

# Postgraduate Certificate

Antibiotic Resistance in Streptococcus,  
Enterococcus and Staphylococcus





## Postgraduate Certificate Antibiotic Resistance in Streptococcus, Enterococcus and Staphylococcus

- » 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/antibiotic-resistance-streptococcus-enterococcus-staphylococcus](http://www.techtute.com/us/pharmacy/postgraduate-certificate/antibiotic-resistance-streptococcus-enterococcus-staphylococcus)

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# 01

# Introduction

Multidrug-Resistant Bacteria, such as Streptococcus, Enterococcus and Staphylococcus, have developed sophisticated mechanisms to evade the effects of antimicrobial treatments, complicating the management of serious infections in clinical settings. A worrisome increase in the resistance of these pathogens has been observed, exacerbating the burden of disease worldwide and underscoring the urgency for more rigorous infection control strategies as well as the development of new effective antimicrobial agents. In this scenario, TECH has created an online program tailored to the personal and occupational needs of the student body. In addition, it is based on the innovative learning methodology known as Relearning, which is unique and original within this university.



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*Thanks to this 100% online Postgraduate Certificate, you will obtain the necessary tools to effectively face the growing threats posed by bacterial resistance in daily clinical practice”*

Antibiotic resistance in bacteria such as Streptococcus, Enterococcus and Staphylococcus represents a growing global concern in Public Health. In fact, these pathogens have hindered the treatment of common and potentially life-threatening infections. Therefore, the continuous evolution of these resistances underlines the urgent need for appropriate antibiotic use policies and the development of new therapeutic strategies.

This Postgraduate Certificate will address the complex problems of Gram-positive bacterial infections and their resistance to antimicrobial treatments. In this sense, the characteristics of the natural habitat of these pathogens will be examined, as well as the differences in Nosocomial and Community Acquired Infections, highlighting the importance of differentiated clinical management strategies.

The study plan will also focus on in vitro and in vivo systems used to study bacterial resistance. From biofilm formation, to cellular and animal models, pharmacists will investigate how these structures and systems can influence the effectiveness of antimicrobial treatments and the evolution of resistance.

Finally, each of the specific pathogens will be explored in depth: Streptococcus pneumoniae, Streptococcus pyogenes, Streptococcus agalactiae, Enterococcus faecalis, Enterococcus faecium and Staphylococcus aureus. In this way, they will be analyzed in terms of their clinical importance, the mechanisms they develop to resist antibiotics, the formation of biofilms that complicate their eradication and the therapeutic options available. In addition, the clinical relevance of Mycobacterium tuberculosis will be discussed and other emerging Gram-positive pathogens and their ability to generate antimicrobial resistance will be analyzed.

Therefore, TECH has introduced a comprehensive and fully online university program, accessible through any electronic device with an Internet connection. Additionally, it is supported by the revolutionary Relearning methodology, which focuses on the systematic repetition of fundamental concepts to ensure a solid and fluent understanding of the contents.

This **Postgraduate Certificate in Antibiotic Resistance in Streptococcus, Enterococcus and Staphylococcus** 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 delve into the importance of rational antibiotic use strategies, as well as the development of new therapies to combat complex infections, which are increasingly difficult to treat. What are you waiting for to enroll?"*

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*You will delve into the importance of epidemiological surveillance and the rational use of antibiotics to mitigate the development and spread of bacterial resistance, thanks to an extensive library of multimedia resources”*

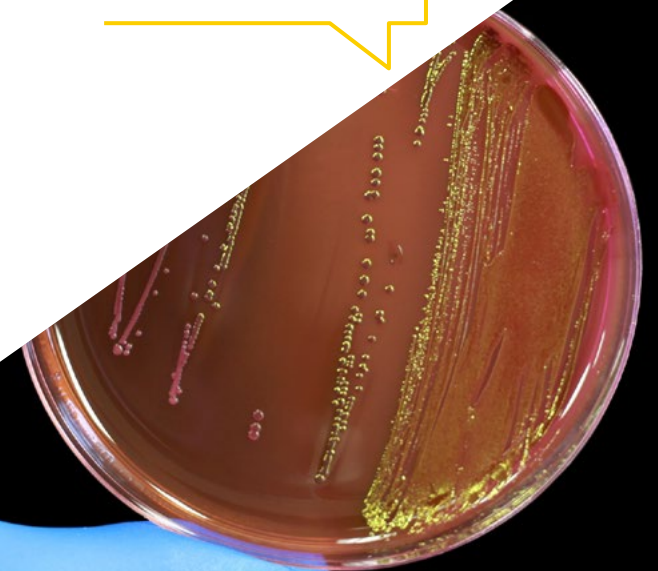
The program's teaching staff includes professionals from the field who contribute their work experience to this educational program, as well as renowned specialists from leading societies and prestigious universities.

