

# Postgraduate Certificate

## Muscular and Metabolic Physiology Related to Exercise

Endorsed by the NBA





## Postgraduate Certificate Muscular and Metabolic Physiology Related to Exercise

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

Website: [www.techtitute.com/us/sports-science/postgraduate-certificate/muscular-metabolic-physiology-related-exercise](http://www.techtitute.com/us/sports-science/postgraduate-certificate/muscular-metabolic-physiology-related-exercise)

# Index

01

Introduction

---

*p. 4*

02

Objectives

---

*p. 8*

03

Course Management

---

*p. 12*

04

Structure and Content

---

*p. 16*

05

Methodology

---

*p. 20*

06

Certificate

---

*p. 28*

01

# Introduction

This intensive course 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.

A unique opportunity to specialize and stand out in a sector with a high demand for professionals.





“

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

The muscle physiology, as well as the biochemistry that regulates the entire metabolic process resulting from physical activity is the basis of any Sports Nutritionist. This intensive course will approach biochemistry and exercise metabolism from a scientific and practical point of view, partially renouncing the complexity of the subject.

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. It has multimedia content that helps to acquire the knowledge taught, developed with the latest educational technology. At the same time, it will provide the student with situated and contextual learning, within a simulated environment that provides training focused on solving real problems.

As it is an online Postgraduate Certificate, the student is not conditioned by fixed schedules or the need to move to another physical location, but can access the contents at any time of the day, balancing their work or personal life with their academic life.

This **Postgraduate Certificate in Muscular and Metabolic Physiology Related to Exercise** 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"*



“

*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 Sports Nutrition, you will obtain a degree from the leading online university in spanish: TECH”*

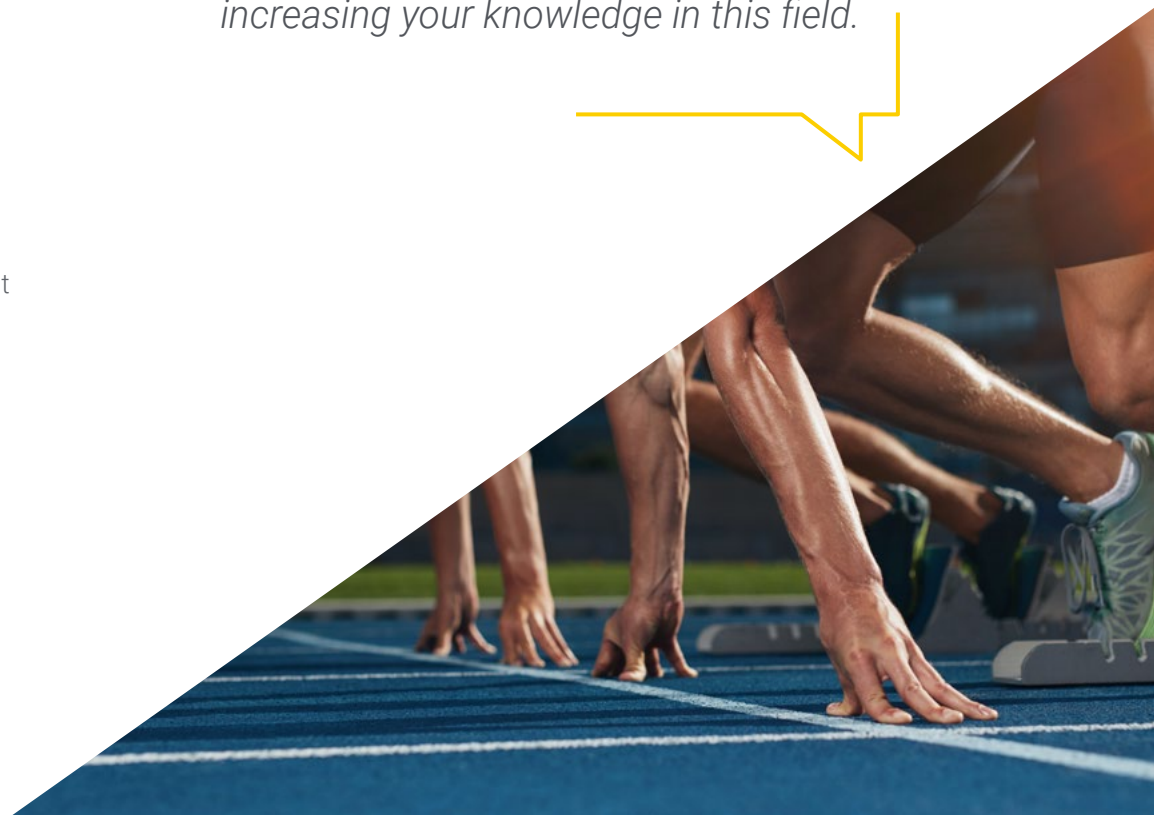
Its teaching staff includes professionals belonging to the field of nutrition, who contribute their work experience to this training, as well as renowned specialists from reference societies and prestigious universities.

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.

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

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



# 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.







“

*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

---

- ◆ 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.

“

*Make the most of this opportunity and take the step to get up to date on the latest developments in Muscular Physiology and Metabolic Physiology Related to Exercise”*

# 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 Certificate with recent updates on the subject 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. 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.







“

*This Postgraduate Certificate in Muscular and Metabolic Physiology Related to Exercise contains the most complete and up-to-date scientific program on the market”*

## Module 1. Muscular and Metabolic Physiology Related to 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







“

*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.





“

*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.

