

# EUROPASS DIPLOMA SUPPLEMENT

## TITLE OF THE DIPLOMA (ES)

*Técnico Superior en Laboratorio Clínico y Biomédico*

## TRANSLATED TITLE OF THE DIPLOMA (EN)<sup>(1)</sup>

*Higher Technician in Clinical and Biomedical Laboratory*

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(1) This translation has no legal status.

## DIPLOMA DESCRIPTION

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

Carrying out analytical studies of biological samples, following normalised protocols of work, applying established quality, safety and environmental regulations, and assessing technical results, so that they can be used as a support for prevention, diagnosis and control of evolution, for the treatment of diseases, and for research, following the protocols established in the health care unit.

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

### “Management of Biological Samples”.

The holder:

- Analyses the organisational structure of the health sector and the working area, interpreting laws.
- Identifies laboratory documentation, relating it to working processes in the pre-analytical phase and to the inventory control.
- Identifies types of biological samples, relating them to analyses or studies that need to be carried out.
- Carries out collection and distribution of the most usual biological samples, applying specific protocols of the unit.
- Carries out collection and distribution of human biological samples obtained by means of invasive and surgical procedures, applying specific protocols of the unit.
- Selects techniques for preservation, storage, transport and shipment of samples, following the requirements of the sample.
- Applies safety and risk prevention protocols when handling chemical and biological products by applying current regulations.

### “General Laboratory Techniques”.

The holder:

- Classifies materials, basic equipment and reagents used in laboratories, describing their use and maintenance.
- Applies safety and risk prevention protocols when handling chemical and biological products by interpreting current regulations.
- Carries out solutions and dilutions of samples and reagents, justifying calculations of mass, volume and concentration.
- Applies methods for separation of substances, justifying the selected technique.
- Carries out the technical assessment of coherence and reliability of the results obtained, using statistical tools.
- Carries out microscopy techniques, applying tools for digitalisation and delivery of images.
- Applies quality management systems in the clinical and pathological anatomy laboratory, analysing quality regulations.

### “Molecular Biology and Cytogenetics”.

The holder:

- Determines the characteristics of processes that need to be carried out in cytogenetics and molecular biology laboratories, relating them to materials and equipment.
- Carries out cellular samples, describing the steps of the procedure.
- Applies techniques for chromosome analysis in peripheral blood, fluids and tissues, interpreting the protocols established.
- Applies techniques for extraction of nucleic acids to biological samples, selecting the type of technique according to the sample to be analysed.
- Applies techniques of PCR and electrophoresis to the study of nucleic acids, selecting the type of technique according to the study to be carried out.
- Applies techniques for hybridization with probe to samples of nucleic acids, chromosomes and cuts in tissues, interpreting the protocols established.
- Determines methods for cloning and nucleic acid sequencing, justifying the steps for each procedure of analysis.

### **“General Pathophysiology”.**

The holder:

- Recognises the general structure and organization of the human body, describing its structural units and the relations according to their specialisation.
- Identifies the developmental process of the disease, relating it to functional changes of the organism and the alterations that causes.
- Recognises immune system disorders, relating them to general characteristics of immunity.
- Identifies the characteristics of infectious diseases, relating them to infectious agents and clinical manifestations.
- Identifies the process of tumour development, describing the characteristics of benign and malignant neoplasms.
- Recognises manifestations of diseases in the big systems of the organism, describing physiological alterations of the most frequent pathologies.
- Recognises hemodynamic and vascular disorders, relating their alterations to human diseases of big morbidity and high mortality.
- Recognises eating and endocrine and metabolic disorders, relating them to manifestations of common pathologies.

### **“Biochemical Analysis”.**

The holder:

- Applies the techniques used in the laboratory of clinical biochemistry, identifying equipment and its applications.
- Analyses biochemical quantities related to the metabolism of biomolecules, selecting the appropriate technique.
- Analyses biochemical quantities related to final products of metabolism, selecting the appropriate technique.
- Determines enzymes, describing the sequence of the procedure.
- Carries out techniques for the study of urine samples, following the protocols established.
- Determines the characteristics of determinations in faeces and other body fluids, selecting the technique according to the sample.
- Determines the quantities related to fluid, electrolyte and acid-base balance, linking it to the corresponding disorders.
- Determines the characteristics of determinations showed in other special studies, describing the techniques to be used.

