

Postgraduate Certificate

Emerging Strategies Against Multidrug-Resistant Bacteria





Postgraduate Certificate Emerging Strategies Against Multidrug-Resistant 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/emerging-strategies-against-multidrug-resistant-bacteria

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01

Introduction

According to the World Health Organization, infections caused by multidrug-resistant bacteria are one of the top ten health threats worldwide. This fact has led to the development of updated strategies to treat them and reduce the number of deaths associated with them. Therefore, professionals are obliged to be aware of these advances in order to keep up to date with scientific developments. For this reason, TECH has promoted this program, through which pharmacists will learn more about the latest bacteriophage or genetic therapies used to combat these diseases. All this, 100% online and without the need to give up their personal and work obligations.



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Learn about the most cutting-edge bacteriophage therapies used to combat diseases caused by multidrug-resistant bacteria”

Based on the most recent scientific studies, the number of deaths caused by antibiotic resistance is experiencing an increasing trend in recent years. It is estimated that by 2050 it could be the leading cause of death in the world. This circumstance has led the healthcare community to focus its efforts on combating diseases caused by multi-resistant bacteria, developing cutting-edge therapies aimed at treating them more effectively. Therefore, pharmacists who are concerned about the approach to these infections must have an in-depth knowledge of them in order to meet the new challenges that exist in the healthcare field.

With this idea in mind, TECH has decided to create this academic program, which will provide students with an intense update on Emerging Strategies against Multidrug-Resistant Bacteria. Through this program, students will analyze the challenges presented by CRISPR-Cas9 gene editing, as well as the challenges and limitations of the temporary collateral sensitization method. In the same way, they will investigate the vaccines against the main multidrug-resistant bacteria that are in the process of development or the updated antibiotic combination therapies.

Thanks to the 100% online mode used in this program, pharmacists will be able to complete their professional update without having to make uncomfortable daily trips to a study center. Likewise, they will have the didactic content is available 24 hours a day and in a wide range of study formats such as readings, videos or interactive summaries.

This will allow you to study at any time, achieving more effective learning and ensuring long-term knowledge acquisition.

This **Postgraduate Certificate in Emerging Strategies Against Multidrug-Resistant 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 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 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



Access your learning content from anywhere you want and from any electronic device to optimize your learning"

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Identify the most current antibiotic combination therapies that are used to address the most current diseases caused by multidrug-resistant bacteria”

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.

Its multimedia content, developed with the latest educational technology, will allow the professional a situated and contextual learning, that is, a simulated environment that will provide an immersive specialization programmed to prepare 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.

Thanks to this program, you will detect in which process are the vaccines in development oriented to combat the main multidrug-resistant bacteria.

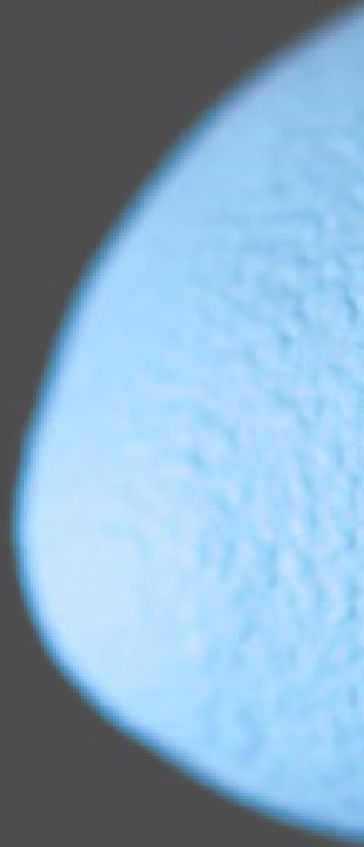
Do you want to be updated on Emerging Strategies Against Multidrug-Resistant Bacteria without leaving your home? Get it with this program.



02

Objectives

This academic program aims to update the pharmacist on the use of Emerging Strategies against Multidrug-Resistant Bacteria. Therefore, professionals will know the advanced laboratory tests that allow the identification of this type of bacteria or will identify the most avant-garde therapies to deal with this type of diseases. In this way, they will ensure that they are up to date in this field of health care.





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Through simulations of real cases, you will guarantee a completely effective update”



General Objective

- ♦ Acquire expertise on innovative antimicrobial molecules, including antimicrobial peptides and bacteriocins, bacteriophage enzymes and nanoparticles





Specific Objective

- ♦ Examine in depth the mechanism of different molecular techniques for use against multidrug-resistant bacteria, including CRISPR-Cas9 gene editing, its molecular mechanism of action and its potential applications

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Identify which treatments are most effective according to bacterial resistance”

03

Course Management

The teaching staff of this program is made up of professionals with extensive experience in the study of strategies to treat bacterial diseases. These specialists have carried out numerous research projects related to this health field throughout their scientific careers. All these experts will be in charge of offering students their best knowledge in the field to position them at the pharmaceutical forefront.



