

# Postgraduate Diploma

## Muscular and Metabolic Physiology. Athlete and Parathlete Assessment

Endorsed by the NBA





## Postgraduate Diploma Muscular and Metabolic Physiology.Athlete and Parathlete Assessment

- » Modality: online
- » Duration: 6 months
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtute.com/pk/sports-science/postgraduate-diploma/postgraduate-diploma-muscular-metabolic-physiology-athlete-parathlete-assessment](http://www.techtute.com/pk/sports-science/postgraduate-diploma/postgraduate-diploma-muscular-metabolic-physiology-athlete-parathlete-assessment)

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# 01

# Introduction

This intensive program addresses the differences that exist between the different sports categories, according to their physical and cognitive limitations. In addition, in the development of this training, the student will be able to acquire the necessary knowledge to detect nutritional problems and establish a nutritional planning for athletes and parathletes. Likewise, it can be updated based on current scientific evidence on the management of ergogenic aids in parathletes, to improve their sports performance.







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*The Postgraduate Diploma allows training in simulated environments, which provide immersive learning programmed to train for real situations”*

The physiology of muscle, as well as the biochemistry that regulates the entire metabolic process resulting from physical activity, is the basis of any Sports Nutritionist. This intensive training explains the relationship of the muscle with the rest of the systems involved in physical activity, as well as the relevance of the different macronutrients in the physiological performance of the muscular system.

This program will approach biochemistry and exercise metabolism from a scientific and practical point of view, partially renouncing the complexity of the subject. Likewise, the student will learn how to monitor the athlete and para-athlete throughout the season, in which it is considered vital to know the basal values to know what their starting point is, and thus plan the different phases of the season to enhance their performance.

Within this program we can find a teaching staff of the highest level, made up of professionals closely related to Sports Nutrition, outstanding in their field and who lead lines of research and field work, as well as recognized specialists from leading societies and prestigious universities. The teachers of this Postgraduate Diploma are professionals who seek excellence in their teaching and work, teaching in university centers and working with athletes to maximize their performance.

This **Postgraduate Diploma in Muscular and Metabolic Physiology. Athlete and Parathlete Assessment** contains the most complete and up-to-date scientific program on the market. The most important features of the program include:

- The graphic, schematic, and eminently practical contents with which they are created contain information that is indispensable for professional practice.
- It contains exercises where the self-assessment process can be carried out to improve learning.
- Algorithm-based interactive learning system for decision-making for patients with feeding problems.
- 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 the most suitable diets for each type of athlete and you will be able to give more personalized advice”*

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*This Postgraduate Diploma may be the best investment you can make in the selection of a refresher program for two reasons: in addition to updating your knowledge in Muscular and Metabolic Physiology. Athlete and Parathlete Assessment, you will obtain a Postgraduate Diploma qualification from TECH Technological University"*

Its teaching staff includes professionals belonging to the field of nutrition, who contribute their work experience to this training, as well as renowned specialists from reference 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 training programmed to train 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. The professional will be assisted by an innovative interactive video system created by renowned and experienced experts in sports nutrition.

*Food and sport must go hand in hand, as it is essential that athletes follow a proper diet to help them improve their performance.*

*Immerse yourself in this comprehensive Postgraduate Diploma and improve your skills in nutritional counseling for athletes.*



# 02 Objectives

The main objective of the program is the development of theoretical and practical learning, so that the sports science professional can master in a practical and rigorous way the study of Sports Nutrition in Special Populations.





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*This refresher program will provide you with a sense of confidence in your daily work, which will help you grow both personally and professionally”*



