Professional Master's Degree

Clinical Analysis

tech global university

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Professional Master's Degree

Clinical Analysis

- Modality: **online**
- Duration: **12 months**
- Certificate: **TECH Global University**
- Credits: **60 ECTS**
- Schedule: **at your own pace**
- Exams: **online**

Website: **www.techtitute.com/us/medicine/professional-master-degree/master-clinical-analysis**

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01

Introduction

Scientific and technological advances in the field of bioengineering, informatics and statistics have dramatically boosted the development of work in the clinical analysis laboratory. In fact, laboratory work is now inconceivable without mastering these tools.

This means there is a constant need for professionals in this field to gain up-to-date knowledge and make a continuous effort to keep abreast of the new techniques and advances that allow us to work on the front line. In this complete program on Clinical Analysis, we offer you the possibility to be at the forefront in this field of work.

A complete review of the latest techniques and working systems of the Clinical Analysis laboratory, with the most efficient teaching system and a program that is totally compatible with other commitments"

The clinical and biomedical laboratory is an indispensable tool for the field of medicine. Given the important contribution to society, the figure of the Clinical Analysis specialist is increasingly in demand. There are certain professionals that can fill a role with these characteristics: doctors, technicians, biochemists and laboratory auxiliary technicians. Each of them requires either a university degree or vocational training. However, given the degree of specificity of a job position in the clinical analysis laboratory, additional specialized training is valued, and sometimes required, to complement the basic studies of the professionals.

With this Professional Master's Degree, students acquire the necessary skills to face the different tasks that arise in Clinical Analysis laboratories, allowing them to differentiate themselves from other professionals.

Working in a clinical analysis laboratory is exciting and necessary. It is a job that is increasingly valued in health systems, for its diagnostic importance and as a tool for prevention in current medicine, which steers healthcare towards the personalization of treatments, known as "personalized medicine".

A standard laboratory has several departments: immunology, microbiology, biochemistry and hematology.

Specialist laboratories, where more specific and sophisticated studies are performed, require professionals to be specialized in the different techniques, machinery, instruments and procedures. In any of them, we must be aware of the legislation that accompanies these processes and the proper management of samples and results.

A compendium of in-depth knowledge that will lead you to excellence in your profession.

This **Professional Master's Degree in Clinical Analysis** contains the most complete and up-to-date scientific program on the market. The most important features include:

- 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 forums
- Communication with the teacher and individual reflection work
- Availability of content from any device, fixed or portable, with an internet connection
- Supplementary documentation databases are permanently available, even after the course

With this Professional Master's Degree in Clinical Analysis, you will be able to combine a high intensity learning with your professional and personal life, achieving your goals in a simple and real way"

A highly-skilled Professional Master's Degree that will allow you to become a highly competent professional working in the Clinical Analysis laboratory"

The learning of this Professional Master's Degree in Clinical Analysis is developed through the most effective educational methods in online teaching, guaranteeing that your efforts will lead to the best possible results.

The professors of the Professional Master's Degree in Clinical Analysis are highly qualified professionals, who are experts in teaching and who will help you understand the reality of the profession, with the most up-to-date knowledge of this sector.

In this way, we ensure that we provide you with the up-to-date knowledge we are aiming for. A multidisciplinary team of professionals prepared and experienced in different environments, who will develop the theoretical knowledge in an efficient way, but, above all, will contribute to the course the practical knowledge derived from their own experience: one of the differential qualities of this program.

This mastery of the subject is complemented by the effectiveness of the methodological design of this Professional Master's Degree in Clinical Analysis. It has been developed by a multidisciplinary team of experts, who integrate the latest advances in educational technology. In 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 for your learning.

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 online learning: 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 facing the scenario you are learning about at that moment. A concept that will allow you to integrate and consolidate your learning in a more realistic and permanent way.

02

Objectives

The objective of this program is to provide professionals working in the clinical analysis laboratory with the knowledge and skills that they need to carry out their activity, using the most advanced protocols and techniques available. Through a work approach that is totally adaptable to the student, this Professional Master's Degree will progressively lead them to acquire the skills that will propel them to a much higher professional level.

Learn from the best, the techniques and procedures of work in Clinical Analysis and train yourself to work in the best laboratories in the sector"

General objectives

- Evaluate the ISO standards of a clinical laboratory
- Demonstrate the importance of good safety and sanitary waste management
- Identify the need for a correct management of health documentation
- Present the obligatory nature of quality control, in a clinical laboratory
- Define the clinical indicators of analytical quality
- Identify clinical decision levels, within the reference intervals
- Define the scientific method and its relationship to evidence-based medicine
- 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 instrumental techniques to solve health analysis problems
- 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 the clinical analysis laboratory, for the use of the different techniques, as well as for the collection of samples, and those aspects related to the validation, calibration, automation and processing of the information obtained, based on the procedures
- Analyze the molecular basis of pathologies, with a biochemical basis
- Develop skills in the management and analysis of biochemical diagnosis parameters
- Identify and define biochemically based diseases, through analysis and case studies
- Apply different biochemical analytical techniques to the diagnosis of human diseases
- Establish the molecular bases of human diseases
- Know the usual procedures used in the field of biomedicine and clinical analysis to generate, transmit and disseminate scientific information
- Develop a capacity for analysis, synthesis and critical reasoning in the application of the scientific method
- Analyze the different physiological functions
- Determine common diseases in human beings
- Substantiate diagnostic tests
- Highlight the molecular markers of the different physiological alterations
- Examine the concepts of fertility and infertility
- Determine the current techniques for assisted reproduction
- Analyze the techniques for preserving gametes and their clinical application
- Identify techniques of cellular growth and cell apoptosis
- Evaluate the study of cancer from a molecular point of view
- Identify the main hematological alterations in analytical tests
- Propose complementary explorations, essential for the clinical approach of patients affected by a hemopathy
- Correlate laboratory findings with clinical entities
- Establish differential diagnosis of the main blood dyscrasias
- Examine the etiological basis, pathogenesis, epidemiology, treatment and diagnosis of the main microbial and parasitic diseases affecting humans
- Apply the knowledge acquired to the control of communicable infectious diseases, both in the hospital and out-of-hospital environment
- Acquire the appropriate skills to choose the correct diagnostic method, with the consequent preparation of a report on the efficiency of the techniques used

- Develop specialized knowledge to carry out a good organization and management of clinical microbiology services. Coordinate activities and teams, and adapt it to the needs and available resources
- Achieve advanced epidemiological knowledge to anticipate and avoid the factors that cause or condition the acquisition of infectious diseases
- Achieve skills and aptitudes to work in a clinical laboratory, research or teaching team, recognizing the specific responsibilities that integrate the field of each specialty
- Provide advanced, specialized, multidisciplinary and up-to-date training, with an academic and scientific approach, oriented to their insertion in the labor career, in the clinical field or as a professional in R&D&I
- Consolidate and expand on knowledge of immunology, in the context of Clinical Analysis
- Interrelate knowledge of immunology, to approach problems from different perspectives
- Develop critical thinking, to interpret and discuss analytical results
- Gain skills in autonomous learning and be able to transmit the knowledge acquired in immunology
- Determine the nature of hereditary material, and establish the mechanisms of traits transmission
- Identify different genetic alterations, and analyze their causes and possible consequences
- Establish and define the different types of genetically based diseases, and substantiate the causes of them
- Compile various molecular biology techniques currently used for genetic diagnosis and analysis. Interpret the results obtained from them
- Present the latest advances in the field of medical genetics, genomics and personalized medicine

Specific objectives

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

- Define the 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.
- Define ISO accreditations, within the framework of an audit
- Develop the reference intervals, through validation guidelines
- Analyze the steps of the scientific method
- Present the levels of scientific evidence, and its relation to Clinical Analyses

Module 2. Instrumental Techniques in the Clinical 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 understanding 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 previous process which are necessary for the use of instrumental techniques and which must be developed in the clinical analysis laboratory
- Justify the rationale for using one practice over another, depending on diagnostic, staffing, management and other factors
- Propose a practical way of learning instrumental techniques, through the use of clinical cases, practical examples and exercises
- Assess the information obtained from the use of instrumental techniques for the interpretation of results

Module 3. Biochemistry I

- Critically and thoroughly analyze analytical data leading to a molecular diagnosis
- Propose specific biochemical tests for the diagnosis of a molecular pathology
- Develop practical skills in the management of reference intervals and critical biochemical parameters for diagnosis
- Compile and review scientific literature in an agile and exhaustive manner, to direct molecular diagnostics
- Demonstrate the ability to understand and explain physiological and pathological mechanisms from a molecular perspective
- Explain the applications of biochemical analysis in the clinical diagnosis of diseases
- Identify the importance and complexity of the regulation of biochemical processes, which give rise to the various functions of the organism

Module 4. Biochemistry II

- Develop specialized knowledge of the different molecular mechanisms involved in a biological process
- Analyze problems related to the molecular basis of physiological processes and their consequences
- Generate advanced knowledge in relation to the genetic basis of diseases
- Demonstrate good management of laboratory practice with clinical orientation
- Analyze the experimental approximations and their limitations
- Interpret scientific results and establish a relationship between those results and the genetic bases of the disease
- Identify the applications of molecular diagnostic applications in clinical practice

Module 5. Biochemistry III

- Develop specialized knowledge about motor function disorders and their diagnosis
- Associate the cardiac alterations with their molecular markers
- Define specific kidney and liver diseases
- Develop specialized knowledge of gastrointestinal alterations
- Associate neurodegenerative diseases with their molecular bases
- Analyze the alterations of various endocrine glands
- Examine the different diagnosis techniques