“

The best researchers specialized in Emerging Strategies against Multidrug-Resistant Bacteria will be in charge of providing you with the best knowledge in the 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. Ocaña Fuentes, Aurelio

- ◆ Director of Research at the Bureau Veritas University Center, Camilo José Cela University
- ◆ Research Fellow at the Neurobehavioral Institute, Miami
- ◆ Researcher in the Area of Food Technology, Nutrition and Dietetics, Department of Applied Physical Chemistry, Autonomous University of Madrid
- ◆ Researcher in the Area of Human Physiology, Epidemiology and Public Health, Department of Health Sciences, Rey Juan Carlos University
- ◆ Researcher of the Training Plan for Research Personnel of the University of Alcalá
- ◆ D. in Health Sciences from the Rey Juan Carlos University
- ◆ Master's Degree in Research, Epidemiology and Public Health
- ◆ Diploma in Advanced Studies from Rey Juan Carlos University
- ◆ Degree in Chemical Sciences, specializing in Biochemistry, from the Complutense University of Madrid

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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 syllabus of this program has been designed with the intention of updating pharmacists in the field of Emerging Strategies against Multidrug-Resistant Bacteria, in a 100% online mode and without having to physically travel to the study centers. Therefore, during the 6 weeks of learning, they will investigate the modification of pathogens that allow the realization of more effective treatments for infectious diseases. Likewise, they will acquire a deep knowledge of the existing challenges in the development of antibacterial vaccines.



A close-up photograph of a petri dish containing a bacterial culture. The surface of the agar is covered with various patterns of bacterial growth, including distinct lines and circular colonies. The lighting is warm, highlighting the textures of the cultures.

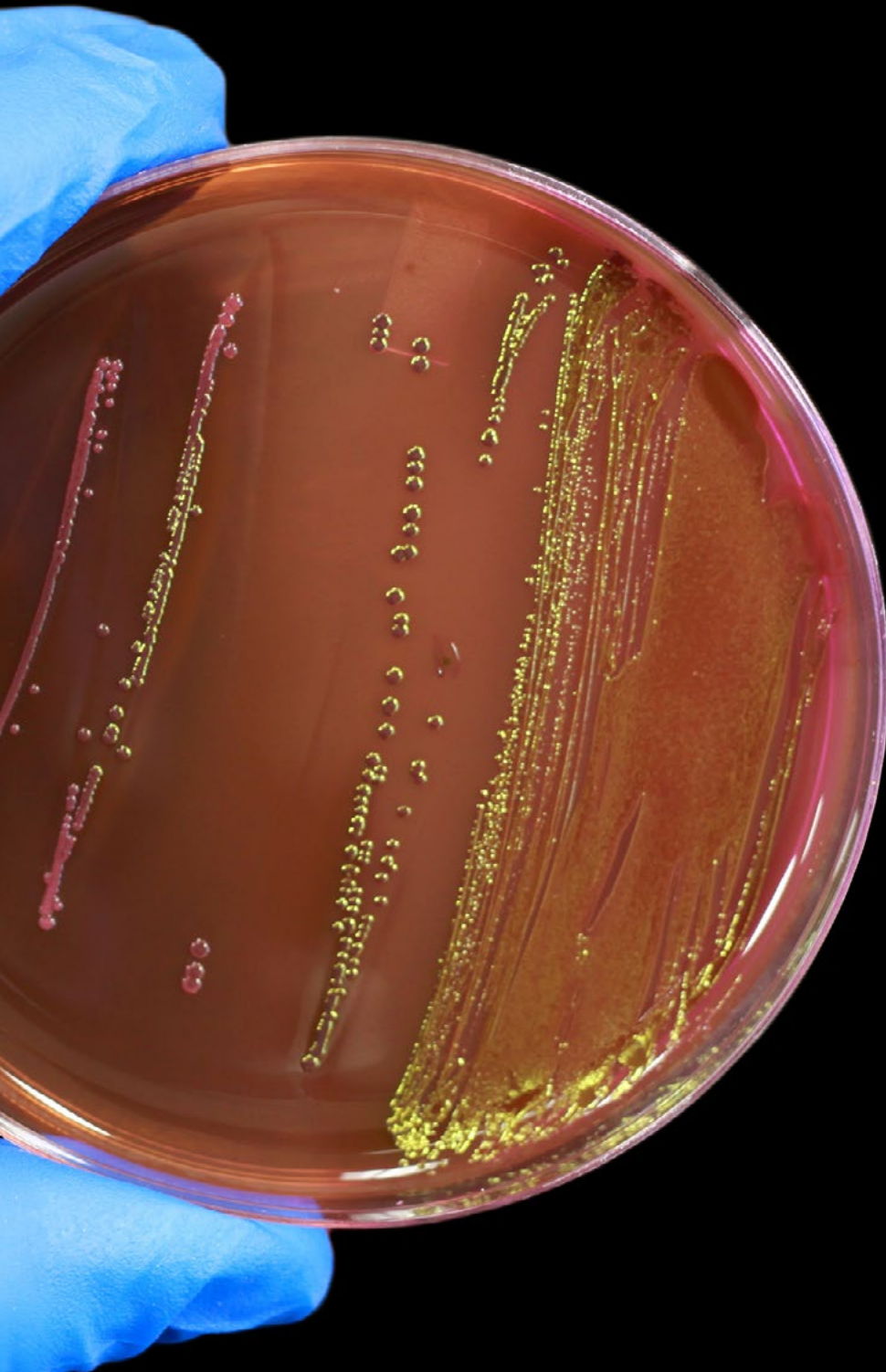
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You will deepen your understanding of the challenges involved in the development of antibacterial vaccines through this program”

