Postgraduate Certificate

Artificial Intelligence in Clinical Microbiology and Infectious Diseases

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Postgraduate Certificate

Artificial Intelligence in Clinical Microbiology and Infectious Diseases

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

Website: **www.techtitute.com/us/pharmacy/postgraduate-certificate/artificial-intelligence-clinical-microbiology-infectious-diseases**

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Introduction

Technological development and the applications of Artificial Intelligence to the scientific field have enabled experts in Microbiology to develop new antibiotic therapies for infectious diseases. Therefore, the increasingly broad and exhaustive knowledge of the multiple possibilities that arise with the advancement of science have highlighted the importance of updating by professionals in the pharmaceutical sector who are dedicated to this field. For this reason, TECH has brought together in this program the most complete, relevant and innovative information based on the application of AI in the field of Clinical Microbiology.
A 100% online academic experience that promises a dynamic, multidisciplinary and comprehensive update thanks to the best content, designed by experts in Microbiology and Biomedicine.

Discover the latest developments in Artificial Intelligence and Microbiology with TECH and the most comprehensive program on the market"

The development of new technologies and their adaptation to the scientific field have made it possible to advance at a dizzying pace in the discovery of techniques and treatments that allow latent and emerging infections to be managed with optimal results. On the other hand, antibiotic resistance and the effort to combine existing knowledge with research to deal with the multiple cases arising from the discovery of new bacterial and viral microorganisms increasingly demand innovative, efficient and effective methods and therapies. Therefore, the innovations in Artificial Intelligence and the multiple applications arising from its use, especially in the management of infectious diseases, make degrees such as this one necessary.

And to make available to specialists in the pharmaceutical field the most complete and innovative information in this field, TECH developed this Postgraduate Certificate. It is an academic experience in which the graduate will be able to update on the latest developments in Artificial Intelligence in Clinical Microbiology and Infectious Diseases through the best theoretical, practical and additional content. Therefore, the program includes the latest trends in AI techniques and other applied technologies, as well as the classification and identification of bacteria in the current clinical context. You will also delve into the most innovative discoveries in bacterial protein decoding, how to handle the latest AI strategies in Microbiology and Public Health and the future lines of research that are currently being considered.

All this through the best multidisciplinary content: in focus videos, pre-recorded lectures, news, outlines, research articles, abstracts, exercises and much more. Everything will be available in a state-of-the-art Virtual Campus which, in addition to being accessible from any device with an Internet connection, will not have fixed schedules (it will be available 24 hours a day throughout the week). In this way, the graduate will be able to design an academic experience according to their demands and time, accessing the best pedagogical material and with the support of the online faculty.

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

- The development of case studies presented by pharmaceutical experts in microbiological AI and infectious diseases
- 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 be able to delve into the most innovative in the use of complementary technologies for the management of infectious diseases"

You will be able to access from wherever and whenever you want thanks to its convenient 100% online format"

Get updated in Machine and Deep Learning through the best theoretical, practical and additional content.

Catch up on the latest findings in epidemiological surveillance and expand your knowledge with TECH.

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

The multimedia content, developed with the latest educational technology, will provide the professional with situated and contextual learning, i.e., a simulated environment that will provide immersive education programmed to learn in real situations.

This program is designed around Problem-Based Learning, whereby the professional must try to solve the different professional practice situations that arise during the course. For this purpose, students will be assisted by an innovative interactive video system created by renowned and experienced experts.

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Objectives

The objective of this Postgraduate Certificate is none other than to make available to Pharmacy graduates and specialists in the field of Microbiology the most relevant, innovative and exhaustive information related to artificial intelligence in the clinical field and infectious diseases in a convenient 100% online format. In this way, you will have the opportunity to get up to date in an intensive and flexible way, accessing innovative and comprehensive content designed by the best professionals. All this from the comfort of your home and with the endorsement of an internationally recognized institution.

