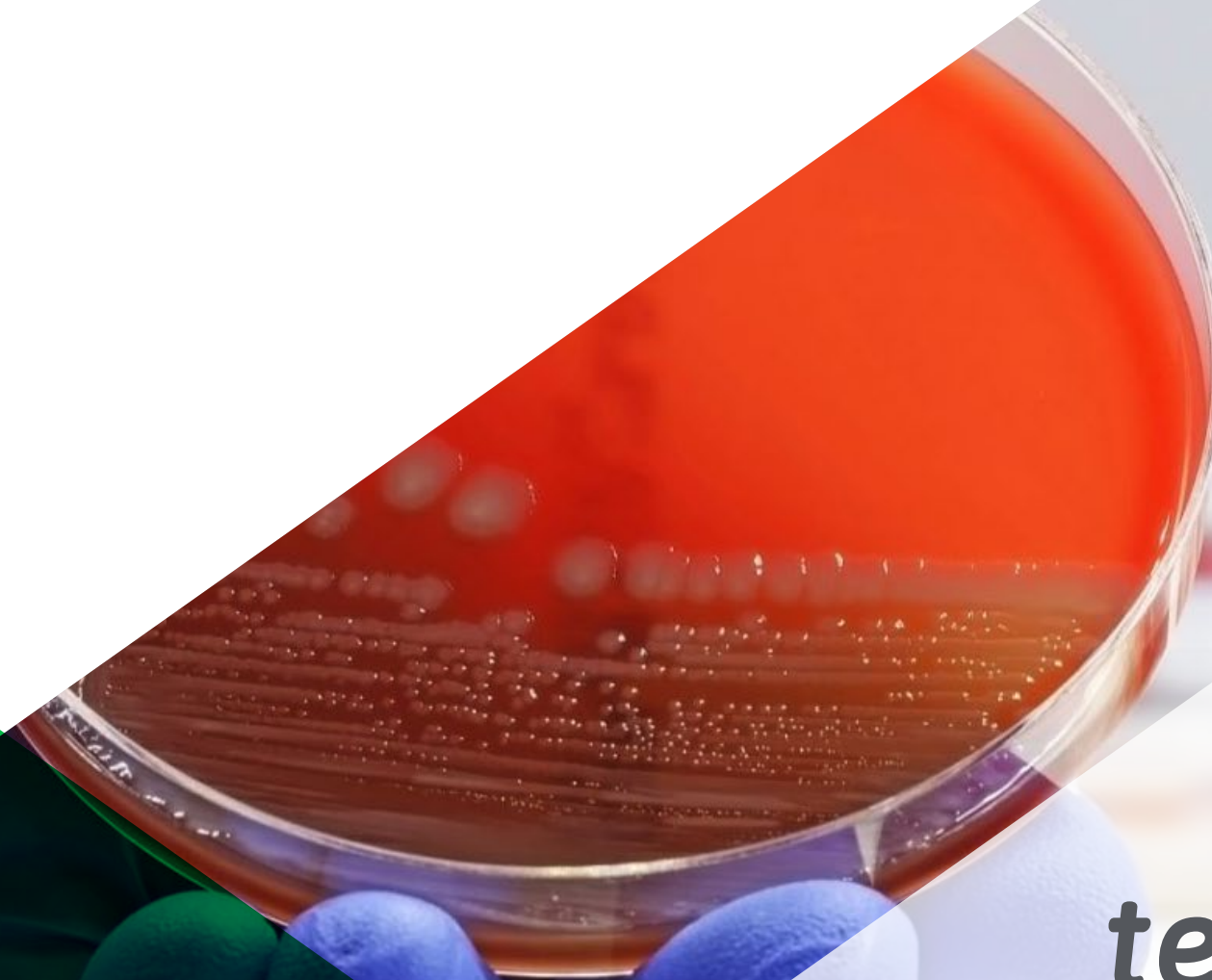


Postgraduate Certificate

Multidrug-Resistant Gram Negative Bacteria





## Postgraduate Certificate Multidrug-Resistant Gram Negative Bacteria

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

Website: [www.techtute.com/us/pharmacy/postgraduate-certificate/multidrug-resistant-gram-negative-bacteria](http://www.techtute.com/us/pharmacy/postgraduate-certificate/multidrug-resistant-gram-negative-bacteria)