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 analyze natural habitats and complexities of fighting infections, such as those caused by Streptococcus pneumoniae, Streptococcus pyogenes, and Streptococcus agalactiae. With TECH's quality assurance!*

*You will cover advanced methods of bacterial resistance research, including the study of biofilms, cellular and animal models, through the best didactic materials, at the forefront of technology and education.*



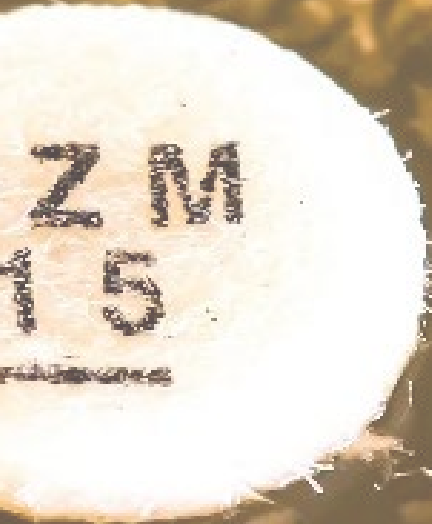
# 02

# Objectives

The main objective of the program will be to provide a deep understanding of the resistance mechanisms developed by Streptococcus, Enterococcus and Staphylococcus, as well as to explore the most effective diagnostic and therapeutic strategies for their management. In addition, pharmacists will be specialized in the identification of risk factors associated with antibiotic resistance in hospital and community settings, promoting a rational use of antibiotics and encouraging the implementation of preventive measures to reduce the spread of resistant strains.







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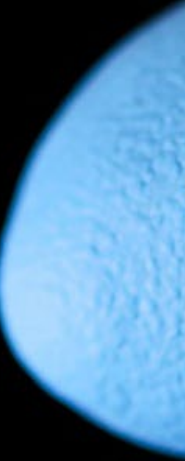
*You will focus on the development of innovative therapeutic strategies and the promotion of the rational use of antibiotics to combat the increase of antimicrobial resistance, with the support of the Relearning methodology”*



## General Objectives

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- ♦ 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





## Specific Objectives

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- Explore the implications of antibiotic resistance of the major Gram Positive Bacteria on Public Health and clinical practice
- Discuss strategies to mitigate antibiotic resistance in Gram Positive Bacteria

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*Bet on TECH! You will equip yourself with the tools necessary to meet emerging challenges in daily clinical practice, strengthening your crucial role in Public Health and patient safety”*



03

# Course Management

The lecturers behind the Postgraduate Certificate on Antibiotic Resistance in Streptococcus, Enterococcus and Staphylococcus are recognized experts in Microbiology and Parasitology. In addition, they come from several leading academic institutions and research centers in the field, each with a solid track record in the research and treatment of infections caused by Multidrug-Resistant Gram-Positive Bacteria.





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*Leading experts in Antibiotic Resistance in Streptococcus, Enterococcus and Staphylococcus have come together in this program to show you their knowledge in this field”*

