

# Postgraduate Certificate Transcutaneous Electrical Stimulation in Physical Activity and Sport

Endorsed by the NBA





## Postgraduate Certificate Transcutaneous Electrical Stimulation in Physical Activity and Sport

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

Website: [www.techtute.com/us/sports-science/postgraduate-certificate/transcutaneous-electrical-stimulation-physical-activity-sport](http://www.techtute.com/us/sports-science/postgraduate-certificate/transcutaneous-electrical-stimulation-physical-activity-sport)

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# 01

# Introduction

The use of transcutaneous electrical stimulation is gaining more and more strength in the treatment of muscle pain, due to the remarkable benefits it can bring to the injured person. Therefore, this specific training for sports science professionals acquires a higher level of interest in this field, where the introduction of these tools allows better recoveries in athletes. If you want to obtain a superior knowledge in this area, do not think twice and train with us.



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*We offer you superior training in transcutaneous electrical stimulation to provide more personalized care to injured athletes”*

Transcutaneous electrical stimulation is one of the main techniques used to reduce or eliminate pain. Its benefits derive from the possibility of emitting such electrical stimulation to localized areas, which are the focus that causes pain, so that the intervention becomes more efficient, achieving great improvements in injured people. Its use is increasingly widespread in the practice of rehabilitation professionals working with elite athletes, who are accustomed to performing high-level exercises in their daily practice.

Therefore, the specialization of these professionals is essential to achieve an effective application, improving both at a personal and professional level. In this context, at TECH we wanted to improve the training of all sports science professionals who work in the rehabilitation of injured athletes and who, therefore, can find in this technique a useful tool for their daily practice. In this way, we offer you this program that has an absolutely innovative methodology accompanied by a multitude of practical cases, which favors the understanding of the intensive theoretical part that we provide.

One of the main advantages of this program is that, since it is 100% online, it is the student who decides where and when to study. Without having to face any kind of limitation, either in terms of time or travel to a physical location. All this, with the intention of facilitating to the maximum the possibility of study for professionals who must combine their training with the rest of their daily obligations.

This **Postgraduate Certificate in Transcutaneous Electrical Stimulation in Physical Activity and Sport** 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 in electrotherapy.
- 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
- News on the role of the sports science professional in the application of electrotherapy
- Practical exercises where self-assessment can be used to improve learning
- Algorithm-based interactive learning system for decision-making in the situations that are presented to the student.
- Its special emphasis on research methodologies on electrotherapy applied to sports sciences
- 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



*Immerse yourself in the study of this high-level Postgraduate Certificate and improve your skills as a sports professional"*

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*This Postgraduate Certificate is the best investment you can make in the selection of a refresher program for two reasons: in addition to updating your knowledge in electrotherapy, you will obtain a certificate from the leading online university in Spanish: TECH”*

