

# Postgraduate Diploma

## Microbiology and Parasitology Laboratory



## Postgraduate Diploma Microbiology and Parasitology Laboratory

Course Modality: **Online**

Duration: **6 months.**

Certificate: **TECH Technological University**

**18 ECTS Credits**

Teaching Hours: **450 hours.**

Website: [www.techtitute.com/medicine/postgraduate-diploma/postgraduate-diploma-microbiology-parasitology-laboratory](http://www.techtitute.com/medicine/postgraduate-diploma/postgraduate-diploma-microbiology-parasitology-laboratory)

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# 01

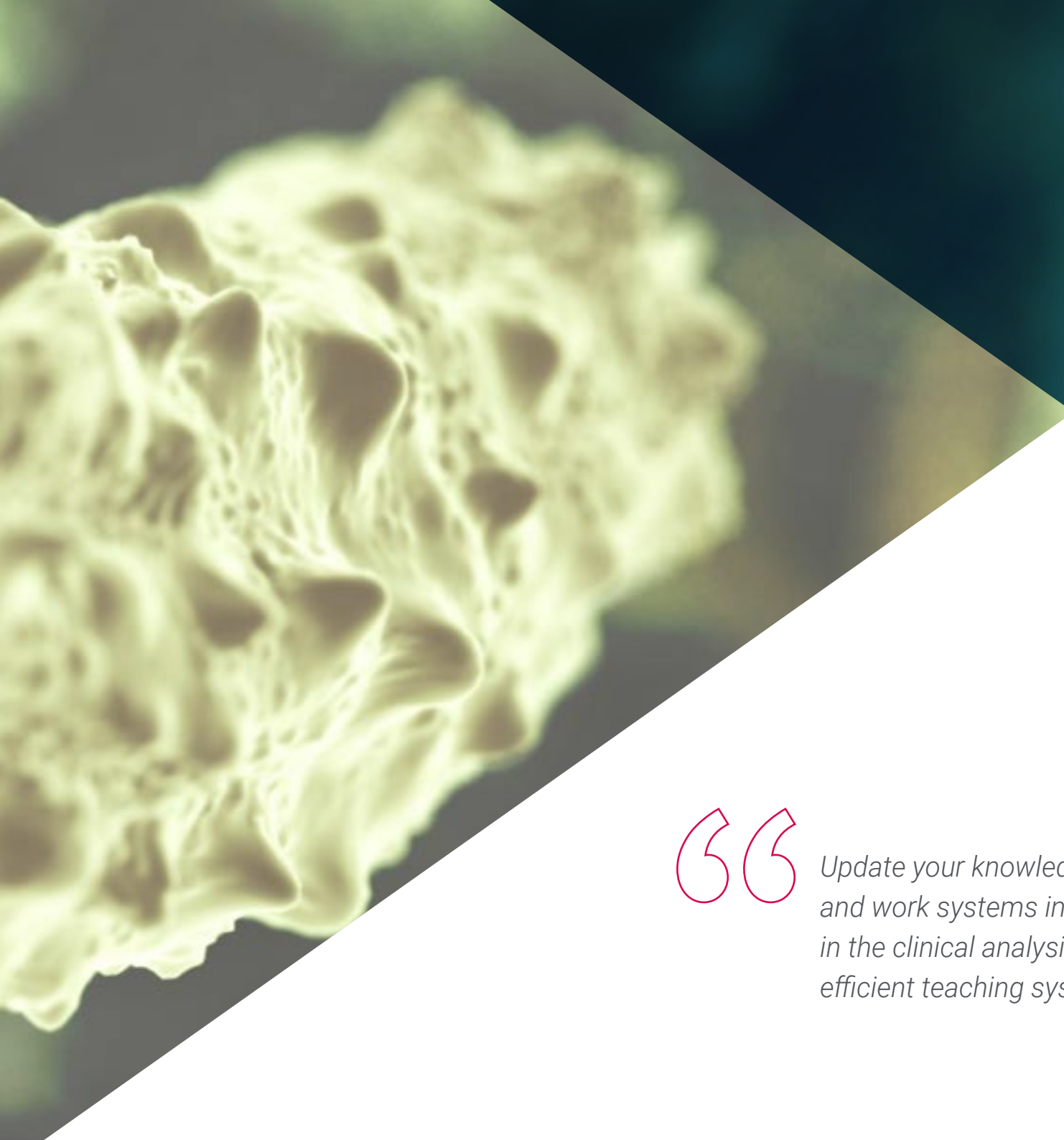
# Introduction

The specific knowledge in microbiology and parasitology requires clinical analysis laboratory professionals to be highly qualified and their knowledge to be constantly updated in order to remain competitive and at the forefront in this field of work.

In this comprehensive Postgraduate Diploma, we offer you the possibility to place you at the forefront in this field of work.

Through the most developed teaching techniques, you will learn the theory and practice of all the advances needed to work in a clinical analysis laboratory at a high level. With a structure and plan that is totally compatible with your personal and professional life.





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*Update your knowledge in the latest techniques and work systems in Microbiology and Parasitology in the clinical analysis laboratory, with the most efficient teaching system on the market"*

Since Anton van Leeuwenhoek discovered the first microscope, the techniques for the analysis of clinical samples have evolved in leaps and bounds, so much so that today we have a wide variety of analytical procedures, which have become increasingly important for the diagnosis and prevention of pathologies in the biomedical sciences.

Therefore, given the molecular variability of diseases in the population, clinical analyses are necessary and thus have a leading role in medical personnel's clinical decision making and in turn, as a link to medicine based on scientific evidence.

Another of the aspects covered in this course is the specialty of Clinical Analysis, with an eminently multidisciplinary character, and it is the students themselves who must focus on those aspects in which they are lacking training, depending on their educational background.

