

# Postgraduate Certificate

## Pharmacology and Nutrition in Trauma in the ICU



## Postgraduate Certificate Pharmacology and Nutrition in Trauma in the ICU

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

Website: [www.techtute.com/us/medicine/postgraduate-certificate/pharmacology-nutrition-trauma-icu](http://www.techtute.com/us/medicine/postgraduate-certificate/pharmacology-nutrition-trauma-icu)

# Index

01

Introduction

---

*p. 4*

02

Objectives

---

*p. 8*

03

Course Management

---

*p. 12*

04

Structure and Content

---

*p. 18*

05

Methodology

---

*p. 24*

06

Certificate

---

*p. 32*

# 01

# Introduction

Critically ill patients present a set of metabolic and organic alterations, whose inadequate treatment and nutritional follow-up leads to malnutrition, with negative effects on their prognosis. For this reason, nutritional support is used, with benefits at different levels. Likewise, the correct administration of medications is a permanent challenge for Intensive Care teams. This is determined by the multiplicity of drugs that the patient receives and their extreme fragility, which exposes them to a high probability of error. For all these reasons, TECH offers professionals the opportunity to obtain a comprehensive academic program in this field, providing the latest didactic materials and applying a revolutionary learning methodology in its field: *Relearning*.



“

*Choose TECH! Update yourself with this Postgraduate Certificate and contribute to the successful recovery and rehabilitation of critical ICU patients"*

Pharmacology and Nutrition play crucial roles in the comprehensive management of trauma patients in Intensive Care Units (ICU). Trauma, whether resulting from motor vehicle accidents, falls or other serious injuries, can trigger complex physiological responses that affect the body's homeostasis. In this context, proper administration of drugs and provision of optimal nutrition are critical to enhance recovery and reduce complications.

The program will address the use of medications and nutritional strategies in patients with traumatic injuries in ICU. In this way, the physician will be able to select and manage medications for pain control and sedation. In addition, Nonsteroidal Anti-inflammatory Drugs (NSAIDs) and steroid drugs will also be needed to control the systemic inflammatory response, while antibiotics will be used to prevent or treat infections associated with the injuries. In addition to this, pharmacological therapies for the management of shock and coagulopathy will be analyzed.

Likewise, the graduate will delve into the importance of nutrition in the recovery of traumatized patients, considering energy, protein and micronutrient requirements. In practice, enteral nutrition will be recommended from early stages to maintain the integrity of the gastrointestinal tract and prevent muscle atrophy. Likewise, specialized formulas with immunomodulatory nutrients will be beneficial to modulate the inflammatory response and improve wound healing.

The completely online option of this Postgraduate Certificate in Pharmacology and Nutrition in Trauma in the ICU will give the professional the freedom to take it in the place and time they prefer, without the limitation of schedules. It will be as comfortable and simple as connecting through an electronic device with Internet access. In this way, the student will enjoy innovative multimedia content, benefiting from an innovative learning methodology in TECH. This is *Relearning*, which involves the repetition of key concepts to ensure optimal assimilation of content.

This **Postgraduate Certificate in Pharmacology and Nutrition in Trauma in the ICU** 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 experts in ICU Trauma Pharmacology and Nutrition
- ♦ 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 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 delve into a comprehensive approach to pain management, inflammation, infection prevention and nutritional optimization of the Severe Trauma patient"*

“

*You will master the use of Nonsteroidal Anti-inflammatory Drugs (NSAIDs) to relieve pain in the severely injured trauma patient, all thanks to state-of-the-art didactic materials”*

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

Its multimedia content, developed with the latest educational technology, will allow the professional a situated and contextual learning, that is, a simulated environment that will provide an immersive 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 academic year. For this purpose, the students will be assisted by an innovative interactive video system created by renowned and experienced experts.

*You will delve into the management of the Extracorporeal Membrane Oxygenation (ECMO) system, a mechanical ventilation equipment that performs respiratory function and cleans the blood.*

*You will analyze the most commonly used medications in the care of the severe trauma patient in the ICU. And in only 6 weeks.*



# 02 Objectives

The main objective of the program is to provide the physician with solid knowledge in Pharmacology and Nutrition, two fundamental pillars in the care of critically ill patients. Throughout this Postgraduate Certificate, you will delve into the most recent advances in pharmacotherapy, learning how to effectively manage pain, control inflammation and prevent infections. In addition, you will explore the specialized nutrition necessary to meet the metabolic challenges that accompany trauma. Likewise, a distinctive aspect of this academic program is the implementation of the pioneering *Relearning* methodology, which guarantees optimal assimilation of content through repetition of key concepts.