A program that will undoubtedly live up to your highest expectations with innovative, comprehensive and complete content"

General Objective

- Understand how bacterial resistance evolves as new antibiotics are introduced into clinical practice

State-of-the-art multidisciplinary content awaits you in this Postgraduate Certificate"

Specific Objectives

- Analyze the fundamentals of AI in Microbiology, including its history and evolution, technologies that can be used in Microbiology and research objectives
- Include AI algorithms and models for protein structure prediction, identification and understanding of resistance mechanisms, and analysis of genomic Big Data
- Apply AI in machine learning techniques for bacterial identification and its practical implementation in clinical and Microbiology research laboratories
- Explore synergy strategies with AI between Microbiology and Public Health, including infectious outbreak management, epidemiological surveillance, and personalized treatments

03

Course Management

The faculty of this program has been designed by the best experts in Biomedicine and Microbiology. Specialists with decades of experience in the field of research and clinical practice who have dedicated months to create a complete, comprehensive and dynamic syllabus in which the graduate will see the experience and professionalism reflected in each module. It is, therefore, about going a step further, using the background of top-level professionals to create an incomparable syllabus and additional content based on the latest trends.

A teaching team versed in the area has been in charge of designing all the content that you will find in this program"

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. Breñosa Martínez, José Manuel

- Project Manager at the Cantabria Centre for Industrial Research and Technology (CITICAN)
- Academic of Artificial Intelligence at the European University of the Atlantic (UNEAT), Cantabria
- Programmer and Simulation Developer at Ingemotions, Cantabria
- Researcher at the Centre for Automation and Robotics (CAR: UPM-CSIC), Madrid
- PhD in Automatics and Robotics at the Polytechnic University of Madrid
- Master's Degree in Automatics and Robotics at the Polytechnic University of Madrid
- Degree in Industrial Engineering at the Polytechnic University of Madrid

A unique, crucial and decisive learning experience to boost your professional development"

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Structure and Content

TECH strives every day to remain at the academic forefront by offering the best programs. Therefore, this Postgraduate Certificate in Artificial Intelligence in Clinical Microbiology and Infectious Diseases is a clear example of a complete, comprehensive and innovative program. Through the best theoretical, practical and additional content, the graduate will be able to catch up with the latest trends in AI and Microbiology in just 6 weeks and with the flexibility provided by its convenient 100% online format.

The Relearning methodology will allow you to catch up in a natural way, without the need to invest extra hours in memorizing"

Module 1. Artificial Intelligence in Clinical Microbiology and Infectious Diseases

1.1. Artificial Intelligence (AI) in Clinical Microbiology and Infectious Diseases
- 1.1.1. Current Expectation of AI in Clinical Microbiology
- 1.1.2. Emerging Areas Interrelated to AI
- 1.1.3. Transversality of AI

1.2. Artificial Intelligence (AI) Techniques and other Complementary Technologies applied to Clinical Microbiology and Infectious Diseases
- 1.2.1. AI Logic and Models
- 1.2.2. Technologies for AI
  - 1.2.2.1. Machine Learning
  - 1.2.2.2. Deep Learning
  - 1.2.2.3. Data Science and Big Data

1.3. Artificial Intelligence (AI) in Microbiology
- 1.3.1. AI in Microbiology: History and Evolution
- 1.3.2. AI Technologies that can be Used in Microbiology
- 1.3.3. Research Objectives of AI in Microbiology
  - 1.3.3.1. Understanding Bacterial Diversity
  - 1.3.3.2. Exploring Bacterial Physiology
  - 1.3.3.3. Investigation of Bacterial Pathogenicity
  - 1.3.3.4. Epidemiological Surveillance
  - 1.3.3.5. Development of Antimicrobial Therapies
  - 1.3.3.6. Microbiology in Industry and Biotechnology

1.4. Classification and Identification of Bacteria using Artificial Intelligence (AI)
- 1.4.1. Machine Learning Techniques for Bacterial Identification
- 1.4.2. Taxonomy of Multi-Resistant Bacteria using AI
- 1.4.3. Practical Implementation of AI in Clinical and Research Laboratories in Microbiology

1.5. Bacterial Protein Decoding
- 1.5.1. AI Algorithms and Models for Protein Structure Prediction
- 1.5.2. Applications in the Identification and Understanding of Resistance Mechanisms
- 1.5.3. Practical Application AlphaFold and Rosetta