## General Objectives

- ♦ Manage advanced knowledge on nutritional planning in professional and non-professional athletes for the healthy performance of physical exercise.
- ♦ Manage advanced knowledge on nutritional planning in professional athletes of different disciplines to achieve maximum sports performance.
- ♦ Manage advanced knowledge on nutritional planning in professional athletes of team disciplines to achieve maximum sports performance.
- ♦ Manage and consolidate the initiative and entrepreneurial spirit to implement projects related to nutrition in physical activity and sport.
- ♦ Know how to incorporate the different scientific advances to one's own professional field.
- ♦ Ability to work in a multidisciplinary environment.
- ♦ Advanced understanding of the context in which the area of their specialty is developed.
- ♦ Manage advanced skills to detect possible signs of nutritional alteration associated with sports practice.
- ♦ Manage the necessary skills through the teaching-learning process that will allow them to continue training and learning in the field of Sports Nutrition, both through the contacts established with teachers and professionals of this training, as well as in an autonomous way.
- ♦ Specialize in the structure of muscle tissue and its implication in sport.
- ♦ Know the energy and nutritional needs of athletes in different pathophysiological situations.
- ♦ Specialize in the energy and nutritional needs of athletes in different age and gender specific situations.
- ♦ Specialize in dietary strategies for the prevention and treatment of the injured athlete.
- ♦ Specialize in the energy and nutritional needs of children athletes.
- ♦ Specialize in the energy and nutritional needs of Paralympic athletes.



## Specific Objectives

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- ♦ Gain a deep knowledge of the structure of skeletal muscle.
- ♦ Understand in depth the functioning of skeletal muscle.
- ♦ Delve into the most important adaptations that occur in athletes.
- ♦ Delve into the mechanisms of energy production based on the type of exercise performed.
- ♦ Delve into the integration of the different energy systems that make up the energy metabolism of muscle.
- ♦ Biochemical interpretation to detect nutritional deficits or overtraining states.
- ♦ Interpretation of the different methods of body composition, to optimize the weight and fat percentage appropriate to the sport practiced.
- ♦ Monitoring of the athlete throughout the season.
- ♦ Planning of seasonal schedules according to individual requirements.
- ♦ Delve into the differences between the different categories of para-sportsmen and their physiological-metabolic limitations.
- ♦ Determine the nutritional requirements of the different para-sportsmen in order to establish a specific nutritional plan.
- ♦ Delve into the knowledge necessary to establish interactions between the intake of drugs in these athletes and nutrients, to avoid deficits.
- ♦ Understand the body composition of paraathletes in their different sport categories.
- ♦ Apply current scientific evidence on nutritional ergogenic aids.

03

# Course Management

Our teachers, made up of experts in Sports Nutrition, are well known in the profession and are professionals with years of teaching experience who have come together to help you boost your career. To this end, they have developed this Postgraduate Diploma with recent updates in the field that will allow you to train and increase your skills in this sector.







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

## Management



### Dr. Marhuenda Hernández, Javier

- ♦ Full Member of the Spanish Academy of Human Nutrition and Dietetics. Professor and researcher at UCAM.
- ♦ Ph.D. in Nutrition.
- ♦ Master's Degree in Clinical Nutrition.
- ♦ Graduate in Nutrition.

## Professors

### Arcusa, Raúl

- ♦ Graduate in Human Nutrition and Dietetics
- ♦ Master's Degree in Nutrition in Physical Activity and Sport.
- ♦ Anthropometrist ISAK level 1.
- ♦ Currently a Doctoral student in the Department of Pharmacy of the UCAM, researching Nutrition and Oxidative Stress, in addition to his work as a Nutritionist in the Youth Team of C.D. Castellón.
- ♦ Experience in different soccer teams in the Valencian community, as well as extensive experience in consultation in face-to-face clinic.





# 04

# Structure and Content

The structure of the contents has been designed by a team of professionals knowledgeable about the implications of training in daily practice, aware of the current relevance of Sports Nutrition education; and committed to quality teaching through new educational technologies.