“

*Become a leader in Pharmacology and Nutrition in Trauma in the ICU! At TECH you will make your update an experience that will propel you in your profession"*



## General Objectives

---

- ♦ Delve into a thorough understanding of the anatomophysiological, pathophysiological, and clinical basis of severe traumatic injuries, as well as associated complications and comorbidities
- ♦ Effectively communicate injury prevention information to different audiences and utilize health promotion strategies
- ♦ Integrate quality and safety practices in the management of trauma patients, minimizing risks and optimizing outcomes
- ♦ Be aware of the specific nutritional requirements of severe trauma patients and develop appropriate nutrition plans
- ♦ Implement triage protocols in mass trauma situations and prioritize care





## Specific Objectives

---

- Select and administer specific medications for pain management, sedation and *shock* control in trauma
- Update knowledge on appropriate dosages and routes of administration for different medications used in trauma patients
- Delve into the side effects and possible complications of medications used in the management of trauma patients
- Learn the specific nutritional requirements of severe trauma patients and develop appropriate nutrition plans

“

*This program will guide you through each step, preparing you to meet the challenges of critical care with confidence and skill”*

# 03

## Course Management

This Postgraduate Certificate is not only distinguished by its innovative content, but also by the exceptional teaching team that has designed its innovative program. In this way, the physician will benefit from a deep theoretical knowledge, as well as immersion in daily clinical practice. The TECH faculty are passionate and dedicated professionals with vast experience in Pharmacology and Nutrition in the specific context of ICU Trauma. Each of these educators is committed to imparting information and inspiring and guiding students to excellence.





“

*TECH will provide you with access to the guidance and expertise of an exceptional teaching team that will make a difference in your career"*

## International Guest Director

Doctor George S. Dyer is an eminent orthopedic surgeon, specializing in **Upper Limb Traumatology and Complex Post Traumatic Reconstructions of the Shoulder, Elbow, Wrist and Hand**. In fact, he has served as an **Upper Limb Surgeon** at **Brigham and Women's Hospital** in Boston, where he has also held the prestigious **Barry P. Simmons Chair in Orthopedic Surgery**.

Therefore, one of his most significant contributions has been his work in **Haiti**, where he has had a lasting impact. After the devastating **earthquake** of 2010, he was one of the first surgeons to arrive in the country, providing assistance at a critical time. In doing so, he has worked closely with **local surgeons** and other **health professionals** to strengthen **Haiti's** capacity to manage **medical emergencies**. As such, his efforts have been instrumental in training a new generation of **Haitian orthopedic surgeons**, who demonstrated their skill and preparedness during the 2021 earthquake, handling the situation with great efficiency and professionalism.

Likewise, during his time as **Director of the Harvard Combined Orthopedic Residency Program**, he has strived to improve the **working and educational conditions** of the **residents**, fostering a more balanced and healthy work environment. This focus on resident well-being reflects his commitment to preparing future physicians and his concern for the **mental and professional health** of his colleagues.

As such, Doctor George S. Dyer's impact on his field has been recognized through various honors, such as the **Humanitarian Award** given by the **Hippocrates Society** at **Brigham and Women's Hospital**, as well as being named a **Top Doctor** in **Massachusetts**. These awards have underscored his influence and significant contribution to **global Orthopedic Surgery**, reflecting his dedication and commitment to all aspects of his career.