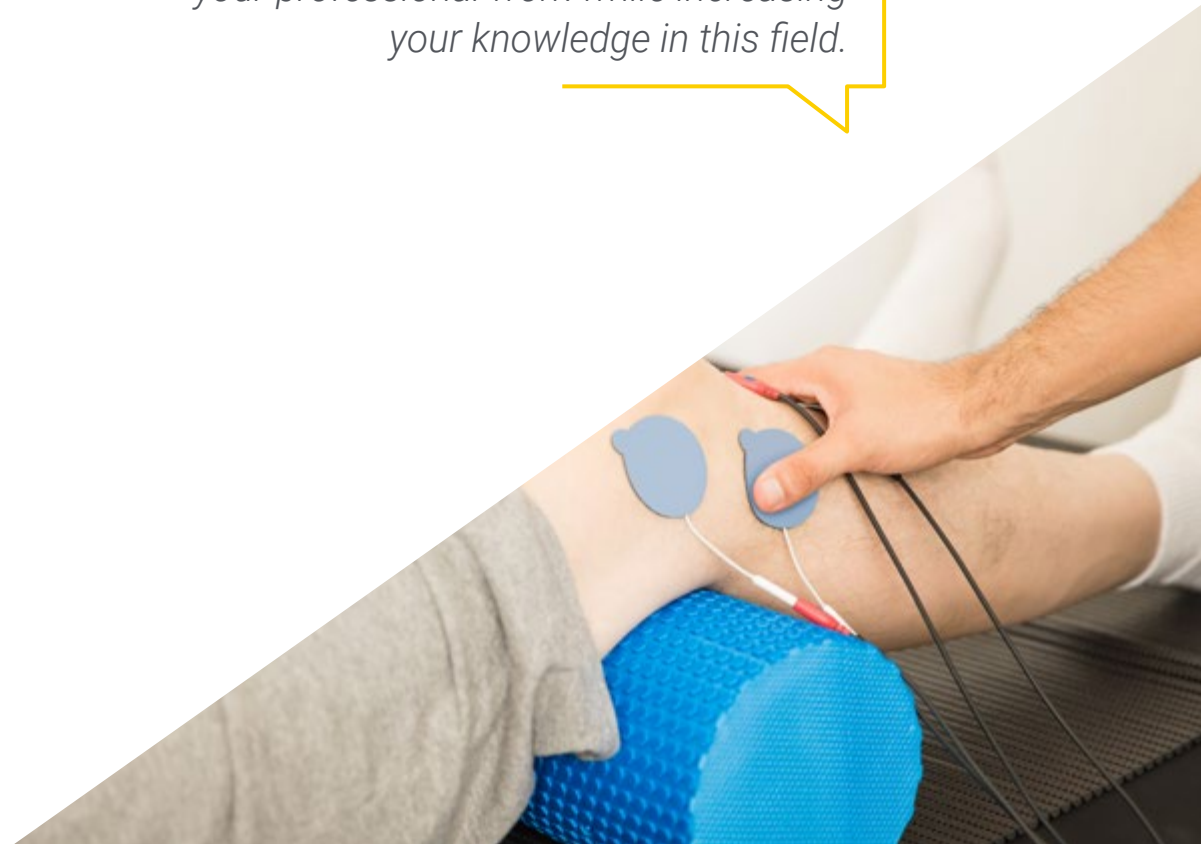
The teaching staff includes professionals from the field of sports science, who bring their experience to this training program, as well as renowned specialists from leading societies and prestigious universities.

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 professionals must try to solve the different Laboral Lawsuits practice situations that arise during the academic year. For this purpose, the professional will be assisted by an innovative interactive video system created by renowned experts in transcutaneous electrical stimulation with extensive experience.

*This course allows training in simulated environments, which provide immersive learning programmed to train for real situations.*

*This 100% online Postgraduate Certificate will allow you to balance your studies with your professional work while increasing your knowledge in this field.*



# 02 Objectives

The Postgraduate Certificate in Transcutaneous Electrical Stimulation in Physical Activity and Sport is oriented to help the sports science professional in their daily practice in situations where the application of electrotherapy is necessary.





