

# Postgraduate Diploma

## Antimicrobial Resistance and Treatment of Nosocomial Infection



## Postgraduate Diploma Antimicrobial Resistance and Treatment of Nosocomial Infection

Course Modality: Online

Duration: 6 months

Certificate: TECH Technological University

Official N° of hours: 400 h.

Website: [www.techtute.com/us/medicine/postgraduate-diploma/postgraduate-diploma-antimicrobial-resistance-treatment-nosocomial-infection](http://www.techtute.com/us/medicine/postgraduate-diploma/postgraduate-diploma-antimicrobial-resistance-treatment-nosocomial-infection)

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# 01

# Introduction

Specialize in Antimicrobial Resistance and the treatment of Nosocomial Infection and develop your knowledge and skills in infectious diseases. This complete program has been prepared by renowned professionals, who have invested all their knowledge and experience into the creation of this course. A unique opportunity to specialise in a highly demanding professional field.







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*With the Postgraduate Diploma in Antimicrobial Resistance and Treatment of Nosocomial Infection you have the opportunity to update your knowledge with the utmost scientific rigor and incorporate the latest advances in the approach to infectious diseases into your daily medical practice"*

Infectious diseases remain the leading cause of mortality and disability (i.e. the loss of a productive life) in the world. In 2016, of the 56.4 million total deaths worldwide, 33% were due to infectious diseases, 30% to cardiovascular diseases and 10% as a result of cancer. The fight against disease can be separated into two categories: infectious diseases and chronic non-communicable diseases.

From the 17.3 million people who died from infection diseases in 2016, the most frequent causes of death were lower respiratory infections (3.7 million), malaria (2.2 million), tuberculosis (1.3 million), diarrhea (1.4 million), and HIV/AIDS infection (1.1 million).

The most important factors to take into consideration regarding infectious diseases are demographics and human behavior, technological and industrial development, economic development and the variations in land use, intercontinental travelling and commerce, climate change, microbiotic adaptation and finally the disappearance or reduction of efficient public health measures.

These factors mean that it would be wrong to consider any part of the planet to be isolated enough from the rest, nor the appearance, reappearance or dissemination of imported or apparently eradicated infectious diseases in our environment to be impossible.

This century's complex international epidemiological situation, so far exemplified by the deliberate release of *Bacillus anthracis* spores as a bioweapon which causes pulmonary anthrax in victims when inhaled, the emergence of West Nile virus as a pathogen in the United States, the SARS epidemic, the zoonotic spread of monkeypox in the United States, the threat of pandemic influenza, the Ebola epidemic in Africa, the emergence of yellow fever cases in Angola, coupled with the re-emergence of Dengue and Cholera. The emergence of new arboviruses in locations like Chikungunya and more recently Zika in the Americas. Together with the mortality rate from other endemic infectious diseases, such as HIV/AIDS, leptospirosis, tuberculosis, community-acquired pneumonia and our increased resistance to antibiotics with the development of multidrug-resistant bacteria, all of which highlight the need for professionals with specialist expertise in order to raise the performance levels of all the personnel needed to face up to the challenges involved in controlling and dealing with biological, hospital and public health emergencies and provide a higher standard of health care the world over.

This **Postgraduate Diploma in Antimicrobial Resistance and Treatment of Nosocomial Infection** contains the most complete and up-to-date scientific program on the market. The most important features include:

- ♦ The development of clinical cases presented by experts in Antimicrobial Resistance and Treatment of Nosocomial Infection
- ♦ The graphic, schematic, and practical contents with which they are created provide scientific and practical information on the disciplines that are essential for professional practice
- ♦ New developments in Antimicrobial Resistance and Treatment of Nosocomial Infection
- ♦ Practical exercises where self-assessment can be used to improve learning
- ♦ An algorithm-based interactive learning system for decision-making in the clinical situations presented throughout the course
- ♦ 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



*Seize the moment and gain up-to-date knowledge on the management of coronavirus infections"*

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*This Postgraduate Diploma is the best investment you can make in the selection of a refresher program for two reasons: in addition to updating your knowledge in Antimicrobial Resistance and Treatment of Nosocomial Infection, you will obtain a qualification from TECH Technological University"*

TECH's teaching staff is made up of prestigious, renowned professionals who have had a long career in health care, teaching and research, and have worked in many countries on several continents, gaining indispensable professional teaching experience that delivers essential content of the highest quality to this Postgraduate Diploma.