## Management



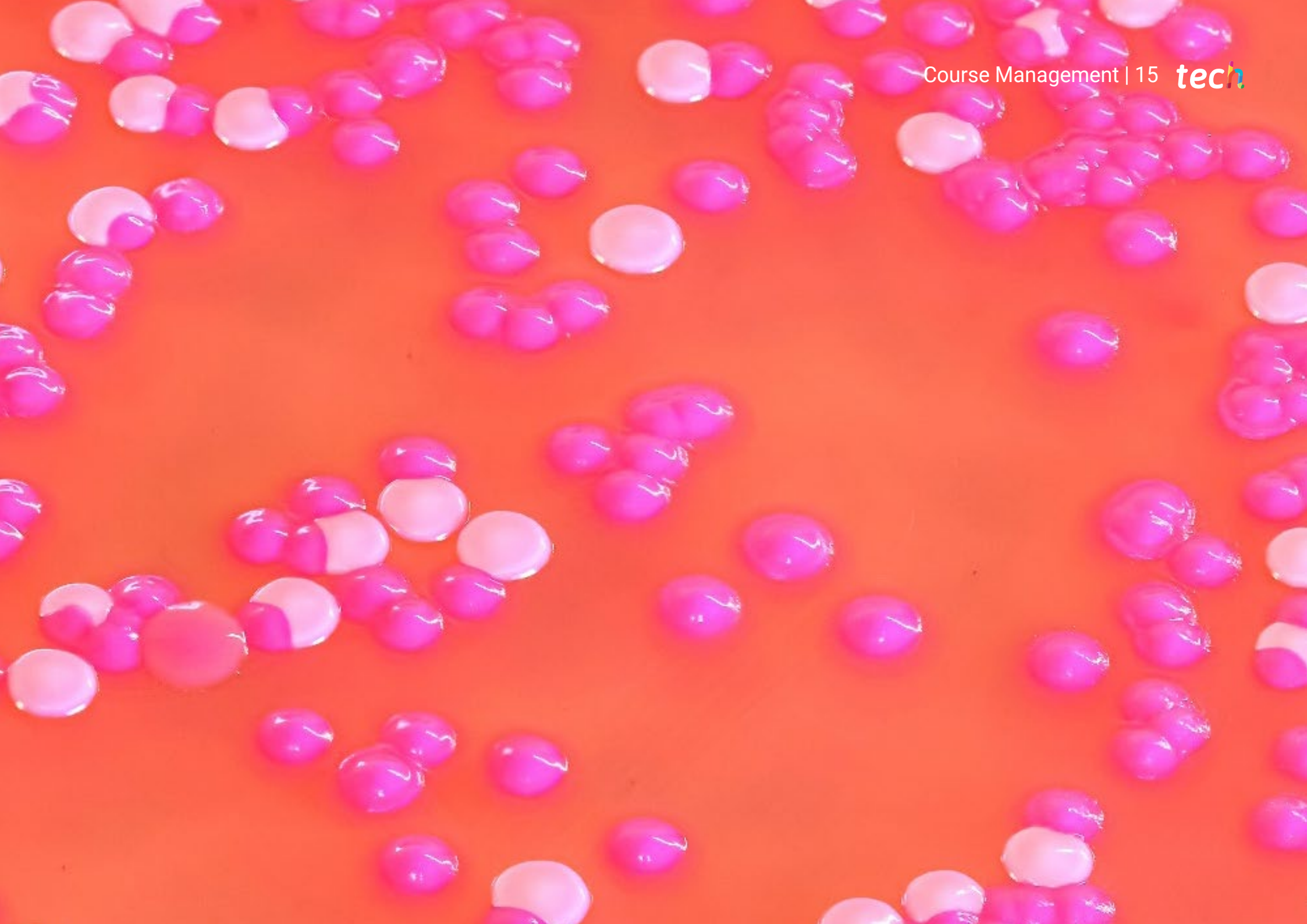
### Dr. Ramos Vivas, José

- ♦ 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. Domenech Lucas, Mirian

- ♦ Researcher at the Spanish Reference Laboratory for Pneumococci, National Centre of Microbiology
- ♦ Researcher in International Groups led from College London, UK and Radboud University in the Netherlands
- ♦ Academician of the Department of Genetics, Physiology and Microbiology of UCM
- ♦ PhD in Biology from the Complutense University of Madrid
- ♦ Degree in Biology, specializing in Biotechnology from UCM
- ♦ Diploma of Advanced Studies, UCM



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# Structure and Content

The contents of this academic program will be structured in a module that covers from the natural habitat and nosocomial and community infections of *Streptococcus*, *Enterococcus* and *Staphylococcus*, to in vitro and in vivo systems to study bacterial resistance, including biofilms and animal models. In addition, clinical particularities, resistance mechanisms, and treatment options for specific species, such as *Streptococcus pneumoniae*, *Streptococcus pyogenes*, *Streptococcus agalactiae*, *Enterococcus faecalis*, *Enterococcus faecium* and *Staphylococcus aureus*, will be discussed in depth.





