

# Postgraduate Diploma

## Biomedicine in the Field of Clinical Analysis





## Postgraduate Diploma Biomedicine in the Field of Clinical Analysis

- » Modality: online
- » Duration: 6 months
- » Certificate: TECH Global University
- » Accreditation: 18 ECTS
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtitute.com/us/medicine/postgraduate-diploma/postgraduate-diploma-biomedicine-field-clinical-analysis](http://www.techtitute.com/us/medicine/postgraduate-diploma/postgraduate-diploma-biomedicine-field-clinical-analysis)

# Index

01

Introduction

---

*p. 4*

02

Objectives

---

*p. 8*

03

Course Management

---

*p. 12*

04

Structure and Content

---

*p. 18*

05

Methodology

---

*p. 28*

06

Certificate

---

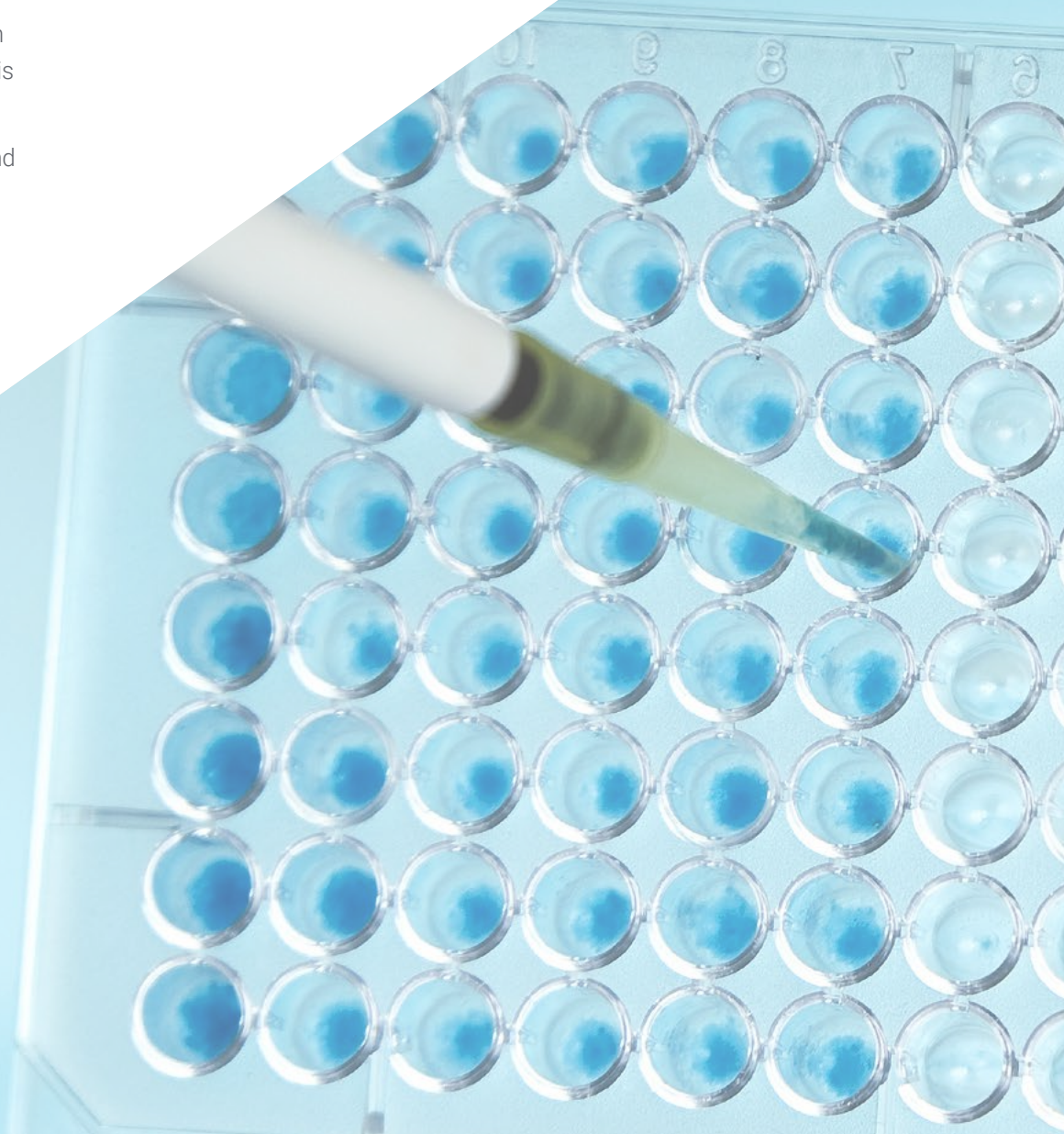
*p. 36*

# 01

# Introduction

Biomedicine has become one of the fields of work with the greatest scientific impact in recent times. In the field of clinical analysis this area is of special relevance because it is configured as the cornerstone of diagnostics and research.