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*This Postgraduate Diploma in Muscular and Metabolic Physiology. Athlete and Parathlete Assessment contains the most complete and up-to-date scientific program on the market”*

## Module 1. Muscle and Metabolic Physiology Associated with Exercise

- 1.1. Cardiovascular Adaptations Related to Exercise
  - 1.1.1. Increased Systolic Volume
  - 1.1.2. Decreased Heart Rate
- 1.2. Ventilatory Adaptations Related to Exercise
  - 1.2.1. Changes in the Ventilatory Volume
  - 1.2.2. Changes in Oxygen Consumption
- 1.3. Hormonal Adaptations Related to Exercise
  - 1.3.1. Cortisol
  - 1.3.2. Testosterone
- 1.4. Muscle Structure and Types of Muscle Fibers
  - 1.4.1. Muscle Fiber
  - 1.4.2. Type I Muscle Fiber
  - 1.4.3. Type II Muscle Fibers
- 1.5. The Concept of Lactic Threshold
- 1.6. ATP and Phosphagen Metabolism
  - 1.6.1. Metabolic Pathways for ATP Resynthesis during Exercise
  - 1.6.2. Phosphagen Metabolism
- 1.7. Carbohydrate Metabolism.
  - 1.7.1. Carbohydrate Mobilization during Exercise
  - 1.7.2. Types of Glycolysis
- 1.8. Functions of Lipids.
  - 1.8.1. Lipolysis
  - 1.8.2. Fat Oxidation during Exercise
  - 1.8.3. Ketone Bodies
- 1.9. Protein Metabolism.
  - 1.9.1. Ammonium Metabolism
  - 1.9.2. Amino Acid Oxidation
- 1.10. Mixed Bioenergetics of Muscle Fibers
  - 1.10.1. Energy Sources and their Relation to Exercise
  - 1.10.2. Factors Determining the Use of One or Another Energy Source during Exercise

## Module 2. The Evaluation of the Athlete at Different Moments of the Season

- 2.1. Biochemical Evaluation
  - 2.1.1. Blood count:
  - 2.1.2. Overtraining Markers
- 2.2. Anthropometric Evaluation
  - 2.2.1. Body Composition.
  - 2.2.2. ISAK Profile
- 2.3. Preseason
  - 2.3.1. High Workload
  - 2.3.2. Assuring Caloric and Protein Intake
- 2.4. Competitive Season
  - 2.4.1. Sports Performance
  - 2.4.2. Recovery between Games
- 2.5. Transition Period
  - 2.5.1. Vacation Period
  - 2.5.2. Changes in Body Composition
- 2.6. Travel
  - 2.6.1. Tournaments during the Season
  - 2.6.2. Off-season Tournaments (World Cups, European Cups and The Olympic Games)
- 2.7. Athlete Monitoring
  - 2.7.1. Basal Athlete Status
  - 2.7.2. Evolution during the Season
- 2.8. Sweat Rate Calculation
  - 2.8.1. Hydric losses
  - 2.8.2. Calculation Protocol
- 2.9. Multidisciplinary Work
  - 2.9.1. The Role of the Nutritionist in the Athlete's Environment
  - 2.9.2. Communication with the Rest of the Areas
- 2.10. Doping
  - 2.10.1. WADA List
  - 2.10.2. Anti-doping Tests

## Module 3. Para-Athletes

- 3.1. Classification and Categories in Para-Athletes
  - 3.1.1. What is a Para Athlete?
  - 3.1.2. How are Para Athletes Classified?
- 3.2. Sports Science in Para Athletes
  - 3.2.1. Metabolism and Physiology
  - 3.2.2. 2.2. Biomechanics
  - 3.2.3. 2.3. Psychology
- 3.3. Energy Requirements and Hydration in Para-Athletes
  - 3.3.1. Optimal Energy Demands for Training
  - 3.3.2. Hydration Planning before, during and after Training and Competitions
- 3.4. Nutritional Problems in the Different Categories of Para Athletes According to Pathology or Anomaly
  - 3.4.1. Spinal Cord Injuries
  - 3.4.2. Cerebral Palsy and Acquired Brain Injuries
  - 3.4.3. Amputees
  - 3.4.4. Vision and Hearing Impairment
  - 3.4.5. Intellectual Impairments
- 3.5. Nutritional Planning in Para Athletes with Spinal Cord Injury and Cerebral Palsy and Acquired Brain Injuries
  - 3.5.1. Nutritional Requirements (Macro and Micronutrients)
  - 3.5.2. Sweating and Fluid Replacement during Exercise
- 3.6. Nutritional Planning in Amputee Para Athletes
  - 3.6.1. Energy Requirements
  - 3.6.2. Macronutrients
  - 3.6.3. Thermoregulation and Hydration
  - 3.6.4. Nutritional Issues Related to Prosthetics
- 3.7. Planning and Nutritional Problems in Para Athletes with Vision-Hearing Impairment and Intellectual Impairment
  - 3.7.1. Sports Nutrition Problems with Visual Impairment: Retinitis Pigmentosa, Diabetic Retinopathy, Albinism, Stargardt's Disease and Hearing Pathologies.
  - 3.7.2. Sports Nutrition Problems in Para-Athletes with Intellectual Deficiencies: Down Syndrome, Autism and Asperger's and Phenylketonuria.
- 3.8. Body Composition in Para Athletes
  - 3.8.1. Measurement Techniques
  - 3.8.2. Factors Influencing the Reliability of Different Measurement Methods
- 3.9. Pharmacology and Nutrient Interactions
  - 3.9.1. Different Types of Drugs Taken by Para Athletes
  - 3.9.2. Micronutrient Deficiencies in Para Athletes
- 3.10. Ergogenic Aids
  - 3.10.1. Potentially Beneficial Supplements for Para Athletes
  - 3.10.2. Adverse Effects on Health and Contamination and Doping Problems Due to the Intake of Ergogenic Aids