In addition, the study of Microbiology and Parasitology is essential in the daily practice of a Clinical Analysis Laboratory. Microorganisms and parasites are causative agents of a wide variety of pathologies. It is also important to bear in mind that many of these microbial agents make up a large part of the normal microbiota of healthy individuals, exerting numerous benefits when there is a balance. The interpretation of the results obtained in the microbiology laboratory depends on the quality of the samples received, as well as the knowledge and experience of the microbiologist, with sample processing being a critical step for the accuracy of the results.

A compendium and deepening of knowledge that will lead you to excellence in your profession.

This **Postgraduate Diploma in Microbiology and Parasitology Laboratory** offers you the characteristics of a high-level scientific, teaching, and technological course. These are some of its most notable features:

- ♦ Latest technology in online teaching software.
- ♦ Highly visual teaching system, supported by graphic and schematic contents that are easy to assimilate and understand.
- ♦ Practical cases presented by practising experts.
- ♦ State-of-the-art interactive video systems.
- ♦ Teaching supported by telepractice.
- ♦ Continuous updating and recycling systems.
- ♦ Self-regulating learning: full compatibility with other occupations.
- ♦ Practical exercises for self-evaluation and learning verification.
- ♦ Support groups and educational synergies: questions to the expert, debate and knowledge forums.
- ♦ Communication with the teacher and individual reflection work.
- ♦ Content that is accessible from any fixed or portable device with an Internet connection.
- ♦ Supplementary documentation databases are permanently available, even after the course.



*With this Postgraduate Diploma you will be able to combine high intensity training with your personal and professional life, achieving your goals in a simple and real way”*

“ *A highly skilled course which will allow you to become a highly competent professional in hematology in a clinical analysis laboratory* ”

The teachers of this course are professionals currently working in a modern and accredited Clinical Laboratory, with a very solid training base and up to date knowledge in both scientific and purely technical disciplines.

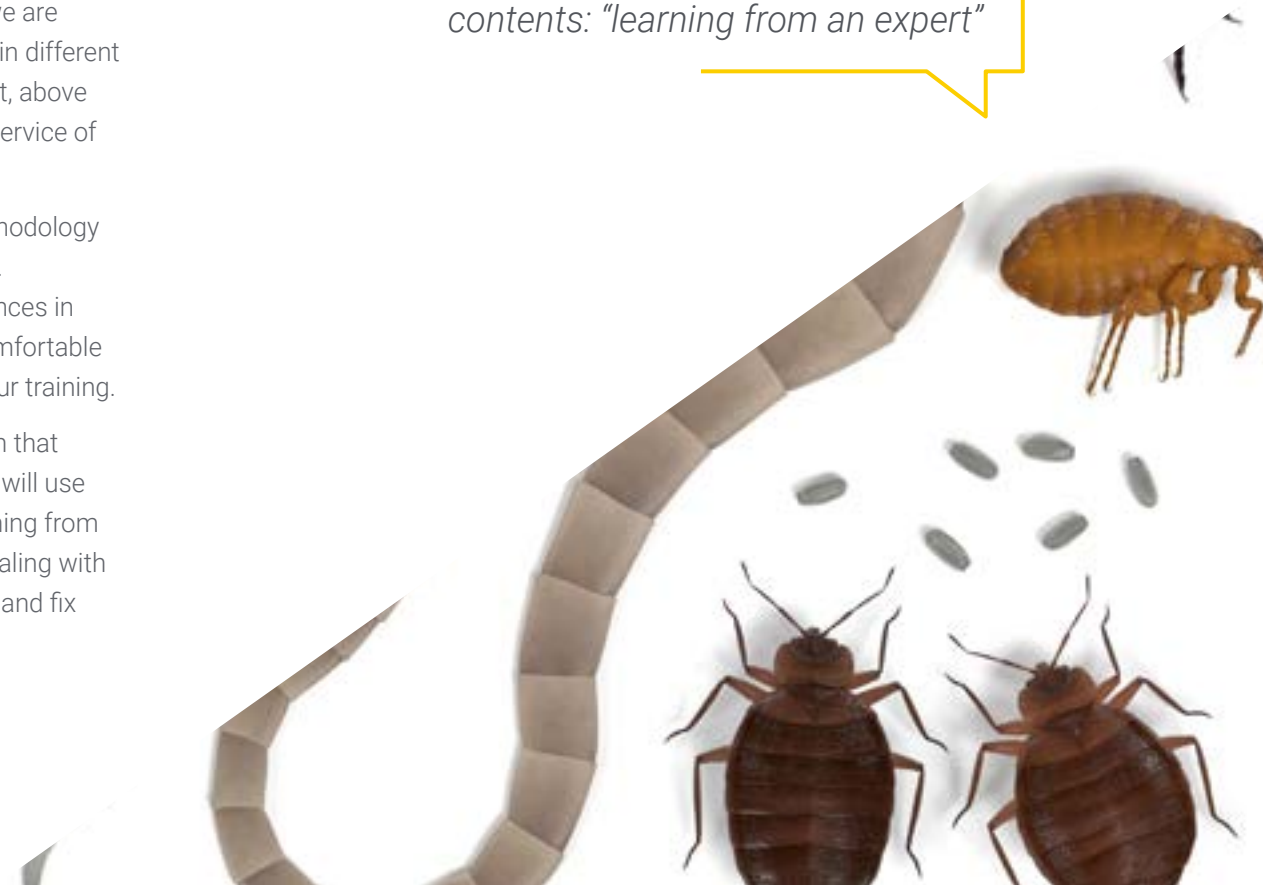
In this way, we ensure that we provide you with the most innovative training we are aiming for. A multidisciplinary team of professionals trained and experienced in different environments, who will cover the theoretical knowledge in an efficient way, but, above all, will put the practical knowledge derived from their own experience at the service of the course: one of the differential qualities of this course.