In this program we offer you the possibility of obtaining skills in this area in a simple and very efficient way. 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.





“

*Acquire the necessary specialization to compete among the best in the area of Biomedicine in the field of Clinical Analysis with this Postgraduate Diploma of first academic and technological level"*

This Postgraduate Diploma brings together the most specialized and updated theoretical contents, existing at present, with respect to other programs of similar subject matter. Furthermore, in this particular module, the associated theoretical and practical material is of vital importance, since the explanation of the techniques and their complete understanding requires numerous visual and pedagogical support materials of the highest quality, at the service of the innovative methodology that characterizes us.

This Postgraduate Diploma will provide the clinical professional with specialized knowledge in the approach to blood pathologies, both oncological and non-oncological or benign, with the goal of obtaining the necessary tools to be able to make an adequate differential diagnosis of the different hemopathologies.

Throughout the Postgraduate Diploma, the laboratory study will also be approached with the analysis and peripheral blood smear. In addition to other more complex tests, it allows a comprehensive and specialized diagnosis of the most relevant hematological diseases.

Another of the areas of knowledge in which students will develop is the immune system, its molecular and cellular components and the interactions that are produced between them in order to organize the immune response. They will analyze the immune mechanisms responsible for pathologies such as hypersensitivity, autoimmunity, transplants, immunodeficiency or cancer. And finally, it establishes the immunoanalytical techniques most commonly used in a clinical analysis laboratory.

Additionally, this TECH program will enable students to broaden their knowledge and skills through a group of intensive *Masterclasses*. The latter will be given by a prestigious international expert who has accumulated experience and advanced results in this field. and advanced results in this field, as well as various awards.

This **Postgraduate Diploma in Biomedicine in the Field of Clinical Analysis** contains the most complete and up-to-date scientific program on the market.

Its most notable features are:

- ♦ The latest technology in online teaching software
- ♦ A highly visual teaching system, supported by graphic and schematic contents that are easy to assimilate and understand
- ♦ Practical cases presented by practicing 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-assessment 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 has finished



*The International Guest Director of this Postgraduate Diploma is a true pioneer and innovator in the scientific and research field of Clinical Analysis"*

“

*Acquire the professional skills from a Postgraduate Diploma in Biomedicine in the field of Clinical Analysis and start competing with the best job prospects”*

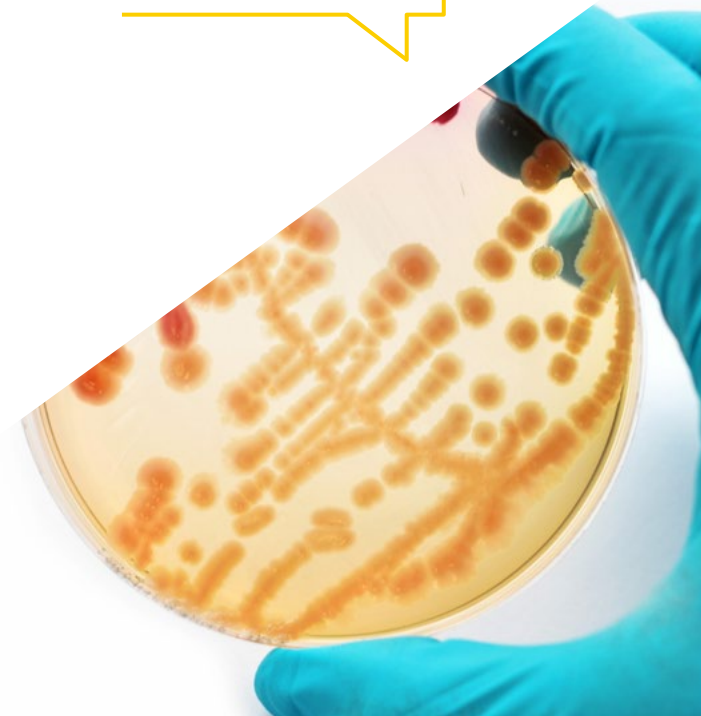
The program's teaching staff includes professionals from the sector who contribute their work experience to this educational program, as well as renowned specialists from leading societies and prestigious universities.

The multimedia content, developed with the latest educational technology, will provide the professional with situated and contextual learning, i.e., a simulated environment that will provide immersive education programmed to learn in real situations.

