

Postgraduate Certificate Instrumental Techniques in the Clinical Analysis Laboratory





Postgraduate Certificate

Instrumental Techniques in the Clinical Analysis Laboratory

Course Modality: **Online**

Duration: **2 months.**

Certificate: **TECH Technological University**

6 ECTS Credits

Teaching Hours: **150 hours.**

Website: www.techtute.com/medicine/postgraduate-certificate/instrumental-techniques-clinical-analysis-laboratory

Index

01

Introduction

p. 4

02

Objectives

p. 8

03

Course Management

p. 12

04

Structure and Content

p. 16

05

Methodology

p. 22

06

Certificate

p. 30

01

Introduction

In this complete Postgraduate Certificate we offer you the possibility to update your knowledge in clinical analysis laboratory work and, specifically, in the instrumental techniques that are performed within it. 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.



“

A comprehensive Postgraduate Certificate that will teach you the instrumental techniques which make up the way of working in the clinical analysis laboratory”

Through this Postgraduate Certificate the clinical professional will achieve excellence in the knowledge of instrumental techniques and sample collection techniques, as the basis of analytical methodology. This is one of the fundamental points of their expertise as specialists in the area. Upon completing this course, the professional will have gained an understanding of instrumental techniques and their management, being equipped with specialized skills in order to perform these tasks in the laboratory.

The skills that the student must acquire in order to be qualified as an expert in Clinical Analysis and develop their work in a laboratory of this kind are:

- ◆ Be able to select, recommend, take samples and perform the most appropriate laboratory procedures to study the patient's situation, ensuring the collection of quality-assured and cost-optimal results.
- ◆ Interpret the results obtained in relation to the clinical situation of the patient, by passing this information on to the clinicians.
- ◆ Gain specialized knowledge focused on the clinical usefulness of laboratory procedures, evaluating and maintaining the quality of available methods and designing and implementing new analytical methods.

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



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

This **Postgraduate Certificate in Instrumental Techniques in the Clinical Analysis Laboratory** offers you the advantages of a high-level scientific, teaching, and technological course. These are some of its most notable features:

- ◆ The 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.
- ◆ Autonomous 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.
- ◆ 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 Postgraduate Certificate

“ *A highly skilled course which will allow you to become a highly competent professional 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.

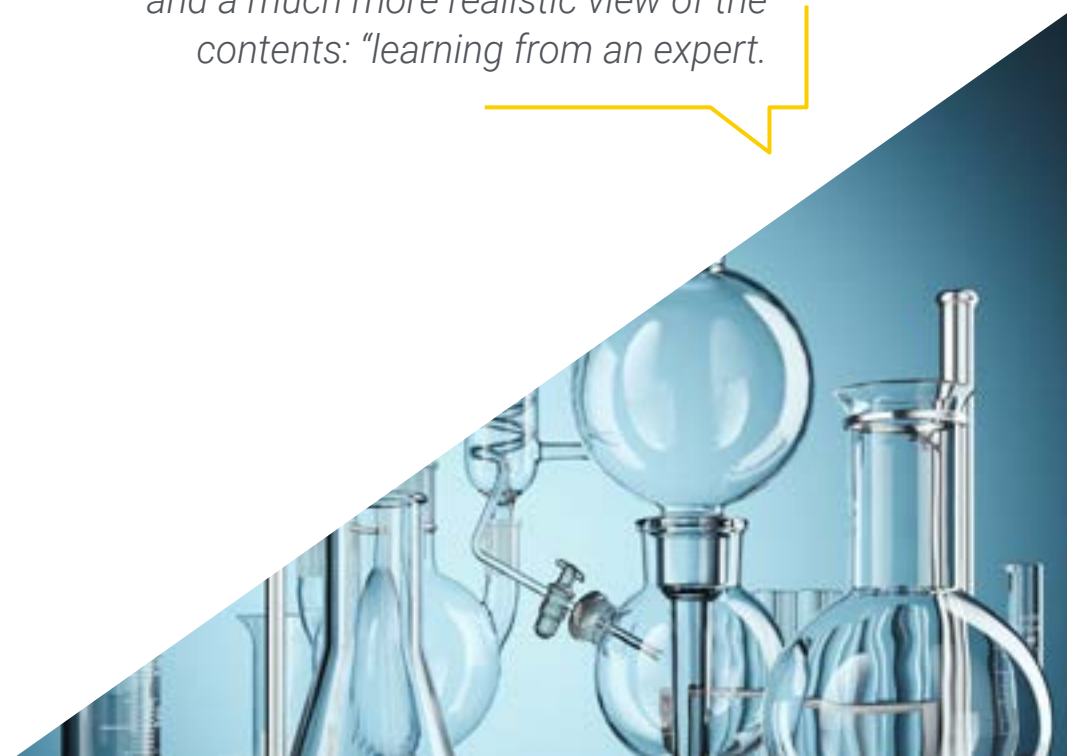
In this way we ensure that we deliver the educational update we are aiming for. A multidisciplinary team of professionals trained and experienced in different environments, who will cover the theoretical knowledge in an efficient way, but, above all, will put the practical knowledge derived from their 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 methodological design of this Postgraduate Certificate in Instrumental Techniques in the Clinical Analysis Laboratory. Developed by a multidisciplinary team of experts, it integrates the latest advances in educational technology. In this way, you will be able to study with a range of easy-to-use and versatile multimedia tools that will give you the necessary skills you need for your specialization.

