

# Postgraduate Diploma

Mycobacterium Tuberculosis  
Infection: Clinical Manifestations,  
Diagnosis and Treatment





## Postgraduate Diploma Mycobacterium Tuberculosis Infection: Clinical Manifestations, Diagnosis and Treatment

- » Modality: online
- » Duration: 6 months
- » Certificate: TECH Global University
- » Credits: 18 ECTS
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtute.com/us/medicine/postgraduate-diploma/postgraduate-diploma-mycobacterium-tuberculosis-infection-clinical-manifestations-diagnosis-treatment](http://www.techtute.com/us/medicine/postgraduate-diploma/postgraduate-diploma-mycobacterium-tuberculosis-infection-clinical-manifestations-diagnosis-treatment)

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# 01

# Introduction

Tuberculosis is one of the deadliest infectious diseases. However, scientific advances in recent years have allowed the emergence of drugs that favor the recovery of patients and even reduce side effects after such a long treatment. This 100% online program provides the professional with a renewed knowledge of diagnostic methods, the most recently used pharmacology, treatment guidelines and a comprehensive overview of pulmonary and extrapulmonary tuberculosis. The simulation of practical cases provided by the teaching team will be one of the key tools for the health professional who wishes to apply the latest advances in this disease.





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*Renew your knowledge on tuberculosis  
and the latest treatments successfully  
applied in patients around the world”*

This program has an interdisciplinary vision that will allow the medical professional to broaden their knowledge about the infections that cause tuberculosis and improve the management of patients with this pathology. In this way, diagnostic techniques will be used and interpreted with rigor, the appropriate treatment will be prescribed according to efficacy and all this according to the latest scientific advances in this field.

The multidisciplinary teaching team, specialized in the area of infectious diseases, has designed a 100% online program in which diagnostic methods such as chromatographic identification and immunochromatography will be studied in depth, in addition to developing the application of techniques based on proteomics through the use of MALDI-TOF for the identification of the different species of the Mycobacterium complex. In addition, during the six months of this of this program, the existing drugs and their spectrum of action will be reviewed.

The infections that can produce Mycobacterium Tuberculosis Complex will have a special development in this teaching where pulmonary tuberculosis, tuberculous pleuritis and extrapulmonary tuberculosis, which includes clinical pictures such as genitourinary tuberculosis, osteo-articular, intestinal, miliary or meningeal, with their own characteristics and with a detailed study of each of them will be developed in depth.

A program with an eminently practical approach, which provides students with the ease of being able to take it comfortably, wherever and whenever they want. You will only need a device with an Internet access to keep abreast of the latest developments in tuberculosis. A modern approach with an extensive library of multimedia resources that can be downloaded for viewing at any time.

This **Postgraduate Diploma in Mycobacterium Tuberculosis Infection: Clinical Manifestations, Diagnosis and Treatment** 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 Medicine and Microbiology
- ♦ 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
- ♦ 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



*Learn, with this Postgraduate Diploma, which treatment to apply to a patient with tuberculosis, the adverse effects that may alter compliance and lead to a therapeutic failure"*

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*Experts in tuberculosis will guide you through the latest discoveries to address this disease in patients with resistance to commonly used drugs”*

The program's teaching staff includes professionals from the sector 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, the student will be assisted by an innovative interactive video system created by renowned and experienced experts.

*Gain a broad knowledge of the methods of sensitivity studies in microbiology laboratories with this Postgraduate Diploma.*

*Learn about new diagnostic techniques based on interferon gamma release (IGRA).*



# 02 Objectives

This Postgraduate Diploma provides students with a broad and comprehensive knowledge about the advantages and disadvantages of applying certain diagnostic methods for tuberculosis, as well as acquiring a renewed knowledge about the new antibiotics available and whose spectrum of action includes mycobacteria and the resistance of the most polyvalent antibiotics. Likewise, at the end of this 100% online program, the professional will be able to recognize clinical signs and symptoms, advance in the interpretation of laboratory findings and imaging studies. Multimedia content, specialized readings and practical cases will help students to achieve these goals.