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

# 05 Methodology

This training provides you with a different way of learning. Our methodology uses a cyclical learning approach: ***Re-learning***.

This teaching system is used 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 Re-learning, 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

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

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*With TECH you can experience a way of learning that is shaking the foundations of traditional universities around the world”*



*Our University is the first in the world to combine Harvard Business School case studies with a 100%-online learning system based on repetition.*



### A learning method that is different and innovative.

This Sports Science program at TECH Technological University is an intensive program that prepares you to face all the challenges in this field, both nationally and internationally. We are committed to promoting your personal and professional growth, the best way to strive for success, that is why at TECH you will use Harvard case studies, with which we have a strategic agreement that allows us to offer you material from the best university in the world.



*We are the only online university that offers Harvard materials as teaching materials on its courses"*

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

The case method is the most widely used learning system by 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.

In a given situation, what would you do? This is the question that you are presented with in the case method, an action-oriented learning method. Throughout the course, you will be presented with multiple real cases. You will have to combine all your knowledge, and research, argue, and defend your ideas and decisions.



## Re-Learning Methodology

Our University is the first in the world to combine Harvard University case studies with a 100%-online learning system based on repetition, which combines 8 different teaching elements in each lesson.

We enhance Harvard case studies with the best 100% online teaching method: Re-learning.

*In 2019 we obtained the best learning results of all Spanish-language 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 Re-learning.

Our University is the only one in Spanish-speaking countries licensed to incorporate 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 Spanish online university indicators.





In our program, learning is not a linear process, but rather a spiral (we 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.

*Re-learning 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 to success.*

Based on the latest evidence in neuroscience, not only do we know how to organize information, ideas, images, memories, but we also know that the place and context where we have learned something is crucial for us to be able to remember it and store it in the hippocampus, and 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.



In this program you will have access to the best educational material, prepared with you 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.

This content is then adapted in an audiovisual format that will create our way of working online, with the latest techniques that allow us to offer you high quality in all of the material that we provide you with.



