	10
Assembly and maintenance management of electromedicine systems.	9
Project on Clinical Electromedicine.	5
Vocational 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