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# 01

# Introduction

Multidrug-Resistant Gram-Negative Bacteria, which include species such as *Acinetobacter baumannii*, *Pseudomonas aeruginosa* and various strains of *Enterobacteriaceae*, have complicated the treatment of hospital and community infections. According to recent data from the World Health Organization (WHO), the increase in the prevalence of these bacteria is related to the excessive and inappropriate use of antibiotics and poor control practices, underscoring the urgent need for coordinated global strategies to contain and manage this growing public health crisis. In this situation, TECH has developed a comprehensive online program that adapts to the individual needs of students, taking into account their personal and work schedules. In addition, it is based on the innovative learning methodology known as Relearning.



“

*This 100% online Postgraduate Certificate will provide you with specialized and updated knowledge on the epidemiology, pathogenesis, diagnosis and treatment of Multidrug-Resistant Gram Negative Bacteria”*

Gram Negative Bacteria have developed resistance to multiple classes of antibiotics, seriously complicating the treatment of common and potentially life-threatening infections. This problem not only increases morbidity and mortality among patients, but also imposes a significant burden on healthcare systems, urgently demanding innovative prevention and control strategies to contain their spread.

This is how this Postgraduate Certificate is born, which will comprehensively address every key aspect of these emerging infections. In this sense, it will delve into the various dimensions of infections by Gram-negative microorganisms, starting with the epidemiology, both in community and nosocomial settings. In addition, the critical relevance of multidrug-resistant infections will be analyzed, highlighting their impact on public health and the need for effective management strategies.

In addition, the pathogenesis of these infections will be discussed, examining the specific factors, both of the microorganism and the patient, that influence their development. We will also investigate the methodologies for clinical evaluation and the importance of complementary tests, such as blood tests, imaging and microbiological techniques in the diagnosis, and the optimal management of these complex infections.

Finally, the estimation of severity and risk of acquisition will be covered, introducing traditional and new tools to assess and predict the severity of these infections. Likewise, a complete section will be devoted to empirical and targeted treatment, discussing the microorganisms involved, adjustments according to microbiological results and the management of side effects of antibiotherapy. In short, professionals will be immersed in the functioning of the Optimization of Antimicrobial Use (PROA) teams and their crucial role in promoting the rational use of antibiotics.

In this way, TECH has launched a complete and fully online university program, accessible through any electronic device connected to the Internet. In addition, it is supported by the innovative Relearning methodology, which focuses on the repeated review of key concepts to ensure an effective and fluent understanding of the contents.

This **Postgraduate Certificate in Multidrug-Resistant Gram Negative Bacteria** 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 Pharmacy
- ♦ 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



*Bet on TECH! You will be prepared to address emerging challenges in antimicrobial resistance, promoting rational use of antibiotics and improving public health outcomes globally”*

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*You will address optimal duration of antibiotherapy, challenges associated with side effects, and management of Program Optimization of Antibiotics (PROA) teams. What are you waiting for to enroll?"*

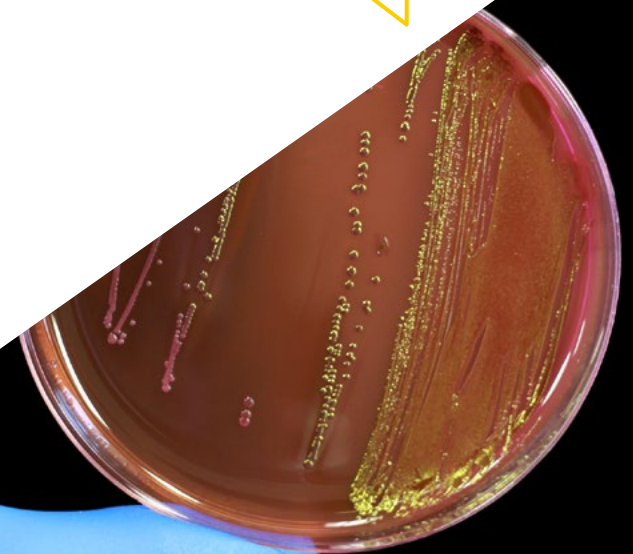
The program's teaching staff includes professionals from the field who contribute their work experience to this educational program, as well as renowned specialists from leading societies and prestigious universities.