1.6. Decoding the Genome of Multi-Resistant Bacteria
- 1.6.1. Identification of Resistance Genes
- 1.6.2. Genomic Big Data Analysis: AI-Assisted Sequencing of Bacterial Genomes
- 1.6.3. Practical Application Identification of Resistance Genes

1.7. Artificial Intelligence (AI) Strategies in Microbiology and Public Health
- 1.7.1. Infectious Outbreak Management
- 1.7.2. Epidemiological Surveillance
- 1.7.3. AI for Personalized Treatments

1.8. Artificial Intelligence (AI) to Combat Antibiotic Resistance in Bacteria
- 1.8.1. Optimizing Antibiotic Use
- 1.8.2. Predictive Models for the Evolution of Antimicrobial Resistance
- 1.8.3. Targeted Therapy Based on Development of New Antibiotics by IA

1.9. Future of Artificial Intelligence in Microbiology
- 1.9.1. Synergies between Microbiology and IA
- 1.9.2. Lines of AI Implementation in Microbiology
- 1.9.3. Long-Term Vision of the Impact of AI in the Fight against Multi-Drug Resistant Bacteria

1.10. Technical and Ethical Challenges in the Implementation of Artificial Intelligence (AI) in Microbiology
- 1.10.1. Legal Considerations
- 1.10.2. Ethical and Liability Considerations
- 1.10.3. Barriers to AI Implementation
  - 1.10.3.1. Technical Barriers
  - 1.10.3.2. Social Barriers
  - 1.10.3.3. Economic Barriers
  - 1.10.3.4. Cybersecurity

05

Methodology

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

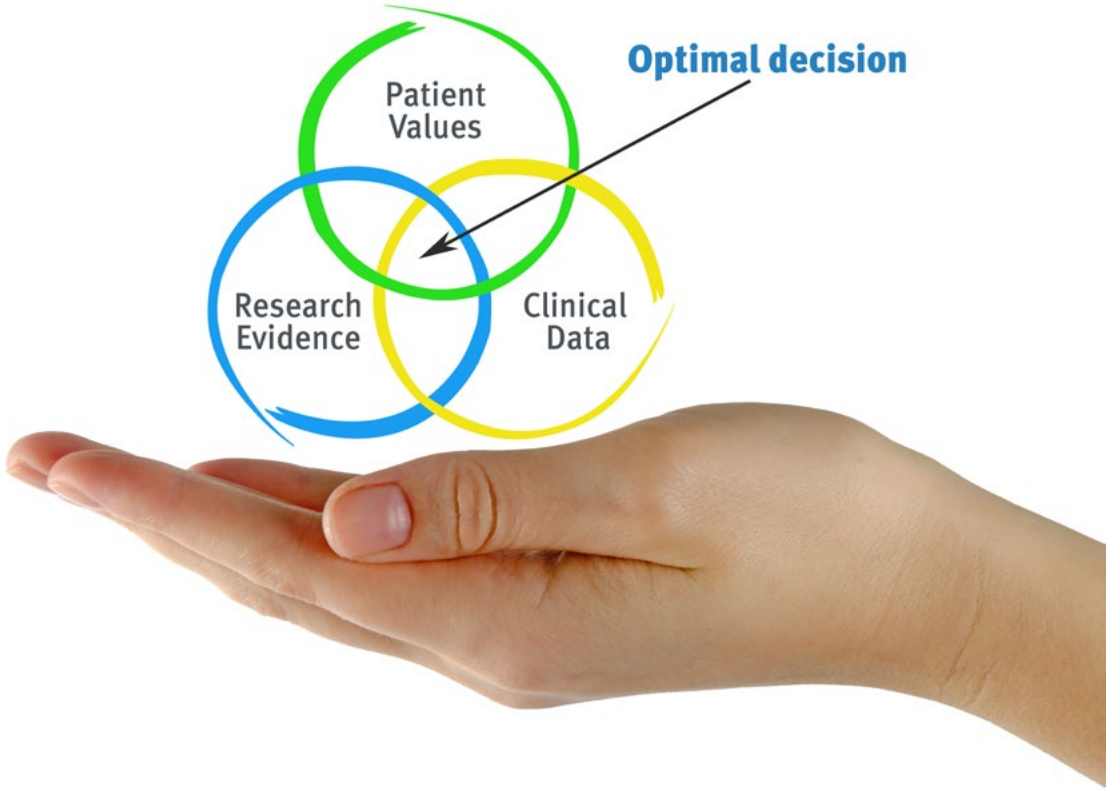
This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.