Module 6. Biochemistry IV

- Evaluate the most frequent gynecological and andrological problems in the clinical laboratory
- Specify assisted reproduction techniques, such as artificial insemination
- Identify the legal framework of the gamete donation bank
- Develop the stages of the embryo under the inverted microscope
- Define the parameters of cellular culture
- Analyze the hematoxylin-eosin staining technique
- Examine the types of tumor markers
- Analyze the usefulness of a uroanalysis

Module 7. Hematology

- Determine the quantitative and qualitative alterations of the different blood cells
- Delve into the study of peripheral blood, 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 battery of complementary tests for the initial assessment 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 8. Microbiology and Parasitology

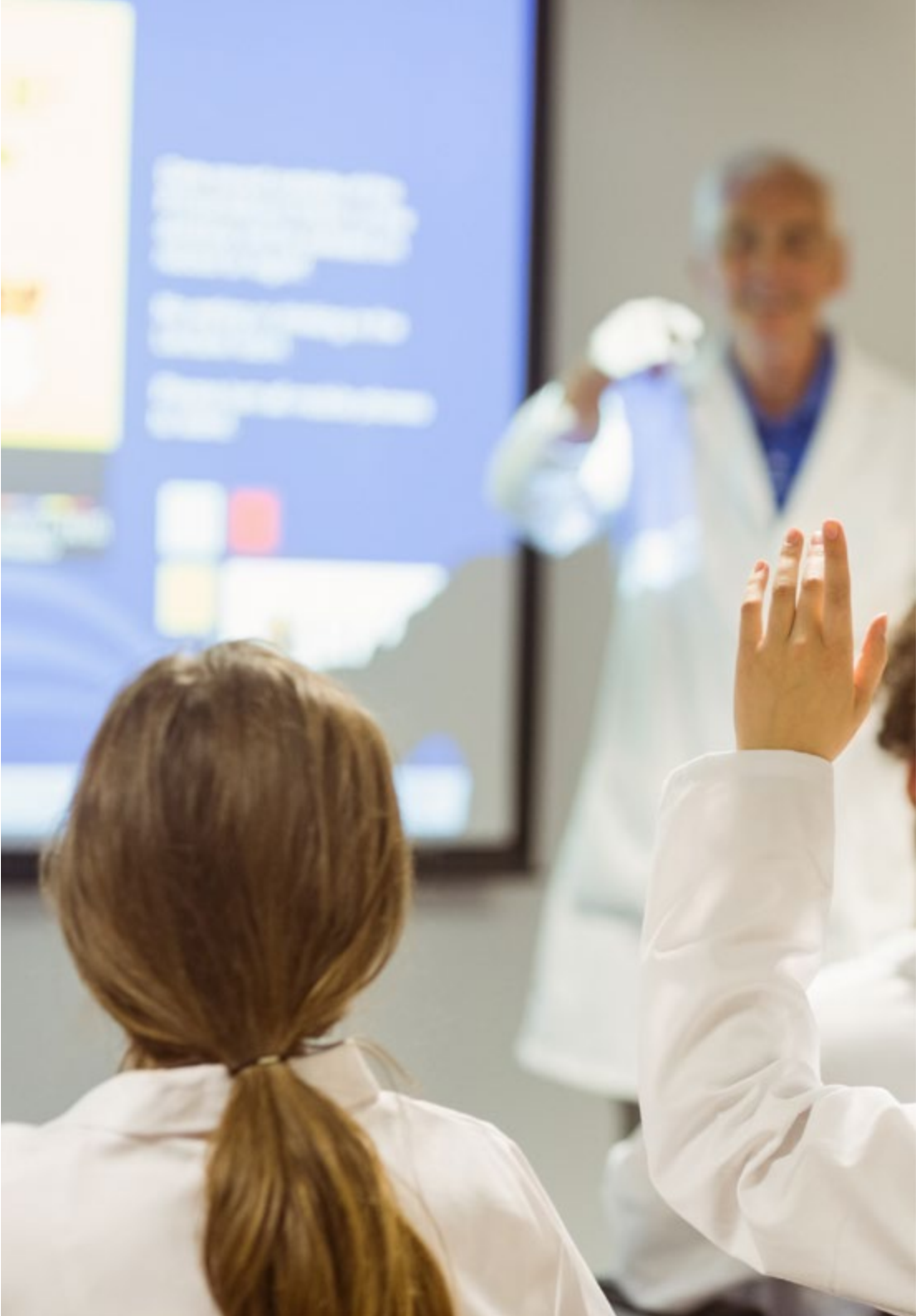
- Acquire advanced knowledge in Clinical Microbiology and Parasitology. Study the main infectious diseases of clinical interest
- Identify disease-causing microorganisms in humans and understand the pathophysiology and practice detection and diagnostic techniques, within a framework of responsibility and health safety
- Organize the preparation of the necessary material for its use in the Microbiology laboratory, and control its sterility when necessary
- Know the basis and operation of any culture medium, in order to use it in the performance of 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 the collection and processing of samples
- Design work protocols, specific for each pathogen, selecting the appropriate parameters for their correct diagnosis, based on criteria of efficacy and efficiency
- Interpret the sensitivity to antimicrobial or antiparasitic agents, in order to orientate 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

Module 9. 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 allergy
- Apply and integrate the most commonly used immunoanalytical techniques in Clinical Analysis
- Diagnose alterations of the immune system, based on the assessment of the analytical results obtained
- Develop integrated thinking and critical reasoning for solving immunological problems
- Propose and design new experiments to improve or incorporate new immunological techniques, as well as to know their limitations

Module 10. Genetics

- Build detailed family trees and perform segregation analysis
- Examine karyotypes and identify chromosomal abnormalities
- Analyze the probability of transmission of genetically based diseases, and identify potential carriers
- Learn about the fundamentals of the application of different molecular biology techniques for the diagnosis and investigation of genetic diseases: PCR, hybridization techniques, restriction and sequencing assays, among others
- Interpret the results obtained from analysis techniques used in the characterization of genetic alterations or molecular markers
- Identify different genetically based diseases in detail, establish their causes and diagnostic methods
- Establish the legal and ethical aspects related to medical genetics and new technologies developed in the field of genetics
- Present the new genomic and bio-informatics tools, their benefits and scope of application. Carry out searches in genomic databases



A boost to your CV, which will make you as competitive as the most qualified professionals in the labor market"

03

Skills

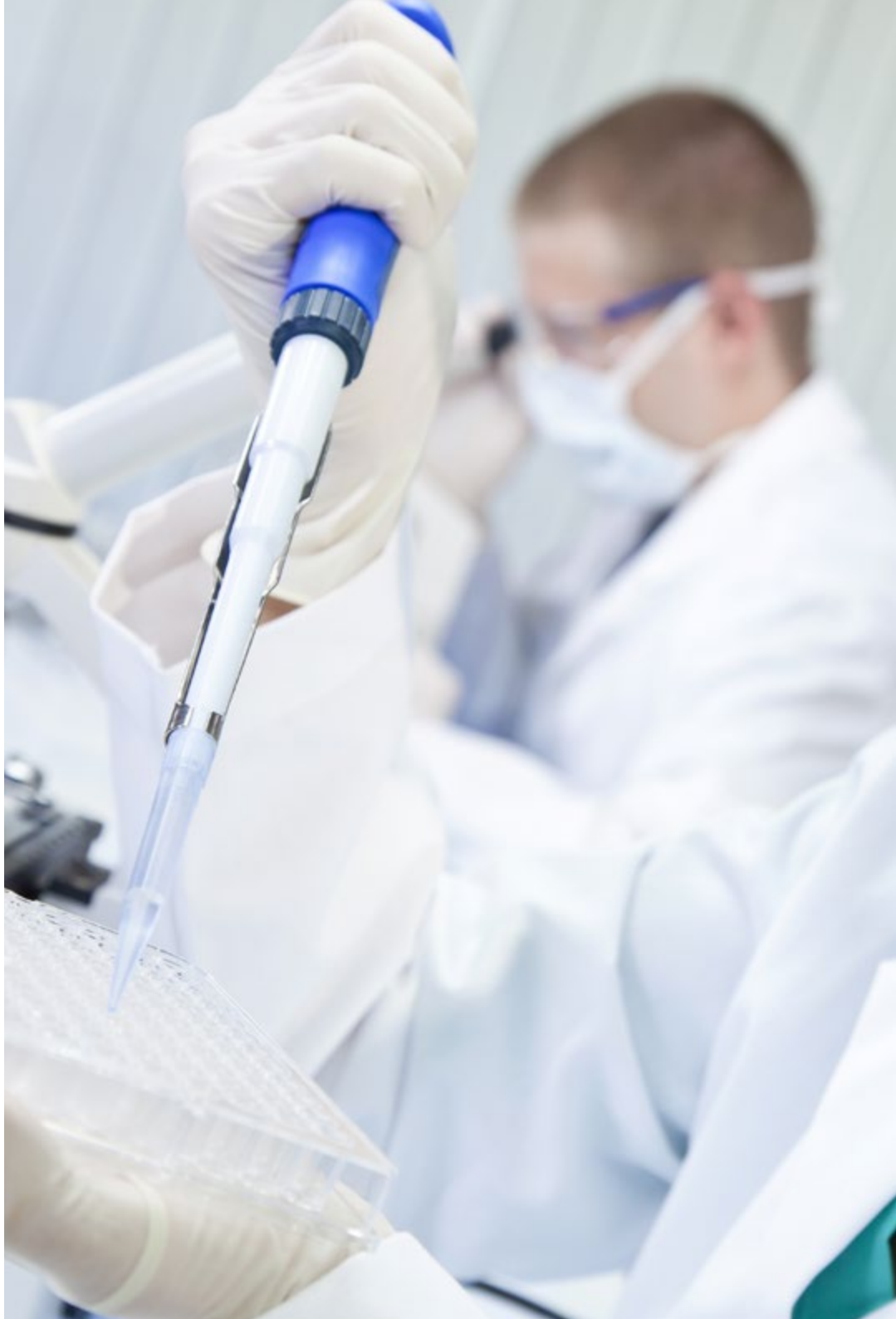
This Professional Master's Degree in Clinical Analysis has been created as a highly valuable academic tool for the laboratory professional. The level of intensity will prepare you to be able to intervene in the different areas of work in this field. A compendium of knowledge that will provide you with the most up-to-date skills to act safely and competently in all procedures in this field of work.