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*Delve into the comprehensive management of both pulmonary and extrapulmonary clinical pictures caused by Mycobacterium Tuberculosis Complex"*



## General Objectives

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- ♦ In-depth study and updating of knowledge on infections caused by mycobacteria
- ♦ Have a broad body of knowledge of the available diagnostic methods and perform a detailed study of the drugs used in treatment, so as to optimize diagnoses and establish the most effective treatment guidelines with less adverse effects
- ♦ Comprehensively address and manage both pulmonary and extrapulmonary clinical pictures caused by Mycobacterium Tuberculosis Complex, so as to know how to recognize, diagnose and treat this type of infections
- ♦ Define and recognize the clinical, microbiological, diagnostic and therapeutic characteristics of infections caused by an important number of non-tuberculous mycobacteria





## Specific Objectives

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### Module 1. Mycobacterial Infection Diagnosis

- ♦ In-depth knowledge of which types of samples and methods of sample collection are the most appropriate to send to the laboratory
- ♦ Gain a deep understanding of the advantages and disadvantages of the main diagnostic methods so as to optimize diagnoses
- ♦ Know when and where (cultures, clinical samples) molecular biology techniques can be used to diagnose mycobacterial infections
- ♦ Know the other diagnostic techniques used, such as proteomics or diagnostic imaging

### Module 2. Medication and Treatments for Mycobacterial Infections

- ♦ Recognize the different populations to be treated in tuberculosis infection in order to design treatments with the appropriate drugs
- ♦ In-depth knowledge of the spectrum of action, dosage and most important adverse effects of the drugs used in the various treatments used in infections caused by these bacteria
- ♦ Know the new antibiotics available whose spectrum of action includes mycobacteria and can offer alternatives in infections caused by resistant mycobacteria
- ♦ Have in-depth knowledge of the most prevalent antibiotic resistances and understand the repercussions they may have when prescribing different treatments

### Module 3. Infections caused by Mycobacterium Tuberculosis Complex

- ♦ Learn the natural history of the disease caused by Mycobacterium Tuberculosis Complex
- ♦ Become deeply familiar with the pathogenesis of these infections and the diagnostic criteria according to the clinical features manifested in patients
- ♦ Recognize the clinical signs and symptoms, laboratory findings and imaging studies for the diagnosis of pulmonary tuberculosis and other forms of extrapulmonary tuberculosis
- ♦ Learn to make decisions regarding available treatment regimens



*The simulation of practical cases provided in this 100% online program will facilitate your understanding of the improvements in tuberculosis diagnosis and treatment"*

# 03

# Course Management

TECH offers its students a quality education within everyone's reach. With this philosophy, TECH carefully selects the entire teaching team that teaches each of its programs. Therefore, in this program, the medical professional has a broad faculty with experience in tuberculosis and infectious diseases. In addition, their professional experience in the areas of Microbiology and Infectious Diseases in reference hospitals guarantees that students will receive a close learning experience with great application in clinical consultations.





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*A team specialized in microbiology and infectious diseases will provide you with the latest knowledge in tuberculosis in this Postgraduate Diploma"*

## Management



### Dr. Sánchez Romero, Isabel

- Area Specialist in the Microbiology Department of the Puerta de Hierro Majadahonda University Hospital, Madrid
- PhD in Medicine and Surgery from the University of Salamanca
- Medical Specialist in Clinical Microbiology and Parasitology
- Member of the Spanish Society of Infectious Diseases and Clinical Microbiology
- Technical Secretary of the Madrid Society of Clinical Microbiology

## Professors

### Dr. Alarcón Cavero, Teresa

- Biologist Specialist in Microbiology, La Princesa University Hospital
- Head of Group 52 of the Research Institute of the La Princesa Hospital
- Degree in Biological Sciences with a major in Fundamental Biology from the Complutense University of Madrid
- Master's Degree in Medical Microbiology from the Complutense University of Madrid

