

# Postgraduate Certificate Proteomics in Clinical Microbiology for Nursing



## Postgraduate Certificate Proteomics in Clinical Microbiology for Nursing

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

Website: [www.techtute.com/us/nursing/postgraduate-certificate/proteomics-clinical-microbiology-nursing](http://www.techtute.com/us/nursing/postgraduate-certificate/proteomics-clinical-microbiology-nursing)

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# 01

# Introduction

Proteomics has completely revolutionized the field of Clinical Microbiology by allowing a detailed and systematic analysis of the proteome of pathogenic microorganisms. In this sense, nurses play a crucial role in the practical application of these scientific advances, contributing significantly to the diagnosis, treatment and management of infectious diseases. For this reason, these professionals have the task of staying at the forefront of the latest advances in this field with the aim of improving diagnostic accuracy and the selection of personalized treatments. In this context, TECH presents a revolutionary university degree that brings together the most recent innovations in this field. In addition, it is taught entirely in a convenient 100% online mode.



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*Thanks to this 100% online Postgraduate Certificate, you will master the technique of two-dimensional electrophoresis and obtain information on how the proteome changes in response to different stimuli"*

The evolution of Proteomics has allowed a deeper understanding of the mechanisms of pathogenicity of microorganisms such as Staphylococcus aureus, Streptococcus pneumoniae and other prevalent infectious agents. These advanced techniques have not only facilitated the identification of new therapeutic targets, but have also transformed the way infectious diseases are diagnosed and treated in clinical settings. Given this reality, nurses have an important role to play in applying proteomic knowledge to optimize treatment and infection control strategies. However, these experts need to incorporate state-of-the-art techniques into their practice to improve patient care and contribute to their overall well-being.

Within this framework, TECH implements a very complete Postgraduate Certificate in Proteomics in Clinical Microbiology for Nursing . The academic itinerary will analyze both the evolution and development of proteins, allowing graduates to make informed clinical decisions. At the same time, the syllabus will delve into the most innovative qualitative techniques for protein separation, among which two-dimensional electrophoresis (2DE) stands out. In line with this, the program will provide nurses with the competencies required to adequately handle bioinformatics tools for Proteomics. In addition, the study plan incorporates a disruptive topic that will address the future of genomics in the clinical laboratory.

It should be noted that the university program has a 100% online delivery, allowing nurses to get into the program comfortably.

In this way, all the specialists will need is a device with Internet access to expand their knowledge and become an expert in Public Health Surveillance. In this sense, the degree offers graduates the most avant-garde methodology on the market today: Relearning. This teaching system is based on the repetition of the most important contents in order to guarantee natural learning that is capable of lasting in the memory of professionals over a long period of time.

This **Postgraduate Certificate in Proteomics in Clinical Microbiology for Nursing** 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 Clinical Microbiology and Multidrug-resistant Bacteria
- ♦ 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 the self-assessment process can be carried out 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 have a library of teaching resources available 24 hours a day and with material that stands out for its quality"*

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*You will deepen your understanding of the challenges of Proteomics in the clinical laboratory and be able to successfully overcome them"*

The program's teaching staff includes professionals from the sector who contribute their work experience to this specializing 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, the student will be assisted by an innovative interactive video system created by renowned and experienced experts.

*Looking to delve into the genomics of Multidrug-Resistant Bacteria? Achieve it with this program.*

*A degree that will allow you to update your knowledge at your own pace and without time constraints thanks to the Relearning system that TECH offers you.*



# 02

# Objectives

Upon completion of this Postgraduate Certificate, nurses will stand out for having a solid understanding of the techniques of Proteomics applied to Clinical Microbiology. Similarly, graduates will develop practical skills in the performance of advanced proteomic techniques such as two-dimensional electrophoresis, mass spectrometry or differential protein expression analysis. In tune with this, professionals will contribute to improve infection management in clinical settings, optimizing the use of antibiotics and facilitating the design of bacterial resistance control strategies.