This complete program will provide you with the personal and professional skills required to work in the Clinical Analysis laboratory and compete at the highest level"

General skill

- This module provides students with the necessary skills to perform their work with the utmost excellence as clinical personnel in a laboratory

A highly-skilled program that will allow you to become a highly competent professional in the Clinical Analysis laboratory"



Specific skills

- Select, recommend, perform and take samples of laboratory procedures appropriate to the study of the patient's situation, ensuring the issuance of quality-assured, cost-optimal results
- Interpret the results obtained, in relation to the clinical situation of the patient, providing this information to the clinicians
- Gain specialized knowledge, focused on the clinical utility of laboratory procedures, assessing and maintaining the quality of available methods, and designing and implementing new analytical methods
- Rigorously analyze and assess the results of biochemical laboratory analyses, and conclude an accurate molecular diagnosis
- Analyze the results of biochemical laboratory tests and relate them to different diseases based on inborn errors of metabolism
- Understand how the main functions of the human body develop, as well as the alterations that give rise to the most common pathologies that may occur
- Perform more frequent clinical analyses, in public and private health care settings, such as urine culture or analysis of nasopharyngeal samples for the detection of COVID-19
- Study the alterations of the hemostatic system; hemorrhagic pathology and problems of hypercoagulability or thrombosis, in addition to improving skills in hemotherapy and transfusion medicine
- Be able to perform clinical and microbiological analysis of human biological samples, and choose the appropriate techniques, in order to obtain the correct microbiological diagnosis
- Have a broad vision of the study of immunological processes within a Clinical Analysis laboratory
- Understand the different types of genetic alterations that give rise to diseases, analyze their transmission, identify carriers, and develop methods of prevention and treatment

04

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 this program: a unique opportunity not to be missed"

International Guest Director

Jeffrey Jhang, M.D. is a dedicated expert in Clinical Pathology and Laboratory Medicine. He has won several awards in these areas, including the Dr. Joseph G. Fink Award from the Columbia University College of Medicine and Surgery, among other recognitions 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. In addition, Dr. Jhang has held management positions in the Clinical Laboratory at the Langone Health Center of New York University 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. In turn, 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 analytical technical facilities.

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

Dr. Jhang, Jeffrey

- Director of Clinical Laboratories at NYU Langone Health, New York, United States
- Director of Clinical Laboratories at NYU Tisch Hospital, New York
- Professor of Pathology at the NYU Grossman School of Medicine
- Medical Director of the Clinical Laboratory Center at Mount Sinai Health System
- Director of the Blood Bank and Transfusion Service at Mount Sinai Hospital
- Director of Hematology and Coagulation Specialty 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
- Anatomic and Clinical Pathology Residency at NewYork-Presbyterian Hospital
- Member of:

  American Society for Clinical Pathology
  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

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

Professors

Dr. Aparicio Fernández, Cristina

- Degree in Biotechnology with a Professional Master's Degree in Advanced Immunology
- Interuniversity Professional Master's Degree in Advanced Immunology from the University of Barcelona and the Autonomous University of Barcelona in 2020
- Degree in Biotechnology from the University of León (2019)

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)

Dr. Corbacho Sánchez, Jorge

- Degree and International PhD in Biology from the University of Extremadura
- Degree in Biology from the University of Extremadura, 2012
- Master's Degree in Quality and Traceability of Plant-based Food from the University of Extremadura, 2013
- PhD in Plant Biology, Ecology and Earth Sciences from the University of Extremadura in 2015
- Master's Degree in Advanced Bioinformatics Analysis from the Pablo de Olavide University in 2018

Dr. Carmona Talavera, Diego

- Degree in Biochemistry from the University of Córdoba (2014)
- Specialist in Clinical Analysis through BIR (2020)
- Professional Master's Degree on the Theoretical Basis and Laboratory Procedures of Assisted Reproduction from the University of Valencia (2019)
- University Expert in Medical Genetics and Genomics from the San Antonio Catholic University of Murcia (2020)
- Postgraduate Diploma in Health Services Management from the University of Seville (2019)
- Cytology, Histology and Embryology Professor at GoBIR Academy (2019)
- Site Coordinator at GoFIR Academy in Valencia (from 2019)
- Professor of Biochemistry, Molecular Biology and Genetics at GoFIR Academy (since the 2017 academic year)
- Clinical Analysis Specialist, Head of the Laboratory of the Vithas Valencia Consuelo Hospital (July - November 2020)
- Member of the AEFA New Specialists Commission (since July 2020)
- Resident member of the National Commission of Clinical Analysis (since May 2018)
- Resident Internal Biochemist of Clinical Analysis at the Dr. Peset de Valencia University Hospital (2016-2020)
- MECD Collaboration Grant in the Department of Biochemistry and Molecular Biology of the UCO (academic year 2013-2014)

Dr. Cela Rodríguez, Carmela

- Degree in Biochemistry from the Complutense University of Madrid, 2019
- Research Master's Degree in Immunology from the Complutense University Madrid (2020)
- Research Master's Degree in Immunology. Complutense University of Madrid (2019/2020) Average Mark: 9.6/ 10
- Master's Thesis: "Preclinical targeting of T-ALL relapse using a novel immunotherapy with anti-pre-TCR CAR-T cells" Honorary Degree
- Degree in Biochemistry Complutense University of Madrid (2015-2019)
- Erasmus+ Placement. Trinity College Dublin (2018-2019)
- Degree Thesis: "Synthesis and characterization of nanomaterials with biomedical applications". Qualification 9.8

Dr. Naranjo Santana, Yurena

- Head of Clinical Analysis Department at San Roque Las Palmas Hospital
- PhD in Public Health, University of Las Palmas in Gran Canaria
- Professional Master's Degree in Public Health, Miguel Hernández University
- Degree in Pharmacy, University of Granada
- Member of the Spanish Association of Medical Biopathology (A.E.B.M.)
- Member of the Spanish Association of Analytical Pharmacists (A.E.F.A.)

Dr. Del Río Riego, Javier

- Degree in Biology from the University of Seville, 2015
- Specialized in Assisted Human Reproduction from the University of Oviedo in 2016
- Senior biologist in the Andrology and Assisted Human Reproduction section of the Clinical Analysis Service of the La Paz University Hospital. (December 2018- present)
- Expert in Medical Genetics from University of Valencia, 2017
- Professional Master's Degree in Biology and Reproduction Technology, 2016

Dr. Santo Quiles, Ana María

- PhD in Pharmacy from the University of Miguel Hernández de Elche, 2014
- Specialist pharmacists through FIR in Clinical Analysis, 2010
- Degree in Pharmacy from the University of Miguel Hernández de Elche, 2004
- Bachelor's Degree in Pharmacy. Miguel Hernández de Elche University. Promotion 1999-2004
- Diploma of Advanced Studies of the 3rd cycle (Research Sufficiency) in the Doctoral Program Research in Clinical Practice of the Faculty of Medicine, Miguel Hernández University. Topic: Analysis of Diabetes Control in a Health Area (2002-2006)
- University Specialist in Biology and Human Reproduction. VII Edition. Official postgraduate course of the Department of Histology and Anatomy of the University Miguel Hernández (UMH) in collaboration with the Vistahermosa Clinic. Alicante, October 2007-June 2008

Dr. Solar Málaga, Soraya

- Master's Degree in Agri-Food Production from the University of Cadiz in 2020
- Several training courses related to the agri-food industry and HACCP-based self-monitoring systems

Dr. 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
- 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)

Dr. Utrilla Carriazo, Carmen Lucía

- Degree in Biochemistry from the Complutense University of Madrid, 2019
- Master's Degree in Neurosciences from the Complutense University Madrid (2019 - 2020)
- Degree in Biochemistry from the Complutense University of Madrid (2015 - 2019)

05

Structure and Content

The contents of this Professional Master's Degree have been developed by the different experts of this course, with a clear purpose: to ensure that our students acquire each and every one of the skills required to become true experts in this field.

A complete program, very well structured into teaching units and oriented towards fast and efficient learning that will take you to the highest standards of quality and success.