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

At TECH we use the Case Method

What should a professional do in a given situation? Throughout the program, students will be confronted with multiple simulated clinical cases based on real patients, in which they will have to investigate, establish hypotheses and ultimately, resolve the situation. There is an abundance of scientific evidence on the effectiveness of the method. Pharmacists learn better, more quickly and more sustainably over time.

With TECH you will experience a way of learning that is shaking the foundations of traditional universities around the world.



According to Dr. Gérvas, the clinical case is the annotated presentation of a patient, or group of patients, which becomes a "case", an example or model that illustrates some peculiar clinical component, either because of its teaching power or because of its uniqueness or rarity. It is essential that the case is based on current professional life, attempting to recreate the actual conditions in a pharmacist's professional practice.

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

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

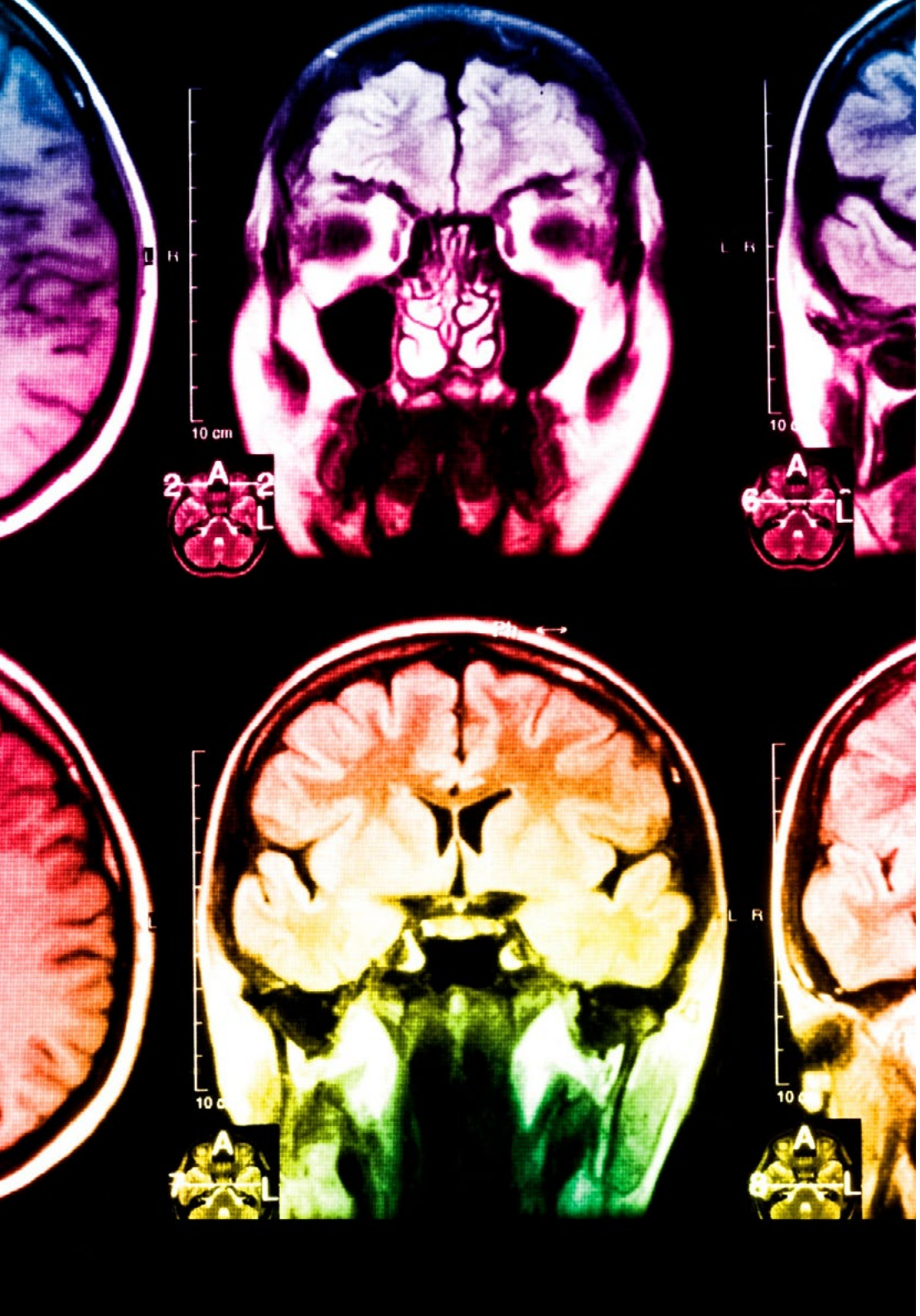
1. Pharmacists who follow this method not only grasp concepts, but also develop their mental capacity, by evaluating real situations and applying their knowledge.
2. Learning is solidly translated into practical skills that allow the student to better integrate into the real world.
3. Ideas and concepts are understood more efficiently, given that the example situations are based on real-life.
4. Students like to feel that the effort they put into their studies is worthwhile. This then translates into a greater interest in learning and more time dedicated to working on the course.