Module 1. Emerging Strategies for Multidrug-Resistant Bacteria

- 1.1. CRISPR-Cas9 Gene Editing
 - 1.1.1. Molecular Mechanism of Action
 - 1.1.2. Applications
 - 1.1.2.1. CRISPR-Cas9 as a Therapeutic Tool
 - 1.1.2.2. Engineering of Probiotic Bacteria
 - 1.1.2.3. Rapid Detection of Resistance
 - 1.1.2.4. Elimination of Resistance Plasmids
 - 1.1.2.5. Development of New Antibiotics
 - 1.1.2.6. Safety and Stability
 - 1.1.3. Limitations and Challenges
- 1.2. Temporary Collateral Sensitization (SCT)
 - 1.2.1. Molecular Mechanism
 - 1.2.2. Advantages and Applications of SCT
 - 1.2.3. Limitations and Challenges
- 1.3. Gene Silencing
 - 1.3.1. Molecular Mechanism
 - 1.3.2. RNA Interference
 - 1.3.3. Antisense Oligonucleotides
 - 1.3.4. Benefits and Applications of Gene Silencing
 - 1.3.5. Limitations
- 1.4. High-Throughput Sequencing
 - 1.4.1. Stages of High-Throughput Sequencing
 - 1.4.2. Bioinformatics Tools for Combating Multidrug-Resistant Bacteria
 - 1.4.3. Challenges
- 1.5. Nanoparticles
 - 1.5.1. Mechanisms of Action against Bacteria
 - 1.5.2. Clinical Applications
 - 1.5.3. Limitations and Challenges





- 1.6. Engineering of Probiotic Bacteria
 - 1.6.1. Production of Antimicrobial Molecules
 - 1.6.2. Bacterial Antagonism
 - 1.6.3. Modulation of the Immune System
 - 1.6.4. Clinical Applications
 - 1.6.4.1. Prevention of Nosocomial Infections
 - 1.6.4.2. Reducing the Incidence of Respiratory Infections
 - 1.6.4.3. Adjunctive Therapy in the Treatment of Urinary Tract Infections
 - 1.6.4.4. Prevention of Resistant Skin Infections
 - 1.6.5. Limitations and Challenges
- 1.7. Antibacterial Vaccines
 - 1.7.1. Types of Vaccines against Diseases Caused by Bacteria
 - 1.7.2. Vaccines in Development against Major Multidrug-Resistant Bacteria
 - 1.7.3. Challenges and Considerations
- 1.8. Bacteriophages
 - 1.8.1. Mechanism of Action
 - 1.8.2. Lytic Cycle of Bacteriophages
 - 1.8.3. Lysogenic Cycle of Bacteriophages
- 1.9. Phage Therapy
 - 1.9.1. Isolation and Transport of Bacteriophages
 - 1.9.2. Purification and Handling of Bacteriophages in the Laboratory
 - 1.9.3. Phenotypic and Genetic Characterisation of Bacteriophages
 - 1.9.4. Preclinical and Clinical Trials
 - 1.9.5. Compassionate Use of Phages and Success Stories
- 1.10. Antibiotic Combination Therapy
 - 1.10.1. Mechanisms of Action
 - 1.10.2. Efficacy and Risks
 - 1.10.3. Challenges and Constraints
 - 1.10.4. Combined Antibiotic and Phage Therapy

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 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.

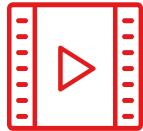
Relearning will allow you to learn with less effort and better performance, involving you more in your specialization, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation to success.