“

*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.



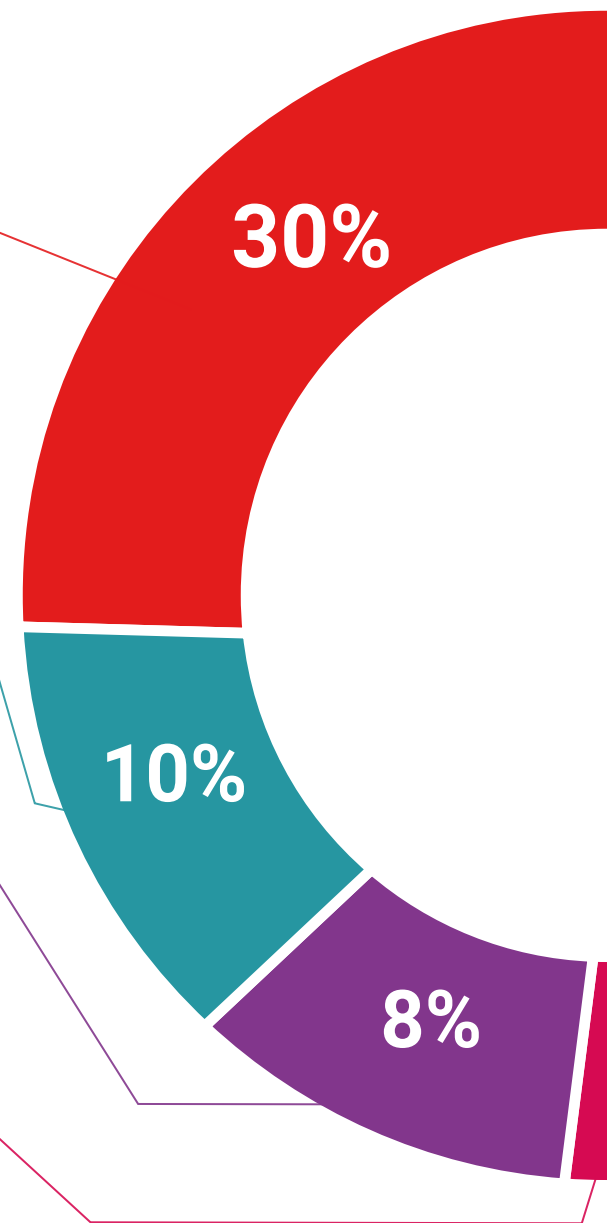
### Practising Skills and Abilities

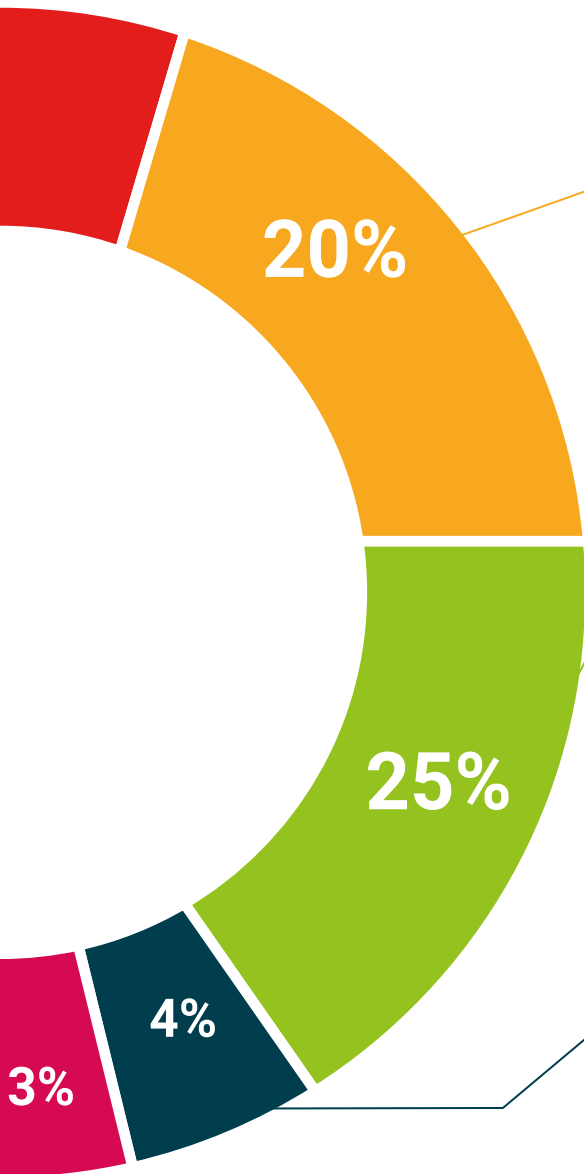
You will carry out activities to develop specific skills and abilities in each subject area. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop in the context of the globalization we live in.



### 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.





“

*Add to your CV a Postgraduate Certificate in Muscular and Metabolic Physiology Related to Exercise and become a highly competitive professional”*

This **Postgraduate Certificate in Muscular and Metabolic Physiology Related to Exercise** 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 Certificate** issued by **TECH Technological University** via **tracked delivery**.

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

Title: **Postgraduate Certificate in Muscular and Metabolic Physiology Related to Exercise**

Official Number of Hours: **150**

Endorsed by the NBA



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



## Postgraduate Certificate

Muscular and Metabolic  
Physiology Related  
to Exercise

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

# Postgraduate Certificate

## Muscular and Metabolic Physiology Related to Exercise

Endorsed by the NBA