A comprehensive teaching program, structured into well-developed teaching units, oriented towards efficient and swift 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. Workflow 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. Flowchart of Work
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 Concepts
- 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 Microscope

2.3. Microbiological 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. Volumetrics 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 Gravimetric 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. Conductometry
  - 2.4.3.6. Application in Clinical Analysis

2.4.4. Evaluation
2.4.4.1. Acid Base
2.4.4.2. Precipitation
2.4.4.3. Complex Formation
2.4.4.4. Application in Clinical Analysis
2.5. Spectral Techniques in Clinical Analysis
2.5.1. Introduction and Concepts
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. Procedure
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. Procedure
2.5.8. Applications of the Most Commonly Used Spectral Techniques in Clinical Analysis
2.6. Immunoanalysis Techniques in Clinical Analysis
2.6.1. Introduction and Concepts
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. Enzymatic Immunohistochemistry Technique
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 Immunoanalysis
2.6.5.1. Immuno-nephelometry
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 Concepts
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 Concepts
2.7.3.2. Instruments and Procedures
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, Gas Masses and Liquid Masses
2.8. Molecular Biology Techniques in Clinical Analysis
2.8.1. Introduction and Concepts
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 Procedures
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 Proteomics
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. Leukocyte Count
2.9.2.1. Procedure
2.9.2.2. Pathologies Diagnosed with this Methodology
2.9.3. Flow Cytometry
2.9.3.1. Introduction and Concepts
2.9.3.2. Technique Procedure
2.9.3.3. Cytometry Applications 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, from Analysis to the Patient's Bedside
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. Precision
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 to Detect and Quantify an Interference, in a Specific Method or Analysis

Module 3. Biochemistry I

3.1. Biochemical and Molecular Base of Diseases
3.1.1. Genetic Alterations
3.1.2. Cell Signaling Alterations
3.1.3. Metabolism Alterations
3.2. Metabolism of Nutrients
3.2.1. Concept of Metabolism
3.2.2. Biochemical Phases of Nutrition: Digestion, Transport, Metabolism, Excretion
3.2.3. Clinical Laboratory in the Study of Alterations in Digestion, Absorption and Metabolism of Nutrients
3.3. Biochemical Study of Vitamins and Vitamin Deficiency
3.3.1. Liposoluble Vitamins
3.3.2. Hydrosoluble Vitamins
3.3.3. Vitamin Deficiencies
3.4. Biochemical Study of Protein Alterations and Nitrogen Compounds
3.4.1. Plasmatic Proteins
3.4.2. Clinical Enzymology
3.4.3. Evaluation of Biochemical Markers in Renal Function

3.5. Biochemical Study of Carbohydrate Metabolism Regulation and its Pathophysiological Alterations
- 3.5.1. Hypoglycemia
- 3.5.2. Hyperglycemia
- 3.5.3. Diabetes Mellitus: Diagnosis and Monitoring in a Clinical Laboratory

3.6. Biochemical Study of the Pathophysiological Alterations of Lipids and Plasma Lipoproteins
- 3.6.1. Lipoproteins
- 3.6.2. Primary Dyslipidemia
- 3.6.3. Hyperlipoproteinemia
- 3.6.4. Sphingolipidosis

3.7. Biochemistry of Blood in a Chemical Laboratory
- 3.7.1. Blood Hemostasis
- 3.7.2. Coagulation and Fibrinolysis
- 3.7.3. Biochemical Analysis of Iron Metabolism

3.8. Mineral Metabolism and its Clinical Alterations
- 3.8.1. Calcium Homeostasis
- 3.8.2. Phosphorus Homeostasis
- 3.8.3. Magnesium Homeostasis
- 3.8.4. Biochemical Markers of Bone Remodeling

3.9. Acid-Base Balance and Peripheral Blood Gas Study
- 3.9.1. Acid-Base Balance
- 3.9.2. Peripheral Blood Gasometry
- 3.9.3. Gasometry Markers

3.10. Hydroelectrolyte Balance and its Alterations
- 3.10.1. Sodium
- 3.10.2. Potassium
- 3.10.3. Chlorine

Module 4. Biochemistry II

4.1. Congenital Alterations of Carbohydrate Metabolism
- 4.1.1. Alterations in the Digestion and Intestinal Absorption of Carbohydrates
- 4.1.2. Galactose Metabolism Alterations
- 4.1.3. Fructose Metabolism Alterations
- 4.1.4. Glucogen Metabolism Alterations
  - 4.1.4.1. Glucogenesis: Types

4.2. Congenital Alterations of Amino Acid Metabolism
- 4.2.1. Aromatic Amino Acid Metabolism Alterations
  - 4.2.1.1. Phenylketonuria
  - 4.2.1.2. Glutaric Aciduria Type 1
- 4.2.2. Alterations of Branched Amino Acid Metabolism
  - 4.2.2.1. Maple Syrup Urine Disease
  - 4.2.2.2. Isovaleric Acidemia
- 4.2.3. Alterations in the Metabolism of Sulfur Amino Acids
  - 4.2.3.1. Homocystinuria

4.3. Congenital Alterations of Lipid Metabolism
- 4.3.1. Beta-Oxidation of Fatty Acids
  - 4.3.1.1. Introduction to Beta-Oxidation of Fatty Acids
  - 4.3.1.2. Fatty Acid Beta-Oxidation Alterations
- 4.3.2. Carnitine Cycle
  - 4.3.2.1. Introduction to Carnitine Cycle
  - 4.3.2.2. Carnitine Cycle Alterations

4.4. Urea Cycle Disorders
- 4.4.1. Urea Cycle
- 4.4.2. Genetic Alterations of the Urea Cycle
  - 4.4.2.1. Ornithine Transcarbamylase (OTC) Deficiency
  - 4.4.2.2. Other Urea Cycle Disorders
- 4.4.3. Diagnosis and Treatment of Urea Cycle Diseases

4.5. Molecular Pathologies of Nucleotide Bases Alterations of Purine and Pyrimidine Metabolism
- 4.5.1. Introduction to Purine and Pyrimidine Metabolism
- 4.5.2. Purine Metabolism Disorders
- 4.5.3. Pyrimidine Metabolism Disorders
- 4.5.4. Diagnosis of Purine and Pyrimidine Disorders

4.6. Porphyrias. Alterations in the Synthesis of the Heme Group
- 4.6.1. Heme Group Synthesis
- 4.6.2. Porphyrias: Types
  - 4.6.2.1. Liver Porphyrias
    - 4.6.2.1.1. Acute Porphyrias
  - 4.6.2.2. Hematopoietic Porphyrias
- 4.6.3. Diagnosis and Treatment of Porphyrias

4.7. Jaundice Bilirubin Metabolism Disorders
- 4.7.1. Introduction to Bilirubin Metabolism
- 4.7.2. Congenital Jaundice
  - 4.7.2.1. Unconjugated Hyperbilirubinemia
  - 4.7.2.2. Unconjugated Hyperbilirubinemia
- 4.7.3. Diagnosis and Treatment of Jaundice

4.8. Oxidative Phosphorylation
- 4.8.1. Mitochondria
  - 4.8.1.1. Mitochondrial Enzyme and Protein Constituents
- 4.8.2. Electronic Transport Chain
  - 4.8.2.1. Electronic Transporters
  - 4.8.2.2. Electronic Complexes
- 4.8.3. Coupling of Electronic Transport to ATP Synthesis
  - 4.8.3.1. ATP Synthase
  - 4.8.3.2. Oxidative Phosphorylation Uncoupling Agents
- 4.8.4. NADH Shuttle

4.9. Mitochondrial Disorders
- 4.9.1. Maternal Inheritance
- 4.9.2. Heteroplasmy and Homoplasmy
- 4.9.3. Mitochondrial Diseases
  - 4.9.3.1. Leber Hereditary Optic Neuropathy
  - 4.9.3.2. Leigh Disease
  - 4.9.3.3. Melas Syndrome
  - 4.9.3.4. Myoclonic Epilepsy with Ragged Red Fibers (MERRF)
- 4.9.4. Diagnosis and Treatment of Mitochondrial Diseases

4.10. Other Disorders Produced by Alterations in Other Organelles
- 4.10.1. Lysosomes
  - 4.10.1.1. Lysosomal Diseases
    - 4.10.1.1.1. Sphingolipidosis
    - 4.10.1.1.2. Mucopolysaccharidosis
- 4.10.2. Peroxisomes
  - 4.10.2.1. Lysosomal Diseases
    - 4.10.2.1.1. Zellweger Syndrome
- 4.10.3. Golgi Apparatus
  - 4.10.3.1. Golgi Apparatus Diseases
    - 4.10.3.1.1. Mucolipidosis II

Module 5. Biochemistry III

5.1. Study of Motor Function
- 5.1.1. Overview of Motor Function and Osteoarticular System
- 5.1.2. Alterations of Motor Function
- 5.1.3. Diagnosis of Alterations of Motor Function
  - 5.1.3.1. Diagnostic Techniques
  - 5 1.3.2. Molecular Markers

5.2. Study of Cardiac Function
- 5.2.1. Overview of Cardiac Function
- 5.2.2. Alterations of Cardiac Function
- 5.2.3. Diagnosis of Alterations of Cardiac Function
  - 5.2.3.1. Diagnostic Techniques
  - 5.2.3.2. Molecular Markers

5.3. Study of Renal Function
- 5.3.1. Overview of Renal Function
- 5.3.2. Alterations of Renal Function
- 5.3.3. Diagnosis of Alterations of Renal Function
  - 5.3.3.1. Diagnostic Techniques
  - 5.3.3.2. Molecular Markers

5.4. Study of Liver Function
- 5.4.1. Overview of Liver Function
- 5.4.2. Alterations of Liver Function
- 5.4.3. Diagnosis of Alterations of Liver Function
  - 5.4.3.1. Diagnostic Techniques
  - 5.4.3.2. Molecular Markers

5.5. Study of Neurological Function
- 5.5.1. Overview of Neurological Function
- 5.5.2. Alterations in Neurological Function (Neurodegenerative Diseases)
- 5.5.3. Diagnosis of Alterations of Neurological Function
  - 5.5.3.1. Diagnostic Techniques
  - 5.5.3.2. Molecular Markers