The methodological design of this Postgraduate Diploma, developed by a multidisciplinary team of e-learning experts, integrates the latest advances in educational technology for the creation of numerous multimedia educational tools that allow the professional, based primarily on the problem-solving method, to face the solution of real problems in their daily clinical practice, which will allow them to advance in the acquisition of knowledge and the development of skills that will positively impact their future professional work.

Each of the contents generated for this Postgraduate Diploma, as well as the videos, self-evaluations, clinical cases and exams have been thoroughly reviewed, updated, and integrated by the professors and the team of experts that make up TECH's staff. This will facilitate the learning process with a step-by-step approach in order to achieve the program's teaching objectives.

*This program, last updated in April 2020, is the most complete and up-to-date course available in the field of clinically infectious diseases.*

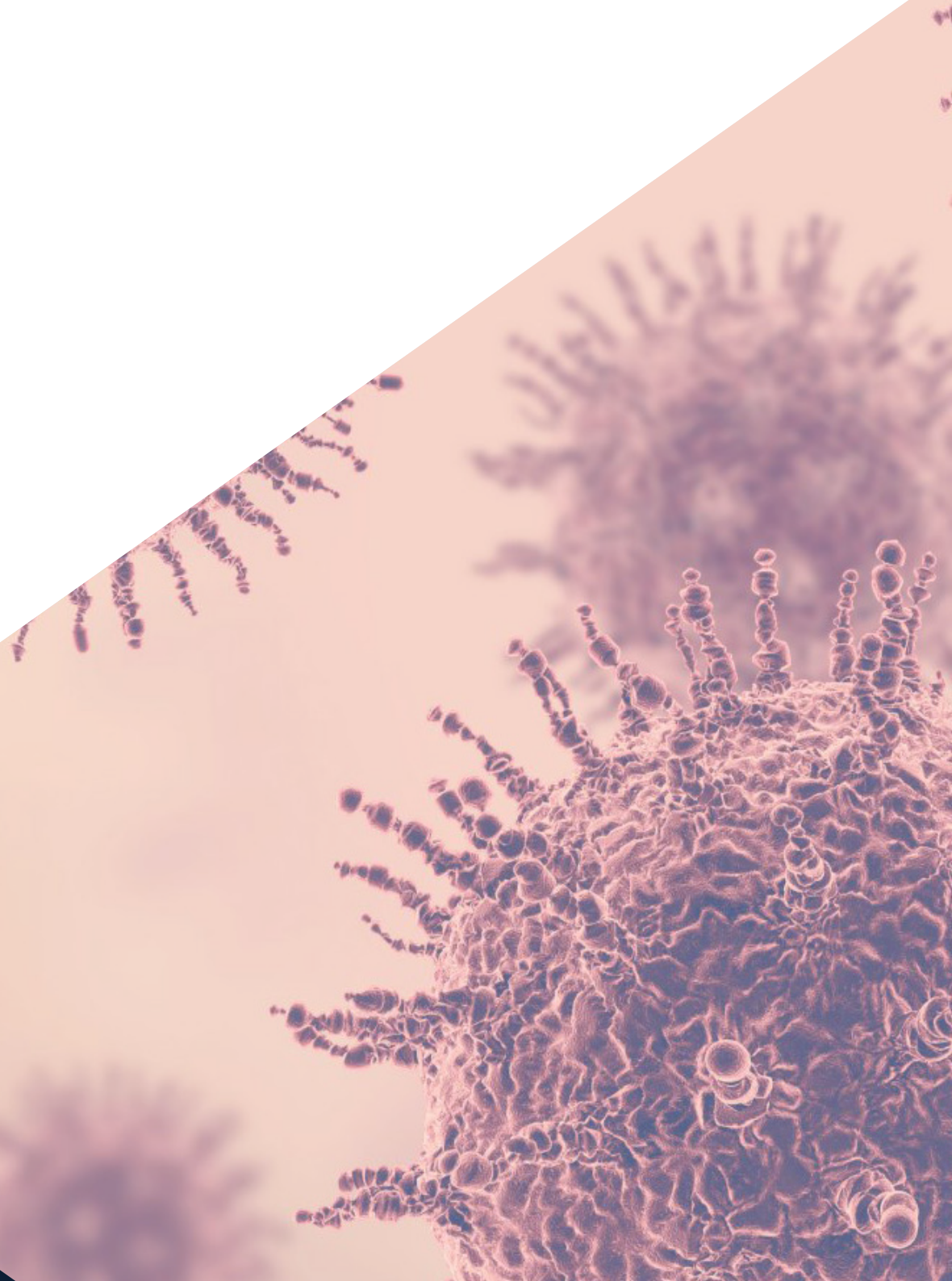
*Don't miss the opportunity to get up to date with the latest advances in the treatment of infections and incorporate them into your daily medical practice.*