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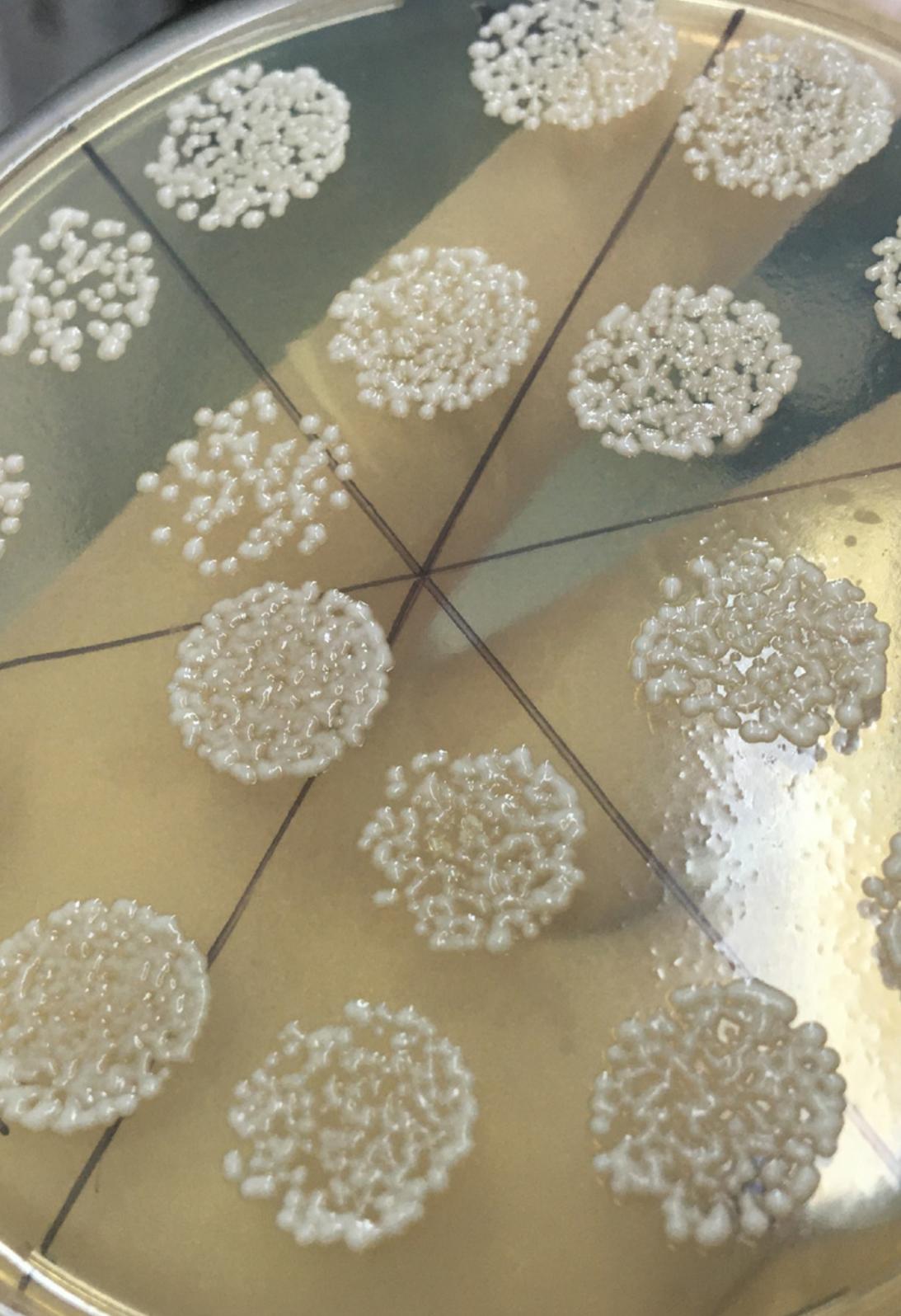
*You will be able to interpret proteomics data obtained from clinical samples, identifying relevant biomarkers and correlating findings with the treatment of infectious diseases”*



## General Objectives

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- ♦ Understand how bacterial resistance evolves as new antibiotics are introduced into clinical practice
- ♦ Understand the colonization and infection of patients in Intensive Care Units (ICUs), the different types and risk factors associated with infection
- ♦ Evaluate the impact of Nosocomial Infections in the critically ill patient, including the importance of risk factors and their impact on length of stay in the ICU
- ♦ Analyze the effectiveness of infection prevention strategies, including the use of quality indicators, evaluation tools and continuous improvement tools
- ♦ Understand the pathogenesis of Gram-negative Infections, including the factors related to these bacteria and patients themselves
- ♦ Examine the main infections by Gram Positive Bacteria, including their natural habitat, Nosocomial Infections and community-acquired infections
- ♦ Determine the clinical significance, resistance mechanisms and treatment options for different Gram-positive Bacteria
- ♦ Substantiate the importance of Proteomics and Genomics in the Microbiology laboratory including recent advances and technical and bioinformatics challenges
- ♦ Acquire knowledge on the dissemination of resistant bacteria in food production
- ♦ Study the presence of multidrug-resistant bacteria in the environment and wildlife, as well as to understand their potential impact on public health
- ♦ Acquire expertise on innovative antimicrobial molecules, including antimicrobial peptides and bacteriocins, bacteriophage enzymes and nanoparticles
- ♦ Develop expertise in the discovery methods for new antimicrobial molecules
- ♦ Gain specialized knowledge on Artificial Intelligence (AI) in Microbiology, including current expectations, emerging areas and its cross-cutting nature
- ♦ Understand the role that AI will play in Clinical Microbiology, including the technical lines and challenges for its implementation and deployment in laboratories