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 Certificate is developed through the most performed 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 Certificate will progressively allow you to acquire the skills that will push you towards a much higher professional level.





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A Postgraduate Certificate focused on achieving the necessary skills in order to carry out the instrumental techniques of a laboratory with the solvency of an expert”



General Objectives

- ◆ 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.





Specific Objectives

- ◆ 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 necessary process prior to the use of instrumental techniques that should 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.



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.



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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 by the Miguel Hernández University of Alicante for the 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).



04

Structure and Content

The contents of this Postgraduate Certificate 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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An interesting syllabus from start to finish which will take you through the process of personal and professional growth in a more fluid and comfortable way”

Module 1. Instrumental Techniques in the Clinical Analysis Laboratory

- 1.1. Instrumental Techniques in Clinical Analysis
 - 1.1.1. Introduction
 - 1.1.2. Main Concepts
 - 1.1.3. Classification of Instrumental Methods
 - 1.1.3.1. Classic Methods
 - 1.1.3.2. Instrumental Methods
 - 1.1.4. Preparation of Reagents, Solutions, Buffers and Controls
 - 1.1.5. Equipment Calibration
 - 1.1.5.1. Importance of Calibration
 - 1.1.5.2. Methods of Calibration
 - 1.1.6. Clinical Analysis Process
 - 1.1.6.1. Reasons for Requesting a Clinical Analysis
 - 1.1.6.2. Phases of the Analysis Process
 - 1.1.6.3. Patient Preparation and Sample Taking
- 1.2. Microscopic Techniques in Clinical Analysis
 - 1.2.1. Introduction and Concepts
 - 1.2.2. Types of Microscopes
 - 1.2.2.1. Optical Microscopes
 - 1.2.2.2. Electronic Microscopes
 - 1.2.3. Lenses, Light and Image Formation
 - 1.2.4. Management and Maintenance of Light Optical Microscopes
 - 1.2.4.1. Handling and Properties
 - 1.2.4.2. Maintenance
 - 1.2.4.3. Observation Incidents
 - 1.2.4.4. Application in Clinical Analysis
 - 1.2.5. Other Microscopes Characteristics and Management
 - 1.2.5.1. Dark Field Microscope
 - 1.2.5.2. Polarized Light Microscope
 - 1.2.5.3. Interference Microscope
 - 1.2.5.4. Inverted Microscope
 - 1.2.5.5. Ultraviolet Light Microscope
 - 1.2.5.6. Fluorescence Microscope
 - 1.2.5.7. Electronic Microscope