Relearning Methodology

At TECH we enhance the case method with the best 100% online teaching methodology available: Relearning.

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

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



At the forefront of world teaching, the Relearning method has managed to improve the overall satisfaction levels of professionals who complete their studies, with respect to the quality indicators of the best online university (Columbia University).

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

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

In our program, learning is not a linear process, but rather a spiral (learn, unlearn, forget, and re-learn). Therefore, we combine each of these elements concentrically.

The overall score obtained by TECH's learning system is 8.01, according to the highest international standards.

This program offers the best educational material, prepared with professionals in mind:

Study Material

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

These contents are then applied to the audiovisual format, to create the TECH online working method. All this, with the latest techniques that offer high quality pieces in each and every one of the materials that are made available to the student.

Video Techniques and Procedures

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

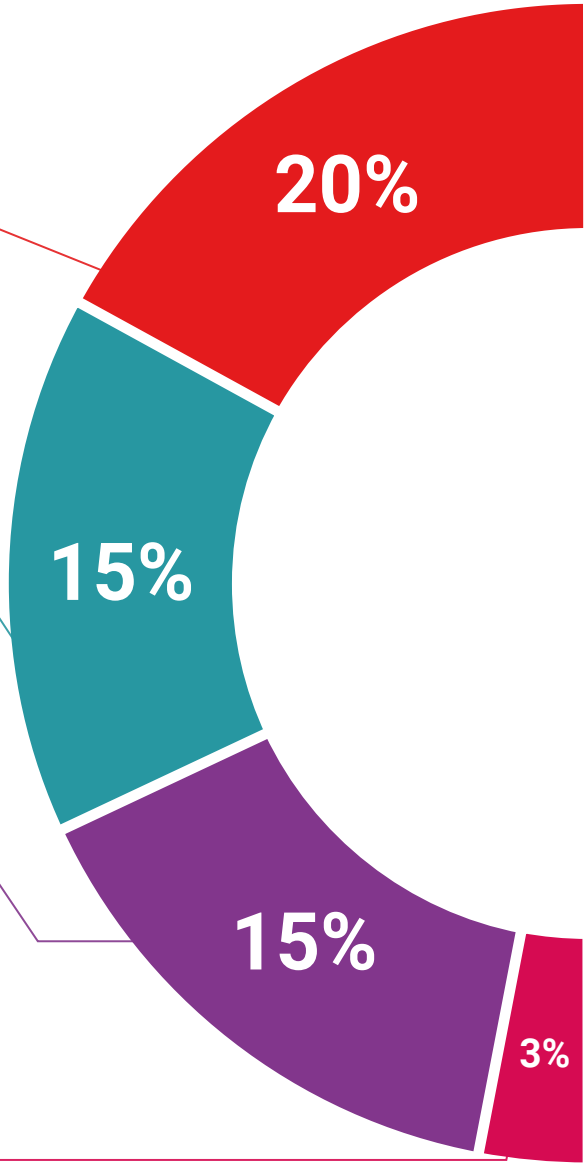
Interactive Summaries

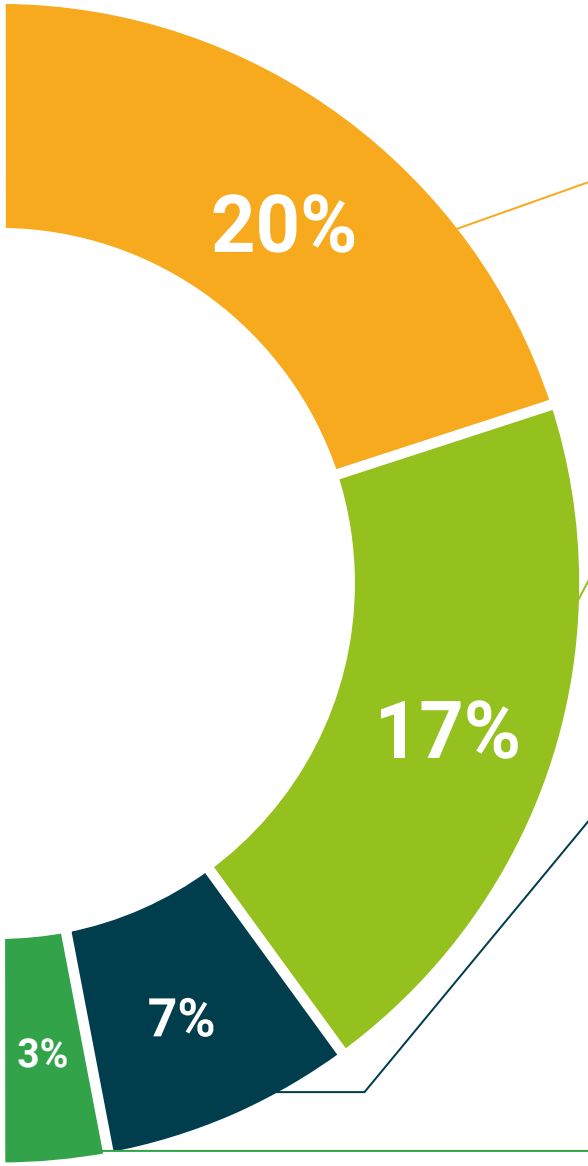
The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

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

Additional Reading

Recent articles, consensus documents and international guidelines, among others. In TECH's virtual library, students will have access to everything they need to complete their course.





Expert-Led Case Studies and Case Analysis

Effective learning ought to be contextual. Therefore, we will present you with real case developments in which the expert will guide you through focusing on and solving the different situations: a clear and direct way to achieve the highest degree of understanding.

Testing & Retesting