## Dr. Dyer, George S.

---

- ♦ Upper Limb Surgeon at Brigham and Women's Hospital, Boston, United States
- ♦ Barry P. Simmons Chair in Orthopedic Surgery at Brigham and Women's Hospital, Boston, United States
- ♦ Commandant Surgeon in the Medical Corps of the U.S. Navy
- ♦ Director of the Harvard Combined Orthopedic Residency Residency Program
- ♦ Fellowship in Upper Limb Fellowship at Brigham and Women's Hospital and Children's Hospital
- ♦ Doctor of Medicine from Harvard Medical School
- ♦ B.A. in Political Science and Government from Harvard University
- ♦ Humanitarian Award from the Hippocratic Society of Brigham and Women's Hospital
- ♦ Massachusetts Top Doctor



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

## Management



### Dr. Bustamante Munguira, Elena

- ♦ Head of the Intensive Care Medicine Department of the Hospital Clínico de Valladolid
- ♦ Medical Director of the Health Area of Ibiza and Formentera
- ♦ Specialist in Intensive Care Medicine
- ♦ Teacher of refresher courses and workshops
- ♦ Illustrious Official College of Physicians of Salamanca Award
- ♦ Ramón Llul Award of the Patient Safety Unit
- ♦ PhD in Medicine and Surgery
- ♦ Master's Degree in Management
- ♦ Medical and Healthcare Management
- ♦ Master in Patient Safety

## Professors

### Dr. Pérez Gutiérrez, Jaime Eduardo

- ♦ Intensive Care Specialist
- ♦ Intensive Care Physician at Hospital Clínico Universitario de Valladolid
- ♦ General Physician at Hospital 12 de Octubre
- ♦ Graduate in Medicine from the Francisco de Vitoria University
- ♦ Member of: Member of the Spanish Society of Intensive Care Medicine, Critical Care and Coronary Units (SEMICYUC), Official College of Physicians of Madrid and Official College of Physicians of Valladolid





# 04

## Structure and Content

This academic program is composed of topics carefully designed to address specific aspects of Pharmacology and Nutrition in Trauma in the ICU situations. From pain management to advanced nutritional strategies, the curriculum has been developed to provide in-depth and dynamic knowledge. In this way, the specialist will address emerging therapies and best practices supported by the latest scientific evidence. The program is based on an innovative learning methodology: *Relearning*, which reinforces key concepts through repetition, ensuring a deep and lasting assimilation of the contents.