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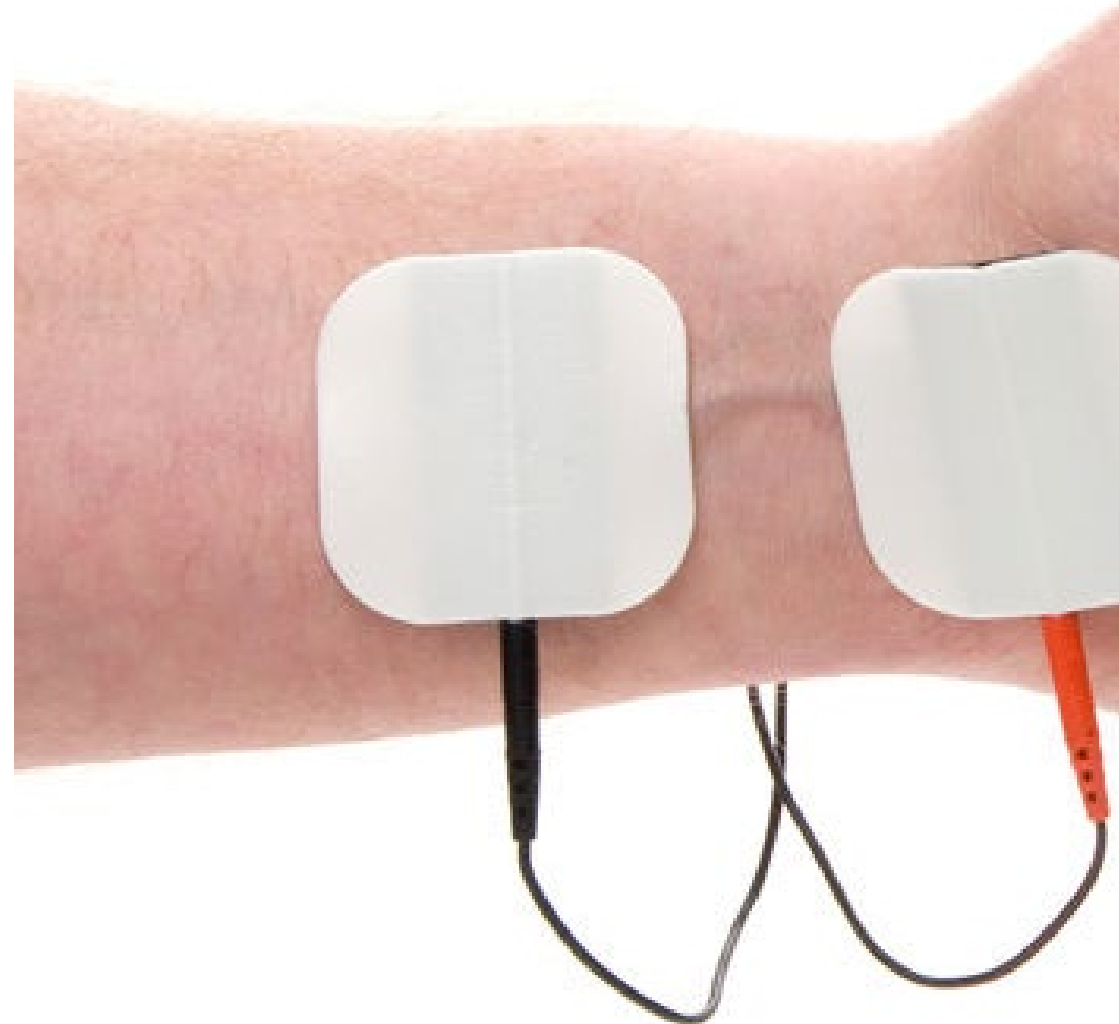
*This Postgraduate Certificate is designed for you to update your knowledge in electrotherapy, with the use of the latest educational technology, to contribute with quality and safety to decision making in this new field"*



## General Objectives

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- Update the knowledge of sports science professionals in the field of electrotherapy.
- Promote work strategies based on a comprehensive approach to the patient as a standard model for achieving excellent care
- Encourage the acquisition of technical skills and abilities, through a powerful audiovisual system, and the possibility of development through online simulation workshops and/or specific education
- Encourage professional stimulation through continuous education and research





## Specific Objectives

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- ◆ Expand your knowledge of new applications of invasive electrotherapy for pain modulation and tissue regeneration



*The sports field requires prepared professionals and we give you the keys to position yourself among the professional elite"*

03

# Course Management

Our team of teachers, experts in electrotherapy, has a wide prestige in the profession and are professionals with years of teaching experience who have come together to help you give a boost to your profession. To this end, they have developed this program with recent updates in the field that will allow you to train and increase your skills in this sector.