5.6. Study of Hypothalamic and Pituitary Functions
- 5.6.1. Overview of Hypothalamic and Pituitary Functions
- 5.6.2. Alterations in Hypothalamic and Pituitary Functions
- 5.6.3. Diagnosis of Alterations in Hypothalamic and Pituitary Functions
  - 5.6.3.1. Diagnostic Techniques
  - 5.6.3.2. Molecular Markers

5.7. Study of Pancreatic Function
- 5.7.1. Overview of Pancreatic Function
- 5.7.2. Alterations of Pancreatic Function
- 5.7.3. Diagnosis of Alterations in Pancreatic Function
  - 5.7.3.1. Diagnostic Techniques
  - 5.7.3.2. Molecular Markers

5.8. Study of Thyroid and Parathyroid Function
- 5.8.1. Overview of Thyroid and Parathyroid Functions
- 5.8.2. Alterations of Thyroid and Parathyroid Function
- 5.8.3. Diagnosis of Alterations in Thyroid and Parathyroid Functions
  - 5.8.3.1. Diagnostic Techniques
  - 5.8.3.2. Molecular Markers

5.9. Study of Adrenal Gland Function
- 5.9.1. Overview of Adrenal Gland Function
- 5.9.2. Alterations of Adrenal Gland Function
- 5.9.3. Diagnosis of Alterations in Adrenal Gland Function
  - 5.9.3.1. Diagnostic Techniques
  - 5.9.3.2. Molecular Markers

5.10. Study of Gonad Function
- 5.10.1. Overview of Gonad Function
- 5.10.2. Alterations of Gonad Function
- 5.10.3. Diagnosis of Alterations in Gonad Function
  - 5.10.3.1. Diagnostic Techniques
  - 5.10.3.2. Molecular Markers

Module 6. Biochemistry IV

6.1. Study of Human Fertility and Infertility
- 6.1.1. Most Frequent Gynecological Problems
  - 6.1.1.1. Reproductive System Abnormalities
  - 6.1.1.2. Endometriosis
  - 6.1.1.3. Polycystic Ovaries
  - 6.1.1.4. FSH Serum Concentration
- 6.1.2. Most Common Andrological Problems
  - 6.1.2.1. Seminal Quality Alteration
  - 6.1.2.2. Retrograde Ejaculation
  - 6.1.2.3. Neurological Lesions
  - 6.1.2.4. FSH Concentration

6.2. Current Assisted Reproduction Techniques
- 6.2.1. Artificial Insemination
- 6.2.2. IUI-H
- 6.2.3. IUI-D
- 6.2.4. Ovarian Puncture
- 6.2.5. In Vitro Fertilization and Intracytoplasmic Sperm Injection
- 6.2.6. Gamete Transfer

6.3. Techniques for Gamete Conservation in a Urology Laboratory Gamete Donation Bank
- 6.3.1. Current Legal Framework
- 6.3.2. Principles of Cell Cryopreservation
- 6.3.3. Oocyte Freezing/Thawing Protocol
- 6.3.4. Semen Freezing/Thawing Protocol
- 6.3.5. Gamete Donation Bank
  - 6.3.5.1. Concept and Purpose of Assisted Reproduction
  - 6.3.5.2. Donor Characteristics

6.4. Study of Embryology and Andrology in the Clinical Laboratory
- 6.4.1. Pre-Embryo and Sperm Culture
- 6.4.2. Embryo Stages
- 6.4.3. Seminal Study Techniques
  - 6.4.3.1. Seminogram
  - 6.4.3.2. Seminal Lavage

6.5. Laboratory Techniques for the Study of Cell Growth, Senescence and Apoptosis
- 6.5.1. Study of Cell Growth
  - 6.5.1.1. Concept
  - 6.5.1.2. Conditioning Parameters of Cell Growth
    - 6.5.1.2.1. Viability
    - 6.5.1.2.2. Multiplication
    - 6.5.1.2.3. Temperature
    - 6.5.1.2.4. External Agents
  - 6.5.1.3. Practical Applications in Clinical Analysis
- 6.5.2. Study of Cellular Senescence and Apoptosis
  - 6.5.2.1. Concept of Senescence
- 6.5.3. Hematoxylin/Eosin Staining
- 6.5.4. Clinical Application of Oxidative Stress

6.6. Analysis of Body Fluids
- 6.6.1. Amniotic Fluid
- 6.6.2. Saliva Nasopharynx
- 6.6.3. LCR
- 6.6.4. Synovial Fluid
- 6.6.5. Pleural
- 6.6.6. Pericardial
- 6.6.7. Peritoneal

6.7. Urine Study in the Urology and Pathological Anatomy Laboratory
- 6.7.1. Systematic Uroanalysis
- 6.7.2. Urine culture
- 6.7.3. Pathological Anatomy Cytology

6.8. Clinical Study of Stools
- 6.8.1. Physical Study
- 6.8.2. Hidden Blood in Stools
- 6.8.3. Fresh Study
- 6.8.4. Stool Culture

6.9. Molecular Study of Cancer. Most Common Tumor Markers
- 6.9.1. PSA
- 6.9.2. EGFR
- 6.9.3. HER2 Gene
- 6.9.4. CD20
- 6.9.5. Neuron-Specific Enolase NSE
- 6.9.6. FAP
- 6.9.7. ALK Gene
- 6.9.8. ROS1 Gene
- 6.9.9. BRAF V600e Mutation

6.10. Therapeutic Drug Monitoring Pharmacokinetics
- 6.10.1. Concept
- 6.10.2. Study Parameters
  - 6.10.2.1. Absorption
  - 6.10.2.2. Distribution
  - 6.10.2.3. Elimination
- 6.10.3. Clinical Applications of Pharmacokinetics

Module 7. Hematology

7.1. Introduction to the Hematopoietic System and Study Techniques
- 7.1.1. Classification of Blood Cells and Hematopoiesis
- 7.1.2. Hemacytometry and Blood Smear Study
- 7.1.3. Bone Marrow Study
- 7.1.4. Role of the Pathologist in the Diagnosis of Testicular Neoplasms
- 7.1.5. Role of Immunophenotyping in the Diagnosis of Hematologic Disorders

7.2. Diagnosis of Erythrocyte Disorders Anemias, Erythrocytosis, Hemoglobinopathies and Thalassemias
- 7.2.1. Classification of the Types of Anaemia
  - 7.2.1.1. Etiopathogenic Classification
  - 7.2.1.2. Classification According to VCM
    - 7.2.1.2.1. Microcytic Anemia
    - 7.2.1.2.2. Normocytic Anemia
    - 7.2.1.2.3. Macrocytic Anemia
- 7.2.2. Erythrocytosis Differential Diagnosis
  - 7.2.2.1. Primary Erythrocytosis
  - 7.2.2.2. Secondary Erythrocytosis
- 7.2.3. Hemoglobinopathies and Thalassemias
  - 7.2.3.1. Classification
  - 7.2.3.2. Laboratory Diagnosis

7.3. Quantitative Alterations of the White Series
- 7.3.1. Neutrophils: Neutropenia and Neutrophilia
- 7.3.2. Lymphocytes: Lymphopenia and Lymphocytosis

7.4. Diagnosis of Platelet Disorders
- 7.4.1. Morphologic Alterations: Thrombocytopathies
- 7.4.2. Thrombocytopenias. Diagnostic Approach

7.5. Myeloproliferative and Myelodysplastic Syndromes
- 7.5.1. Laboratory Findings and Complementary Examinations
  - 7.5.1.1. Hemogram and Peripheral Blood Smear
  - 7.5.1.2. Bone Marrow Study
    - 7.5.1.2.1. Bone Marrow Morphology
    - 7.5.1.2.2. Flow Cytometry
    - 7.5.1.2.3. Cytogenetics
    - 7.5.1.2.4. Molecular Biology
- 7.5.2. Diagnosis Classification Differential Diagnosis

7.6. Monoclonal Gammopathies Multiple Myeloma
- 7.6.1. Study of Monoclonal Gammopathies
  - 7.6.1.1. Bone Marrow Morphology
  - 7.6.1.2. Study of the Monoclonal Component
  - 7.6.1.3. Other Laboratory Studies
- 7.6.2. Classification of Monoclonal Gammopathies Differential Diagnosis
  - 7.6.2.1. Monoclonal Gammopathy of Uncertain Significance and Quiescent Myeloma
  - 7.6.2.2. Multiple Myeloma
    - 7.6.2.2.1. Diagnostic Criteria
  - 7.6.2.3. Amyloidosis
  - 7.6.2.4. Waldenström's Macroglobulinemia

7.7. Differential Diagnosis of Acute Leukemia
- 7.7.1. Acute Myeloid Leukemia. Promyelocytic Leukemia
  - 7.7.1.1. Laboratory Findings and Complementary Examinations
  - 7.7.1.2. Hemogram and Peripheral Blood Smear
  - 7.7.1.3. Bone Marrow Study
    - 7.7.1.3.1. Bone Marrow Morphology
    - 7.7.1.3.2. Flow Cytometry
    - 7.7.1.3.3. Cytogenetics
    - 7.7.1.3.4. Molecular Biology
  - 7.7.1.4. Diagnosis Classification
- 7.7.2. Acute Lymphoid Leukemia
  - 7.7.2.1. Laboratory Findings and Complementary Examinations
  - 7.7.2.2. Hemogram and Peripheral Blood Smear
  - 7.7.2.3. Bone Marrow Study
    - 7.7.1.3.1. Bone Marrow Morphology
    - 7.7.1.3.2. Flow Cytometry
    - 7.7.1.3.3. Cytogenetics
    - 7.7.1.3.4. Molecular Biology
  - 7.7.2.4. Diagnosis Classification