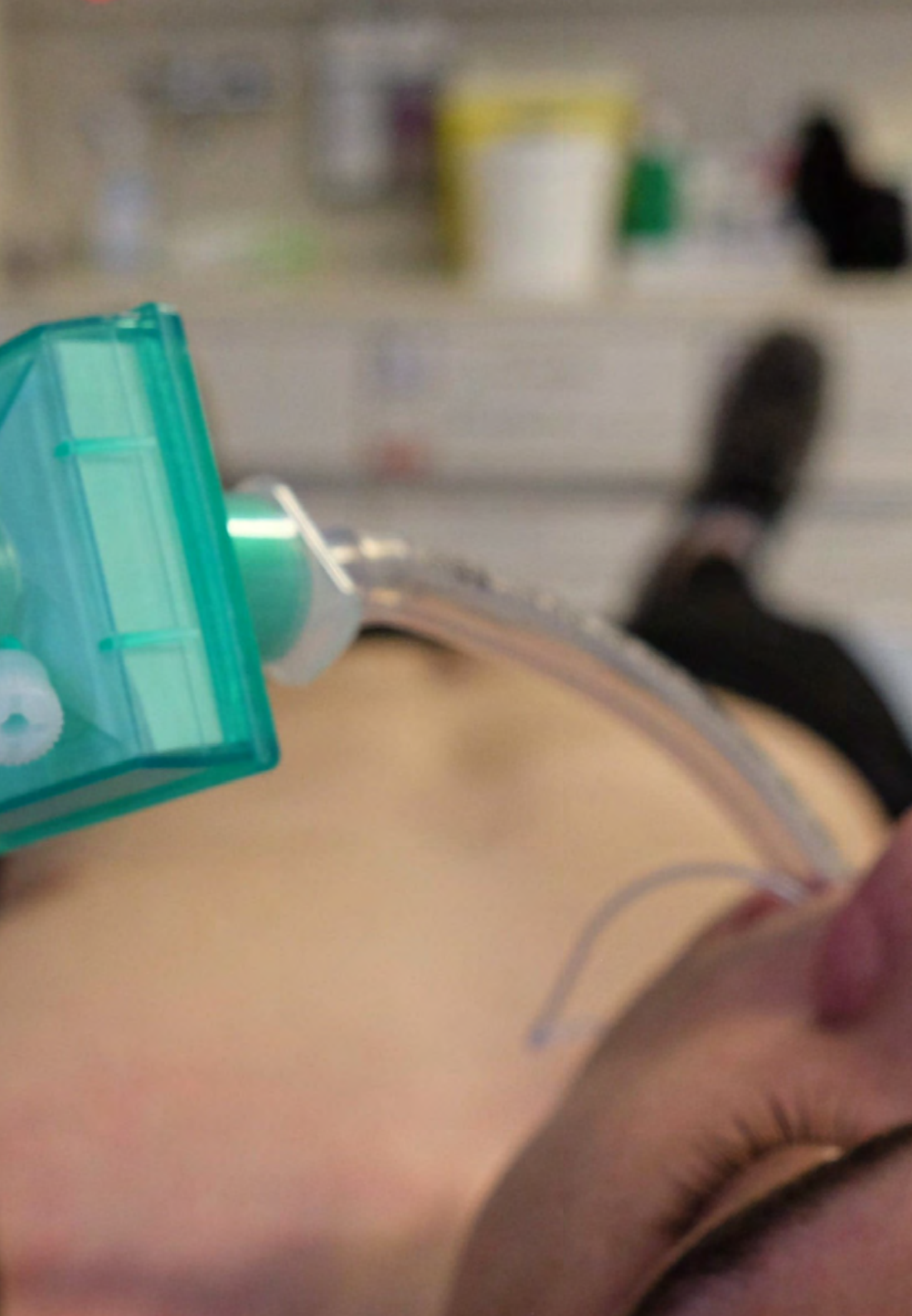
“

*You will dive into specific nutritional strategies for trauma patients, addressing metabolic challenges and optimizing their recovery”*

## Module 1. Trauma Pharmacology and Nutrition

- 1.1. Indications for sedation
  - 1.1.1. Sedation
  - 1.1.2. Physiological response to pain
    - 1.1.2.1. Pain Control
    - 1.1.2.2. Control of sedation
- 1.2. Drugs commonly used in the care of the severely traumatized patient
  - 1.2.1. Drugs:
  - 1.2.2. Hypnotics: intravenous sedatives
    - 1.2.2.1. Thiopental
    - 1.2.2.2. Etomidate
    - 1.2.2.3. Ketamine
    - 1.2.2.4. Propofol
    - 1.2.2.5. Benzodiazepines
  - 1.2.3. Muscle relaxants
    - 1.2.3.1. Depolarizing neuromuscular relaxants
    - 1.2.3.2. Non-depolarizing neuromuscular relaxants
    - 1.2.3.3. Anticholinesterase drugs
  - 1.2.4. Opioid Analgesics
    - 1.2.4.1. Pure Agonists
    - 1.2.4.2. Pure antagonists
  - 1.2.5. Inotropic agents
    - 1.2.5.1. Adrenaline
    - 1.2.5.2. Dopamine
    - 1.2.5.3. Dobutamine
- 1.3. Sedation analgesia guidelines
  - 1.3.1. Short-duration sedo analgesia
  - 1.3.2. Prolonged Sedo analgesia guideline
  - 1.3.3. Conclusions



- 
- 1.4. Minor analgesics
    - 1.4.1. Analgesia
    - 1.4.2. Drugs and dosage
      - 1.4.2.1. NSAIDs
      - 1.4.2.2. Nonsteroidal Anti-Inflammatory Drugs
      - 1.4.2.3. Patient-controlled analgesia
  - 1.5. Regional Thorax and Abdomen Analgesia
    - 1.5.1. Indications
    - 1.5.2. Classification
      - 1.5.2.1. Central Blocks
      - 1.5.2.2. Peripheral blocks
      - 1.5.2.3. Fascicular blocks
    - 1.5.3. Procedures used in Thorax and Abdomen
    - 1.5.4. Procedures used on the Upper Limb and Lower Limb
  - 1.6. Neuromuscular Blockade
    - 1.6.1. Blockade
    - 1.6.2. Indications
    - 1.6.3. Classification
      - 1.6.3.1. Depolarizing agents
      - 1.6.3.2. Non-depolarizing
    - 1.6.4. Monitoring
  - 1.7. Delirium
    - 1.7.1. Delirium
    - 1.7.2. Definition and scales
    - 1.7.3. Risk Factors
    - 1.7.4. Classification and clinical
      - 1.7.4.1. Hyperactive delirium
      - 1.7.4.2. Hypoactive delirium
      - 1.7.4.3. Mixed delirium
    - 1.7.5. Management and Treatments
    - 1.7.6. Prevention of delirium in ICU