# 02 Objectives

The main purpose of the teaching program is to provide education and professional development so that physicians can thoroughly master the most current scientific findings in the field of clinically infectious diseases. In addition to developing the skills that will allow them to approach outbreaks of infectious diseases in individuals and communities with more confidence and safety.





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*This program will provide you with a sense of confidence in your medical practice, which will help you grow personally and professionally”*



## General objectives

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- Update your knowledge and develop your skills in healthcare, teaching or research roles in the field of infectious diseases in order to provide care for individuals or groups
- Improve the medical attention and the overall health of patients with infectious diseases based on integral care, the application of the epidemiological clinical method and the correct use of antimicrobials in correspondence with the most up to date scientific evidence



*Improve your patients' care by taking advantage of the specialization offered by the Postgraduate Diploma in Antimicrobial Resistance and Treatment of Nosocomial Infection"*





## Specific objectives

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### Module 1. The Immune System in Infections in the Immunosuppressed Host

- ♦ Understand the structure and development of the immune system, its composition, which organs compose it and its chemical mediators
- ♦ Understand the immune response to viral and bacterial infections
- ♦ Recognize the most frequent clinical manifestations of immunosuppression
- ♦ Identify the most frequent clinical manifestations of febrile syndrome in neutropenic patients

### Module 2. Nosocomial Infections Associated with Healthcare and Patient Safety

- ♦ Recognize surgical site infection through in-depth knowledge of its definition, epidemiology, most frequent germs and therapeutic conduct
- ♦ Identify nosocomial pneumonia associated with mechanical ventilation, establishing the general concepts, epidemiology, risk factors, etiology, diagnosis, prevention and most commonly used antibiotics
- ♦ Understand the Infection Associated with Non-Tunneled Peripheral and Central Venous Catheters and Urinary Catheters
- ♦ Know how to apply the main internationally recommended universal measures for nosocomial infection control

### Module 3. Antimicrobial Resistance

- ♦ Establish epidemiology from the molecular to the socioeconomic level
- ♦ Comprehensive understanding of the genetic and acquired mechanisms of antimicrobial resistance
- ♦ Identify viral, fungal and parasitic resistance and their therapeutic alternatives
- ♦ Gain up-to-date knowledge based on the global program for the control of antimicrobial resistance and research on new antibiotics
- ♦ Assess the global program's objectives and directives for the control of antimicrobial resistance

### Module 4. The Correct Use of Antimicrobials

- ♦ Apply the use of antimicrobials in special host situations
- ♦ Describe the role of rational antibiotic utilization policies and programs and their impact on antimicrobial resistance and the cost of medical care
- ♦ Know the functioning of pharmacotherapeutic committees as tools for the control and evaluation of the use of antibiotics



03

# Course Management

This academic program includes the most specialized teaching staff in the current educational market. They are specialists selected by TECH to develop the whole syllabus. In this way, starting from their own existence and the latest evidence, they have designed the most up-to-date content that provides a guarantee of quality in such a relevant subject.



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*TECH offers the most specialized teaching staff in the field of study. Enroll now and enjoy the quality you deserve”*

## International Guest Director

Dr. Jatin Vyas is a prestigious physician specializing in Microbial Infectious Pathologies and Fungal Immunology. His work philosophy is based on providing holistic care to his patients, with an empathetic approach to pain management. Likewise, his work, code of ethics and values have been recognized on multiple occasions in the form of awards, including the Kass Award for “Clinical Excellence in Infectious Diseases”.