This mastery of the subject is complemented by the effectiveness of the methodology used in the design of this course in Microbiology and Parasitology Laboratory. Developed by a multidisciplinary team of experts, it integrates the latest advances in educational technology. This way, you will be able to study with a range of comfortable and versatile multimedia tools that will give you the operability you need in your training.

The design of this program is based on Problem-Based Learning: an approach that conceives learning as a highly practical process. To achieve this remotely, we will use telepractice: with the help of an innovative interactive video system, and learning from an expert, you will be able to acquire the knowledge as if you were actually dealing with the scenario you are learning about. A concept that will allow you to integrate and fix learning in a more realistic and permanent way.

*The learning in this Postgraduate Diploma is developed through the most developed didactic methods in online teaching to guarantee that your efforts produce the best results possible.*

*Our innovative telepractice concept will give you the opportunity to learn through an immersive experience, which will provide you with a faster integration and a much more realistic view of the contents: “learning from an expert”*



# 02 Objectives

The objective of this training is to offer professionals who work in clinical analysis laboratories, the necessary knowledge and skills to perform their duties using the most advanced protocols and techniques of the moment. Through a study plan totally adapted to the student, this Postgraduate Diploma will progressively allow you to acquire the skills that will push you towards a much higher professional level.





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*Learn from the best and study the techniques and work procedures of Clinical Analysis to be able to work in the best laboratories in the field”*



## General Objectives

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- ♦ Evaluate the ISO standards of a clinical laboratory
- ♦ Demonstrate the importance of good safety and sanitary waste management.
- ♦ Identify the need for correct management of health documentation.
- ♦ Present why quality control is obligatory in a clinical laboratory.
- ♦ Define the clinical indicators of analytical quality.
- ♦ Identify clinical decision levels within reference ranges.
- ♦ Define scientific method and its relationship with medicine based on scientific evidence.
- ♦ Analyze and carry out the instrumental techniques and sample collection processes that specifically apply to medical clinical analysis laboratories as well as understanding the basics and the correct management of the necessary instruments.
- ♦ Apply the instrumental techniques in the resolution of problems in health analysis.
- ♦ Gain specialized knowledge to carry out the tasks specific to a clinical analysis laboratory in terms of the implementation of new analytic methods and the monitoring the quality of those already implemented.
- ♦ Define the procedures used in clinical analysis laboratories for the use of different techniques as well as for sample collection and those aspects related to validation, calibration, automatization and processing of the information obtained from the procedures.
- ♦ Examine the etiological, pathogenic, epidemiological, treatment and diagnostic bases of the main microbial and parasitic diseases affecting human beings.
- ♦ Apply the acquired knowledge to the control of transmittable infectious diseases, both in the hospital and the out-of-hospital environment.
- ♦ Acquire appropriate skills to select the correct diagnostic method with the consequent preparation of a report on the efficiency of the techniques employed.
- ♦ Develop specialised knowledge to carry out a good organization and management of the services in a microbiology clinic. Coordinate activities and teams, and adapt them to the needs and resources available.
- ♦ Acquire advanced epidemiological knowledge to anticipate and avoid the factors that cause or condition the acquisition of infectious diseases.
- ♦ Gain skills to work in a clinical laboratory, research or teaching team, recognising the specific responsibilities needed in each speciality field.
- ♦ Provide advanced, specialized, multidisciplinary and up-to-date training, with an academic and scientific approach, oriented to a career in the clinical field or as a professional in R&D.



## Specific Objectives

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- Define workflows within a clinical analysis laboratory.
- Identify the evacuation plan during a health emergency.
- Develop the types of sanitary waste.
- Present the need for process management.
- Develop the administrative procedure for health documentation.
- Identify the types of health inspections.
- Defining ISO accreditations within the framework of an audit.
- Develop reference intervals through validation guidelines.
- Analyze the steps of the scientific method.
- Present scientific evidence levels and their relation with clinical analysis.
- Compile the instrumental techniques used in a clinical analysis laboratory.
- Determine the procedures involved in microscopic, microbiological, spectral, molecular biology, separation and cell counting techniques.
- Develop the fundamental theoretical concepts for the understanding of in-depth instrumental techniques.
- Establish the direct applications of instrumental techniques of clinical analysis in human health as a diagnostic and preventive element.
- Analyze the process prior to the use of the instrumental techniques to be developed in the clinical analysis laboratory.
- Justify the rationale for using one practice over another based on diagnostic, staffing, management and other factors.
- Propose a practical learning of instrumental techniques through the use of clinical cases, practical examples and exercises.
- Evaluate the information obtained from the use of instrumental techniques for the interpretation of results.
- Acquire advanced knowledge in Clinical Microbiology and Parasitology. Study the main infectious diseases of clinical interest.
- Identify disease-causing microorganisms in humans, to understand the pathophysiology and to practice detection and diagnostic techniques within a framework of responsibility and health safety.
- Organize the preparation of necessary material for its use in the Microbiology laboratory and check for sterility when appropriate. Know the basis and operation of any culture environment in order to use it to perform the different tests used in the microbiology laboratory.
- Correctly handle the different apparatus and equipment used in the Microbiology laboratory.
- Establish a proper functioning through a registration system for sample collection and processing.
- Design specific work protocols for each pathogen, selecting the appropriate parameters for its correct diagnosis, based on criteria of effectiveness and efficiency.
- Interpret antimicrobial or antiparasitic sensitivity in order to provide the best treatment.
- Know the new techniques used for the identification of pathogens.
- Establish proper communication between the laboratory and the clinic.
- Promote and monitor compliance with internal and external quality controls and safety standards.