7.8. Mature B- and T-Lymphoid Neoplasms
- 7.8.1. Chronic Lymphoproliferative Syndromes B. Chronic Lymphocytic Leukemia
  - 7.8.1.1. Laboratory Studies and Differential Diagnosis
    - 7.8.1.1.1. Chronic Lymphocytic Leukemia
    - 7.8.1.1.2. Tricholeukemia
    - 7.8.1.1.3. Splenic Marginal Zone Lymphoma
    - 7.8.1.1.4. Prolymphocytic Leukemia
    - 7.8.1.1.5. Granular Lymphocyte Leukemia
- 7.8.2. Non-Hodgkin's Lymphomas
  - 7.8.2.1. Initial Study and Diagnosis
  - 7.8.2.2. Classification of Lymphoid Neoplasms
    - 7.8.2.2.1. Follicular Lymphoma
    - 7.8.2.2.2. Mantle Cell Lymphoma
    - 7.8.2.2.3. Diffuse Large B-cell Lymphoma
    - 7.8.2.2.4. MALT Lymphoma
    - 7.8.2.2.5. Burkitt Lymphoma
    - 7.8.2.2.6. Peripheral T Lymphomas
    - 7.8.2.2.7. Cutaneous Lymphomas
    - 7.8.2.2.8. Others
- 7.8.3. Hodgkin's Lymphomas
  - 7.8.3.1. Complementary Tests
  - 7.8.3.2. Histological Classification

7.9. Diagnosis of Coagulation Disorders
- 7.9.1. Study of Hemorrhagic Diatheses
  - 7.9.1.1. Initial Tests
  - 7.9.1.2. Specific Studies
- 7.9.2. Congenital Coagulation Alterations
  - 7.9.2.1. Hemophilia A and B
  - 7.9.2.2. Von Willebrand Disease
  - 7.9.2.3. Other Congenital Coagulopathies
- 7.9.3. Acquired Coagulation Alterations
- 7.9.4. Thrombosis and Thrombophilia Antiphospholipid Syndrome
- 7.9.5. Monitoring of Anticoagulant Therapy

7.10. Introduction to Hemotherapy
- 7.10.1. Blood Groups
- 7.10.2. Blood Components
- 7.10.3. Recommendations for the Use of Blood Derivatives
- 7.10.4. Most Common Transfusional Reactions

Module 8. Microbiology and Parasitology

8.1. General Concepts of Microbiology
- 8.1.1. Structure of Microorganisms
- 8.1.2. Nutrition, Metabolism and Microbial Growth
- 8.1.3. Microbial Taxonomy
- 8.1.4. Microbial Genomes and Genetics

8.2. Study of Infectious Bacteria
- 8.2.1. Gram Positive Cocci
- 8.2.2. Gram Negative Cocci
- 8.2.3. Gram Positive Bacilli
- 8.2.4. Gram Negative Bacilli
- 8.2.5. Other Bacteria of Clinical Interest
  - 8.2.5.1. Legionella Pneumophila
  - 8.2.5.2. Mycobacteria

8.3. General Techniques in Microbiology
- 8.3.1. Processing of Microbiological Samples
- 8.3.2. Types of Microbiological Samples
- 8.3.3. Planting Techniques
- 8.3.4. Types of Staining in Microbiology
- 8.3.5. Current Microorganism Identification Techniques
  - 8.3.5.1. Biochemical Tests
  - 8.3.5.2. Manual or Automatic Commercial Systems and Multitest Galleries
  - 8.3.5.3. MALDI TOF Mass Spectrometry

8.3.5.4. Molecular Tests
8.3.5.4.1. 16S rRNA
8.3.5.4.2. 16S-23S rRNA
8.3.5.4.3. 23S rRNA
8.3.5.4.4. rpoB Gene
8.3.5.4.5. gyrB Gene
8.3.5.5. Serological Diagnosis of Microbial Infections

8.4. Antimicrobial Sensitivity Tests
8.4.1. Antimicrobial Resistance Mechanisms
8.4.2. Sensitivity Test
8.4.3. Antibacterials

8.5. Study of Viral Infections
8.5.1. Basic Principles of Virology
8.5.2. Taxonomy
8.5.3. Viruses Affecting the Respiratory System
8.5.4. Viruses Affecting the Digestive System
8.5.5. Viruses Affecting the Central Nervous System
8.5.6. Viruses Affecting the Reproductive System
8.5.7. Systemic Viruses

8.6. General Techniques in Virology
8.6.1. Processing of Samples
8.6.2. Laboratory Techniques for Viral Diagnosis
8.6.3. Antivirals

8.7. Most Common Fungal Infections
8.7.1. General Information on Fungi
8.7.2. Taxonomy
8.7.3. Primary Mycoses
8.7.4. Opportunist Mycoses
8.7.5. Subcutaneous Mycoses
8.7.6. Cutaneous and Superficial Mycoses
8.7.7. Mycosis of Atypical Etiology

8.8. Diagnostic Techniques in a Clinical Mycology
8.8.1. Processing of Samples
8.8.2. Study of Superficial Mycoses
8.8.3. Study of Subcutaneous Mycoses
8.8.4. Study of Deep Mycoses
8.8.5. Study of Opportunist Mycoses
8.8.6. Diagnostic Techniques
8.8.7. Antifungal

8.9. Parasitic Diseases
8.9.1. General Concepts of Parasitology
8.9.2. Protozoa
8.9.2.1. Amoeba (Sarcodina)
8.9.2.2. Ciliates (Ciliophora)
8.9.2.3. Flagellates (Mastigophora)
8.9.2.4. Apicomplexa
8.9.2.5. Plasmodium
8.9.2.6. Sarcocystis
8.9.2.7. Microsporidiosis
8.9.3. Helmintos
8.9.3.1. Nematodes
8.9.3.2. Platyhelminthes
8.9.3.2.1. Cestodes
8.9.3.2.2. Trematodes
8.9.4. Arthropods

8.10. Diagnostic Techniques in a Clinical Parasitology
8.10.1. Processing of Samples
8.10.2. Diagnostic Methods
8.10.3. Antiparasitics II

Module 9. Immunology

9.1. Immune System Organs
- 9.1.1. Primary Lymphoid Organs
  - 9.1.1.1. Fetal Liver
  - 9.1.1.2. Bone Marrow
  - 9.1.1.3. Thymus
- 9.1.2. Secondary Lymphoid Organs
  - 9.1.2.1. Bladder
  - 9.1.2.2. Lymph Nodes
  - 9.1.2.3. Mucosal-Associated Lymphoid Tissue
- 9.1.3. Tertiary Lymphoid Organs
- 9.1.4. Lymphatic system

9.2. Immune System Cells
- 9.2.1. Granulocytes
  - 9.2.1.1. Neutrophils
  - 9.2.1.2. Eosinophils
  - 9.2.1.3. Basophils
- 9.2.2. Monocytes and Macrophages
- 9.2.3. Lymphocytes
  - 9.2.3.1. T Lymphocytes
  - 9.2.3.2. B Lymphocytes
- 9.2.4. Natural Killer Cells
- 9.2.5. Antigen Presenting Cells

9.3. Antigens and Immunoglobulins
- 9.3.1. Antigenicity and Immunogenicity
  - 9.3.1.1. Antigen
  - 9.3.1.2. Immunogen
  - 9.3.1.3. Epitopes
  - 9.3.1.4. Haptenos and Carriers
- 9.3.2. Immunoglobulins
  - 9.3.2.1. Structure and Function
  - 9.3.2.2. Classification of Immunoglobulins
  - 9.3.2.3. Somatic Hypermutation and Isotype Shift

9.4. Complement System
- 9.4.1. Functions
- 9.4.2. Activation Routes
  - 9.4.2.1. Classical Pathway
  - 9.4.2.2. Alternative Pathway
  - 9.4.2.3. Lectin Pathway
- 9.4.3. Complement Receptors
- 9.4.4. Complements and Inflammation
- 9.4.5. Complement Cascade

9.5. Major Histocompatibility Complex
- 9.5.1. Major and Minor Histocompatibility Antigens
- 9.5.2. HLA Genetics
- 9.5.3. HLA and Disease
- 9.5.4. Transplant Immunology

9.6. Immune Response
- 9.6.1. Innate and Adaptive Immune Response
- 9.6.2. Humoral Immune Response
  - 9.6.2.1. Primary Response
  - 9.6.2.2. Secondary Response
- 9.6.3. Cellular Immune Response

9.7. Autoimmune Diseases
- 9.7.1. Immunogenic Tolerance
- 9.7.2. Autoimmunity
- 9.7.3. Autoimmune Diseases
- 9.7.4. Study of Autoimmune Diseases

9.8. Immunodeficiencies
- 9.8.1. Primary Immunodeficiencies
- 9.8.2. Secondary Immunodeficiencies
- 9.8.3. Antitumor Immunity
- 9.8.4. Evaluation of Immunity

9.9. Hypersensitivity Reactions
- 9.9.1. Classification of Hypersensitivity Reactions
- 9.9.2. Type I Hypersensitivity or Allergic Reactions
- 9.9.3. Anaphylaxis
- 9.9.4. Allergological Diagnostic Methods