This program is designed around Problem-Based Learning, whereby the professional must try to solve the different professional practice situations that arise during the course. For this purpose, students will be assisted by an innovative interactive video system created by renowned and experienced experts.

*A specialization created and directed by professionals in this area of work, which makes this Postgraduate Diploma a unique opportunity for professional growth.*

*The learning of this Postgraduate Diploma is supported by the most developed didactic means in online teaching to guarantee that your effort will have the best possible results.*



# 02 Objectives

The Postgraduate Diploma in Biomedicine in the Field of Clinical Analysis is aimed at facilitating the performance of the professional dedicated to teaching with the latest advances and newest treatments in the sector.







“

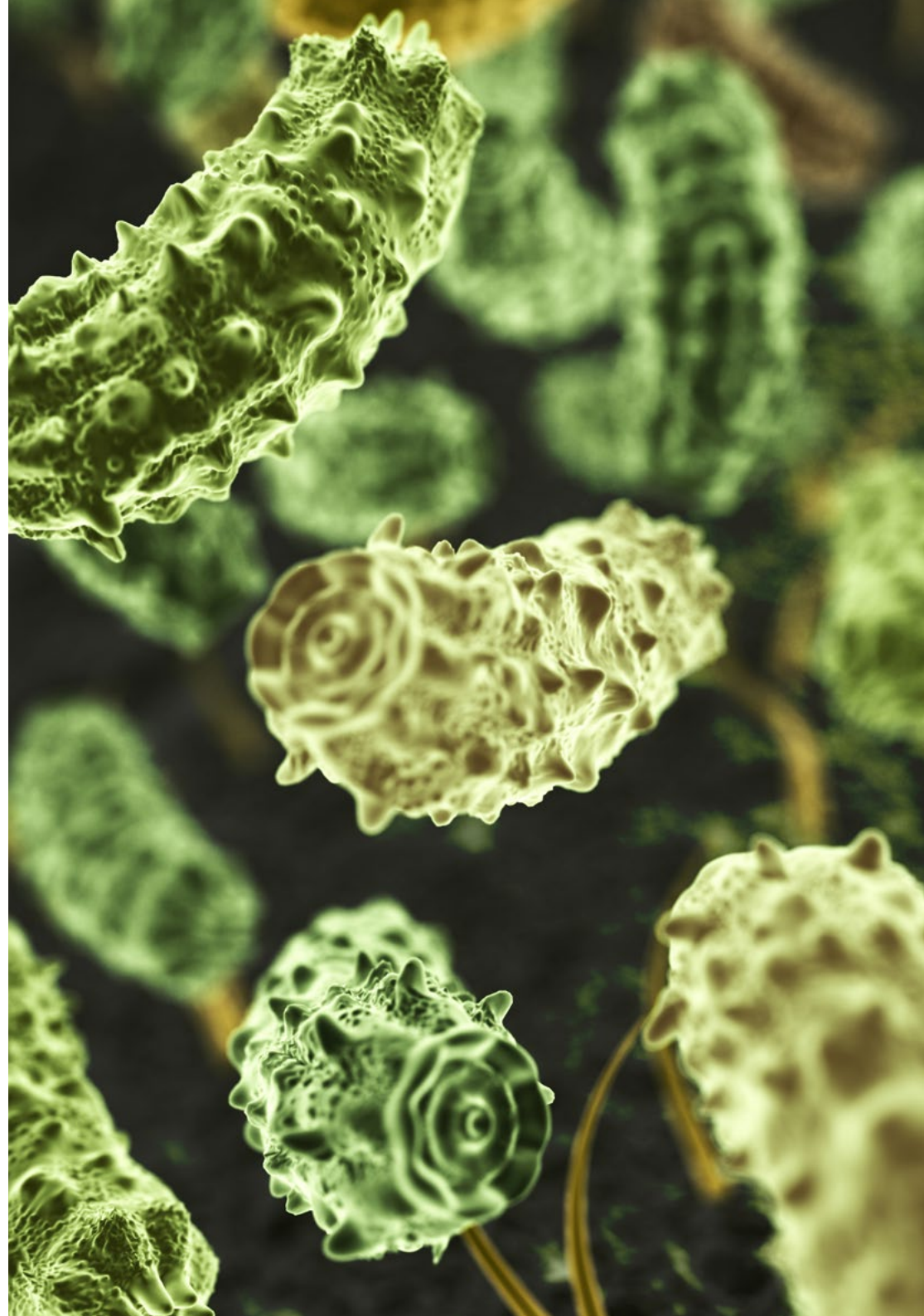
*Thanks to this Postgraduate Diploma you will be able to specialize in Biomedicine in the Field of Clinical Analysis”*