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.

*You will delve into the epidemiological characteristics of Gram-negative microorganisms, highlighting community and nosocomial infections, through the best didactic materials, at the forefront of technology.*

*You will emphasize the importance of a rigorous clinical evaluation, including advanced anamnesis techniques and other complementary tests, thanks to an extensive library of multimedia resources.*



# 02

# Objectives

This university program will deepen the knowledge of the epidemiology, pathogenesis and antimicrobial resistance of multidrug-resistant Gram-negative microorganisms, as well as the clinical evaluation and optimal treatment of causative infections. In addition, professionals will be equipped with practical skills in the management of advanced diagnostic tests, rational antibiotic selection and the use of tools, such as the Program Optimization of Antibiotic Programs (PROA) teams, in order to improve the quality of care and contribute to the reduction of antimicrobial resistance locally and internationally.







“

*The main objective of this Postgraduate Certificate will be to provide pharmacists with comprehensive specialization to effectively face the clinical and epidemiological challenges of Multidrug-Resistant Gram Negative Bacteria”*



## General Objectives

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- ♦ 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





## Specific Objectives

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- ♦ Select the appropriate empirical antibiotic treatment for suspected infections with multidrug-resistant Gram-negative Microorganisms
- ♦ Determine the importance of PROA (Program for Optimization of Antimicrobial Agents) teams in infections by Multidrug-resistant Gram-negative Microorganisms



*You will acquire specific skills to identify and properly assess the severity of infections, as well as to implement empirical and targeted treatment strategies based on the latest scientific advances”*

03

# Course Management

The faculty are highly qualified and experienced experts in Microbiology, Parasitology and Infectious Diseases. In this regard, their work will focus on providing graduates with critical tools for accurate diagnosis, comprehensive clinical evaluation and appropriate selection of antimicrobial treatments, preparing them to effectively address emerging clinical challenges in pharmaceutical and healthcare practice.



“

*Faculty possess in-depth theoretical and practical knowledge of Multidrug-Resistant Gram Negative Bacteria, according to the latest research and advances in the field of antimicrobial resistance”*

## 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. Armiñanzas Castillo, Carlos

- ◆ FEA at the University Hospital Marqués de Valdecilla, Cantabria
- ◆ Researcher at the Valdecilla Research Institute (IDIVAL), Cantabria
- ◆ Doctor in Medicine by the University of Cantabria
- ◆ Master's Degree in Human Immunodeficiency Virus Infection, Rey Juan Carlos University
- ◆ Master's Degree in Graphic Medicine from the International University of Andalusia
- ◆ Degree in Medicine from the University of Cantabria
- ◆ Member of: Centre for Biomedical Research in the Infectious Diseases Network CIBERINFEC (MICINN-ISCIII) and Society of Infectious Diseases and Clinical Microbiology (SEIMC)

“

*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

From epidemiology and pathogenesis, to clinical diagnosis and therapeutic strategies, the academic program will examine in detail the risk factors associated with Multidrug-Resistant Gram Negative Bacteria, the differences between nosocomial and community infections, and the critical importance of identifying and managing multidrug-resistant strains. In addition, emphasis will be placed on advanced laboratory techniques, such as microbiological and imaging tests, along with the evaluation of the severity of infections and the rational use of antibiotics.