We periodically evaluate and re-evaluate students' knowledge throughout the program, through assessment and self-assessment activities and exercises, so that they can see how they are achieving their goals.

Classes

There is scientific evidence on the usefulness of learning by observing experts. The system known as Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

Quick Action Guides

TECH offers the most relevant contents of the course in the form of worksheets or quick action guides. A synthetic, practical, and effective way to help students progress in their learning.

06

Certificate

The Postgraduate Certificate in Artificial Intelligence in Clinical Microbiology and Infectious Diseases guarantees, in addition to the most rigorous and updated knowledge, access to a Postgraduate Certificate issued by TECH Global University.

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

This private qualification will allow you to obtain a **Postgraduate Certificate in Artificial Intelligence in Clinical Microbiology and Infectious Diseases** 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 Artificial Intelligence in Clinical Microbiology and Infectious Diseases**

Modality: **online**

Duration: **6 weeks**

Accreditation: **6 ECTS**


tech global university

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

Postgraduate Certificate in Artificial Intelligence in Clinical Microbiology and Infectious Diseases

This is a private qualification of 180 hours of duration equivalent to 6 ECTS, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH Global University is a university officially recognized by the Government of Andorra on the 31st of January of 2024, which belongs to the European Higher Education Area (EHEA).

In Andorra la Vella, on the 28th of February of 2024

Dr. Pedro Navarro Illana
Dean

This qualification must always be accompanied by the university degree issued by the competent authority to practice professionally in each country. Unique TECH Code: AFWORD23S techtitute.com/certificates

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

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