

# Postgraduate Certificate Environmental Microbiology



## Postgraduate Certificate Environmental Microbiology

- » Modality: online
- » Duration: 6 weeks
- » Certificate: TECH Technological University
- » Dedication: 8h/week
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtitute.com/us/engineering/postgraduate-certificate/environmental-microbiology](http://www.techtitute.com/us/engineering/postgraduate-certificate/environmental-microbiology)

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# 01

# Introduction

Finding beneficial bacteria that allow restoring the balance of ecosystems is one of the main objectives of scientists working in the field of Environmental Microbiology. A challenge taking into account the degradation of soils or the low quality of water in practically the entire world due to polluting elements. However, the achievements in this field show the relevance of this discipline and the need to have highly qualified profiles to be able to launch projects that will give great results. For this reason, this degree was born, which offers the graduate the most advanced knowledge about microorganisms, their relationship with the environment and their use for the recovery of minerals and energy.. All this, in a 100% online format and with multimedia teaching material that you can access 24 hours a day, from a computer with an internet connection.







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*With this 100% online Postgraduate Certificate you will be able to advance in the study and application of microorganisms for the recovery of contaminated soils and waters”*

Soil, water and air pollution is one of the main concerns of today's society. Various disciplines such as Environmental Microbiology are working to reverse this situation as soon as possible. Thus, it has been able to improve the quality of the water using beneficial bacteria or using said microorganisms to decontaminate water from heavy metals.

Undoubtedly, technology will contribute to the achievement of great successes in a field that presents a multidisciplinary approach in its search for the preservation and restoration of the balance of ecosystems. In this scenario, the Engineering professional has a wide range of possibilities to enter a field that is growing and of great interest to both private and public companies.

That is why TECH offers graduates this Postgraduate Certificate in Environmental Microbiology, which will provide them with the most advanced knowledge through innovative pedagogical tools. Thus, you will be able to delve into the cultivation of microorganisms, microbial evolution, quantitative ecology, virology or the microbial control of pests and disease-causing populations.

All in a program with a theoretical-practical approach, which you can take comfortably when and where you want. You only need an electronic device with an Internet connection to be able to access, at any time, the agenda hosted on the Virtual Campus. Without face-to-face, or fixed schedules, students also have the freedom to distribute the class load according to their needs. An excellent opportunity for the Engineering professional who wishes to advance in their field of work through a flexible Postgraduate Certificate compatible with the most demanding responsibilities.

This **Postgraduate Certificate in Environmental Microbiology** contains the most complete and up-to-date program on the market. The most important features include:

- ◆ The development of case studies presented by experts of Environmental Engineering
- ◆ 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 self-assessment can be used to improve learning
- ◆ Its special emphasis on innovative methodologies
- ◆ Theoretical lessons, questions for 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 whenever you want, from your computer with an Internet connection, to the most advanced content on biogeochemical cycles and microbiology”*

“

*The library of multimedia resources will show you the latest advances on the use of microorganisms for the production of fuel and biomass”*

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.

Its 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 an immersive education designed to learn in real situations.

The design of this program focuses on Problem-Based Learning, by means of which the professional must try to solve different professional practice situations that are presented throughout the academic course. For this purpose, the student will be assisted by an innovative interactive video system created by renowned experts.

*A 100% online university education, which will take you to learn about the latest techniques used in soil, waste and water management.*

*You have case studies of great practical use, prepared by specialists in Environmental Microbiology.*





# 02

# Objectives

TECH has designed this university program to provide the graduate with the most advanced and essential learning about Environmental Microbiology. To do this, it makes multimedia educational resources available to students, which will allow them, at the end of this program, to understand the physiological state of microorganisms in the environment and find the necessary solutions to restore environmental balance. The specialized teaching team, which is part of this teaching, will guide the students to achieve these goals.





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*You will be able to identify the main microorganisms and modern techniques used for the restoration of ecosystems”*



## General Objectives

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- ◆ Evaluate the possible application of modern techniques in environmental and industrial processes
- ◆ Know the importance of certain microorganisms for the recovery of areas affected by pollutants
- ◆ Understand the Microbial Community Dynamics
- ◆ Biodiversity Evolution







### Specific Objectives

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- ◆ Identify the basis of microbial diversity and its role in the biosphere
- ◆ Know the physiological state of microorganisms in the environment
- ◆ Understand modern techniques for estimating and interpreting biodiversity
- ◆ Analyze the importance of using microorganisms to solve environmental problems: water supply treatment, wastewater treatment and biomining techniques

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*You are facing a flexible qualification, which will lead you to achieve a quality university education, without neglecting other areas of your personal life”*



03

# Structure and Content

The study plan of this university program has been designed with the aim of offering, in just 6 weeks, the most relevant and current scientific information on Environmental Microbiology. The video summaries, the videos in detail, diagrams or complementary readings will be essential to understand the relationship of microbiology with Environmental Sciences, the study techniques used and the use of microorganisms to carry out water treatment. In addition, thanks to the Relearning system, the graduate will be able to advance in a much more natural way through the agenda of this degree.