## General Objectives

---

- ♦ Consolidate and broaden knowledge of immunology in the context of clinical analysis
- ♦ Interrelate knowledge of immunology to address problems from different perspectives
- ♦ Develop critical thinking skills to interpret and discuss analytical results
- ♦ Gain skills in autonomous learning and ability to transmit knowledge acquired on immunology
- ♦ Identify the main hematological alterations in analytical tests
- ♦ Propose the essential complimentary examinations for the clinical approach in patients with a hematological disease
- ♦ Correlate laboratory findings with clinical entities
- ♦ Establish differential diagnosis of the main blood dyscrasias
- ♦ Analyze and carry out the instrumental techniques and sample collection processes that apply specifically to the clinical health analysis laboratory, as well as determine the fundamentals and correct handling of the necessary instruments
- ♦ Apply the instrumental techniques in the resolution of problems in health analysis
- ♦ Generate specialized knowledge to carry out the tasks of a clinical analysis laboratory regarding the implementation of new analytical methods and quality monitoring 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

---

### Module 1. Instrumental Techniques in the Analysis Laboratory

- ♦ 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

### Module 2. Hematology

- ♦ Determine the quantitative and qualitative alterations of the different blood cells
- ♦ Gain in depth understanding of peripheral blood smears of red blood series alterations
- ♦ Identify white blood cell abnormalities and their main causes
- ♦ Present the most frequent platelet disorders
- ♦ Propose a differential diagnosis of myelodysplastic and myeloproliferative syndromes

- ♦ Analyze the complementary tests for the initial evaluation of acute leukemias
- ♦ Establish a differential diagnosis of the main acute and chronic lymphoid neoplasms
- ♦ Identify the various coagulation pathologies
- ♦ Establish appropriate guidelines for transfusion procedures

### Module 3. Immunology

- ♦ Define the molecular and cellular components and organ organization of the immune system
- ♦ Analyze innate and adaptive immune responses, both humoral and cellular based
- ♦ Examine the immunological processes that occur in pathological processes such as cancer, transplantation, autoimmunity and allergies
- ♦ Apply and integrate the most commonly used immunoanalytical techniques in clinical analysis
- ♦ Diagnose alterations of the immune system based on the evaluation of the analytical results obtained
- ♦ Develop integrated thinking and critical reasoning for immunological problem solving
- ♦ Propose and design new experiments to improve or incorporate new immunological techniques, as well as to know their limitations

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.





“

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

## International Guest Director

Dr. Jeffrey Jhang is a dedicated expert in **Clinical Pathology and Laboratory Medicine**. He has won several awards in these areas of health care. These include the **Dr. Joseph G. Fink Award** from the Columbia University College of Medicine and Surgery, and other awards from the **College of American Pathologists**.

His **scientific leadership** has been latent thanks to his exhaustive work as **Medical Director of the Clinical Laboratory Center**, attached to the **Icahn School of Medicine at Mount Sinai**. At the same institution, he coordinates the **Department of Transfusion Medicine and Cell Therapy**. Dr. Jhang has also served in leadership roles in the Clinical Laboratory at **New York University Langone Health Center** and as **Chief of the Laboratory Service at Tisch Hospital**.

Through these experiences, the expert has mastered different functions such as **the supervision and management of laboratory operations**, complying with the **main regulatory standards and protocols**. At the same time, he has collaborated with interdisciplinary teams to contribute to **the accurate diagnosis and care** of different patients. On the other hand, he has spearheaded initiatives to improve the **quality, performance and efficiency of technical analysis facilities**.

At the same time, Dr. Jhang is a prolific **academic author**. His articles are related to scientific research in a variety of health fields ranging from **Cardiology to Hematology**. In addition, he is a member of several national and international committees and international committees that outline **regulations for hospitals and laboratories** around the world.

He is also a regular speaker at congresses, a guest medical commentator on television programs and has participated in several books.