- 1.3. Microbiological Techniques in Clinical Analysis
 - 1.3.1. Introduction and Concept
 - 1.3.2. Design and Work Standards of the Clinical Microbiology Laboratory
 - 1.3.2.1. Necessary Rules and Resources
 - 1.3.2.2. Routines and Procedures in the Laboratory
 - 1.3.2.3. Sterilization and Contamination
 - 1.3.3. Cellular Culture Techniques
 - 1.3.3.1. Growth Environment
 - 1.3.4. Most Commonly used Extension and Staining Procedures in Clinical Microbiology
 - 1.3.4.1. Bacteria Recognition
 - 1.3.4.2. Cytological
 - 1.3.4.3. Other Procedures
 - 1.3.5. Other Methods of Microbiological Analysis
 - 1.3.5.1. Direct Microscopic Examination Identification of Normal and Pathogenic Flora
 - 1.3.5.2. Identification by Biochemical Tests
 - 1.3.5.3. Rapid Immunological Test
- 1.4. Volumetric, Gravimetric, Electrochemical and Titration Techniques
 - 1.4.1. Volumetrics Introduction and Concept
 - 1.4.1.1. Classification of Methods
 - 1.4.1.2. Laboratory Procedure to Perform a Volumetric Analysis
 - 1.4.2. Gravimetry
 - 1.4.2.1. Introduction and Concept
 - 1.4.2.2. Classification of Gravimetric Methods
 - 1.4.2.3. Laboratory Procedure to Perform a Gravimetric Analysis
 - 1.4.3. Electrochemical Techniques
 - 1.4.3.1. Introduction and Concept
 - 1.4.3.2. Potentiometry
 - 1.4.3.3. Amperometry
 - 1.4.3.4. Coulometry
 - 1.4.3.5. Conductometry
 - 1.4.3.6. Application in Clinical Analysis

- 1.4.4. Evaluation
 - 1.4.4.1. Acid Base
 - 1.4.4.2. Precipitation
 - 1.4.4.3. Complex Formation
 - 1.4.4.4. Application in Clinical Analysis
- 1.5. Spectral Techniques in Clinical Analysis
 - 1.5.1. Introduction and Concepts
 - 1.5.1.1. Electromagnetic Radiation and its Interaction with the Material
 - 1.5.1.2. Radiation Absorption and Emission
 - 1.5.2. Spectrophotometry Application in Clinical Analysis
 - 1.5.2.1. Instruments
 - 1.5.2.2. Procedure
 - 1.5.3. Atomic Absorption Spectrophotometry
 - 1.5.4. Flame Emission Photometry
 - 1.5.5. Fluorimetry
 - 1.5.6. Nephelometry and Turbidimetry
 - 1.5.7. Mass and Reflectance Spectrometry
 - 1.5.7.1. Instruments
 - 1.5.7.2. Procedure
 - 1.5.8. Applications of the Most Common Spectral Techniques Currently Used in Clinical Analysis
- 1.6. Immunoanalysis Techniques in Clinical Analysis
 - 1.6.1. Introduction and Concepts
 - 1.6.1.1. Immunological Concepts
 - 1.6.1.2. Types of Immunoanalysis
 - 1.6.1.3. Cross-Reactivity and Antigen
 - 1.6.1.4. Detection Molecules
 - 1.6.1.5. Quantification and Analytical Sensitivity
 - 1.6.2. Immunohistochemical Techniques
 - 1.6.2.1. Concept
 - 1.6.2.2. Immunohistochemical Procedures
 - 1.6.3. Enzyme Immunochemical Technique
 - 1.6.3.1. Concept and Procedure
 - 1.6.4. Immunofluorescence
 - 1.6.4.1. Concept and Classification
 - 1.6.4.2. Immunofluorescence Procedure
 - 1.6.5. Other Methods of Immunoanalysis
 - 1.6.5.1. Immunophelometry
 - 1.6.5.2. Radial Immunodiffusion
 - 1.6.5.3. Immunoturbidimetry
- 1.7. Separation Techniques in Clinical Analysis Chromatography and Electrophoresis
 - 1.7.1. Introduction and Concepts
 - 1.7.2. Chromatographic Techniques
 - 1.7.2.1. Principles, Concepts and Classification
 - 1.7.2.2. Gas-Liquid Chromatography Concepts and Procedure
 - 1.7.2.3. High Efficacy Liquid Chromatography Concepts and Procedure
 - 1.7.2.4. Thin Layer Chromatography
 - 1.7.2.5. Application in Clinical Analysis
 - 1.7.3. Electrophoretic Techniques
 - 1.7.3.1. Introduction and Concepts
 - 1.7.3.2. Instruments and Procedures
 - 1.7.3.3. Purpose and Field of Application in Clinical Analysis
 - 1.7.3.4. Capillary Electrophoresis
 - 1.7.3.4.1. Serum Protein Electrophoresis
 - 1.7.4. Hybrid Techniques: ICP masses, Gases masses and Liquids masses
- 1.8. Molecular Biology Techniques in Clinical Analysis
 - 1.8.1. Introduction and Concepts
 - 1.8.2. DNA and RNA Extraction Techniques
 - 1.8.2.1. Procedure and Conservation

