Postgraduate Certificate

Proteomics in Clinical Microbiology

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Postgraduate Certificate

Proteomics in Clinical Microbiology

- Modality: **online**
- Duration: **6 weeks**
- Certificate: **TECH Global University**
- Accreditation: **6 ECTS**
- Schedule: **at your own pace**
- Exams: **online**

Website: **www.techtitute.com/us/pharmacy/postgraduate-certificate/proteomics-clinical-microbiology**

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01

Introduction

Proteomics is an essential tool in clinical microbiology, especially in the diagnosis and treatment of infectious diseases. However, despite the advances, its clinical application faces several challenges, such as the need for biomarker validation in clinical trials and the integration of these results into daily practice. Therefore, the increasing adoption of protein spectra databases and the improvement of analytical techniques continue to drive its relevance in Clinical Microbiology.

In this situation, TECH has developed an online program adapted to the individual and professional needs of the students. In addition, it is based on the innovative learning methodology called Relearning, which is a pioneer in this university.

This program will provide you with a comprehensive understanding of how Proteomic and Genomic techniques are applied in Clinical Microbiology to improve the diagnosis and treatment of complex infections"

In today's Clinical Microbiology, Proteomics has emerged as a crucial tool for the identification and characterization of microorganisms. For example, the MALDI-TOF mass spectrometry technique is especially noted for its ability to rapidly identify bacteria, fungi and parasites by peptide fingerprinting, which is unique to each microorganism.

This is how this program is born, which will cover the introduction to Proteomics in the Microbiology laboratory, addressing its evolution, development and relevance in microbiological diagnosis, with special attention to the Proteomics of Multidrug-Resistant Bacteria. Therefore, pharmacists will be immersed in qualitative and quantitative techniques for protein separation, such as Two-Dimensional Electrophoresis (2DE), DIGE technology, isotopic labeling, High Performance Liquid Chromatography (HPLC), and Mass Spectrometry (MS), including MALDI-TOF technologies.

Likewise, the applications of MALDI-TOF mass spectrometry in Clinical Microbiology will be examined, highlighting its use in the identification of microorganisms, characterization of antibiotic resistance and bacterial typing. In addition, essential bioinformatics tools for proteomic analysis will be introduced, such as databases and protein sequence analysis tools, together with proteomic data visualization techniques.

Finally, Genomics in Clinical Microbiology will be discussed in depth, covering its evolution, importance in diagnosis, and genomics of multidrug-resistant bacteria, as well as different types of sequencing and its applications in epidemiological surveillance and microbial diversity studies. The future of Genomics and Proteomics in the clinical laboratory will also be explored, addressing recent and future advances, as well as the development of new therapeutic strategies.

Therefore, TECH has implemented a complete and fully online university program, accessible from any electronic device with an Internet connection. Additionally, it is based on the revolutionary Relearning learning methodology, which focuses on the systematic review of key concepts to ensure a solid and fluent understanding of the contents.

This **Postgraduate Certificate in Proteomics in Clinical Microbiology** contains the most complete and up-to-date scientific program on the market. The most important features include:

- The development of practical cases presented by experts in Microbiology, Medicine and Parasitology.
- The graphic, schematic and eminently practical contents with which it is conceived gather scientific and practical information on those disciplines that are indispensable for professional practice
- Practical exercises where self-assessment can be used to improve learning.
- Its special emphasis on innovative methodologies
- Theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- Content that is accessible from any fixed or portable device with an Internet connection

You will cover Genomics in the Microbiology laboratory, addressing its evolution, importance in diagnosis and its application in the study of multidrug-resistant bacteria. With all the TECH quality guarantees!"