## Dr. Jhang, Jeffrey

---

- Director of Clinical Laboratories at NYU Langone Health
- Director of Clinical Laboratories at New York Tisch Hospital
- Professor of Pathology at the NYU Grossman School of Medicine
- Medical Director of the Clinical Laboratory Center of Mount Sinai Health System
- Director of the Blood Bank and Transfusion Service at Mount Sinai Hospital
- Special Laboratory Director of Hematology and Coagulation Laboratory at Columbia University Irving Medical Center
- Director of the Parathyroid Tissue Collection and Processing Center at Columbia University Irving Medical Center
- Assistant Director of Transfusion Medicine at Columbia University Irving Medical Center
- Transfusion Medicine Specialist at the New York Blood Bank
- M.D. from the Icahn School of Medicine at Mount Sinai
- Residency in Anatomic and Clinical Pathology at the New York Presbyterian Hospital
- Member of: American Society for Clinical Pathology and College of American Pathologists

“

*Thanks to TECH you will be able to learn with the best professionals in the world”*

## Management



### Ms. Cano Armenteros, Montserrat

- Research Project Coordinator
- Coordinator of research studies at 12 de Octubre University Hospital.
- Vaccine and Infection Studies Coordinator at CSISP-Salud Publica
- Clinical Research Assistant at TFS HealthScience
- Professor in postgraduate university studies
- Degree in Biology by the University of Alicante
- Master's Degree in Clinical Trials from the University of Seville
- Professional Master's Degree in Clinical Analysis from the University CEU Cardenal Herrera
- Professional Master's Degree in Primary Care Research from the Miguel Hernández University of Elche

## Professors

### Dr. Calle Guisado, Violeta

- ♦ Researcher in Microbiology
- ♦ Responsible for the Microbiology Laboratory at Gallina Blanca
- ♦ Research Laboratory Technician at the University of Extremadura
- ♦ Researcher in several university centers and hospitals
- ♦ Lecturer in university studies and job training courses
- ♦ Doctor in Public and Animal Health by the UEx
- ♦ Degree in Biology from the UEx
- ♦ Master's Degree in Research in Science from the UEx

### Ms. Aparicio Fernández, Cristina

- ♦ Researcher in Biomedicine
- ♦ Graduate in Biotechnology from the University of León.
- ♦ Master's Degree in Advanced Immunology from the University of Barcelona
- ♦ Master's Degree in Management and Monitoring of Clinical Trials by the University CEU Cardenal Herrera





# 04

# Structure and Content

The contents of this Postgraduate Diploma 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.





“

*A high-intensity specialized education that will allow you to acquire the necessary skills to work safely and competently in this interesting field"*

## 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 Immunohistochemical 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. Evalutation 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

## Module 2. Hematology

- 2.1. Introduction to the Hematopoietic System and Study Techniques
  - 2.1.1. Classification of Blood Cells and Hematopoiesis
  - 2.1.2. Hemacytometry and Blood Smear Study
  - 2.1.3. Bone Marrow Study
  - 2.1.4. Role of the Pathologist in the Diagnosis of Testicular Neoplasms
  - 2.1.5. Role of Immunophenotyping in the Diagnosis of Hematologic Disorders
- 2.2. Diagnosis of Erythrocyte Disorders Anemias, Erythrocytosis, Hemoglobinopathies and Thalassemias
  - 2.2.1. Classification of the Types of Anaemia
    - 2.2.1.1. Etiopathogenic Classification
    - 2.2.1.2. Classification According to VCM
      - 2.2.1.2.1. Microcytic Anemia
      - 2.2.1.2.2. Normocytic Anemia
      - 2.2.1.2.3. Macrocytic Anemia
  - 2.2.2. Erythrocytosis Differential Diagnosis
    - 2.2.2.1. Primary Erythrocytosis
    - 2.2.2.2. Secondary Erythrocytosis
  - 2.2.3. Hemoglobinopathies and Thalassemias
    - 2.2.3.1. Classification
    - 2.2.3.2. Laboratory Diagnosis
- 2.3. Quantitative Alterations of the White Series Myeloproliferative and Myelodysplastic Syndromes
  - 2.3.1. Neutrophils: Neutropenia and Neutrophilia
  - 2.3.2. Lymphocytes: Lymphopenia and Lymphocytosis