### **“Immunodiagnostic Techniques”.**

The holder:

- Applies immunological techniques based on secondary antigen-antibody reactions, differentiating their foundations.
- Applies immunological techniques based on primary antigen-antibody reactions, differentiating their foundations.
- Detects autoantibodies by applying the techniques for the diagnosis of autoimmune diseases.
- Applies techniques for the study of hypersensitivity, relating the antigen to the techniques to be developed.
- Applies techniques for the identification of populations of cells by flow cytometry, carrying out the preventive maintenance of the equipment,
- Assesses the functionality of cellular immunity, describing techniques for cellular sample that are applicable in each case.
- Applies studies of HLA typification, identifying the major histocompatibility complex.

### **“Clinical Microbiology”.**

The holder:

- Applies studies of HLA typification, identifying the major histocompatibility complex.
- Applies techniques for staining and observation of microorganisms to cultures and biological samples, selecting the procedures to be carried out.
- Prepares culture media for microorganisms, interpreting the protocols established.
- Applies techniques for isolation and enumeration of microorganisms, justifying the technique selected.
- Applies techniques for bacterial identification to clinical samples and isolated colonies in a culture, selecting working protocols according to the bacterial group to be identified.
- Applies techniques for identification of fungi and parasites, selecting working protocols according to the microorganism to be identified.
- Identifies viruses, relating them to methods of cellular, immunological and molecular biology culture.

### **“Techniques for Hematologic Analysis”.**

The holder:

- Carries out staining techniques in peripheral blood and bone marrow smears, identifying cellular types present in them.
- Handles automatic equipment for hematologic analysis, identifying their components and maintenance.
- Applies techniques for hematologic analysis to the study of red blood cells, relating the protocols of analysis to the characteristics and functions of the parameters to be determined.
- Applies techniques for hematologic analysis to the study of white blood cells and platelets, relating the protocols of analysis to the characteristics and functions of the parameters to be determined.
- Carries out assessment techniques of haemostasis and blood clotting, selecting equipment and reagents according to the parameter to be determined.
- Applies procedures for guaranteeing the compatibility of the blood components of the donor and the recipient, following the protocols established.
- Prepares blood products, interpreting standardised protocols for obtaining, preserving and distributing them.

### **“Project on Clinical and Biomedical Laboratory”.**

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 in the diploma, 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.

### **“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 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 and Biomedical Laboratory.

### **“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 structure and organization of the enterprise, relating them to the production and commercialisation of the products that obtains.
- 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.
- Manages biological samples, according to a specific protocol of the unit, according to the analysis to be carried out.
- Handles biological samples, applying laboratory techniques.
- Analyses biochemical quantities by applying analysis techniques for their determination.
- Applies immunological techniques by following established protocols.
- Carries out microbiological analysis of samples by applying established protocols.
- Carries out hematologic analysis techniques according to established protocols.

## **RANGE OF OCCUPATIONS ACCESSIBLE TO THE HOLDER OF THE DIPLOMA**

The Higher Technician in Clinical and Biomedical Laboratory works in the health sector, in public institutions and bodies and in private enterprises, in the area of the laboratory of clinical analysis and in the diagnosis, treatment, management and research.

S/He acts as a dependent worker for a body or institution that can be small, medium-size or large. Her/His professional activity is regulated by the State Health Administration.

The most relevant occupations or jobs are the following:

- Higher technician in a laboratory of clinical diagnosis.
- Expert technician in a laboratory.
- Assistant technician in a laboratory for research and experimentation.
- Assistant technician in a toxicology laboratory
- Hospital and pharmaceutical sales representative.

## 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 771/2014, of 12 September, according to which the diploma of Higher Technician in Clinical and Biomedical Laboratory 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
<b>Management of Biological Samples.</b>	11
<b>General Laboratory Techniques.</b>	12
<b>Molecular Biology and Cytogenetics.</b>	11
<b>General Pathophysiology.</b>	12
<b>Biochemical Analysis.</b>	10
<b>Immunodiagnostic Techniques.</b>	8
<b>Clinical Microbiology.</b>	10
<b>Techniques for Hematologic Analysis.</b>	10
<b>Project on Clinical and Biomedical Laboratory.</b>	5
<b>Vocational Training and Guidance.</b>	5
<b>Business and Entrepreneurial Initiative.</b>	4
<b>On the Job Training.</b>	22
	TOTAL CREDITS
	<b>120</b>
OFFICIAL DURATION (HOURS)	<b>2000</b>

\* 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