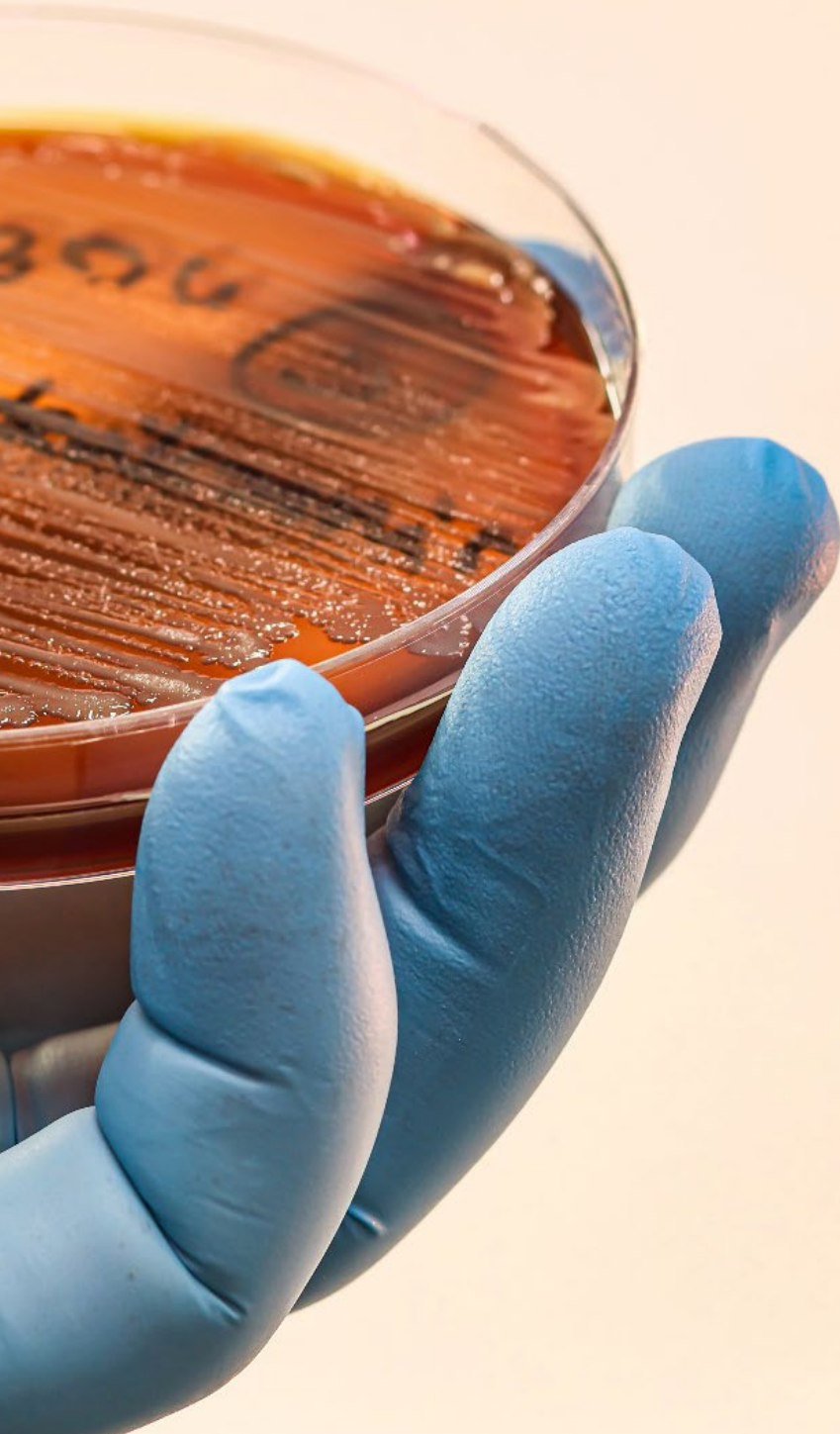
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*This Postgraduate Certificate will cover a wide range of specialized content, designed to provide a comprehensive and up-to-date understanding of Multidrug-Resistant Gram Negative Bacteria”*