### 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 our future difficult decisions.



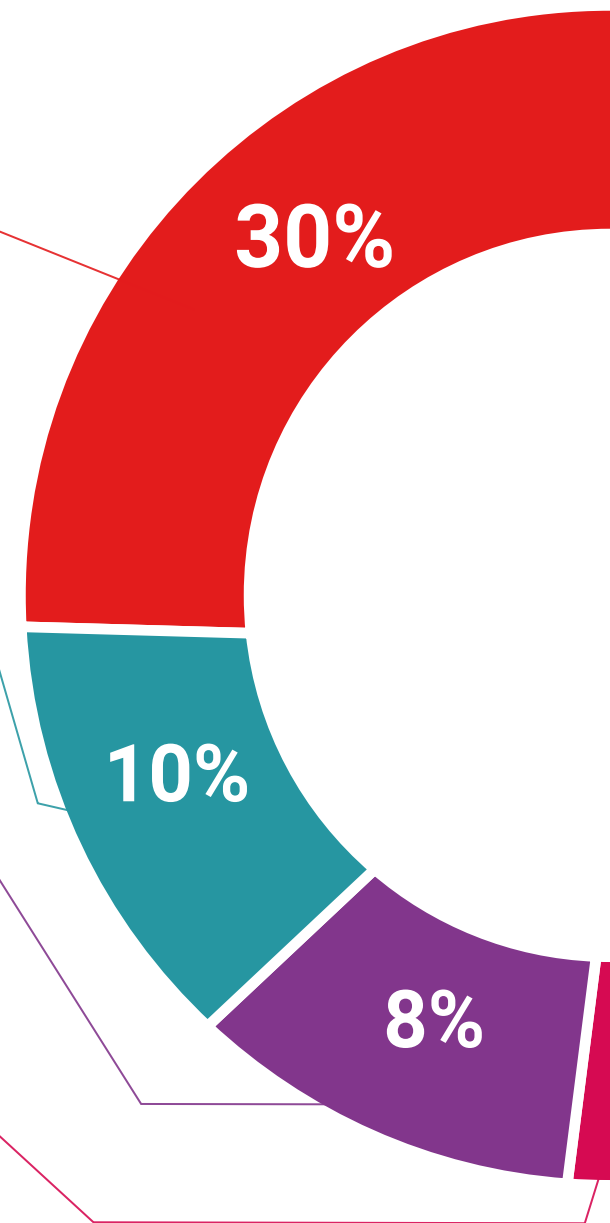
### Practising Skills and Abilities

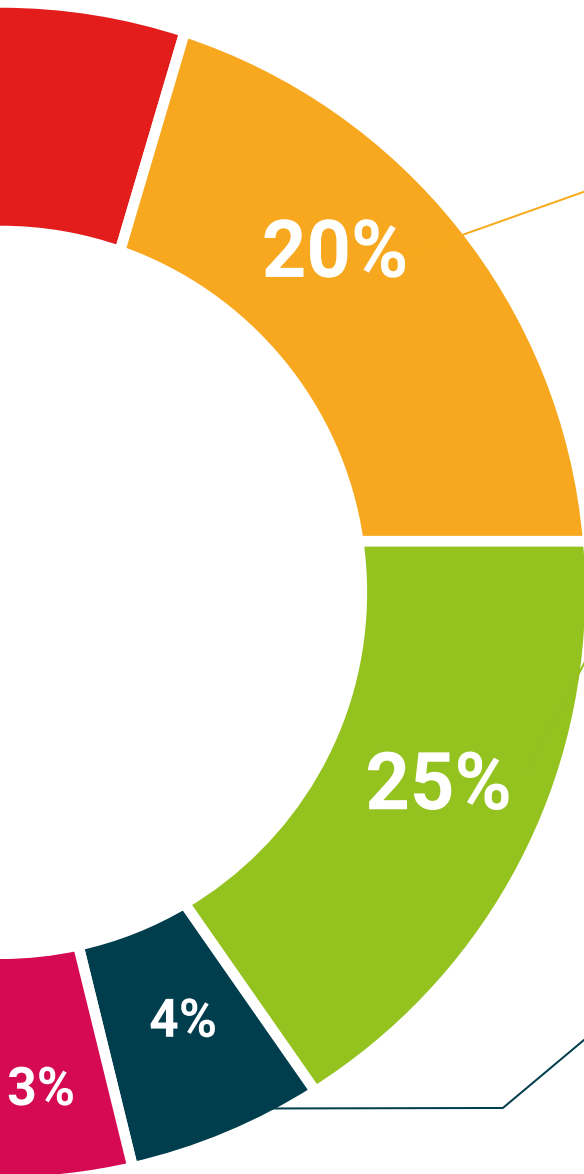
You will carry out activities to develop specific skills and abilities in each subject area. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop in the context of the globalization we live in.



### Additional Reading

Recent articles, consensus documents, international guides. In our virtual library you will have access to everything you need to complete your training.