It should be noted that, after completing his residency in Anesthesiology at Case Western Reserve University in Cleveland, he obtained a fellowship in Interventional Pain Management from the University of Iowa. In line with this, he has combined this work with his role as a Research Scientist, focusing on immune responses to pathogenic fungi. In this sense, he has published a wide production of specialized articles in areas such as viral elimination and evolution of SARS-CoV-2, differentiation of functional airway microfold cells or epithelial defects of the respiratory tract associated with the TAT3 mutation in Job’s Syndrome. On the other hand, he has been in charge of leading multiple research projects focused on infectious conditions and innovative treatments. Likewise, he has contributed significantly to the understanding and management of several contagious bacterial diseases.

In his commitment to clinical excellence, he regularly participates in the most renowned scientific congresses and medical symposia worldwide. He shares his extensive experience and knowledge on subjects such as antibiotic resistance, the adaptation mechanisms of pathogenic fungi or the most cutting-edge therapies to combat different viral infections. Thanks to this, Dr. Jatin Vyas has contributed cutting-edge strategies to raise awareness of these conditions in both the healthcare community and society at large.





## Dr. Vyas, Jatin

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- ♦ Director of Internal Medicine at Massachusetts General Hospital, United States
- ♦ Researcher funded by the National Institutes of Health of the United States Government.
- ♦ Research Fellow in Interventional Pain Management at the University of Iowa
- ♦ Research Fellow in Chemistry at the Welch Foundation, California.
- ♦ Residency in Anesthesiology at Case Western Reserve University, Cleveland, Ohio
- ♦ Doctorate in Medicine, University of Arkansas
- ♦ Bachelor of Science in Forensic Science
- ♦ Board Certification in Infectious Diseases by the American Board of Internal Medicine
- ♦ Board Certification in Internal Medicine by the American Board of Internal Medicine



*Thanks to TECH, you will be able to learn with the best professionals in the world"*

# 04

## Structure and Content

The teaching program has been created by a group of professors and medical professionals from a variety of medical specialties, who have done extensive medical research and possess vast teaching experience in several countries in Africa, Central and South America. They are interested in integrating the latest scientific findings in clinically infectious diseases and antimicrobial therapeutics, to ensure professional development and the improvement of the daily clinical practice of professionals who care for patients with infectious diseases.



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*This Postgraduate Diploma in Antimicrobial Resistance and Treatment of Nosocomial Infection contains the most complete and up-to-date scientific program on the market"*



## Module 1. The Immune System in Infections in the Immunosuppressed Host

- 1.1. Structure and Development of the Immune System
  - 1.1.1. Composition and Development of the Immune System
  - 1.1.2. Immune System Organs
  - 1.1.3. Immune System Cells
  - 1.1.4. Chemical Mediators in the Immune System
- 1.2. The Immune Response to Viral and Bacterial Infections
  - 1.2.1. Main Cells Implicated in the Immune Response to Viruses and Bacteria
  - 1.2.2. Main Chemical Mediators
- 1.3. The Immune Response to Mycotic and Parasitic Infections
  - 1.3.1. Immune Response Against Filamentous and Yeast Fungi
  - 1.3.2. Immune Response Against Protozoas
  - 1.3.3. Immune Response Against Helminths
- 1.4. Most Common Clinical Manifestations of Immunosuppression
  - 1.4.1. Types of Immunosuppression
  - 1.4.2. Clinical Manifestations According to the Infectious Agent
  - 1.4.3. Frequent Infections According to the Type of Immunosuppression
  - 1.4.4. Common Infections in Immunosuppressed Patients According to the Organ System Affected
- 1.5. The Fever Syndrome in Neutropenic Patients
  - 1.5.1. Most Common Clinical Manifestations
  - 1.5.2. Most Diagnosed Infectious Agents
  - 1.5.3. Most-Used Complementary Studies in the Integral Evaluation of a Neutropenic Fever Patient
  - 1.5.4. Therapeutic Recommendations
- 1.6. Management of an Immunosuppressed Patient with Sepsis
  - 1.6.1. Evaluation of Diagnosis, Prognosis and Treatment According to the Latest International Recommendations Endorsed by Scientific Evidence
- 1.7. Immunomodulatory and Immunosuppressive Therapy
  - 1.7.1. Immunomodulators and Their Clinical Use
  - 1.7.2. Immunosuppressors and Their Relation to Sepsis