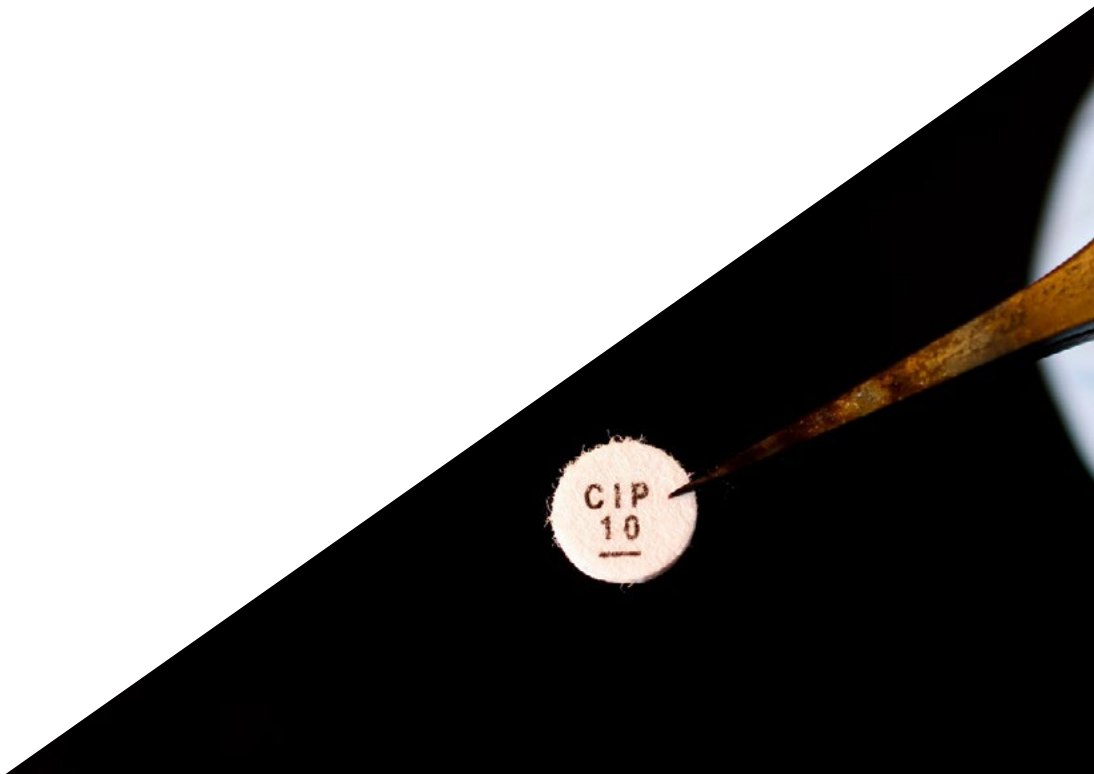
You will master bioinformatics tools for Genomics, including databases and genomic sequence analysis, as well as data visualization, thanks to an extensive library of multimedia resources"

You will delve into the practical applications of MALDI-TOF in Clinical Microbiology, highlighting the identification of microorganisms, characterization of antibiotic resistance and bacterial typing. Enroll now!

The program's teaching staff includes professionals from the field 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.