### Dr. García, Diego Domingo

- Specialist in Microbiology and Parasitology
- Area Specialist in the Microbiology Department La Princesa University Hospital Madrid
- Teaching Collaboration Autonomous University of Madrid
- Doctorate in Microbiology and Parasitology, Faculty of Pharmacy, Complutense University of Madrid
- Graduate in Pharmacy. Complutense University of Madrid

**Dr. Callejas Díaz, Alejandro**

- ♦ Facultative Area Specialist. Infectious Diseases Section (Internal Medicine Department) at the Puerta de Hierro Majadahonda University Hospital (Madrid)
- ♦ Teaching Collaborator at the Autonomous University of Madrid
- ♦ Degree in Medicine from the Autonomous University Madrid
- ♦ PhD in Medicine and Surgery from the Autonomous University of Madrid
- ♦ Master's Degree in Infectious Diseases and Antimicrobial Treatment by the CEU Cardenal Herrera University

**Dr. Muñoz, Elena**

- ♦ Area Specialist in the Infectious Diseases Department (Internal Medicine Service) at the Puerta de Hierro Majadahonda University Hospital in Madrid
- ♦ Doctor in Medicine and Surgery at the Autonomous University of Madrid
- ♦ Degree in Medicine and Surgery from the Complutense University of Madrid

**Dr. Ramos Martínez, Antonio**

- ♦ Head of the Infectious Diseases Department of the Puerta de Hierro Majadahonda University Hospital
- ♦ Head of the Internal Medicine Department, Puerta de Hierro Majadahonda University Hospital
- ♦ Coordinator of Clinical Management of Covid patients of the Puerta de Hierro Majadahonda University Hospital
- ♦ Coordinator of the FEMI Infectious Diseases Working Group
- ♦ Teacher at the Autonomous University of Madrid
- ♦ PhD in Medicine from the Autonomous University in Madrid
- ♦ Degree in Medicine and Surgery from the Complutense University of Madrid

**Dr. Zamarrón Fuertes, Pilar**

- ♦ Area Medical Specialist in charge of the Department of Multiresistant Bacteria and Antibiotic Resistance in the Microbiology Department of the Virgen de la Salud Hospital in Toledo
- ♦ Fellowship in the Tropical Medicine Unit of the Ramón y Cajal Hospital
- ♦ Medical Specialist in Microbiology at the Montepíncipe Hospital
- ♦ Medical Specialist in Microbiology at the Mérida Hospital
- ♦ Doctorate in Medicine and Surgery, University of Alcalá
- ♦ Degree in Medicine and Surgery from the Complutense University of Madrid
- ♦ Resident Medical Intern in Microbiology and Parasitology at the Ramón y Cajal Hospital

**Dr. Pintos Pascual, Ilduara**

- ♦ Assistant Physician of the Internal Medicine Department at the Puerta de Hierro Majadahonda University Hospital
- ♦ PhD in Medicine and Surgery from the Autonomous University of Madrid
- ♦ Degree in Medicine, University of Alcalá Henares

# 04

## Structure and Content

The syllabus of this program has been developed by a teaching staff specialized in infectious diseases and with extensive experience in this field in reference centers. In 3 modules the main diagnostic techniques, especially chromatography, immunochromatography or MALDI-TOF in the identification of mycobacteria, are shown to the health professional. Subsequently, students will delve into the most commonly used antibiotics such as Linezolid or Levofloxacin, to finally delve into the treatment guidelines based on their efficacy and recent studies on tuberculosis. The Relearning system, based on the reiteration of content, will facilitate the acquisition of up-to-date knowledge at the academic forefront.