#### Case Studies

You will complete a selection of the best case studies in the field used at Harvard. Cases that are presented, analyzed, and supervised by the best senior management specialists in Latin America.



#### Interactive Summaries

We present the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

This unique multimedia content presentation training system was awarded by Microsoft as a "European Success Story".



#### Testing & Re-testing

We periodically evaluate and re-evaluate your knowledge throughout the program. We do this on 3 of the 4 levels of Miller's Pyramid.



# 06

# Certificate

Through a different and stimulating learning experience, you will be able to acquire the necessary skills to take a big step in your training. An opportunity to progress, with the support and monitoring of a modern and specialized university, which will propel you to another professional level.





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*Add a to your CV a Postgraduate Diploma in Muscular and Metabolic Physiology. Athlete and Parathlete Assessment and become a highly competitive professional”*

This **Postgraduate Diploma in Muscular and Metabolic Physiology. Athlete and Parathlete Assessment** contains the most complete and up-to-date scientific program on the market.

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

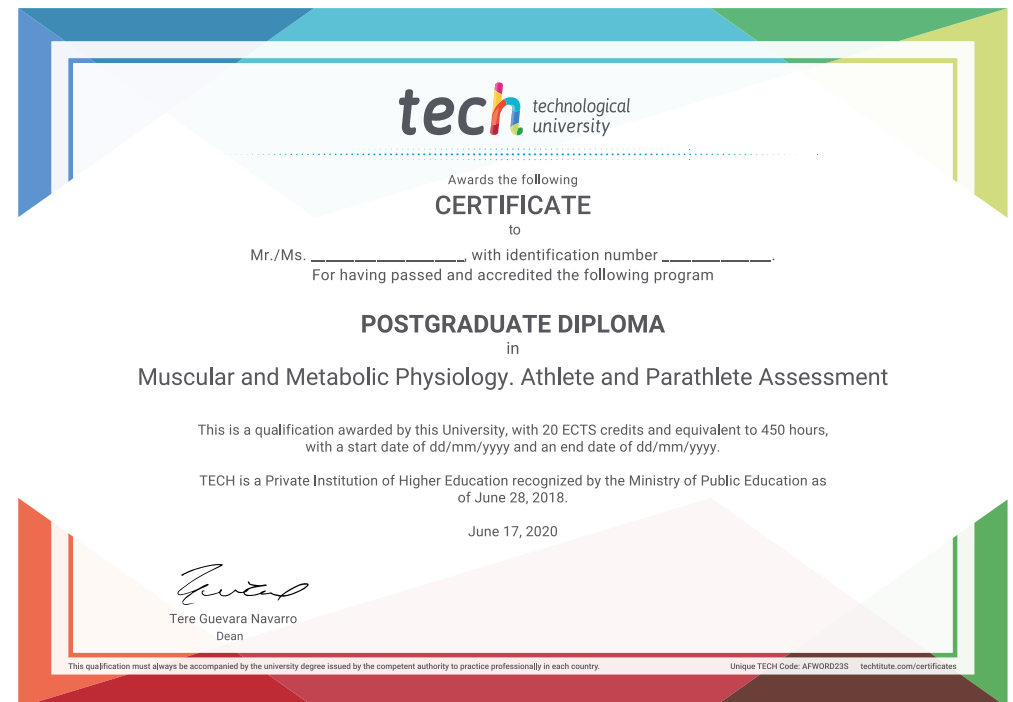
The certificate issued by **TECH Technological University** will reflect the qualification obtained in the Postgraduate Diploma, and meets the requirements commonly demanded by labor exchanges, competitive examinations, and professional career evaluation committees.

Title: **Postgraduate Diploma in Muscular and Metabolic Physiology. Athlete and Parathlete Assessment**

ECTS: **18**

Official Number of Hours: **450**

**Endorsed by the NBA**



\*Apostille Convention. In the event that the student wishes to have their paper certificate 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  
online training  
development language  
virtual classroom

**tech** universidad  
tecnológica

**Postgraduate Diploma**  
Muscular and Metabolic  
Physiology.Athlete  
and Parathlete Assessment

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