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*A study plan that offers you a theoretical-practical vision of Environmental Microbiology and will allow you to advance firmly in your professional career”*



## Module 1. Environmental Microbiology

- 1.1. History of Microbiology
  - 1.1.1. History of Microbiology
  - 1.1.2. Development of Axenic Culture
  - 1.1.3. Relation between Microbiology to Environmental Sciences
- 1.2. Methods to Study Microorganisms
  - 1.2.1. Microscopy and Microscopy
  - 1.2.2. Grams Stain
  - 1.2.3. Microorganism Cultures
- 1.3. Microbial Cell Structure
  - 1.3.1. Bacteria
  - 1.3.2. Protozoa
  - 1.3.3. Fungi
- 1.4. Microbial Growth and Environmental Factors
  - 1.4.1. Microbial Evolution
  - 1.4.2. Genetic Evolutionary Basis
  - 1.4.3. Biodiversity Evolution
  - 1.4.4. Microbial Diversity
- 1.5. Microbial Metabolism
  - 1.5.1. Catabolism
  - 1.5.2. Anabolism
  - 1.5.3. Biosynthetic Pathways
- 1.6. Microbial Communities and Ecosystems
  - 1.6.1. Microbial Community Dynamics
  - 1.6.2. Ecosystems
- 1.7. Quantitative Ecology: Number, Biomass and Activity
  - 1.7.1. Sample Collection
  - 1.7.2. Processing Samples
  - 1.7.3. Hydro-Ecosphere
  - 1.7.4. Litho-Ecosphere





- 1.8. Biogeochemical Cycles and Microbiology
  - 1.8.1. Carbon Cycle
  - 1.8.2. Hydrogen Cycle
  - 1.8.3. Oxygen Cycle
  - 1.8.4. Nitrogen Cycle
  - 1.8.5. Sulfur Cycle
  - 1.8.6. Phosphorus Cycle
  - 1.8.7. Iron Cycle
  - 1.8.8. Other Cycles
- 1.9. Virology
  - 1.9.1. General Characteristics of Viruses
  - 1.9.2. Herpes Virus
  - 1.9.3. Hepatitis virus
  - 1.9.4. Immunodeficiency Virus
- 1.10. Microorganisms and the Environment
  - 1.10.1. Microorganisms in Mineral and Energy Recovery and Fuel and Biomass Production
  - 1.10.2. Microbial Pest and Disease-Causing Population Control
  - 1.10.3. Ecological Aspects of Biodeterioration Control and Soil, Waste and Water Management

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*With this Postgraduate Certificate you will be up-to-date on the use of certain beneficial bacteria to recover contaminated water”*



04

# 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"*



## Case Study to contextualize all content

Our program offers a revolutionary approach to developing skills and knowledge. Our goal is to strengthen skills in a changing, competitive, and highly demanding environment.

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*At TECH, you will experience a learning methodology that is shaking the foundations of traditional universities around the world”*



*You will have access to a learning system based on repetition, with natural and progressive teaching throughout the entire syllabus.*



*The student will learn to solve complex situations in real business environments through collaborative activities and real cases.*

### A learning method that is different and innovative

This TECH program is an intensive educational program, created from scratch, which presents the most demanding challenges and decisions in this field, both nationally and internationally. This methodology promotes personal and professional growth, representing a significant step towards success. The case method, a technique that lays the foundation for this content, ensures that the most current economic, social and professional reality is taken into account.

“*Our program prepares you to face new challenges in uncertain environments and achieve success in your career”*

The case method is the most widely used learning system in the best faculties in the world. The case method was developed in 1912 so that law students would not only learn the law based on theoretical content. It consisted of presenting students with real-life, complex situations for them to make informed decisions and value judgments on how to resolve them. In 1924, Harvard adopted it as a standard teaching method.

What should a professional do in a given situation? This is the question that you are presented with in the case method, an action-oriented learning method. Throughout the program, the studies will be presented with multiple real cases. They will have to combine all their knowledge and research, and argue and defend their ideas and decisions.

## Relearning Methodology

TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines 8 different teaching elements in each lesson.

We enhance the Case Study with the best 100% online teaching method: Relearning.

*In 2019, we obtained the best learning results of all online universities in the world.*

At TECH, you will learn using a cutting-edge methodology designed to train the executives of the future. This method, at the forefront of international teaching, is called Relearning.

Our university is the only one in the world authorized to employ this successful method. In 2019, we managed to improve our students' overall satisfaction levels (teaching quality, quality of materials, course structure, objectives...) based on the best online university indicators.





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.

This methodology has trained more than 650,000 university graduates with unprecedented success in fields as diverse as biochemistry, genetics, surgery, international law, management skills, sports science, philosophy, law, engineering, journalism, history, and financial markets and instruments. All this in a highly demanding environment, where the students have a strong socio-economic 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 training, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation for success.*

From the latest scientific evidence in the field of neuroscience, not only do we know how to organize information, ideas, images and memories, but we know that the place and context where we have learned something is fundamental for us to be able to remember it and store it in the hippocampus, to retain it in our long-term memory.

In this way, and in what is called neurocognitive context-dependent e-learning, the different elements in our program are connected to the context where the individual carries out their professional activity.



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.



### Classes

There is scientific evidence suggesting that observing third-party experts can be useful.

Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.



### Practising Skills and Abilities

They will carry out activities to develop specific skills and abilities in each subject area. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop in the context of the globalization that we are experiencing.



### 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.







#### Case Studies

Students will complete a selection of the best case studies chosen specifically for this program. Cases that are presented, analyzed, and supervised by the best specialists in the world.



#### 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".



#### 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.



05

# Certificate

The Postgraduate Certificate in Environmental Microbiology guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Technological University.







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

This **Postgraduate Certificate in Environmental Microbiology** contains the most complete and up-to-date program on the market.

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

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

Title: **Postgraduate Certificate in Environmental Microbiology**

Official N° of Hours: **150 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  
development language  
classroom



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