## Specific Objectives

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



*You will learn through real cases and by solving complex situations in simulated learning environments”*

03

# Course Management

For the design and delivery of this Postgraduate Certificate, TECH brings together a high-level teaching staff made up of specialists in Proteomics in Clinical Microbiology. These professionals have a wide working background, which has led them to be part of renowned health institutions. These experts pour into the teaching materials both their solid knowledge of this subject and their professional experience. Therefore, graduates have the guarantees they demand to access a quality university program that will optimize their daily clinical practice and significantly expand their job prospects.





“

*The faculty of this program has a long history of research and professional application in Proteomics in Clinical Microbiology”*

## 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)



# 04

## Structure and Content

This university program will provide nursing staff with a holistic understanding of Proteomics techniques applied to Clinical Microbiology. The syllabus will cover in detail the main quantitative techniques for protein separation, including isotopic labeling and high performance liquid chromatography. Likewise, graduates will develop skills to deftly handle the most sophisticated bioinformatics tools for proteomics. Therefore, professionals will use these models to predict the three-dimensional structure of proteins from amino acid sequences, providing information about their possible interactions.





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*You will develop skills in the performance of advanced proteomic techniques, among which the following stand out Two-dimensional Electrophoresis”*

## 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



*Trust your academic progress to TECH and elevate your career as a Nurse to the top. Enroll now!"*

# 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.





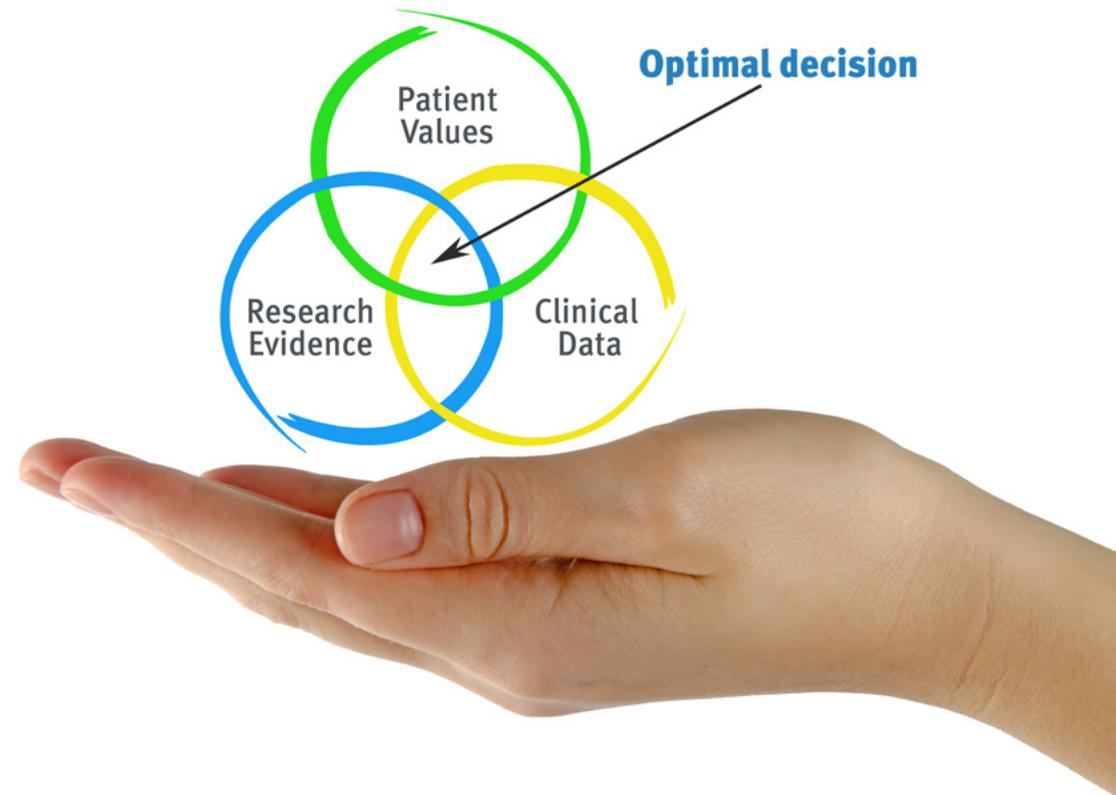
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*Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"*