“

*Learn from the best professionals and  
become a successful professional yourself”*

## Management



### Dr. León Hernández, Jose Vicente

- Doctorate in Physiotherapy from the Rey Juan Carlos University
- Degree in Chemical Sciences from the Complutense University of Madrid, specializing in Biochemistry.
- Diploma in Physiotherapy from the Alfonso X el Sabio University.
- Master's Degree in the Study and Treatment of Pain from the Rey Juan Carlos University

## Professors

### Mr. Suso Martí, Luis

- ◆ Degree in Physiotherapy
- ◆ Master's Degree in "Advanced Physiotherapy in Pain Management".
- ◆ Doctoral candidate

### Mr. Cuenca Martínez, Ferrán

- ◆ Degree in Physiotherapy
- ◆ Master's Degree in "Advanced Physiotherapy in Pain Management".
- ◆ Doctoral candidate

### Mr. Gurdíel Álvarez, Francisco

- ◆ Degree in Physiotherapy
- ◆ Postgraduate Diploma in Orthopedic Manual Therapy and Myofascial Pain Syndrome
- ◆ Professional Master's Degree in Advanced Physiotherapy in Musculoskeletal Pain Management

### Ms. Merayo Fernández, Lucía

- ◆ Degree in Physiotherapy
- ◆ Professional Master's Degree in Advanced Physiotherapy in Musculoskeletal Pain Management

### Mr. Losana Ferrer, Alejandro

- ◆ Physiotherapist
- ◆ Professional Master's Degree in Advanced Physiotherapy in Musculoskeletal Pain Management
- ◆ Postgraduate Diploma in Neuro-Orthopedic Manual Therapy
- ◆ University Advanced Training in Therapeutic Exercise and Invasive Physiotherapy for Musculoskeletal Pain



04

# Structure and Content

The structure of the contents has been designed by a team of professionals from the best centers and universities in the country, aware of the relevance of current training to be able to intervene in situations that require the use of electrotherapy, and committed to quality teaching through new educational technologies.







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*We have the most complete and up-to-date scientific program on the market. We want to provide you with the best education”*

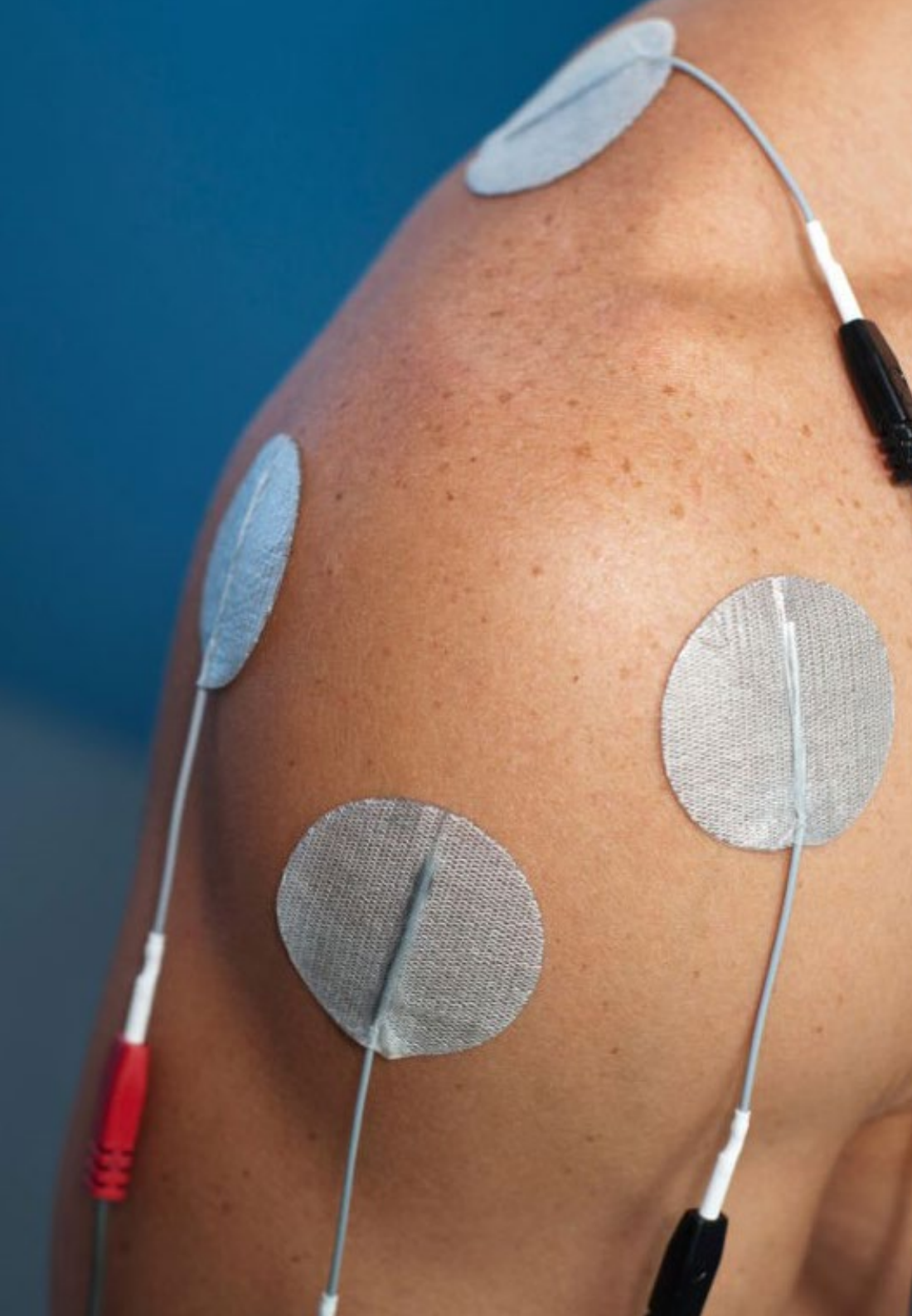
## Module 1. Transcutaneous Electrical Stimulation (TENS)