## Module 1. Multidrug-Resistant Gram Negative Bacteria

- 1.1. Infections Due to Gram-Negative Microorganisms
  - 1.1.1. Epidemiology of Gram-Negative Microorganisms
  - 1.1.2. Community and Nosocomial Infections by Gram-Negative Microorganisms
  - 1.1.3. Relevance of Infections by Multidrug-Resistant Gram-Negative Microorganisms
- 1.2. Pathogenesis of Infections by Gram-Negative Microorganisms
  - 1.2.1. Factors Related to Gram-Negative Microorganisms
  - 1.2.2. Patient Factors in Gram-Negative Infections
  - 1.2.3. Other Factors in Gram-Negative Infections
- 1.3. Clinical Evaluation of Patients with Multidrug-Resistant Gram-Negative Infections
  - 1.3.1. Medical History
  - 1.3.2. Clinical Evaluation of Patients
  - 1.3.3. Other Data of Interest
- 1.4. Complementary Tests in Infections by Multidrug-Resistant Gram-Negative Microorganisms
  - 1.4.1. Blood Tests
  - 1.4.2. Imaging Tests
  - 1.4.3. Microbiological Techniques
- 1.5. Estimation of Severity in Patients with Infections by Multidrug-Resistant Gram-Negative Microorganisms
  - 1.5.1. Gram-Negative Multidrug-Resistant Microorganisms
  - 1.5.2. Traditional Approach to Severity Estimation
  - 1.5.3. Practical Conclusions
- 1.6. Risk of Acquiring Infections by Multidrug-Resistant Gram-Negative Microorganisms
  - 1.6.1. Clinical Factors in the Acquisition of Infections by Multidrug-Resistant Gram-Negative Microorganisms
  - 1.6.2. Other Factors in the Acquisition of Infections by Multidrug-Resistant Gram-Negative Microorganisms
  - 1.6.3. Tools to Calculate the Risk of Presence of Multidrug-Resistant Gram-Negative Microorganisms





- 1.7. Empirical Treatment in the Suspicion of Infections by Multidrug-Resistant Gram-Negative Microorganisms
  - 1.7.1. Microorganisms Involved According to Localization
  - 1.7.2. Comprehensive Assessment of Patients with Suspected Infections by Multidrug-Resistant Gram-Negative Microorganisms
  - 1.7.3. Selection of Empirical Antibiotic Treatment
- 1.8. Targeted Therapy in Infections by Multidrug-Resistant Gram-Negative Microorganisms
  - 1.8.1. Adjustment of Antibiotic Therapy According to Microbiological Results
  - 1.8.2. Follow-up of Multidrug-Resistant Gram-Negative Microorganism Infection
  - 1.8.3. Most Relevant Side Effects of Antibiotherapy
- 1.9. Duration of Antibiotherapy in Infections by Multidrug-Resistant Gram-Negative Microorganisms
  - 1.9.1. Estimation of the Duration of Antibiotic Treatment in Infections by Multidrug-Resistant Gram-Negative Microorganisms
  - 1.9.2. Relevance of Focus Control in Infections by Multidrug-Resistant Gram-Negative Microorganisms
  - 1.9.3. Special Considerations Related to Antibiotic Therapy in These Infections
- 1.10. PROA Teams in Infections Caused by Multidrug-Resistant Gram-Negative Microorganisms
  - 1.10.1. PROA Teams: History
  - 1.10.2. Impact of PROA Teams on the Correct Use of Antibiotic Treatments
  - 1.10.3. Challenge of PROA Teams in the Treatment of Infections Caused by Multidrug-Resistant Gram-Negative Microorganisms

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*This comprehensive university program will prepare pharmacists to effectively address these challenges in daily clinical practice, hand-in-hand with the world's best digital university, according to Forbes”*



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. Gervas, 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.



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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. 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.

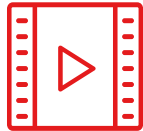
*Relearning will allow you to learn with less effort and better performance, involving you more in your specialization, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation to success.*