*A boost to your CV that will give you the competitiveness of the best prepared professionals in the labor market*

03

# Course Management

For our course to be of the highest quality, we are proud to work with a teaching staff of the highest level, chosen for their proven track record. Professionals from different areas and fields of expertise that make up a complete, multidisciplinary team. A unique opportunity to learn from the best.



A close-up photograph of a person's face, showing their eyes and nose. A white rectangular box is drawn over the left side of the face, highlighting a specific area. The background is a dark blue gradient.

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*An impressive teaching staff, made up of professionals from different areas of expertise, will be your teachers during your training: a unique opportunity not to be missed”*

## Management



### Cano Armenteros, Montserrat

- ♦ Bachelor's Degree in Biology. University of Alicante.
- ♦ Master's Degree in Clinical Trials University of Seville.
- ♦ Official Professional Master's Degree in Primary Care Research from the Miguel Hernández University of Alicante.
- ♦ Doctorate Recognition from the University of Chicago, USA Outstanding.
- ♦ Certificate of Pedagogical Aptitude ( CAP ) University of Alicante.

## Professors

### Dr. Calle Guisado, Violeta

- ♦ PhD in Public and Animal Health from the University of Extremadura. Cum Laude Mention and International PhD obtained in July 2019 and Outstanding Award in her PhD in 2020.
- ♦ Degree in Biology from the University of Extremadura, 2012.

### Tapia Poza, Sandra

- ♦ Degree in Biology from the University of Alcalá de Henares 2018.
- ♦ Master's Degree in Microbiology and Parasitology: Research and Development from the Complutense University of Madrid, 2019.
- ♦ Degree in Biology from the University of Alcalá de Henares, 2018.
- ♦ Master's Degree in Microbiology and Parasitology: Research and Development from the Complutense University of Madrid, 2019.
- ♦ Postgraduate Course in Clinical Analysis and Hematology Laboratory (San Jorge University, 2020)
- ♦ University Specialization Course in Biostatistics Applied to Health Sciences (European University Miguel de Cervantes, 2020)



# 04

# Structure and Content

The contents of this Postgraduate Diploma course have been developed by the different experts on this course, with a clear purpose: to ensure that our students acquire each and every one of the necessary skills to become true experts in this field.

A complete and well-structured program that will take you to the highest standards of quality and success.





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*A comprehensive teaching program, structured in well-developed teaching units, oriented towards learning that is compatible with your personal and professional life"*

## Module 1. Legal Framework and Standard Parameters of the Clinical Analysis Laboratory

### 1.1. ISO Standards Applicable to a Modernized Clinical Laboratory

- 1.1.1. Work Flow and Free of Waste
- 1.1.2. Continuous Mapping of Procedures
- 1.1.3. Physical Filing of Personnel Functions
- 1.1.4. Monitoring of Analytical Stages with Clinical Indicators
- 1.1.5. Internal and External Communication Systems

### 1.2. Safety and Management of Sanitary Waste

#### 1.2.1. Safety in a Laboratory Clinic

- 1.2.1.1. Emergency Evacuation Plan
- 1.2.1.2. Risk Assessment
- 1.2.1.3. Standardized Rules of Work
- 1.2.1.4. Unsupervised Work

#### 1.2.2. Management of Sanitary Waste

- 1.2.2.1. Classes of Sanitary Waste
- 1.2.2.2. Packaging
- 1.2.2.3. Destination

### 1.3. Standardization Model for Sanitary Processes

- 1.3.1. Concepts and Objectives of the Standardization Processes
- 1.3.2. Clinical Variability
- 1.3.3. Need for Process Management

### 1.4. Health Care Documentation Management

#### 1.4.1. Archive Installation

- 1.4.1.1. Established Conditions
- 1.4.1.2. Incident Prevention

#### 1.4.2. Safety in the Archives

### 1.4.3. Administrative Procedures

- 1.4.3.1. Standardized Work Plan
- 1.4.3.2. Records
- 1.4.3.3. Location
- 1.4.3.4. Transfer
- 1.4.3.5. Conservation
- 1.4.3.6. Withdrawal
- 1.4.3.7. Elimination

### 1.4.4. Electronic Archive Records

- 1.4.5. Quality Guarantee
- 1.4.6. Closing the Archive

### 1.5. Quality Control in a Clinical Laboratory

- 1.5.1. Legal Context of Health Care Quality
- 1.5.2. Personnel Functions as a Quality Guarantee
- 1.5.3. Health Inspections

#### 1.5.3.1. Concept

#### 1.5.3.2. Types of Inspections

- 1.5.3.2.1. Studies
- 1.5.3.2.2. Installations
- 1.5.3.2.3. Processes

### 1.5.4. Clinical Data Audits

- 1.5.4.1. Concept of an Audit
- 1.5.4.2. ISO Accreditation

#### 1.5.4.2.1. Laboratory ISO 15189, ISO 17025

#### 1.5.4.2.2. ISO 17020, ISO 22870

#### 1.5.4.3. Certifications

### 1.6. Evaluation of Analytical Quality: Clinical Indicators

- 1.6.1. System Description
- 1.6.2. Work Flowchart
- 1.6.3. Importance of Quality in the Laboratory