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*This Postgraduate Certificate will offer a comprehensive overview of the challenges and advances in the management of infections caused by Gram Positive Bacteria, from the best digital university in the world, according to Forbes”*

## Module 1. Antibiotic Resistance in Streptococcus, Enterococcus and Staphylococcus

- 1.1. Infections Due to Gram-Positive Bacteria
  - 1.1.1. Natural Habitat of Gram-Positive Pathogens
  - 1.1.2. Nosocomial Infections due to Gram-Positive Bacteria
  - 1.1.3. Community-Acquired Infections by Gram-Positive Bacteria
- 1.2. In Vitro and in Vivo Systems for the Study of Resistance in Gram-Positive Bacteria
  - 1.2.1. Biofilms
  - 1.2.2. Cellular Models
  - 1.2.3. Animal Models
- 1.3. Streptococcus Pneumoniae
  - 1.3.1. Clinical Significance
  - 1.3.2. Resistance Mechanisms
  - 1.3.3. Biofilms
  - 1.3.4. Treatment Options
- 1.4. Streptococcus Pyogenes
  - 1.4.1. Clinical Significance
  - 1.4.2. Resistance Mechanisms
  - 1.4.3. Biofilms
  - 1.4.4. Treatment Options
- 1.5. Streptococcus Agalactiae
  - 1.5.1. Clinical Significance
  - 1.5.2. Resistance Mechanisms
  - 1.5.3. Biofilms
  - 1.5.4. Treatment Options
- 1.6. Enterococcus Faecalis
  - 1.6.1. Clinical Significance
  - 1.6.2. Resistance Mechanisms
  - 1.6.3. Biofilms
  - 1.6.4. Treatment Options



- 1.7. Enterococcus Faecium
  - 1.7.1. Clinical Significance
  - 1.7.2. Resistance Mechanisms
  - 1.7.3. Biofilms
  - 1.7.4. Treatment Options
- 1.8. Staphylococcus Aureus
  - 1.8.1. Clinical Significance
  - 1.8.2. Resistance Mechanisms
  - 1.8.3. Biofilms
  - 1.8.4. Treatment Options
- 1.9. Mycobacterium Tuberculosis
  - 1.9.1. Clinical Significance
  - 1.9.2. Resistance Mechanisms
  - 1.9.3. Treatment Options
- 1.10. Resistance in Other Gram-Positive Bacteria
  - 1.10.1. Coagulase-Negative Staphylococcus
  - 1.10.2. Clostridioides Difficile
  - 1.10.3. Emerging Gram Positive Pathogens



*You will cover other emerging Gram-positive pathogens, acquiring the tools and knowledge necessary to effectively address antimicrobial resistance in clinical practice”*

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.



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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 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.

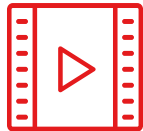
*Relearning will allow you to learn with less effort and better performance, involving you more in your specialization, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation to success.*