## At TECH Nursing School we use the Case Method

In a given situation, what should a professional do? 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. Nurses learn better, faster, and more sustainably over time.

*With TECH, nurses can experience a learning methodology 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, in an attempt to recreate the real conditions in professional nursing practice.

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

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

1. Nurses who follow this method not only grasp concepts, but also develop their mental capacity, by evaluating real situations and applying their knowledge.
2. The learning process has a clear focus on practical skills that allow the nursing professional to better integrate knowledge acquisition into the hospital setting or primary care.
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 case studies with a 100% online learning system based on repetition combining a minimum of 8 different elements in each lesson, which is a real revolution compared to the simple study and analysis of cases.



*The nurse 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 we have trained more than 175,000 nurses with unprecedented success in all specialities regardless of practical workload. 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 really 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.



### Nursing Techniques and Procedures on Video

We introduce you to the latest techniques, to the latest educational advances, to the forefront of current medical techniques. All 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 them as many times as you want.



### Interactive Summaries

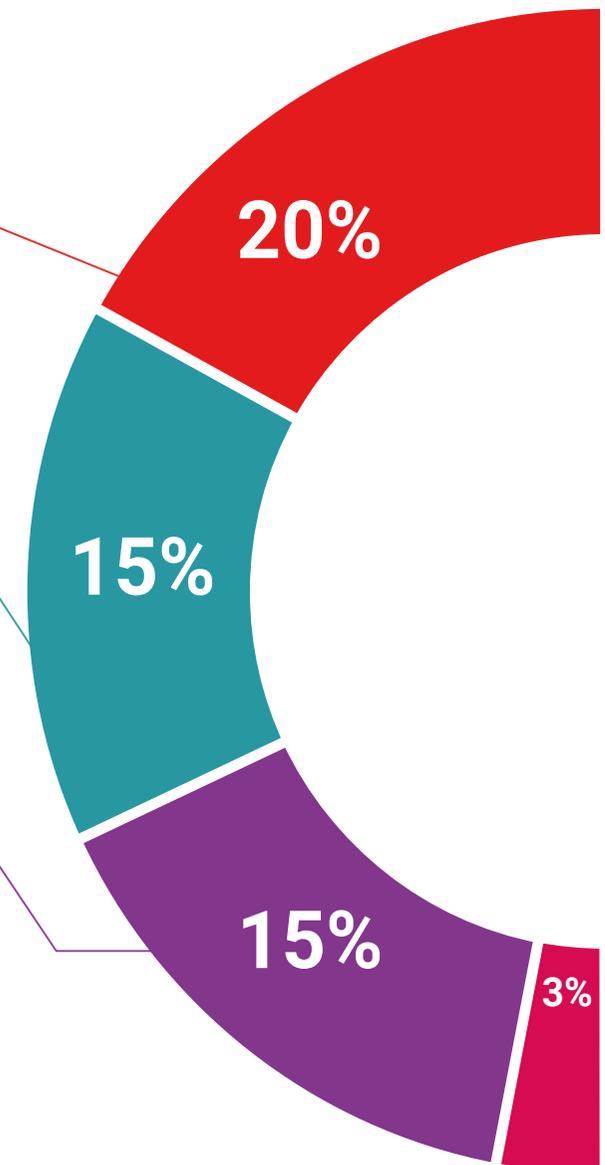
The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

This 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 suggesting that observing third-party experts can be useful.

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 for Nursing guarantees, in addition to the most rigorous and updated knowledge, access to a Postgraduate Certificate issued by TECH Global University.



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*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 for Nursing** for Nursing 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 for Nursing**

Modality: **online**

Duration: **6 weeks**

Accreditation: **6 ECTS**



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

future

health confidence people

education information tutors

guarantee accreditation teaching

institutions technology learning

community commitment

**tech** global  
university

personalized service innovation

knowledge present

online training

development languages

virtual classroom

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