- 1.8. Monitoring. Analgesia and sedation scales
  - 1.8.1. Scales
  - 1.8.2. Causes of pain
  - 1.8.3. Clinical Symptoms
  - 1.8.4. Analgesia Scales
    - 1.8.4.1. Pain assessment in the conscious patient
      - 1.8.4.1.1. EVA Scale
      - 1.8.4.1.2. Numerical verbal scale
    - 1.8.4.2. Pain assessment in the intubated patient with non-deep sedation
      - 1.8.4.2.1. EVA Scale
      - 1.8.4.2.2. Numerical verbal scale
    - 1.8.4.3. Assessment of pain in the non-communicative patient or under deep sedation
      - 1.8.4.3.1. Campbell Scale
      - 1.8.4.3.2. ESCID Scale
  - 1.8.5. Sedation scales
    - 1.8.5.1. Ramsay Scale
    - 1.8.5.2. RASS Scale
    - 1.8.5.3. BIS monitoring
- 1.9. Prophylaxis and antimicrobial treatment in the polytraumatized patient
  - 1.9.1. Prophylaxis
  - 1.9.2. Indications for Prophylaxis
    - 1.9.2.1. Most frequent antibiotic guidelines in polytraumatized patients
  - 1.9.3. Infections related to fractures
  - 1.9.4. Pneumonia
  - 1.9.5. Infections related to cranioencephalic traumatism





- 1.10. Nutrition
  - 1.10.1. Nutrition
  - 1.10.2. Indications for nutritional support in trauma
    - 1.10.2.1. When to initiate nutritional support
    - 1.10.2.2. Assessment of requirements
    - 1.10.2.3. Micronutrients
    - 1.10.2.4. Type of diet and follow-up
  - 1.10.3. Complications
  - 1.10.4. Monitoring
    - 1.10.4.1. Introduction
    - 1.10.4.2. Monitoring
    - 1.10.4.3. Nutritional risk analysis
    - 1.10.4.4. Imaging technique
  - 1.10.5. Nutrition in Special Situations
    - 1.10.5.1. Abdominal Trauma
    - 1.10.5.2. Spinal trauma
    - 1.10.5.3. Barbiturate coma
    - 1.10.5.4. ECMO

“Benefit from an innovative learning methodology based on Relearning, which reinforces key concepts through repetition”

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.





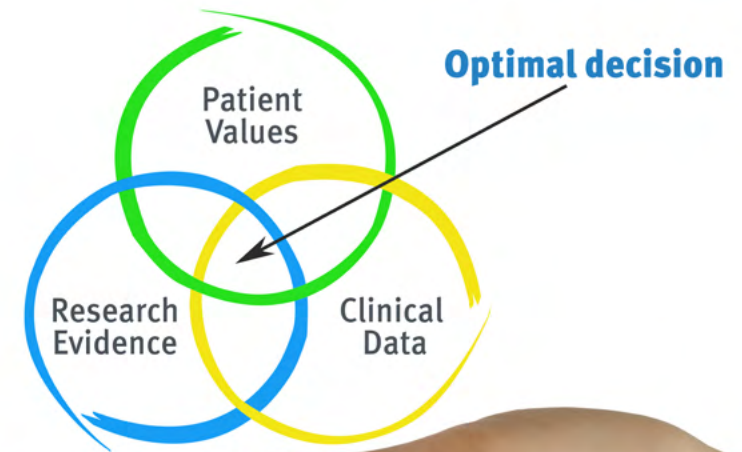
“

*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 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.

“

*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 Certificate in Pharmacology and Nutrition in Trauma in the ICU guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Global University.





“

*Successfully complete this program  
and receive your university certification  
without traveling or complex paperwork”*

This program will allow you to obtain your **Postgraduate Certificate in Pharmacology and Nutrition in Trauma in the ICU** 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 Certificate in Pharmacology and Nutrition in Trauma in the ICU**

Modality: **online**

Duration: **6 weeks**

Accreditation: **6 ECTS**





**Postgraduate Certificate**  
Pharmacology and Nutrition  
in Trauma in the ICU

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

# Postgraduate Certificate

## Pharmacology and Nutrition in Trauma in the ICU