- 1.6.4. Procedure Management in Clinical Analyses
  - 1.6.4.1. Quality Control
  - 1.6.4.2. Extraction and Management of Samples
  - 1.6.4.3. Verification and Validation in the Methods
- 1.7. Clinical Decision Levels within Reference Ranges.
  - 1.7.1. Clinical Laboratory Analysis
    - 1.7.1.1. Concept
    - 1.7.1.2. Standard Clinical Parameters
  - 1.7.2. Reference Intervals
    - 1.7.2.1. Laboratory Ranges International Units
    - 1.7.2.2. Analytical Method Validation Guide
  - 1.7.3. Clinical Decision Levels
  - 1.7.4. Sensitivity and Specificity in Clinical Results
  - 1.7.5. Critical Values Variability
- 1.8. Processing of Requests for Clinical Trials
  - 1.8.1. Most Common Types of Requests
  - 1.8.2. Efficient Use vs. Excess Demand
  - 1.8.3. Practical Example of Requests in the Hospital Field
- 1.9. Scientific Method in Clinical Analysis
  - 1.9.1. PICO Question
  - 1.9.2. Protocol
  - 1.9.3. Bibliographic Search
  - 1.9.4. Study Design
  - 1.9.5. Obtaining Results
  - 1.9.6. Statistical Analysis and Interpretation of Results
  - 1.9.7. Publication of Results



1.10. Medicine Based on Scientific Evidence Application in Clinical Analysis

- 1.10.1. Concept of Scientific Evidence
- 1.10.2. Classification of the Scientific Evidence Levels
- 1.10.3. Routine Clinical Practice Guidelines
- 1.10.4. Evidence Applied in Clinical Analysis Magnitude of Benefit

**Module 2. Instrumental Techniques in the Clinical Analysis Laboratory**

2.1 Instrumental Techniques in Clinical Analysis

- 2.1.1 Introduction
- 2.1.2 Fundamental Concepts
- 2.1.3 Classification of Instrumental Methods

- 2.1.3.1 Classic Methods
- 2.1.3.2 Instrumental Methods

- 2.1.4 Preparation of Reagents, Solutions, Buffers and Controls
- 2.1.5 Equipment Calibration

- 2.1.5.1 Importance of Calibration
- 2.1.5.2 Methods of Calibration

2.1.6 Clinical Analysis Process

- 2.1.6.1 Reasons for Requesting a Clinical Analysis
- 2.1.6.2 Phases of the Analysis Process
- 2.1.6.3 Patient Preparation and Sample Taking

2.2 Microscopic Techniques in Clinical Analysis

- 2.2.1. Introduction and Concept
- 2.2.2. Types of Microscopes

- 2.2.2.1. Optical Microscopes
- 2.2.2.2. Electronic Microscopes

2.2.3 Lenses, Light and Image Formation

2.2.4 Management and Maintenance of Light Optical Microscopes

- 2.2.4.1 Handling and Properties
- 2.2.4.2. Maintenance
- 2.2.4.3. Observation Incidents
- 2.2.4.4 Application in Clinical Analysis

2.2.5. Other Microscopes Characteristics and Management

- 2.2.5.1 Dark Field Microscope
- 2.2.5.2 Polarized Light Microscope
- 2.2.5.3 Interference Microscope
- 2.2.5.4 Inverted Microscope
- 2.2.5.5 Ultraviolet Light Microscope
- 2.2.5.6 Fluorescence Microscope
- 2.2.5.7 Electronic Microscopes

2.3 Instrumental Techniques in Clinical Analysis

- 2.3.1. Introduction and Concept
- 2.3.2. Design and Work Standards of the Clinical Microbiology Laboratory

- 2.3.2.1 Necessary Rules and Resources
- 2.3.2.2 Routines and Procedures in the Laboratory
- 2.3.2.3 Sterilization and Contamination