9.10. Immunoanalytical Techniques
- 9.10.1. Precipitation and Agglutination Techniques
- 9.10.2. Complement Fixation Techniques
- 9.10.3. ELISA Techniques
- 9.10.4. Immunochromatography Techniques
- 9.10.5. Radioimmunoanalysis Techniques
- 9.10.6. Isolation of Lymphocytes
- 9.10.7. Microlymphocytotoxicity Technique
- 9.10.8. Mixed Lymphocyte Culture
- 9.10.9. Flow Cytometry Applied to Immunology
- 9.10.10. Flow Cytometry

Module 10. Genetics

10.1. Introduction to Genetic Medicine Genealogies and Inheritance Patterns
- 10.1.1. Historical Development of Genetics Key Concepts
- 10.1.2. Structure of Genes and Regulation of Genetic Expression Epigenetics
- 10.1.3. Genetic Variability Mutation and Reparation of DNA
- 10.1.4. Human Genetics Organization of the Human Genome
- 10.1.5. Genetic Diseases Morbidity and Mortality
- 10.1.6. Human Inheritance Concept of Genotype and Phenotype
  - 10.1.6.1. Mendelian Inheritance Patterns
  - 10.1.6.2. Multigene and Mitochondrial Inheritance
- 10.1.7. Construction of Genealogies
  - 10.1.7.1. Allele, Genotypic and Phenotypic Frequency Estimation
  - 10.1.7.2. Segregation Analysis
- 10.1.8. Other Factors which Affect the Phenotype

10.2. Molecular Biology Techniques Used in Genetics
- 10.2.1. Genetics and Molecular Diagnostics
- 10.2.2. Polymerase Chain Reaction (PCR) Applied to Diagnosis and Research in Genetics
  - 10.2.2.1. Detection and Amplification of Specific Sequences
  - 10.2.2.2. Quantification of Nucleic Acids (RT-PCR)
- 10.2.3. Cloning Techniques: Isolation, Restriction and Ligation of DNA Fragments
- 10.2.4. Detection of Mutations and Measurement of Genetic Variability: RFLP, VNTR, SNPs
- 10.2.5. Mass Sequencing Techniques. NGS
- 10.2.6. Transgenesis Genetic Therapy
- 10.2.7. Cytogenetic Techniques
  - 10.2.7.1. Chromosome Banding
  - 10.2.7.2. FISH, CGH

10.3. Human Cytogenetics Numerical and Structural Chromosomal Abnormalities
- 10.3.1. Study of Human Cytogenetics Features
- 10.3.2. Chromosome Characterization and Cytogenetic Nomenclature
  - 10.3.2.1. Chromosomal Analysis: Karyotyping
- 10.3.3. Anomalies in the Number of Chromosomes
  - 10.3.3.1. Polyploidies
  - 10.3.3.2. Aneuploidies
- 10.3.4. Structural Chromosomal Alterations Genetic Dose
  - 10.3.4.1. Deletions
  - 10.3.4.2. Duplications
  - 10.3.4.3. Inversions
  - 10.3.4.4. Translocations
- 10.3.5. Chromosomal Polymorphisms
- 10.3.6. Genetic Imprinting

10.4. Prenatal Diagnosis of Genetic Alterations and Congenital Defects. Preimplantational Genetic Diagnosis
- 10.4.1. Prenatal Diagnosis. What Does It Entail?
- 10.4.2. Incidence of Congenital Defects
- 10.4.3. Indications for Performing Prenatal Diagnosis
- 10.4.4. Prenatal Diagnostic Methods
  - 10.4.4.1. Non-Invasive Procedures: First and Second Trimester Screening TPNI
  - 10.4.4.2. Invasive Procedures: Amniocentesis, Cordocentesis and Chorionic Biopsy
- 10.4.5. Preimplantational Genetic Diagnosis Indications
- 10.4.6. Embryo Biopsy and Genetic Analysis

10.5. Genetic Diseases I
- 10.5.1. Diseases with Autosomal Dominant Inheritance
  - 10.5.1.1. Achondroplasia
  - 10.5.1.2. Huntington's Disease
  - 10.5.1.3. Retinoblastoma
  - 10.5.1.4. Charcot-Marie-Tooth Disease
- 10.5.2. Diseases with Autosomal Recessive Inheritance
  - 10.5.2.1. Phenylketonuria
  - 10.5.2.2. Sickle Cell Anemia
  - 10.5.2.3. Cystic fibrosis
  - 10.5.2.4. Laron Syndrome
- 10.5.3. Diseases with Sex-Linked Inheritance
  - 10.5.3.1. Rett Syndrome
  - 10.5.3.2. Haemophilia
  - 10.5.3.3. Duchenne Muscular Dystrophy

10.6. Genetic Diseases II
- 10.6.1. Mitochondrial Inheritance Diseases
  - 10.6.1.1. Mitochondrial Encephalomyopathies
  - 10.6.1.2. Leber Hereditary Optic Neuropathy (NOHL)
- 10.6.2. Genetic Anticipation Phenomena
  - 10.6.2.1. Huntington's Disease
  - 10.6.2.2. Fragile X Syndrome
  - 10.6.2.3. Spinocerebellar Ataxias
- 10.6.3. Allelic Heterogeneity
  - 10.6.3.1. Usher Syndrome

10.7. Complex Diseases Genetics Molecular Basis of Family and Sporadic Cancer
- 10.7.1. Multifactorial Inheritance
  - 10.7.1.1. Polygenes
- 10.7.2. Contribution of Environmental Factors on Complex Diseases
- 10.7.3. Quantitative Genetics
  - 10.7.3.1. Heritability
- 10.7.4. Common Complex Diseases
  - 10.7.4.1. Diabetes Mellitus
  - 10.7.4.2. Alzheimer's Disease
- 10.7.5. Behavioral Diseases and Personality Disorders: Alcoholism, Autism and Schizophrenia

10.7.6. Cancer: Molecular Base and Environmental Factors
10.7.6.1. Genetics of Cycle Cell Proliferation and Differentiation Processes
10.7.6.2. DNA Reparation Genes, Oncogenes and Tumor Suppressor Genes
10.7.6.3. Environmental Influence of the Occurrence of Cancer
10.7.7. Familial Cancer
10.8. Genomics and Proteomics
10.8.1. Omic Sciences and their Usefulness in Medicine
10.8.2. Genome Sequencing and Analysis
10.8.2.1. DNA Libraries
10.8.3. Comparative Genomics
10.8.3.1. Organisms Model
10.8.3.2. Sequencing Comparison
10.8.3.3. Human Genome Project
10.8.4. Functional Genomics
10.8.4.1. Transcriptomics
10.8.4.2. Structural and Functional Organization of the Genome
10.8.4.3. Functional Genomic Elements
10.8.5. From the Genome to the Proteome
10.8.5.1. Post-translational Modifications
10.8.6. Strategies for the Separation and Purification of Proteins
10.8.7. Identification of Proteins
10.8.8. Interactome
10.9. Genetic Assessment Ethical and Legal Aspects of Diagnosis and Research in Genetics
10.9.1. Genetic Assessment Concepts and Base Techniques
10.9.1.1. Risk of Recurrence of Genetically Based Diseases
10.9.1.2. Genetic Assessment in Prenatal Diagnosis
10.9.1.3. Ethical Principles in Genetic Assessment
10.9.2. Legislation of New Genetic Technology
10.9.2.1. Genetic Engineering
10.9.2.2. Human Cloning
10.9.2.3. Genetic Therapy
10.9.3. Bioethics and Genetics
10.10. Biobanks and Bioinformatics Tools
10.10.1. Biobanks Concept and Functions
10.10.2. Organization, Management and Quality of Biobanks
10.10.3. Computational Biology
10.10.4. Big Data and Machine Learning
10.10.5. Bioinformatics Applications in Biomedicine
10.10.5.1. Sequences Analysis
10.10.5.2. Image Analysis
10.10.5.2. Personalized and Precision Medicine

Make the most of this opportunity and take the step to get up to date on the latest developments in Clinical Analysis"

06

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:

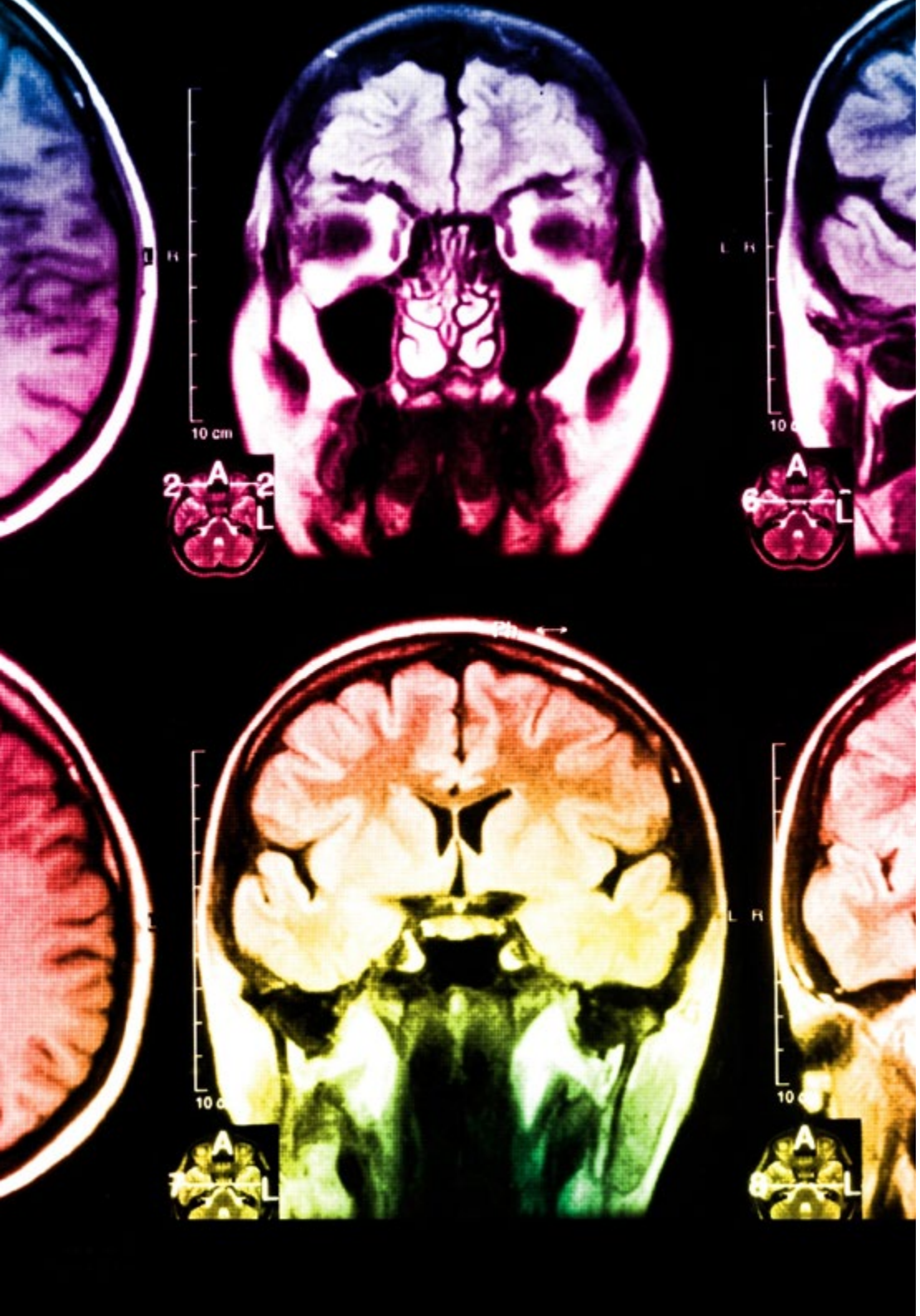
1. Students who follow this method not only achieve the assimilation of concepts, but also a development of their mental capacity, through exercises that evaluate real situations and the application of knowledge.
2. Learning is solidly translated into practical skills that allow the student to better 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.

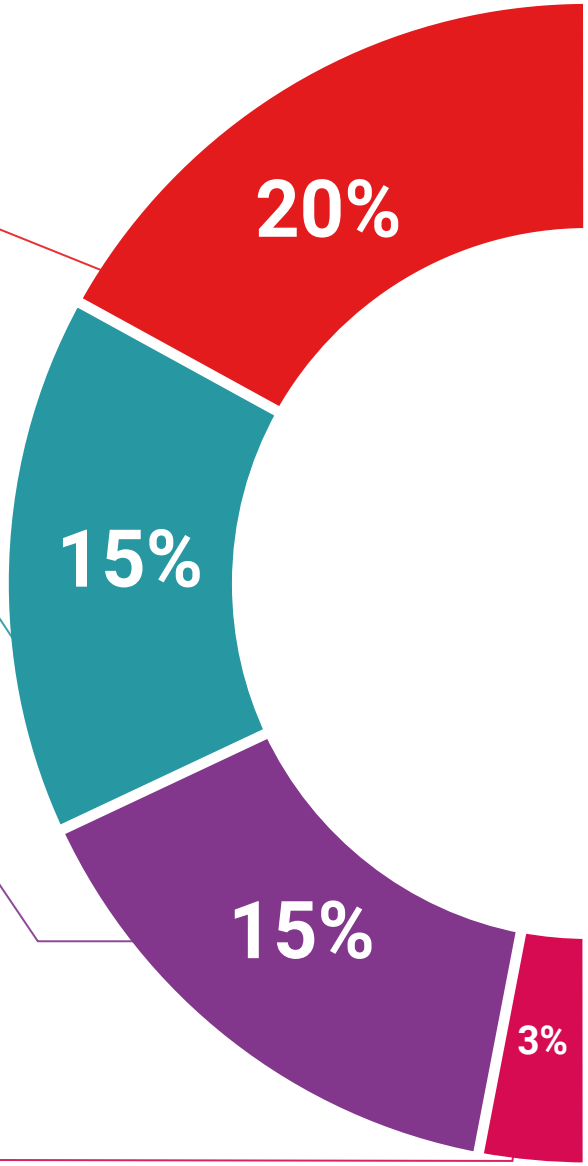
Interactive Summaries

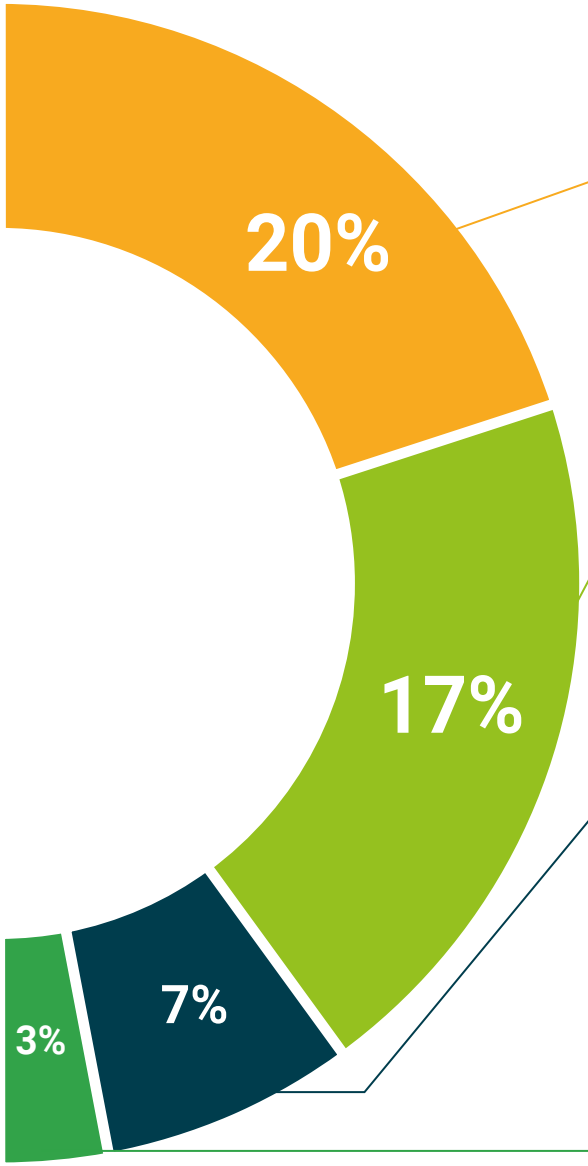
The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

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.

07

Certificate

The Professional Master's Degree in Clinical Analysis guarantees you, in addition to the most rigorous and up-to-date training, access to a Professional Master's Degree issued by TECH Global University.

Successfully complete this program and receive your university diploma without travel or laborious paperwork"

This program will allow you to obtain your **Professional Master's Degree diploma in Clinical Analysis** endorsed by **TECH Global University**, the world's largest online university.

TECH Global University is an official European University publicly recognized by the Government of Andorra (***official bulletin***). Andorra is part of the European Higher Education Area (EHEA) since 2003. The EHEA is an initiative promoted by the European Union that aims to organize the international training framework and harmonize the higher education systems of the member countries of this space. The project promotes common values, the implementation of collaborative tools and strengthening its quality assurance mechanisms to enhance collaboration and mobility among students, researchers and academics.

This **TECH Global University** title is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Professional Master's Degree in Clinical Analysis**

Modality: **online**

Duration: **12 months**

Accreditation: **60 ECTS**


tech global university

Mr./Ms. _____, with identification document _____
has successfully passed and obtained the title of:

Professional Master's Degree in Clinical Analysis

This is a program of 1,500 hours of duration equivalent to 60 ECTS, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH Global University is a university officially recognized by the Government of Andorra on the 31st of January of 2024, which belongs to the European Higher Education Area (EHEA).

In Andorra la Vella, on the 28th of February of 2024

Dr. Pedro Navarro Illana
Rector

This qualification must always be accompanied by the university degree issued by the competent authority to practice professionally in each country. Unique TECH Code: AFWORD23S techtitute.com/certificates


Professional Master's Degree in Clinical Analysis

Subject type	ECTS
Compulsory (CO)	60
Optional (OP)	0
External Work Placement (WP)	0
Master's Degree Thesis (MDT)	0
Total	60

General Structure of the Syllabus

Year	Subject	ECTS	Type
1º	Legal Framework and Standard Parameters of the Clinical Analysis Laboratory	6	CO
1º	Instrumental Techniques in the Clinical Analysis Laboratory	6	CO
1º	Biochemistry I	6	CO
1º	Biochemistry II	6	CO
1º	Biochemistry III	6	CO
1º	Biochemistry IV	6	CO
1º	Hematology	6	CO
1º	Microbiology and Parasitology	6	CO
1º	Immunology	6	CO
1º	Genetics	6	CO

Dr. Pedro Navarro Illana
Rector

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*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.

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Professional Master's Degree

Clinical Analysis

- Modality: **online**
- Duration: **12 months**
- Certificate: **TECH Global University**
- Credits: **60 ECTS**
- Schedule: **at your own pace**
- Exams: **online**

Professional Master's Degree

Clinical Analysis

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