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*Do you want to learn more about the latest antibiotics used to treat tuberculosis and their side effects? The teaching team of this specialization will show you the advances achieved in this field"*

## Module 1. Mycobacterial Infection Diagnosis

- 1.1. Clinical Suspicion
  - 1.1.1. Sample Collection
- 1.2. Tuberculin Test
  - 1.2.2. Booster Effect
  - 1.2.3. Inconveniences
- 1.3. Diagnosis by IGRA
  - 1.3.2. Commercial Systems
  - 1.3.3. Advantages and Disadvantages
- 1.4. Microscopy
  - 1.4.1. Conventional Stains
  - 1.4.2. Stains for Fluorescence Microscopy
- 1.5. Culture
  - 1.5.1. Pre-Treatment Phase
  - 1.5.2. Cultivation in Solid Media
  - 1.5.3. Cultivation in Liquid Media
  - 1.5.4. Cultures in Automated Systems
- 1.6. Phenotypic Identification Techniques
  - 1.6.1. Microscopy and Morphology
  - 1.6.2. Biochemical Tests
- 1.7. Molecular Identification Techniques
  - 1.7.1. Types
  - 1.7.2. On Direct Sampling
  - 1.7.3. On Colony Grown in Cultures
- 1.8. Others Diagnostic Methods
  - 1.8.1. Chromatographic Identification
  - 1.8.2. Immunochromatography
- 1.9. MALDI-TOF in Mycobacteria Identification
- 1.10. Diagnostic Imaging

## Module 2. Medication and Treatments for Mycobacterial Infections

- 2.1. Bacterial Populations to be Treated
- 2.2. Bactericidal Antibiotics
  - 2.2.1. Isoniazid
  - 2.2.2. Rifampicin
  - 2.2.3. Ethambutol
  - 2.2.4. Streptomycin
- 2.3. Sterilizing Antibiotics
  - 2.3.1. Pyrazinamide
  - 2.3.2. Rifampicin
- 2.4. Second-Line Antibiotics
  - 2.4.1. Aminoglycosides
  - 2.4.2. Fluoroquinolones
  - 2.4.3. PAS
- 2.5. New Antibiotics
  - 2.5.1. Linezolid
  - 2.5.2. Levofloxacin
  - 2.5.3. Others
- 2.6. Treatment Guidelines
  - 2.6.1. Tuberculous Infections
  - 2.6.2. Infections from Other Mycobacteria
- 2.7. Sensitivity Studies in Mycobacteria
  - 2.7.1. Indications
  - 2.7.2. Proportion Technique
- 2.8. Sensitivity Studies in Liquid Media
- 2.9. Sensitivity Studies using Molecular Techniques
- 2.10. Antibiotic Resistance and its Impact on Treating Mycobacterial Infections

**Module 3.** Infections Caused by Mycobacterium Tuberculosis Complex

- 3.1. Natural Evolution of the Disease
  - 3.1.1. Immunopathology
- 3.2. Pathogenesis
- 3.3. Clinical Manifestations
  - 3.3.1. Diagnostic Criteria
- 3.4. Pulmonary Tuberculosis
  - 3.4.1. Primary Pulmonary Tuberculosis
  - 3.4.2. Post-Primary Pulmonary Tuberculosis
  - 3.4.3. Tuberculous Pleuritis
- 3.5. Miliary Tuberculosis
- 3.6. Genitourinary Tuberculosis
- 3.7. Osteoarticular Tuberculosis
- 3.8. Intestinal Tuberculosis and Peritonitis
- 3.9. Other Forms of Extrapulmonary Tuberculosis
- 3.10. Treatment Guidelines



*Learn about recent advances in the treatment of pulmonary, miliary and osteoarticular tuberculosis with this Postgraduate Diploma"*



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. 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, 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

This Postgraduate Diploma in Mycobacterium Tuberculosis Infection: Clinical Manifestations, Diagnosis and Treatment guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Diploma 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 program will allow you to obtain your **Postgraduate Diploma in Mycobacterium Tuberculosis Infection: Clinical Manifestations, Diagnosis and Treatment** 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** title 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 Diploma in Mycobacterium Tuberculosis Infection: Clinical Manifestations, Diagnosis and Treatment**

Modality: **online**

Duration: **6 months**

Accreditation: **18 ECTS**



future

health confidence people

education information tutors

guarantee accreditation teaching

institutions technology learning

community commitment

personalized service innovation

knowledge present

online training

development language

virtual classroom

**tech** global  
university

**Postgraduate Diploma**  
Mycobacterium  
Tuberculosis Infection:  
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