- 2.4. Diagnosis of Platelet Disorders
  - 2.4.1. Morphologic Alterations: Thrombocytopathies
  - 2.4.2. Thrombocytopenia Diagnostic Approximation
- 2.5. Myeloproliferative and Myelodysplastic Syndromes
  - 2.5.1. Laboratory Findings and Complementary Examinations
    - 2.5.1.1. Hemogram and Peripheral Blood Smear
    - 2.5.1.2. Bone Marrow Study
      - 2.5.1.2.1. Bone Marrow Morphology
      - 2.5.1.2.2. Flow Cytometry
      - 2.5.1.2.3. Cytogenetics
      - 2.5.1.2.4. Molecular Biology
  - 2.5.2. Diagnosis Classification Differential Diagnosis
- 2.6. Monoclonal Gammopathies Multiple Myeloma
  - 2.6.1. Study of Monoclonal Gammopathies
    - 2.6.1.1. Bone Marrow Morphology
    - 2.6.1.2. Study of the Monoclonal Component
    - 2.6.1.3. Other Laboratory Studies
  - 2.6.2. Classification of Monoclonal Gammopathies Differential Diagnosis
    - 2.6.2.1. Monoclonal Gammopathy of Uncertain Significance and Quiescent Myeloma
    - 2.6.2.2. Multiple Myeloma
      - 2.6.2.2.1. Diagnostic Criteria
    - 2.6.2.3. Amyloidosis
    - 2.6.2.4. Waldenström's Macroglobulinemia
- 2.7. Differential Diagnosis of Acute Leukemia
  - 2.7.1. Acute Myeloid Leukemia Promyelocytic Leukemia
    - 2.7.1.1. Laboratory Findings and Complementary Examinations
    - 2.7.1.2. Hemogram and Peripheral Blood Smear
    - 2.7.1.3. Bone Marrow Study
      - 2.7.1.3.1. Bone Marrow Morphology
      - 2.7.1.3.2. Flow Cytometry
      - 2.7.1.3.3. Cytogenetics
      - 2.7.1.3.4. Molecular Biology
    - 2.7.1.4. Diagnosis Classification
  - 2.7.2. Acute Lymphoid Leukemia
    - 2.7.2.1. Laboratory Findings and Complementary Examinations
    - 2.7.2.2. Hemogram and Peripheral Blood Smear
    - 2.7.2.3. Bone Marrow Study
      - 2.7.1.3.1. Bone Marrow Morphology
      - 2.7.1.3.2. Flow Cytometry
      - 2.7.1.3.3. Cytogenetics
      - 2.7.1.3.4. Molecular Biology
    - 2.7.2.4. Diagnosis Classification
- 2.8. Mature B- and T-Lymphoid Neoplasms
  - 2.8.1. Chronic Lymphoproliferative Syndromes B. Chronic Lymphocytic Leukemia
    - 2.8.1.1. Laboratory Studies and Differential Diagnosis
      - 2.8.1.1.1. Chronic Lymphocytic Leukemia
      - 2.8.1.1.2. Tricholeukemia
      - 2.8.1.1.3. Splenic Marginal Zone Lymphoma
      - 2.8.1.1.4. Prolymphocytic Leukemia
      - 2.8.1.1.5. Granular Lymphocyte Leukemia
  - 2.8.2. Non-Hodgkin's Lymphomas
    - 2.8.2.1. Initial Study and Diagnosis
    - 2.8.2.2. Classification of Lymphoid Neoplasms
      - 2.8.2.2.1. Follicular Lymphoma
      - 2.8.2.2.2. Mantle Cell Lymphoma
      - 2.8.2.2.3. Diffuse Large B-cell Lymphoma
      - 2.8.2.2.4. MALT Lymphoma
      - 2.8.2.2.5. Burkitt Lymphoma
      - 2.8.2.2.6. Peripheral T Lymphomas
      - 2.8.2.2.7. Cutaneous Lymphomas
      - 2.8.2.2.8. Others
  - 2.8.3. Hodgkin's Lymphomas
    - 2.8.3.1. Complementary Tests
    - 2.8.3.2. Histological Classification



- 2.9. Diagnosis of Coagulation Disorders
  - 2.9.1. Study of Hemorrhagic Diatheses
    - 2.9.1.1. Initial Tests
    - 2.9.1.2. Specific Studies
  - 2.9.2. Congenital Coagulation Alterations
    - 2.9.2.1. Hemophilia A and B
    - 2.9.2.2. Von Willebrand Disease
    - 2.9.2.3. Other Congenital Coagulopathies
  - 2.9.3. Acquired Coagulation Alterations
  - 2.9.4. Thrombosis and Thrombophilia Antiphospholipid Syndrome
  - 2.9.5. Monitoring of Antocoagulant Therapy
- 2.10. Introduction to Hemotherapy
  - 2.10.1. Blood Groups
  - 2.10.2. Blood Components
  - 2.10.3. Recommendations for the Use of Blood Derivatives
  - 2.10.4. Most Common Transfusional Reactions