- 1.8.3. Chain Reaction of PCR Polymers
 - 1.8.3.1. Concept and Foundation
 - 1.8.3.2. Instruments and Procedures
 - 1.8.3.3. Modifications of the PCR Method
- 1.8.4. Hybridization Techniques
- 1.8.5. Sequencing
- 1.8.6. Protein Analysis by Western Blotting
- 1.8.7. Proteomics and Genomics
 - 1.8.7.1. Concepts and Procedures in Clinical Analysis
 - 1.8.7.2. Types of Proteomic Studies
 - 1.8.7.3. Bioinformation and Proteomic
 - 1.8.7.4. Metabolomics
 - 1.8.7.5. Relevance in Biomedicine
- 1.9. Techniques for the Determination of Form Elements Flow Cytometry Bedside Testing
 - 1.9.1. Red Blood Cells Count
 - 1.9.1.1. Cellular Count Procedure.
 - 1.9.1.2. Pathologies Diagnosed with this Methodology
 - 1.9.2. Leukocyte Count
 - 1.9.2.1. Procedure
 - 1.9.2.2. Pathologies Diagnosed with this Methodology
 - 1.9.3. Flow Cytometry
 - 1.9.3.1. Introduction and Concepts
 - 1.9.3.2. Technique Procedure
 - 1.9.3.3. Cytometry Tehniques in Clinical Analysis
 - 1.9.3.3.1. Applications in Oncohematology
 - 1.9.3.3.2. Applications in Allergies
 - 1.9.3.3.3. Applications in Infertility
 - 1.9.4. Bedside Testing
 - 1.9.4.1. Concept
 - 1.9.4.2. Types of Samples
 - 1.9.4.3. Techniques Used
 - 1.9.4.4. Most Used Applications in Bedside Testing
- 1.10. Interpretation of Results, Analytical Method Evaluation and Analytical Interferences
 - 1.10.1. Laboratory Report
 - 1.10.1.1. Concept
 - 1.10.1.2. Characteristic Elements of a Laboratory Report
 - 1.10.1.3. Interpretation of the Report
 - 1.10.2. Evaluation of Analytical Methods in Clinical Analysis
 - 1.10.2.1. Concepts and Objectives
 - 1.10.2.2. Linearity
 - 1.10.2.3. Truthfulness
 - 1.10.2.4. Precision
 - 1.10.3. Analytical Interferences
 - 1.10.3.1. Concept, Foundation and Classification
 - 1.10.3.2. Endogenous Interferents
 - 1.10.3.3. Exogenous Interferents
 - 1.10.3.4. Procedures for Detecting and Quantifying an Interference in a Specific Method or Analysis



*A unique, key, and decisive
specialization experience to boost
your professional development”*

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 Certificate in Instrumental Techniques in the Clinical Analysis Laboratory: a highly qualified added value for any medical professional"

This **Postgraduate Certificate in Instrumental Techniques in the Clinical Analysis Laboratory** contains the most complete and up-to-date scientific program on the market.

After students have passed the assessments, they will receive by certified mail their Postgraduate Certificate issued by **TECH Technological University**.

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

Title: **Postgraduate Certificate in Instrumental Techniques in the Clinical Analysis Laboratory**

ECTS: 6

Official Number of Hours: 150



*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.

health future
confidence people
education information tutors
guarantee accreditation teaching
institutions technology learning
community commitment
personalized service innovation
knowledge present quality
development languages
virtual classroom



Postgraduate Certificate

Instrumental Techniques
in the Clinical Analysis
Laboratory

Course Modality: Online

Duration: 2 months.

Certificate: TECH Technological University

6 ECTS Credits

Teaching Hours: 150 hours.

Postgraduate Certificate

Instrumental Techniques
in the Clinical Analysis
Laboratory