2.3.3 Cellular Culture Techniques

- 2.3.3.1 Growth Environment

2.3.4 Most Commonly Used Extension and Staining Procedures in Clinical Microbiology

- 2.3.4.1 Bacteria Recognition
- 2.3.4.2 Cytological
- 2.3.4.3 Other Procedures

### 2.3. 5 Other Methods of Microbiological Analysis

2.3.5.1 Direct Microscopic Examination Identification of Normal and Pathogenic Flora

2.3.5.2 Identification by Biochemical Tests

2.3.5.3 Rapid Immunological Test

### 2.4 Volumetric, Gravimetric, Electrochemical and Titration Techniques

#### 2.4.1. Volumetric Introduction and Concept

2.4.1.1 Classification of Methods

2.4.1.2 Laboratory Procedure to Perform a Volumetric Analysis

#### 2.4. 2 Gravimetry

2.4.2.1 Introduction and Concept

2.4.2.2 Classification of Gravimetric Methods

2.4.2.3 Laboratory Procedure to Perform a Volumetric Analysis

#### 2.4.3 Electrochemical Techniques

2.4.3.1 Introduction and Concept

2.4.3.2 Potentiometry

2.4.3.3 Amperometry

2.4.3.4 Coulometry

2.4.3.5 Conductimetry

2.4.3.6 Application in Clinical Analysis

#### 2.4. 4 Evaluation

2.4.4.1 Acid-Bases

2.4.4.2 Precipitation

2.4.4.3 Complex Formation

2.4.4.4 Application in Clinical Analysis

### 2.5 Instrumental Techniques in Clinical Analysis

#### 2.5.1. Introduction and Concept

2.5.1.1 Electromagnetic Radiation and its Interaction with the Material

2.5.1.2 Radiation Absorption and Emission

#### 2.5.2 Spectrophotometry Application in Clinical Analysis

2.5.2.1 Instruments

2.5.2.2 Procedures

#### 2.5. 3 Atomic Absorption Spectrophotometry

#### 2.5. 4 Flame Emission Photometry

#### 2.5. 5 Fluorimetry

#### 2.5. 6 Nephelometry and Turbidimetry

#### 2.5. 7 Mass and Reflectance Spectrometry

2.5.7.1 Instruments

2.5.7.2 Procedures

#### 2.5.8 Applications of the Most Common Spectral Techniques Currently Used in Clinical Analysis

### 2.6 Immunoanalysis Techniques in Clinical Analysis

#### 2.6.1. Introduction and Concept

2.6.1.1. Immunological Concepts

2.6.1.2 Types of Immunoanalysis

2.6.1.3 Cross-Reactivity and Antigen

2.6.1.4 Detection Molecules

2.6.1.5 Quantification and Analytical Sensitivity

2.6.2 Immunohistochemical Techniques

2.6.2.1 Concept

2.6.2.2 Immunohistochemical Procedures

2.6.3 Immunohistochemical Techniques

2.6.3.1 Concept and Procedure

2.6.4 Immunofluorescence

2.6.4.1 Concept and Classification

2.6.4.2 Immunofluorescence Procedure

2.6.5 Other Methods of Microbiological Analysis

2.6.5.1 Immunofelometry

2.6.5.2 Radial Immunodiffusion

2.6.5.3 Immunoturbidimetry

2.7 Separation Techniques in Clinical Analysis Chromatography and Electrophoresis

2.7.1 Introduction and Concept

2.7.2 Chromatographic Techniques

2.7.2.1 Principles, Concepts and Classification

2.7.2.2 Gas-Liquid Chromatography Concepts and Procedure

2.7.2.3 High Efficacy Liquid Chromatography Concepts and Procedure

2.7.2.4 Thin Layer Chromatography

2.7.2.5 Application in Clinical Analysis

2.7.3 Electrophoretic Techniques

2.7.3.1 Introduction and Concept

2.7.3.2 Instruments and Procedure

2.7.3.3 Purpose and Field of Application in Clinical Analysis

2.7.3.4 Capillary Electrophoresis

2.7.3.4.1 Serum Protein Electrophoresis



2.7.4 Hybrid Techniques: ICP masses, Gases masses and Liquids masses

## 2.8 Molecular Biology Techniques in Clinical Analysis

2.8.1. Introduction and Concept

2.8.2 DNA and RNA Extraction Techniques

2.8.2.1 Procedure and Conservation

2.8.3 Chain Reaction of PCR Polymers

2.8.3.1 Concept and Foundation

2.8.3.2 Instruments and Procedure

2.8.3.3 Modifications of the PCR Method

2.8.4 Hybridization Techniques

2.8.5 Sequencing

2.8.6 Protein Analysis by Western Blotting

2.8.7 Proteomics and Genomics

2.8.7.1 Concepts and Procedures in Clinical Analysis

2.8.7.2 Types of Proteomic Studies

2.8.7.3 Bioinformatics and Proteomic

2.8.7.4 Metabolomics

2.8.7.5 Relevance in Biomedicine

## 2.9 Techniques for the Determination of Form Elements Flow Cytometry Bedside Testing

2.9.1 Red Blood Cells Count

2.9.1.1 Cellular Count Procedure

2.9.1.2 Pathologies Diagnosed with this Methodology

2.9.2 Red Blood Cells Count

2.9.2.1 Procedures

2.9.2.2 Pathologies Diagnosed with this Methodology



### 2.9.3 Flow Cytometry

- 2.9.3.1 Introduction and Concept
- 2.9.3.2 Technique Procedure
- 2.9.3.3 Cytometry Techniques in Clinical Analysis
  - 2.9.3.3.1 Applications in Oncohematology
  - 2.9.3.3.2 Applications in Allergies
  - 2.9.3.3.3 Applications in Infertility

### 2.9.4 Bedside Testing

- 2.9.4.1 Concept
- 2.9.4.2 Types of Samples
- 2.9.4.3 Techniques Used
- 2.9.4.4 Most Used Applications in Bedside Testing

## 2.10 Interpretation of Results, Analytical Method Evaluation and Analytical Interferences

### 2.10.1 Laboratory Report

- 2.10.1.1 Concept
- 2.10.1.2 Characteristic Elements of a Laboratory Report
- 2.10.1.3 Interpretation of the Report

### 2.10.2 Evaluation of Analytical Methods in Clinical Analysis

- 2.10.2.1 Concepts and Objectives
- 2.10.2.2 Linearity
- 2.10.2.3 Truthfulness
- 2.10.2.4 Accuracy

### 2.10.3 Analytical Interferences

- 2.10.3.1 Concept, Foundation and Classification
- 2.10.3.2 Endogenous Interferents
- 2.10.3.3 Exogenous Interferents
- 2.10.3.4 Procedures for Detecting and Quantifying an Interference in a Specific Method or Analysis

## Module 3. Microbiology and Parasitology

### 3.1. General Concepts of Microbiology

- 3.1.1. Structure of Microorganisms
- 3.1.2. Nutrition, Metabolism and Microbial Growth
- 3.1.3. Microbial Taxonomy
- 3.1.4. Microbial Genomes and Genetics

### 3.2. Study of Infectious Bacteria

- 3.2.1. Gram Positive Cocci
- 3.2.2. Gram Negative Cocci
- 3.2.3. Gram Positive Bacilli
- 3.2.4. Gram Negative Bacilli
- 3.2.5. Other Bacteria of Clinical Interest
  - 3.2.5.1. Legionella Pneumophila
  - 3.2.5.2. Mycobacteria

### 3.3. General Techniques in Microbiology

- 3.3.1. Processing of Microbiological Samples
- 3.3.2. Types of Microbiological Samples
- 3.3.3. Planting Techniques
- 3.3.4. Types of Staining in Microbiology
- 3.3.5. Current Microorganism Identification Techniques

#### 3.3.5.1. Biochemical Tests

- 3.3.5.2. Manual or Automatic Commercial Systems and Multitest Galleries
- 3.3.5.3. MALDI TOF Mass Spectrometry