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

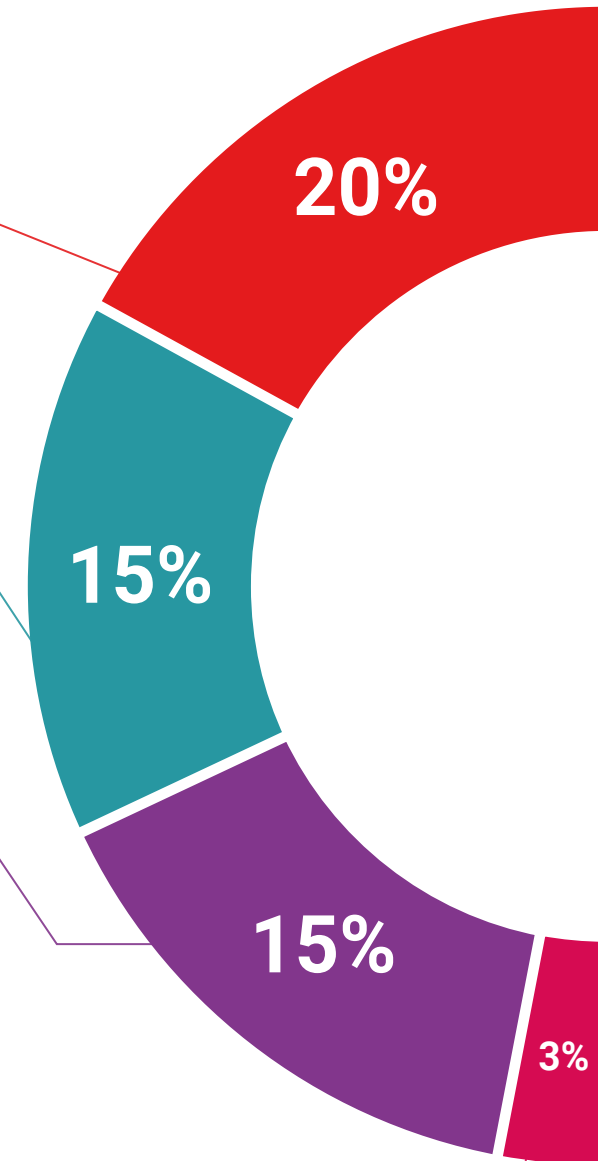
The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

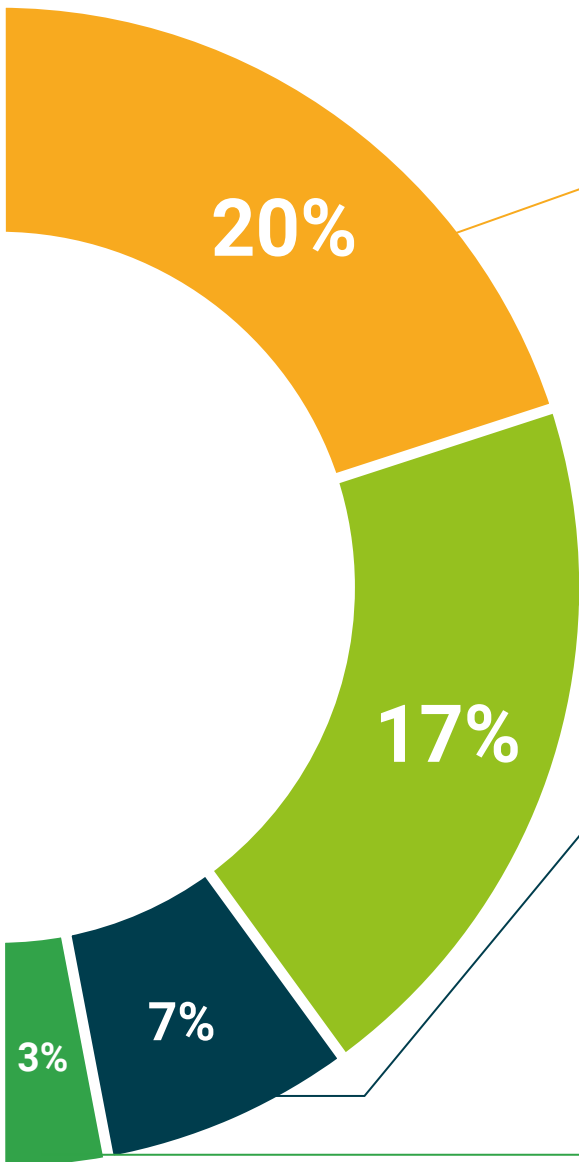
This unique multimedia content presentation training system was awarded by Microsoft as a "European Success Story".



### 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.



07

# Certificate

The Postgraduate Certificate in Antibiotic Resistance in Streptococcus, Enterococcus and Staphylococcus guarantees, in addition to the most accurate 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 Antibiotic Resistance in Streptococcus, Enterococcus and Staphylococcus** 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 Antibiotic Resistance in Streptococcus, Enterococcus and Staphylococcus**

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.



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