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

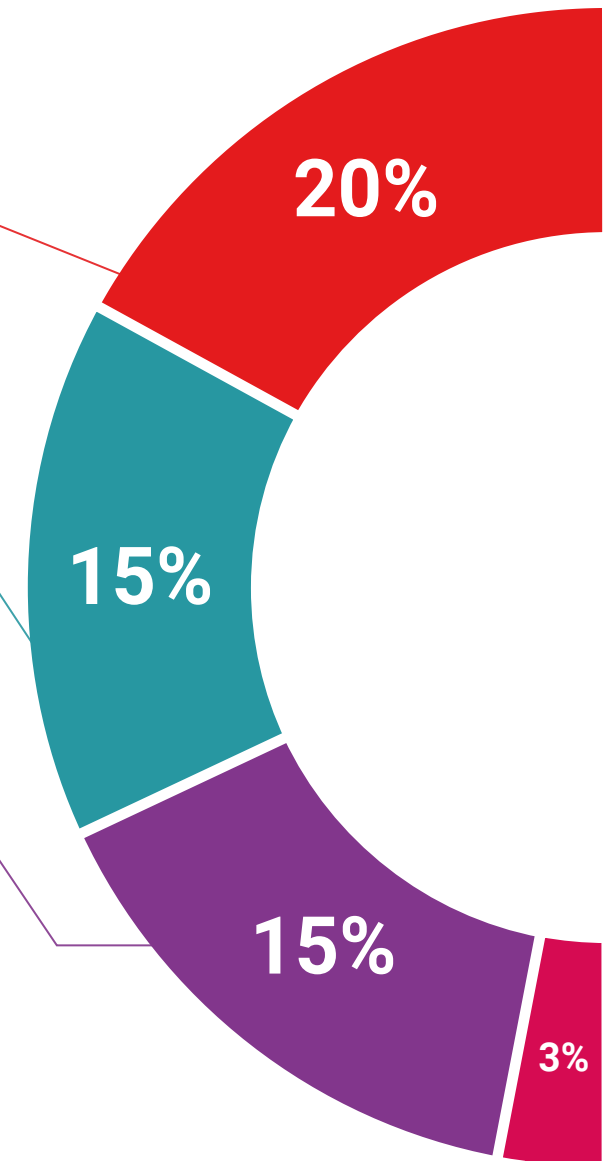
The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

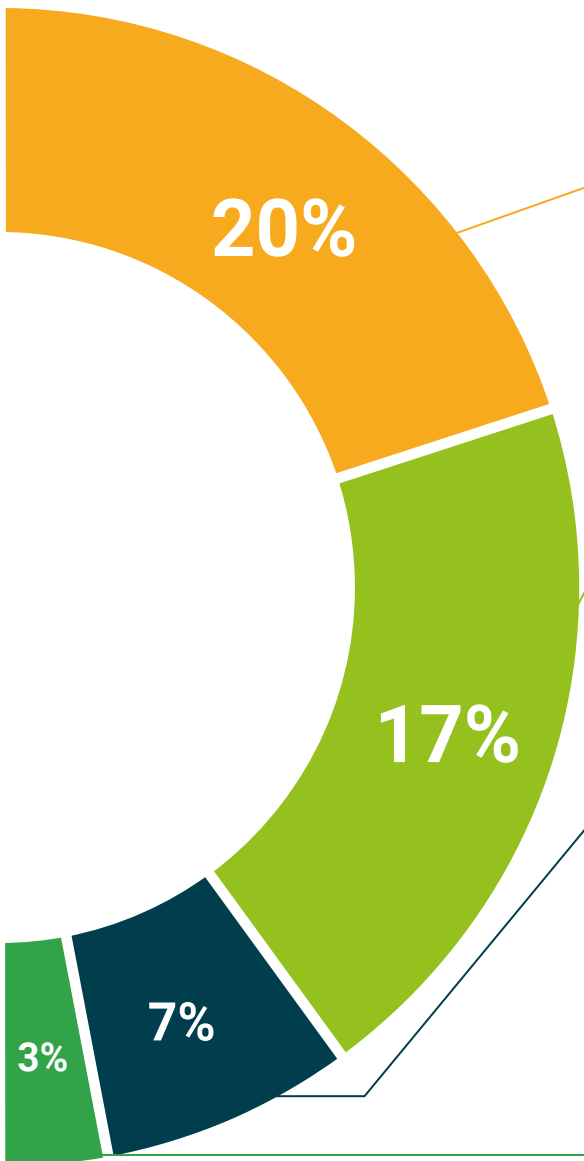
This unique multimedia content presentation training system was awarded by Microsoft as a "European Success Story".



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 Emerging Strategies Against Multidrug-Resistant Bacteria 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 Emerging Strategies Against Multidrug-Resistant 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 Emerging Strategies Against Multidrug-Resistant Bacteria**

Modality: **online**

Duration: **6 weeks**

Accreditation: **6 ECTS**





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