## Module 3. Immunology

- 3.1. Immune System Organs
  - 3.1.1. Primary Lymphoid Organs
    - 3.1.1.1. Fetal Liver
    - 3.1.1.2. Bone Marrow
    - 3.1.1.3. Thymus
  - 3.1.2. Secondary Lymphoid Organs
    - 3.1.2.1. Bladder
    - 3.1.2.2. Lymph Nodes
    - 3.1.2.3. Mucosal-Associated Lymphoid Tissue
  - 3.1.3. Tertiary Lymphoid Organs
  - 3.1.4. Lymphatic system
- 3.2. Immune System Cells
  - 3.2.1. Granulocytes
    - 3.2.1.1. Neutrophils
    - 3.2.1.2. Eosinophils
    - 3.2.1.3. Basophils
  - 3.2.2. Monocytes and Macrophages
  - 3.2.3. Lymphocytes
    - 3.2.3.1. T Lymphocytes
    - 3.2.3.2. B Lymphocytes
  - 3.2.4. Natural Killer Cells
  - 3.2.5. Antigen Presenting Cells
- 3.3. Antigens and Immunoglobulins
  - 3.3.1. Antigenicity and Immunogenicity
    - 3.3.1.1. Antigen
    - 3.3.1.2. Immunogen
    - 3.3.1.3. Epitopes
    - 3.3.1.4. Haptens and Carriers
  - 3.3.2. Immunoglobulins
    - 3.3.2.1. Structure and Function
    - 3.3.2.2. Classification of Immunoglobulins
    - 3.3.2.3. Somatic Hypermutation and Isotype Shift
- 3.4. Complement System
  - 3.4.1. Functions
  - 3.4.2. Activation Routes
    - 3.4.2.1. Classical Pathway
    - 3.4.2.2. Alternative Pathway
    - 3.4.2.3. Lectin Pathway
  - 3.4.3. Complement Receptors
  - 3.4.4. Complements and Inflammation
  - 3.4.5. Complement Cascade
- 3.5. Major Histocompatibility Complex
  - 3.5.1. Major and Minor Histocompatibility Antigens
  - 3.5.2. HLA Genetics
  - 3.5.3. HLA and Disease
  - 3.5.4. Transplant Immunology

- 3.6. Immune Response
  - 3.6.1. Innate and Adaptive Immune Response
  - 3.6.2. Humoral Immune Response
    - 3.6.2.1. Primary Response
    - 3.6.2.2. Secondary Response
  - 3.6.3. Cellular Immune Response
- 3.7. Autoimmune Diseases
  - 3.7.1. Immunogenic Tolerance
  - 3.7.2. Autoimmunity
  - 3.7.3. Autoimmune Diseases
  - 3.7.4. Study of Autoimmune Diseases
- 3.8. Immunodeficiencies
  - 3.8.1. Primary Immunodeficiencies
  - 3.8.2. Secondary Immunodeficiencies
  - 3.8.3. Antitumor Immunity
  - 3.8.4. Evaluation of Immunity
- 3.9. Hypersensitivity Reactions
  - 3.9.1. Classification of Hypersensitivity Reactions
  - 3.9.2. Type I Hypersensitivity or Allergic Reactions
  - 3.9.3. Anaphylaxis.
  - 3.9.4. Allergological Diagnostic Methods
- 3.10. Immunoanalytical Techniques
  - 3.10.1. Precipitation and Agglutination Techniques
  - 3.10.2. Complement Fixation Techniques
  - 3.10.3. ELISA Techniques
  - 3.10.4. Immunochromatography Techniques
  - 3.10.5. Radioimmunoanalysis Techniques
  - 3.10.6. Isolation of Lymphocytes
  - 3.10.7. Microlymphocytotoxicity Technique
  - 3.10.8. Mixed Lymphocyte Culture
  - 3.10.9. Flow Cytometry Applied to Immunology
  - 3.10.10. Flow Cytometry





“

*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 academic program offers students a different way of learning. Our methodology uses a cyclical learning approach: **Relearning**.

This teaching system is used, for example, 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.





“

*Discover Relearning, 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

What should a professional do in a given situation? Throughout the program, students will face multiple simulated clinical cases, based on real patients, in which they will have to do research, establish hypotheses, and ultimately resolve the situation. There is an abundance of scientific evidence on the effectiveness of the method. Specialists learn better, faster, and more sustainably over time.

*With TECH you will 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 power 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 the physician's professional practice.

“

*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 achieve the assimilation of concepts, but also a development of their mental capacity, through exercises that evaluate real situations and the application of knowledge.
2. Learning is solidly translated into 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.



## Relearning Methodology

At TECH we enhance the case method with the best 100% online teaching methodology available: Relearning.

This 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, a real revolution with respect to the mere study and analysis of cases.

*Professionals will learn through real cases and by resolving 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 Relearning method has managed to improve the overall satisfaction levels of professionals who complete their studies, with respect to the quality indicators of the best online university (Columbia University).

With this methodology, more than 250,000 physicians have been trained with unprecedented success in all clinical specialties regardless of surgical load. Our pedagogical methodology is developed in a highly competitive environment, with a university student body with a strong socioeconomic profile and an average age of 43.5 years old.