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Objectives

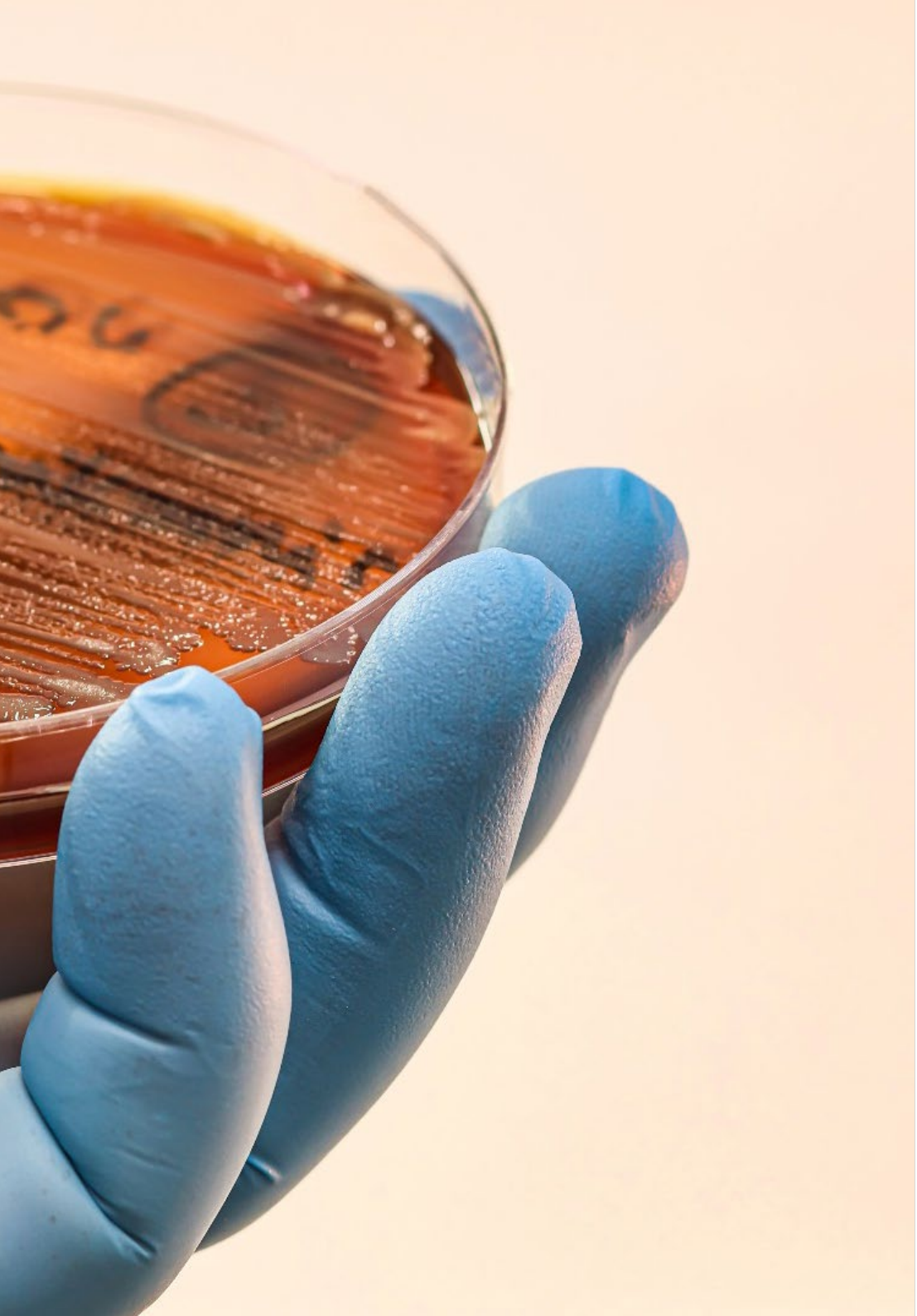
The main objective of the program will be to provide a thorough and practical understanding of the techniques and applications of Proteomics in microbiological diagnostics. Therefore, pharmacists will use advanced technologies, such as MALDI-TOF mass spectrometry, liquid chromatography and various electrophoresis techniques, to identify and characterize microorganisms, especially multidrug-resistant ones. In addition, professionals will be specialized in the use of bioinformatics tools for the analysis of proteomic and genomic data, preparing them to face the technical and ethical challenges in the clinical laboratory.

You will implement and interpret qualitative and quantitative methods of protein separation, such as two-dimensional electrophoresis, DIGE technology and mass spectrometry"

General Objective

- Substantiate the importance of Proteomics and Genomics in the Microbiology laboratory including recent advances and technical and bioinformatics challenges

You will focus on the identification of multidrug/resistant microorganisms, the characterization of antibiotic resistance and the use of bioinformatics tools for the analysis of proteomic and genomic data"



Specific Objectives

- Delve into qualitative and quantitative techniques for protein separation and identification
- Apply bioinformatics tools for Proteomics and Genomics

03

Course Management

The faculty behind this program in Proteomics in Clinical Microbiology are highly qualified experts committed to the comprehensive training of pharmacists in this field. With a solid academic and professional background, these mentors will bring specialized knowledge and practical experience, enriching the learning of the graduates. In addition, their dedication will be reflected in a pedagogical approach oriented to the practical application of advanced proteomic analysis techniques to meet contemporary scientific challenges in the field of microbiological health.

With vast experience in research and practical application, faculty are committed to providing relevant skills to address current challenges in Clinical Microbiology with confidence and effectiveness"

Management

Dr. Ramos Vivas, José

- Director of the Banco Santander-Universidad Europea del Atlántico Chair in Innovation
- Researcher at the Center for Innovation and Technology of Cantabria (CITICAN)
- Academic of Microbiology and Parasitology at the European University of the Atlantic
- Founder and former director of the Cellular Microbiology Laboratory of the Valdecilla Research Institute (IDIVAL)
- PhD in Biology from the University of León
- Doctor in Sciences from the University of Las Palmas de Gran Canaria
- Degree in Biology from the University of Santiago de Compostela
- Master's Degree in Molecular Biology and Biomedicine from the University of Cantabria
- Member of: CIBERINFEC (MICINN-ISCIII), Member of the Spanish Society of Microbiology and Member of the Spanish Network of Research in Infectious Pathology