- 1.1. Fundamentals of Current Type used in TENS
  - 1.1.1. Introduction
    - 1.1.1.1. Theoretical Framework: Neurophysiology of Pain
      - 1.1.1.1.1. Introduction and Classification of Nociceptive Fibers
      - 1.1.1.1.2. Characteristics of Nociceptive Fibers
      - 1.1.1.1.3. Stages of the Nociceptive Process
    - 1.1.2. Anti-Nociceptive System: Gate Theory
      - 1.1.2.1. Introduction to Current Type used in TENS
      - 1.1.2.2. Basic Characteristics of TENS Type of Current (Pulse Shape, Duration, Frequency and Intensity)
  - 1.2. Classification of Current Type used in TENS
    - 1.2.1. Introduction
      - 1.2.1.1. Types of Electrical Current Classification
      - 1.2.1.2. According to Frequency (Number of Pulses Emitted per Second)
    - 1.2.2. Classification of Current Type used in TENS
      - 1.2.2.1. Conventional TENS
      - 1.2.2.2. TENS-Acupuncture
      - 1.2.2.3. Low-Rate Burst TENS
      - 1.2.2.4. Brief or Intense TENS
    - 1.2.3. Mechanisms of Action of the TENS Current Type
  - 1.3. Transcutaneous Electrical Nerve Stimulation (TENS)
    - 1.3.1. Introduction
    - 1.3.2. Neurophysiology of Nerve Cells
    - 1.3.3. Electrical Potential and Neurotransmission
    - 1.3.4. Ionic Concentrations and Equilibrium Potential
    - 1.3.5. All-or-Nothing Law
    - 1.3.6. Refractory Period
    - 1.3.7. Specificity and Transduction
    - 1.3.8. Sensory Receptors
- 1.4. Analgesic Effects of High-Frequency TENS
  - 1.4.1. Introduction
    - 1.4.1.1. Main Reasons for the Wide Clinical Application of Conventional TENS
  - 1.4.2. Hypoalgesia Derived from Conventional/High Frequency TENS
    - 1.4.2.1. Mechanism of Action
  - 1.4.3. Neurophysiology of Conventional TENS
    - 1.4.3.1. Gate Control
    - 1.4.3.2. The Metaphor
  - 1.4.4. Failure to Achieve Analgesic Effects
    - 1.4.4.1. Main Mistakes
    - 1.4.4.2. Main Problem of Hypoalgesia by Conventional TENS
- 1.5. Analgesic Effects of Low-Frequency TENS
  - 1.5.1. Introduction
  - 1.5.2. Mechanisms of Action of TENS-mediated Hypoalgesia Acupuncture: Endogenous Opioid System
  - 1.5.3. Mechanism of Action
  - 1.5.4. High-Intensity and Low-Frequency
    - 1.5.4.1. Parameters.
    - 1.5.4.2. Fundamental Differences from Conventional TENS Current
- 1.6. Analgesic Effects of "Burst-Type TENS"
  - 1.6.1. Introduction
  - 1.6.2. Description
    - 1.6.2.1. Burst-Type TENS Current Details
    - 1.6.2.2. Physical Parameters
    - 1.6.2.3. Sjölund and Eriksson
  - 1.6.3. Summary so far of the Physiological Mechanisms of both Central and Peripheral Analgesia
- 1.7. Importance of Pulse Width
  - 1.7.1. Introduction
    - 1.7.1.1. Physical Characteristics of Waves
      - 1.7.1.1.1. Waves Definition
      - 1.7.1.1.2. Other General Characteristics and Properties of a Wave
  - 1.7.2. Impulse Shape