## Module 2. Nosocomial Infections Associated With Healthcare and Patient Safety

- 2.1. Epidemiology of Nosocomial Infections
  - 2.1.1. Operative Site Infection: Definition Epidemiology. Most Frequent Germs Therapeutic Behavior
  - 2.1.2. Nosocomial and Mechanical Ventilator Associated Pneumonia: General Concepts Epidemiology. Risk Factors. Etiology. Diagnosis. Prevention. Most-Used Antibiotics
- 2.2. Infection Associated with Non-Tunneled Peripheral and Central Venous Catheters and Urinary Catheters
  - 2.2.1. Epidemiology
  - 2.2.2. Etiology
  - 2.2.3. Risk Factors
  - 2.2.4. Behavior for its Diagnosis and Treatment
- 2.3. Clostridium Difficile Infection
  - 2.3.1. Epidemiology
  - 2.3.2. Risk Factors
  - 2.3.3. Clinical Manifestations
  - 2.3.4. Diagnosis
  - 2.3.5. Treatment
- 2.4. Global Vision of the Infection in Critical Patients in the ICU
  - 2.4.1. Epidemiology
  - 2.4.2. Risk Factors
  - 2.4.3. Etiology
  - 2.4.4. Prevention
  - 2.4.5. Most-Used Antibiotics
- 2.5. Infections Associated with Devices Used in Medicine
  - 2.5.1. Infections Associated with Biofilm
  - 2.5.2. Infections From Devices Used in Orthopedics
  - 2.5.3. Infection From Devices Used in Cardiovascular Surgery
  - 2.5.4. Infection in Neurosurgery Devices
  - 2.5.5. Infections of Implants and Prostheses
- 2.6. Universal Measures for Nosocomial Infection
  - 2.6.1. Main Measures Internationally Recommended the Control of Nosocomial Infection

- 2.7. Infections Associated with Healthcare
  - 2.7.1. Definition
  - 2.7.2. Epidemiology
  - 2.7.3. Etiology
  - 2.7.4. Antimicrobials Used

### Module 3. Antimicrobial Resistance

- 3.1. Epidemiology. From Molecular to Socioeconomic
  - 3.1.1. Analysis of Molecular Evolution, Genetics, Clinical Manifestation, Epidemiology and Socioeconomics of the Resistance to Antibiotics
  - 3.1.2. Mortality Due to Super Bacteria
  - 3.1.3. Most Lethal Super Bacteria
- 3.2. Mechanisms of Antimicrobial Resistance
  - 3.2.1. Genetic Mechanisms
  - 3.2.2. Acquired Mechanisms
- 3.3. MRSA and GISA
  - 3.3.1. Epidemiology
  - 3.3.2. Resistance Mechanisms
  - 3.3.3. Alternative Treatments
- 3.4. Resistant Enterobacteria
  - 3.4.1. Epidemiology
  - 3.4.2. Resistance Mechanisms
  - 3.4.3. Alternative Treatments
- 3.5. Resistant Pneumococcus
  - 3.5.1. Epidemiology
  - 3.5.2. Resistance Mechanisms
  - 3.5.3. Alternative Treatments
- 3.6. Viral Resistance
  - 3.6.1. Epidemiology
  - 3.6.2. Resistance Mechanisms
  - 3.6.3. Alternative Treatments
- 3.7. Mycotic and Parasitic Resistance
  - 3.7.1. Epidemiology
  - 3.7.2. Resistance Mechanisms
  - 3.7.3. Alternative Treatments

- 3.8. Worldwide Program for the Control of Antimicrobial Resistance and Research into New Antibiotics
  - 3.8.1. Objectives and Action of the Worldwide Program for the Control of Antimicrobial Resistance
  - 3.8.2. Research into New Antibiotics for Multiresistant Germs
  - 3.8.3. Emergence of Other Forms of Treatment for Infection Control