Professors

Dr. Ruiz de Alegría Puig, Carlos

- FEA at the University Hospital Marqués de Valdecilla, Cantabria
- Rotation in the Area of Molecular Biology and Fungi, Hospital de Basurto, Bilbao
- Specialist in Microbiology and Immunology by the Marqués de Valdecilla University Hospital
- PhD in Molecular Biology and Biomedicine by the University of Cantabria
- Degree in Medicine and Surgery from the University of the Basque Country
- Member of: Spanish Society of Microbiology (SEM) and Center for Biomedical Research in Infectious Diseases Network CIBERINFEC (MICINN-ISCIII)

Take the opportunity to learn about the latest advances in this field in order to apply it to your daily practice"

04

Structure and Content

The contents of this academic program will cover from the theoretical foundations of Proteomics to its practical application in the diagnosis, prognosis and treatment of infectious diseases. Topics such as mass spectrometry, bioinformatics analysis, proteomic biomarkers and the integration of proteomics in personalized pharmacotherapy will also be addressed. In addition, professionals will acquire key competencies to interpret and apply proteomic data, promoting significant advances in health care based on solid and updated scientific evidence.

This program will offer you a comprehensive program, designed to explore in depth the advanced techniques and applications of Proteomics in the context of Clinical Microbiology"

Module 1. Proteomics in Clinical Microbiology

1.1. Proteomics in the Microbiology Laboratory
- 1.1.1. Evolution and Development of Proteomics
- 1.1.2. Importance in Microbiological Diagnosis
- 1.1.3. Proteomics of Multi-Resistant Bacteria

1.2. Qualitative Protein Separation Techniques
- 1.2.1. Two-Dimensional Electrophoresis (2DE)
- 1.2.2. DIGE Technology
- 1.2.3. Applications in Microbiology

1.3. Quantitative Protein Separation Techniques
- 1.3.1. Isotopic Labelling
- 1.3.2. High Performance Liquid Chromatography (HPLC)
- 1.3.3. Mass Spectrometry (MS)
  - 1.3.3.1. MALDI-TOF Technologies in the Clinical Microbiology Laboratory
    - 1.3.3.1.1. VITEK®MS System
    - 1.3.3.1.2. MALDI Biotyper® System

1.4. MALDI-TOF Applications in Clinical Microbiology
- 1.4.1. Identification of Microorganisms
- 1.4.2. Characterization of Antibiotic Resistance
- 1.4.3. Bacterial Typing

1.5. Bioinformatics Tools for Proteomics
- 1.5.1. Proteomic Databases
- 1.5.2. Protein Sequence Analysis Tools
- 1.5.3. Visualization of Proteomic Data

1.6. Genomics in the Microbiology Laboratory
- 1.6.1. Evolution and Development of Genomics
- 1.6.2. Importance in Microbiological Diagnosis
- 1.6.3. Genomics of Multi-Resistant Bacteria

1.7. Types of Sequencing
- 1.7.1. Sequencing of Genes with Taxonomic Value
- 1.7.2. Sequencing of Genes of Taxonomic Value
- 1.7.3. Bulk Sequencing

1.8. Applications of Massive Sequencing in Clinical Microbiology
- 1.8.1. Whole Bacterial Genome Sequencing
- 1.8.2. Comparative Genomics
- 1.8.3. Epidemiological Surveillance
- 1.8.4. Microbial Diversity and Evolution Studies

1.9. Bioinformatics Tools for Genomics
- 1.9.1. Genomic Databases
- 1.9.2. Sequence Analysis Tools
- 1.9.3. Visualization of Genomic Data

1.10. Future of Genomics and Proteomics in the Clinical Laboratory
- 1.10.1. Recent and Future Developments in Genomics and Proteomics
- 1.10.2. Development of New Therapeutic Strategies
- 1.10.3. Technical and Bioinformatics Challenges
- 1.10.4. Ethical and Regulatory Implications

You will access a comprehensive approach to advanced proteomic analysis techniques, applied to the study of clinically relevant microorganisms, through the best teaching materials in the academic market"