*Relearning 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 (learn, unlearn, forget, and re-learn). Therefore, we combine each of these elements concentrically.

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



This program offers the best educational material, prepared with professionals in mind:



#### Study Material

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

These contents are then applied to the audiovisual format, to create the TECH online working method. All this, with the latest techniques that offer high quality pieces in each and every one of the materials that are made available to the student.



#### Surgical Techniques and Procedures on Video

TECH introduces students to the latest techniques, the latest educational advances and to the forefront of current medical techniques. All of this in direct contact with students and explained in detail so as to aid their assimilation and understanding. And best of all, you can watch the videos as many times as you like.



#### Interactive Summaries

The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".



#### Additional Reading

Recent articles, consensus documents and international guidelines, among others. In TECH's virtual library, students will have access to everything they need to complete their course.





#### Expert-Led Case Studies and Case Analysis

Effective learning ought to be contextual. Therefore, TECH presents real cases in which the expert will guide students, focusing on and solving the different situations: a clear and direct way to achieve the highest degree of understanding.



#### Testing & Retesting

We periodically evaluate and re-evaluate students' knowledge throughout the program, through assessment and self-assessment activities and exercises, so that they can see how they are achieving their goals.



#### Classes

There is scientific evidence on the usefulness of learning by observing experts. The system known as Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.



#### Quick Action Guides

TECH offers the most relevant contents of the course in the form of worksheets or quick action guides. A synthetic, practical, and effective way to help students progress in their learning.



06

# Certificate

The Postgraduate Diploma in Biomedicine in the Field of Clinical Analysis guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Diploma issued by TECH Technological University.





“

*Successfully complete this program and receive your university qualification without having to travel or fill out laborious paperwork”*

This **Postgraduate Diploma in Biomedicine in the Field of Clinical Analysis** contains the most complete and up-to-date scientific on the market.

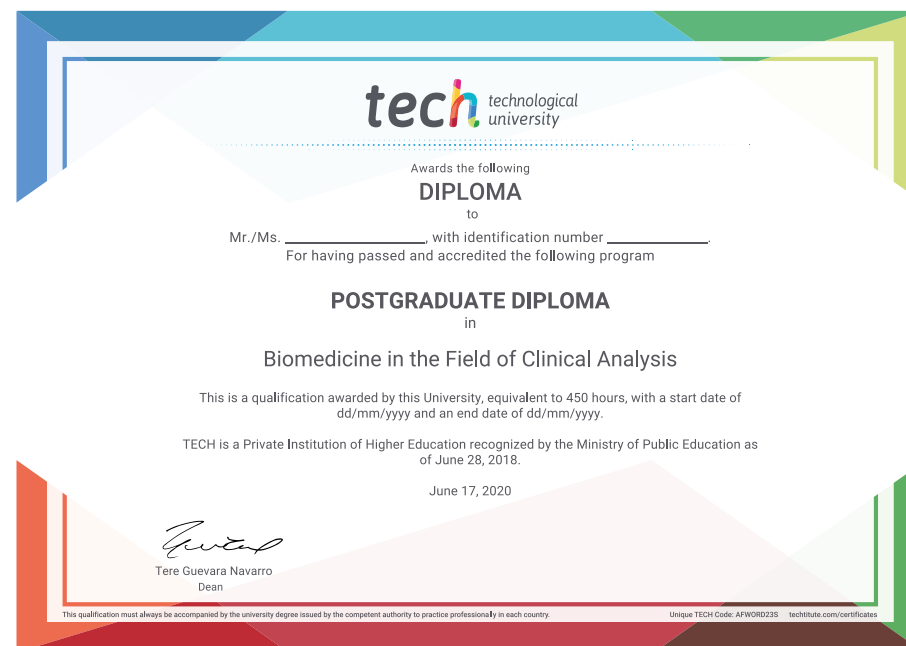
After the student has passed the assessments, they will receive their corresponding **Postgraduate Diploma** issued by **TECH Technological University** via tracked delivery\*.

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

Title: **Postgraduate Diploma in Biomedicine in the Field of Clinical Analysis**

Modality: **online**

Duration: **6 months**



\*Apostille Convention. In the event that the student wishes to have their paper diploma issued with an apostille, TECH Global University 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  
development languages  
virtual classroom



**Postgraduate Diploma**  
Biomedicine in the  
Field of Clinical Analysis

- » Modality: online
- » Duration: 6 months
- » Certificate: TECH Global University
- » Accreditation: 18 ECTS
- » Schedule: at your own pace
- » Exams: online

# Postgraduate Diploma

## Biomedicine in the Field of Clinical Analysis