### Module 4. The Correct Use of Antimicrobials

- 4.1. Basic Principles in the Selection and Use of Antimicrobials
  - 4.1.1. Elements of an Antimicrobial
  - 4.1.2. Elements of a Germ
  - 4.1.3. Elements of the Host
- 4.2. Use of Antimicrobials in Special Situations in the Host
  - 4.2.1. Use in Kidney Failure
  - 4.2.2. Use in Pregnancy
  - 4.2.3. Use in Liver Failure
- 4.3. The Role of Policies and Rational Use of Antibiotics Programs and Their Impact on the Antimicrobial Resistance and The Cost of Medical Care
  - 4.3.1. Situation of Programs and Policies for the Rational Use of Antibiotics
  - 4.3.2. Impact of Programs and Policies in the Use of Antibiotics
  - 4.3.3. Use of Clinical Practice Guides
- 4.4. Pharmacotherapeutic Committees as Tools for the Control and Evaluation of the Use of Antibiotics
  - 4.4.1. Structure
  - 4.4.2. Objectives
  - 4.4.3. Functions
  - 4.4.4. Impact Results
- 4.5. Antibiotic Prophylaxis in Surgery
  - 4.5.1. Classification of Surgical Interventions
  - 4.5.2. Uses of Antibiotic Prophylaxis According to the Type of Surgical Intervention
  - 4.5.3. Most Commonly Used Schemes of Antibiotic Prophylaxis in Surgery
- 4.6. Reasoned Therapeutics in the Use of Antibiotics
  - 4.6.1. Stages of Reasoned Therapeutics
  - 4.6.2. Importance of Reasoned Therapeutics
- 4.7. The Worldwide Experience in the Control of the Use of Antibiotics
  - 4.7.1. Main Worldwide Experiences in the Control of the Use of Antibiotics

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 face multiple simulated clinical cases, based on real patients, in which they will have to do research, establish hypotheses, and ultimately resolve the situation. There is an abundance of scientific evidence on the effectiveness of the method. Specialists learn better, faster, 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, trying to recreate the real conditions in the physician'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. Students who follow this method not only achieve the assimilation of concepts, but also a development of their mental capacity, through exercises that evaluate real situations and the application of 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.

This 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, a real revolution with respect to the mere study and analysis of cases.

*Professionals will learn through real cases and by resolving 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 250,000 physicians have been trained with unprecedented success in all clinical specialties regardless of surgical load. Our pedagogical methodology is developed in a highly competitive environment, with a university student body with a strong socioeconomic profile and an average age of 43.5 years old.

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

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

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



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



#### Study Material

All teaching material is produced by the specialists who teach the course, specifically for the course, so that the teaching content is highly specific and precise.

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



#### Surgical Techniques and Procedures on Video

TECH introduces students to the latest techniques, the latest educational advances and to the forefront of current medical techniques. All of this in direct contact with students and explained in detail so as to aid their assimilation and understanding. And best of all, you can watch the videos as many times as you like.



#### Interactive Summaries

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

This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".



#### Additional Reading

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







#### Expert-Led Case Studies and Case Analysis

Effective learning ought to be contextual. Therefore, TECH presents real cases in which the expert will guide students, focusing on and solving the different situations: a clear and direct way to achieve the highest degree of understanding.



#### Testing & Retesting

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



#### Classes

There is scientific evidence 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 Diploma in Antimicrobial Resistance and Treatment of Nosocomial Infection guarantees students, in addition to the most rigorous and up-to-date education, access to a qualification issued by TECH Technological University.



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*Successfully complete this program  
and receive your university degree  
without travel or laborious paperwork”*



This **Postgraduate Diploma in Antimicrobial Resistance and Treatment of Nosocomial Infection** contains the most complete and updated scientific program on the market.

After the student has passed the assessments, they will receive their corresponding **Postgraduate Diploma** issued by **TECH Technological University** via tracked delivery.

The diploma issued by **TECH Technological University** will reflect the qualification obtained in the Postgraduate Diploma, and meets the requirements commonly demanded by labor exchanges, competitive examinations, and professional career evaluation committees.

Title: **Postgraduate Diploma in Antimicrobial Resistance and Treatment of Nosocomial Infection**

Official N° of hours: **400 h.**



\*Apostille Convention. In the event that the student wishes to have their paper diploma issued with an apostille, TECH EDUCATION 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 quality  
development language  
virtual classroom



**Postgraduate Diploma**  
Antimicrobial Resistance  
and Treatment of  
Nosocomial Infection

Course Modality: **Online**

Duration: **6 months**

Certificate: **TECH Technological University**

Official N°of hours: **400 h.**

# Postgraduate Diploma

## Antimicrobial Resistance and Treatment of Nosocomial Infection