05

Methodology

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

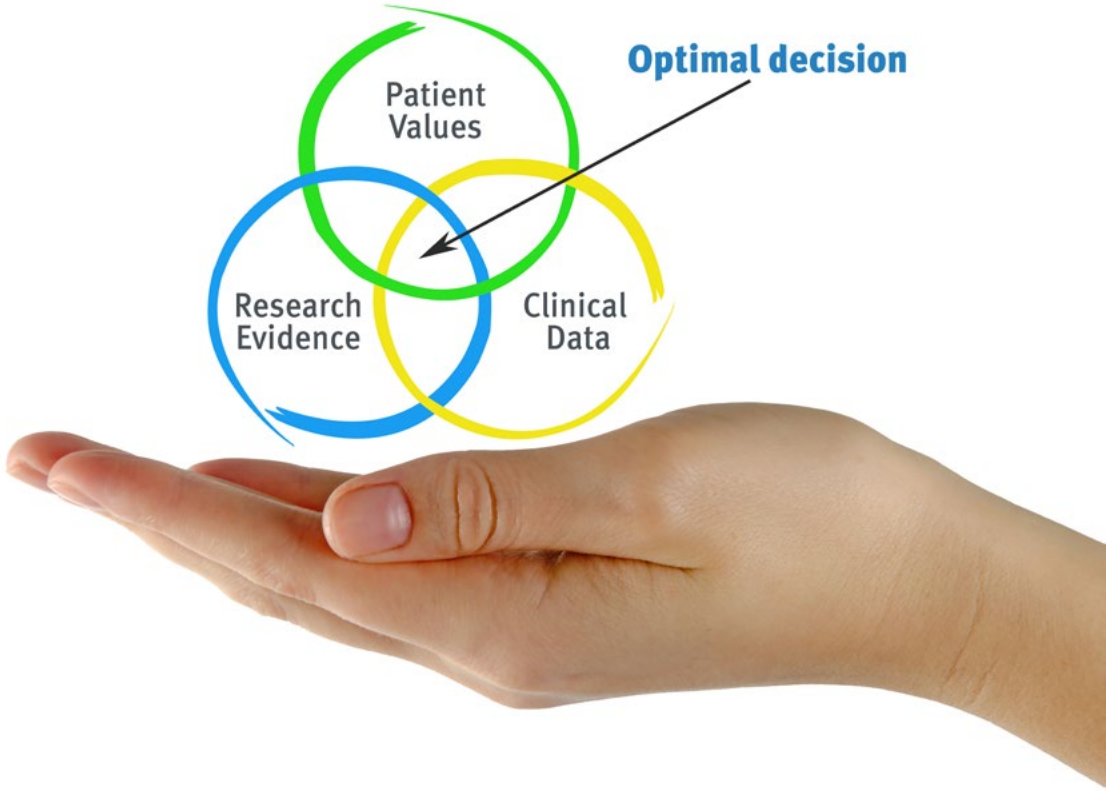
This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.

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 be confronted with multiple simulated clinical cases based on real patients, in which they will have to investigate, establish hypotheses and ultimately, resolve the situation. There is an abundance of scientific evidence on the effectiveness of the method. Pharmacists learn better, more quickly 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, attempting to recreate the actual conditions in a pharmacist'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:

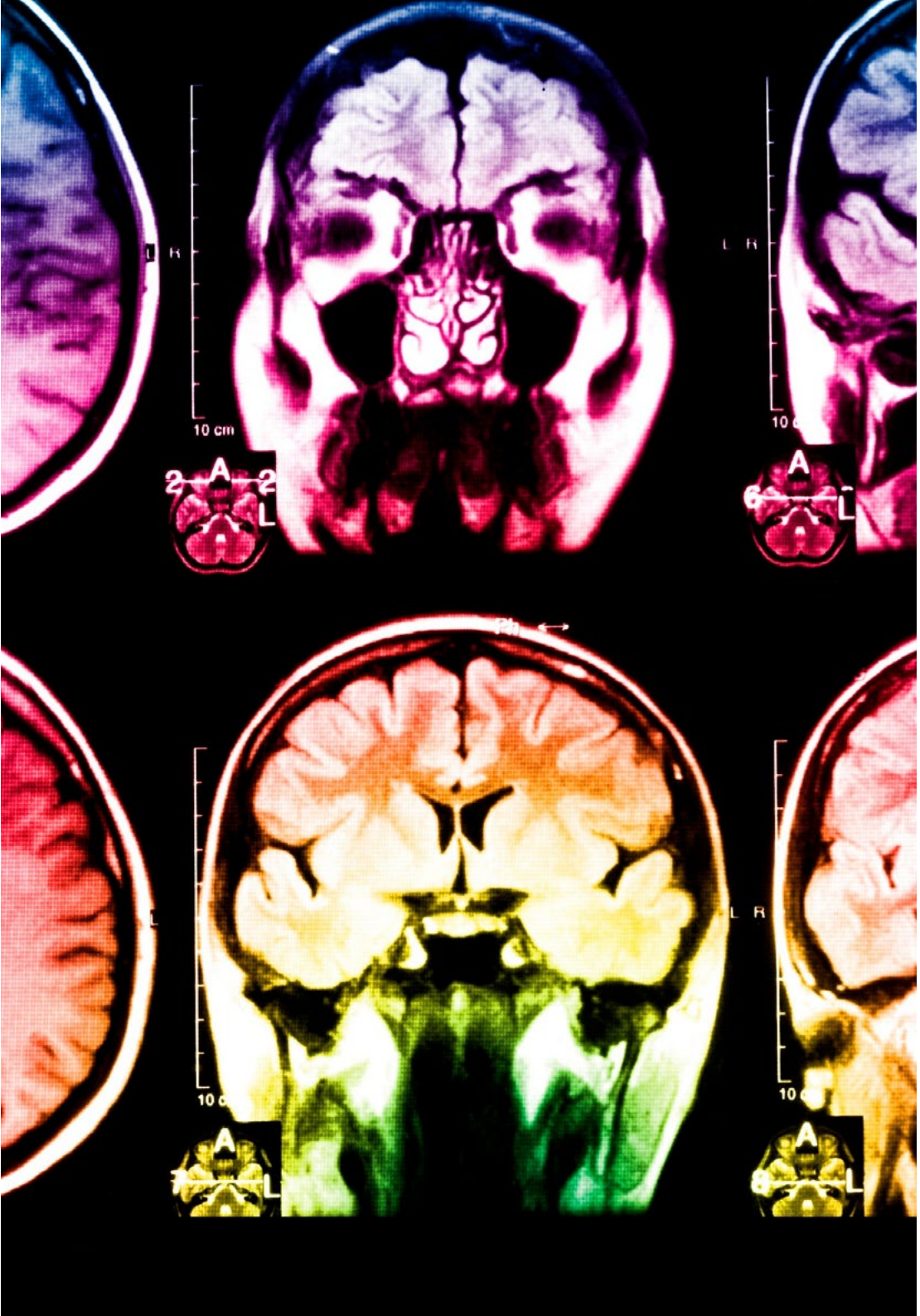
1. Pharmacists who follow this method not only grasp concepts, but also develop their mental capacity, by evaluating real situations and applying their knowledge.
2. Learning is solidly translated into practical skills that allow the student to better integrate into the real world.
3. Ideas and concepts 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.

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

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



At the forefront of world teaching, the 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 115,000 pharmacists have been trained with unprecedented success in all clinical specialties, regardless of the surgical load. This pedagogical methodology is developed in a highly demanding environment, with a university student body with a high socioeconomic profile and an average age of 43.5 years.

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 created specifically for the course by specialist pharmacists who will be teaching the course, so that the didactic development is highly specific and accurate.

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.

Video Techniques and Procedures

TECH introduces students to the latest techniques, to the latest educational advances, to the forefront of current pharmaceutical care procedures. All of this, first hand, and explained and detailed with precision to contribute to assimilation and a better understanding. And best of all, you can watch them as many times as you want.