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

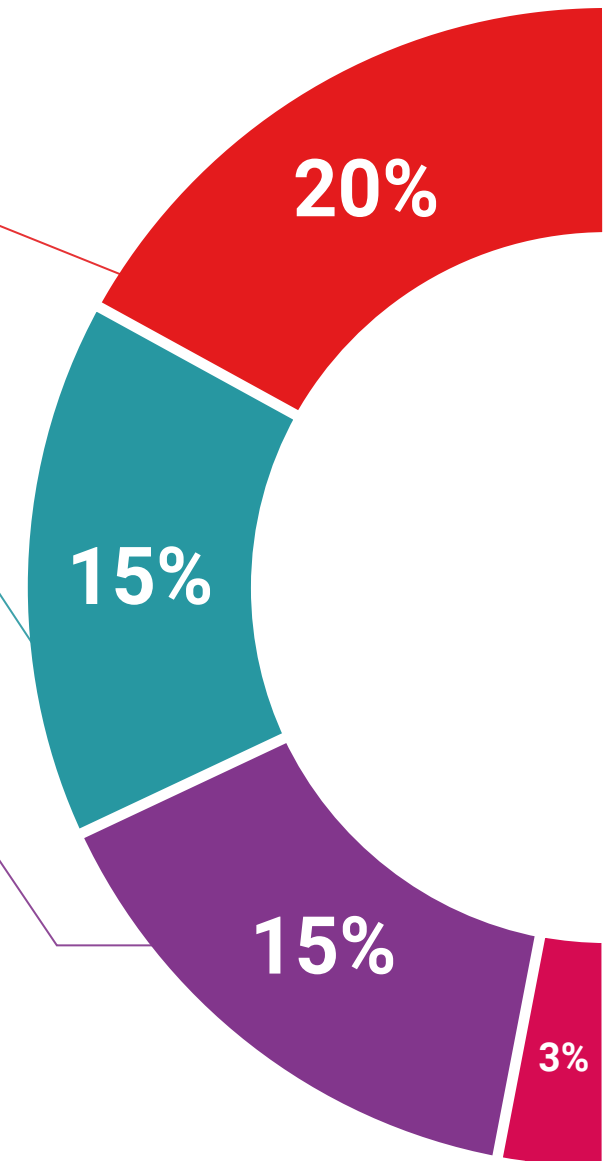
The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

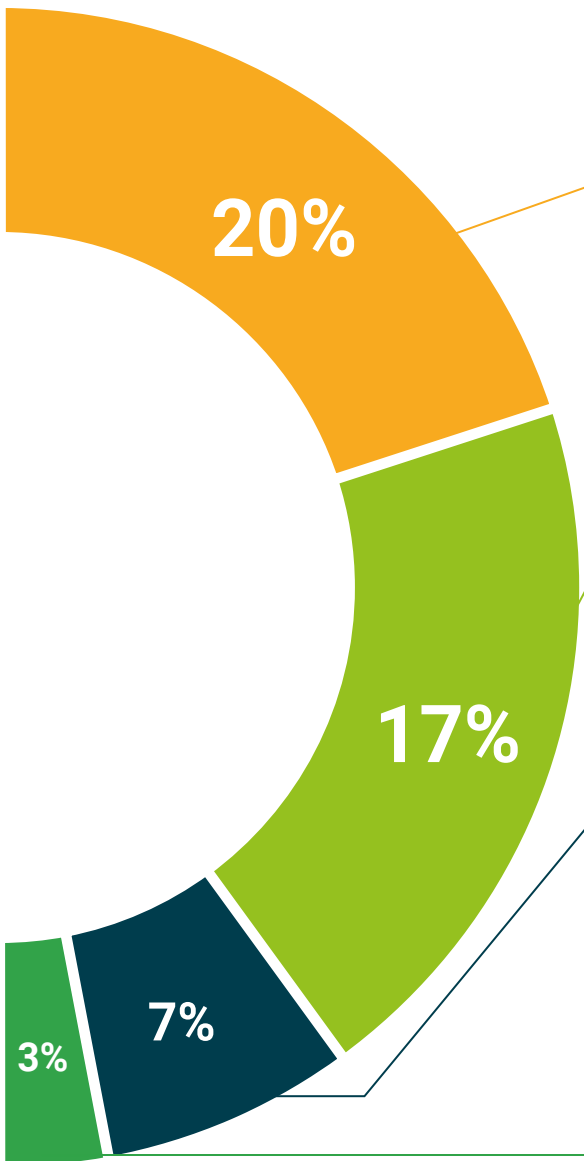
This unique multimedia content presentation training system was awarded by Microsoft as a "European Success Story".



### 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 Multidrug-Resistant Gram Negative Bacteria guarantees students, in addition to the most rigorous and up-to-date education, 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 Multidrug-Resistant Gram Negative Bacteria** 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 Multidrug-Resistant Gram Negative Bacteria**

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  
personalized service innovation  
knowledge present  
development language  
virtual classroom



**Postgraduate Certificate**  
Multidrug-Resistant Gram  
Negative Bacteria

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



Postgraduate Certificate

Multidrug-Resistant Gram Negative Bacteria