- 3.3.5.4. Molecular Tests
  - 3.3.5.4.1. 16S rRNA
  - 3.3.5.4.2. 16S-23S rRNA
  - 3.3.5.4.3. 23S rRNA
  - 3.3.5.4.4. rpoB Gene
  - 3.3.5.4.5. gyrB Gene
- 3.3.5.5. Serological Diagnosis of Microbial Infections
- 3.4. Antimicrobial Sensitivity Tests
  - 3.4.1. Antimicrobial Resistance Mechanisms
  - 3.4.2. Sensitivity Test
  - 3.4.3. Antibacterials
- 3.5. Study of Viral Infections
  - 3.5.1. Basic Principles of Virology
  - 3.5.2. Taxonomy
  - 3.5.3. Viruses Affecting the Respiratory System
  - 3.5.4. Viruses Affecting the Digestive System
  - 3.5.5. Viruses Affecting the Central Nervous System
  - 3.5.6. Viruses Affecting the Reproductive System
  - 3.5.7. Systemic VirusEs
- 3.6. General Techniques in Virology
  - 3.6.1. Processing of Samples
  - 3.6.2. Laboratory Techniques for Viral Diagnosis
  - 3.6.3. Antivirals
- 3.7. Most Common Fungal Infections
  - 3.7.1. General Information on Fungi
  - 3.7.2. Taxonomy
  - 3.7.3. Primary Mycoses
  - 3.7.4. Opportunist Mycoses
  - 3.7.5. Subcutaneous Mycoses
  - 3.7.6. Cutaneous and Superficial Mycoses
  - 3.7.7. Mycosis of Atypical Etiology
- 3.8. Diagnostic Techniques in a Clinical Mycology
  - 3.8.1. Processing of Samples
  - 3.8.2. Study of Superficial Mycoses
  - 3.8.3. Study of Subcutaneous Mycoses
  - 3.8.4. Study of Deep Mycoses
  - 3.8.5. Study of Opportunist Mycoses
  - 3.8.6. Diagnostic Techniques
  - 3.8.7. Antifungal
- 3.9. Parasitic diseases
  - 3.9.1. General Concepts of Parasitology
  - 3.9.2. Protozoa

- 3.9.2.1. Amoeba (Sarcodina)
- 3.9.2.2. Ciliates (Ciliophora)
- 3.9.2.3. Flagellates (Mastigophora)
- 3.9.2.4. Apicomplexa
- 3.9.2.5. Plasmodium
- 3.9.2.6. Sarcocystis
- 3.9.2.7. Microsporidiosis

3.9.3. Helminths

- 3.9.3.1. Nematodes
- 3.9.3.2. Platyhelminthes
  - 3.9.3.2.1. Cestodes
  - 3.9.3.2.2. Trematodes

3.9.4. Arthropods

3.10. Diagnostic Techniques in a Clinical Parasitology

- 3.10.1. Processing of Samples
- 3.10.2. Diagnostic Methods
- 3.10.3. Antiparasitics





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*A comprehensive teaching program, structured in well-developed teaching units, oriented towards learning that is compatible with your personal and professional life"*

05

# Methodology

This training program provides you with a different way of learning. Our methodology uses a cyclical learning approach: ***Re-learning***.

This teaching system is used in the most prestigious medical schools in the world, and major publications such as the ***New England Journal of Medicine*** have considered it to be one of the most effective.



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*Discover Re-learning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"*

## At TECH we use the Case Method

In a given situation, what would you do? Throughout the program, you will be presented with multiple simulated clinical cases based on real patients, where you will have to investigate, establish hypotheses and, finally, resolve the situation. There is abundant scientific evidence on the effectiveness of the method. Specialists learn better, faster, and more sustainably over time.

*With TECH you can experience a way of learning that is shaking the foundations of traditional universities around the world.*



According to Dr. Gérvas, the clinical case is the annotated presentation of a patient, or group of patients, which becomes a "case", an example or model that illustrates some peculiar clinical component, either because of its teaching potential or because of its uniqueness or rarity. It is essential that the case is based on current professional life, trying to recreate the real conditions in professional medical practice.

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*Did you know that this method was developed in 1912 at Harvard for law students? The case method consisted of presenting students with real-life, complex situations for them to make decisions and justify their decisions on how to solve them. In 1924, Harvard adopted it as a standard teaching method”*

The effectiveness of the method is justified by four fundamental achievements:

1. Students who follow this method not only grasp concepts, but also develop their mental capacity by evaluating real situations and applying their knowledge.
2. The learning process has a clear focus on practical skills that allow the student to better integrate into the real world.
3. Ideas and concepts are understood more efficiently, given that the example situations are based on real-life.
4. Students like to feel that the effort they put into their studies is worthwhile. This then translates into a greater interest in learning and more time dedicated to working on the course.



## Re-Learning Methodology

At TECH we enhance the Harvard case method with the best 100% online teaching methodology available: Re-learning.

Our University is the first in the world to combine the study of clinical cases with a 100% online learning system based on repetition, combining a minimum of 8 different elements in each lesson, which represent a real revolution with respect to simply studying and analyzing cases.

The physician will learn through real cases and by solving complex situations in simulated learning environments. These simulations are developed using state-of-the-art software to facilitate immersive learning.





At the forefront of world teaching, the Re-learning method has managed to improve the overall satisfaction levels of professionals who complete their studies, with respect to the quality indicators of the best Spanish-speaking online university (Columbia University).

With this methodology we have trained more than 250,000 physicians with unprecedented success, in all clinical specialties regardless of the surgical load. All this in a highly demanding environment, where the students have a strong socio-economic profile and an average age of 43.5 years.