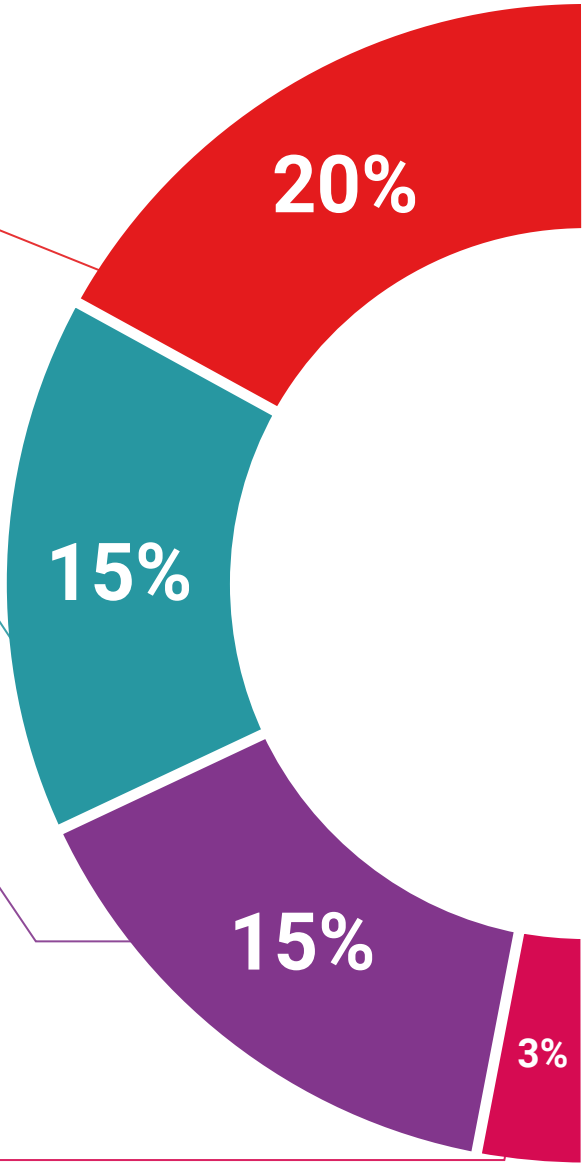
Interactive Summaries

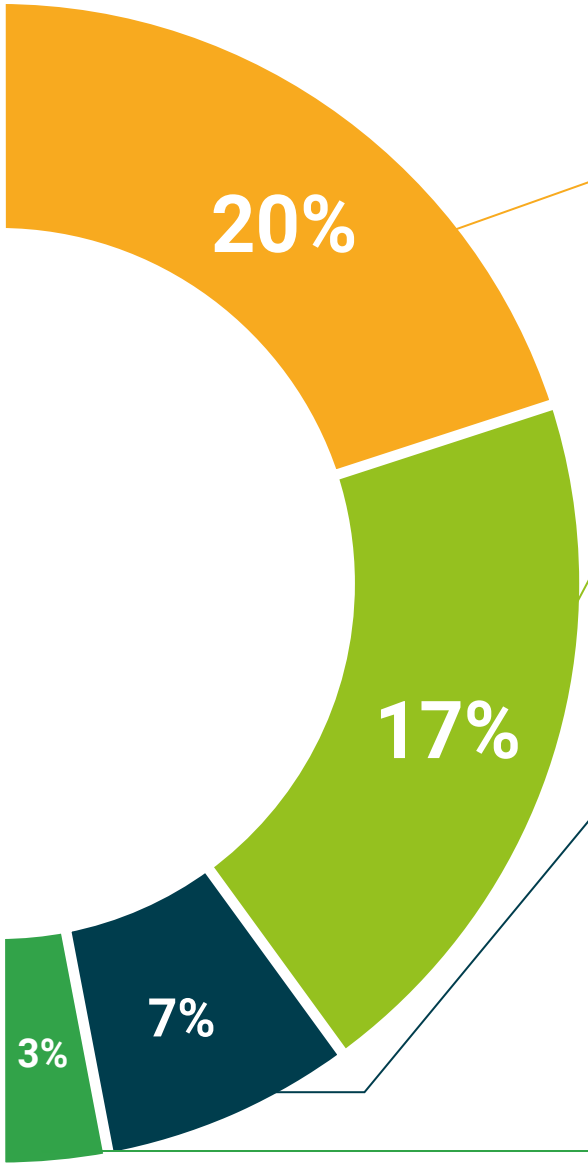
The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

This unique multimedia content presentation training system 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, we will present you with real case developments in which the expert will guide you through focusing on and solving the different situations: a clear and direct way to achieve the highest degree of understanding.

Testing & 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 Certificate in Proteomics in Clinical Microbiology guarantees, in addition to the most rigorous and updated knowledge, access to a Postgraduate Certificate issued by TECH Global University.

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

This private qualification will allow you to obtain a **Postgraduate Certificate in Proteomics in Clinical Microbiology** 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** private qualification, 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: **Postgraduate Certificate in Proteomics in Clinical Microbiology**

Modality: **online**

Duration: **6 weeks**

Accreditation: **6 ECTS**


tech global university

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

Postgraduate Certificate in Proteomics in Clinical Microbiology

This is a private qualification of 180 hours of duration equivalent to 6 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
Dean

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

*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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Proteomics in Clinical Microbiology

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Postgraduate Certificate

Proteomics in Clinical Microbiology

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