- 1.8. Electrodes. Types and Application
  - 1.8.1. Introduction
    - 1.8.1.1. The TENS Current Device
  - 1.8.2. Electrodes
    - 1.8.2.1. General Characteristics
    - 1.8.2.2. Skin Care
    - 1.8.2.3. Other Types of Electrodes
- 1.9. Practical Applications
  - 1.9.1. TENS Applications
  - 1.9.2. Impulse Duration
  - 1.9.3. Impulse Shape
  - 1.9.4. Intensity
  - 1.9.5. Frequency (F)
  - 1.9.6. Electrode Type and Placement
- 1.10. Contraindications
  - 1.10.1. Contraindications to the use of TENS Therapy
  - 1.10.2. Recommendations for Safe TENS Practice



*A unique, key, and decisive educational experience to boost your professional development”*



# 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"*

### 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.

“

*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 we face 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.

With this methodology, we have 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, markets, and financial 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.



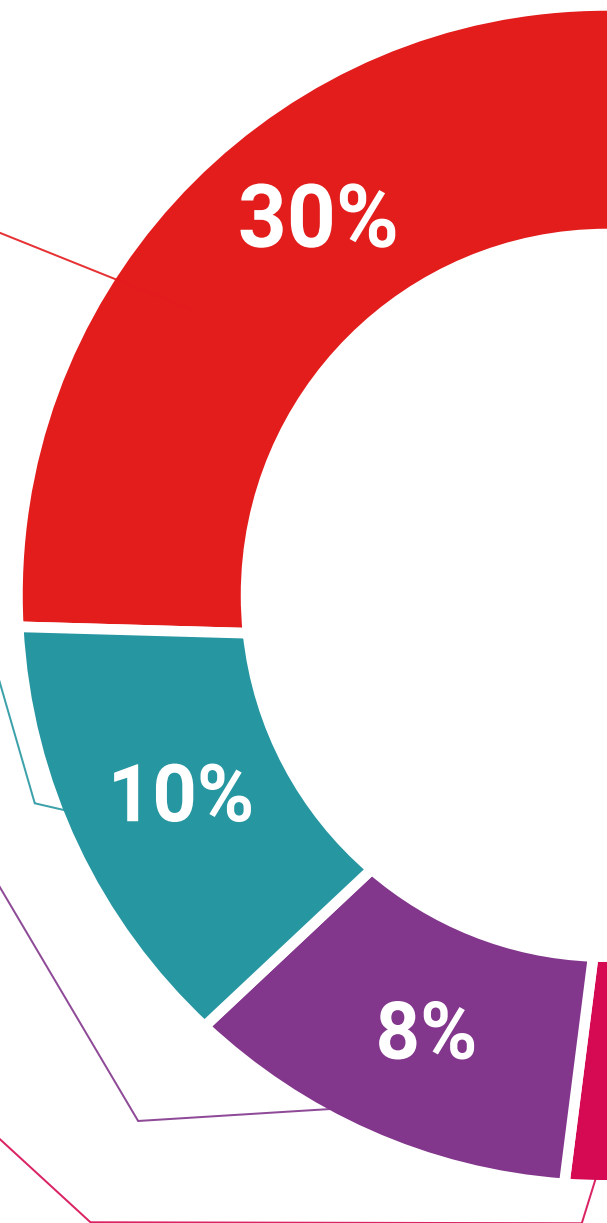
#### Practising Skills and Abilities

They will carry out activities to develop specific competencies and skills in each thematic 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 situation. 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.