*Re-learning will allow you to learn with less effort and better performance, involving you more in your specialization, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation to success.*

In our program, learning is not a linear process, but rather a spiral (we learn, unlearn, forget, and re-learn). Therefore, we combine each of these elements concentrically.

The overall score obtained by our learning system is 8.01, according to the highest international standards.



In this program you will have access to the best educational material, prepared with you in mind:



#### Study Material

All teaching material is produced specifically for the course by the specialists who teach the course, so that the teaching content is highly specific and precise.

This content is then adapted in an audiovisual format that will create our way of working online, with the latest techniques that allow us to offer you high quality in all of the material that we provide you with.



#### Latest Techniques and Procedures on Video

We introduce you to the latest techniques, to the latest educational advances, to the forefront of current medical techniques. All this, in first person, with the maximum rigor, explained and detailed for your assimilation and understanding. And best of all, you can watch them as many times as you want.



#### Interactive Summaries

We present the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

This unique multimedia content presentation training system was awarded by Microsoft as a "European Success Story"



#### Additional Reading

Recent articles, consensus documents, international guides. in our virtual library you will have access to everything you need to complete your training.





**Expert-Led Case Studies and Case Analysis**

Effective learning ought to be contextual. Therefore, we will present you with real case developments in which the expert will guide you through focusing on and solving the different situations: a clear and direct way to achieve the highest degree of understanding.



**Testing & Re-Testing**

We periodically evaluate and re-evaluate your knowledge throughout the program, through assessment and self-assessment activities and exercises: so that you can see how you are achieving your goals.



**Classes**

There is scientific evidence suggesting that observing third-party experts can be useful.

Learning from an expert strengthens knowledge and memory, and generates confidence in our future difficult decisions.



**Quick Action Guides**

We offer you the most relevant contents of the course in the form of worksheets or quick action guides. A synthetic, practical, and effective way to help you progress in your learning.



# 06

# Certificate

Through a different and stimulating learning experience, you will be able to acquire the necessary skills to take a big step in your training. An opportunity to progress, with the support and monitoring of a modern and specialized university, which will propel you to another professional level.



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*Include in your training a Postgraduate Diploma in Microbiology and Parasitology Laboratory: a highly qualified added value for any professional in this area"*

This **Postgraduate Diploma in Microbiology and Parasitology Laboratory** contains the most complete and up-to-date scientific program on the market.

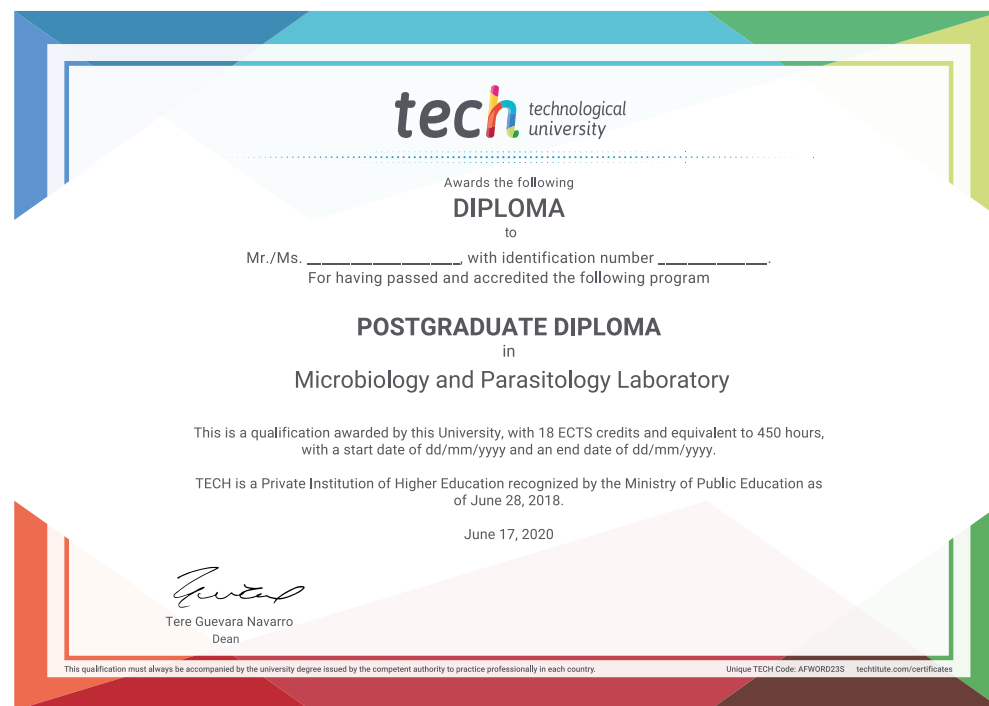
After the student has passed the evaluations, they will receive their corresponding certificate issued by **TECH Technological University** via tracked delivery.

The diploma issued by **TECH Technological University** will reflect the qualification obtained, and meets the requirements commonly demanded by labor exchanges, competitive examinations, and professional from career evaluation committees.

Title: **Postgraduate Diploma in Microbiology and Parasitology Laboratory**

ECTS: **18**

Official Number of Hours: **450**



\*Apostille Convention. In the event that the student wishes to have their paper diploma issued with an apostille, TECH EDUCATION will make the necessary arrangements to obtain it, at an additional cost.

future

health

confidence people

education information tutors

guarantee accreditation teaching

institutions technology learning

community commitment

personalized service innovation

knowledge present

online training

development language

virtual classroom

**tech** technological  
university

**Postgraduate Diploma**  
Microbiology and  
Parasitology Laboratory

Course Modality: **Online**

Duration: **6 months.**

Certificate: **TECH Technological University**

**18 ECTS Credits**

Teaching Hours: **450 hours.**

# Postgraduate Diploma

## Microbiology and Parasitology Laboratory