# 06 Certificate

The Postgraduate Certificate in Transcutaneous Electrical Stimulation in Physical Activity and Sport guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate 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 Certificate in Transcutaneous Electrical Stimulation in Physical Activity and Sport** 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.

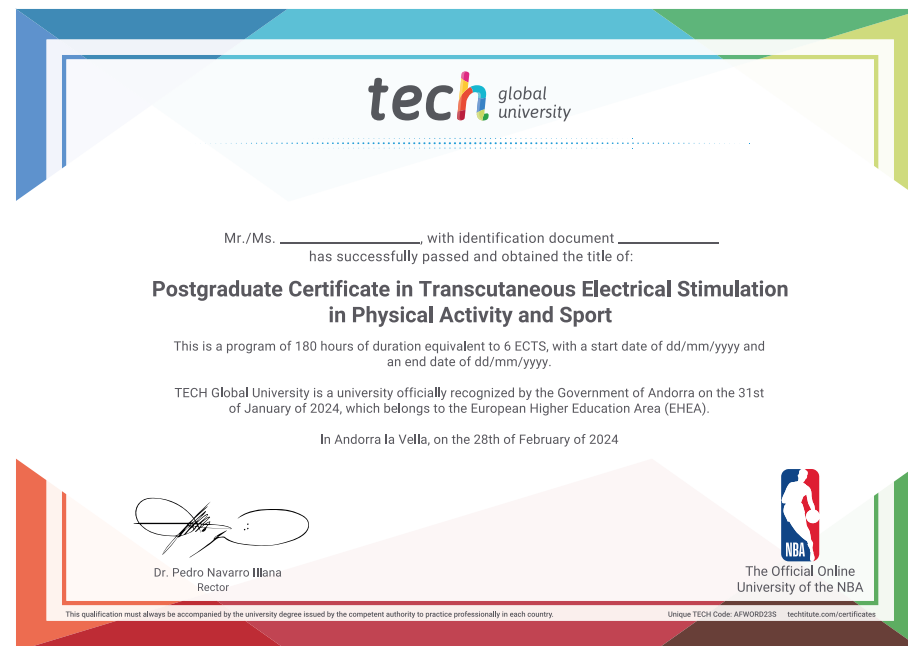
This **TECH Global University** title is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Postgraduate Certificate in Transcutaneous Electrical Stimulation in Physical Activity and Sport**

Modality: **online**

Duration: **6 weeks**

Accreditation: **6 ECTS**



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

future  
health confidence people  
education information tutors  
guarantee accreditation teaching  
institutions technology learning  
community commitment  
personalized service innovation  
knowledge present  
development languages  
virtual classroom



**Postgraduate Certificate**  
Transcutaneous Electrical  
Stimulation in Physical  
Activity and Sport

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