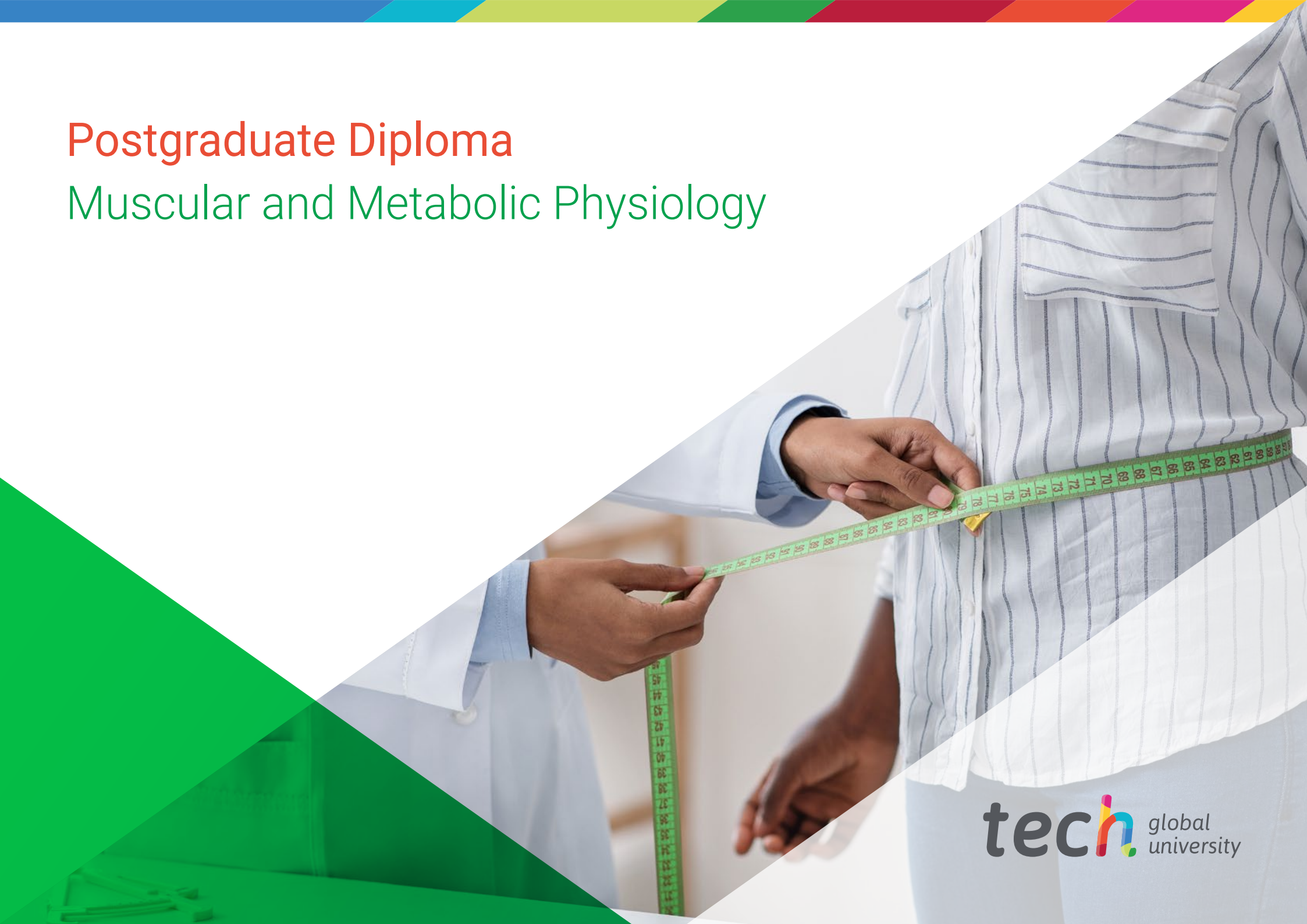
Postgraduate Diploma

Muscular and Metabolic Physiology



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Postgraduate Diploma

Muscular and Metabolic Physiology

- Modality: **online**
- Duration: **6 months.**
- Certificate: **TECH Global University**
- Accreditation: **18 ECTS**
- Schedule: **at your own pace**
- Exams: **online**

Website: **www.techtitute.com/us/pharmacy/postgraduate-diploma/postgraduate-diploma-muscular-metabolic-physiology**

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01

Introduction

Muscular and Metabolic Physiology encompasses a wide range of biological processes that are crucial to the proper functioning of the human body. From force generation to energy production, these procedures are fundamental to health and physical performance at all stages of life. In this sense, pharmaceutical personnel must have a thorough knowledge in this area in order to provide more effective and specialized care to patients suffering from conditions such as muscle disorders, metabolic diseases or health problems related to physical activity. For this reason, TECH implements a pioneering program dedicated to muscle and metabolic dynamics during exercise. In addition, it is taught 100% online.

With this 100% online program, you will elevate your skills to provide optimal individualized advice to patients suffering from muscular and metabolic disorders"

The World Health Organization warns that diseases linked to physical inactivity and metabolic disorders represent a significant burden for healthcare on a global scale. One example of this is obesity, which affects approximately 4 billion people. Faced with this reality, pharmacists need to understand the underlying mechanisms of Muscular and Metabolic Physiology to effectively address these health challenges. However, this can be challenging for professionals given their heavy workload and difficulty in balancing their work and leisure time.

To facilitate this task, TECH has developed an innovative program in Muscular and Metabolic Physiology. The academic itinerary will delve into issues such as muscle structure, carbohydrate metabolism or mixed bioenergetics of muscle fibers. Likewise, the syllabus will analyze the nutritional demands of athletes at different stages of the course (such as the pre-season, the competitive season or the holiday period). This will enable graduates to identify specific dietary needs at each moment and provide personalized advice to users according to their sports objectives. The program will also focus on the diet of Parathletes, examining specific factors such as their physiology, biomechanics or metabolism. In addition, a prestigious International Guest Director will offer a rigorous master class to examine the most recent advances in ergogenic aids.

TECH provides a 100% online methodology, adapted to the needs of pharmaceutical professionals who need to improve themselves and, at the same time, remain active in the workplace. In the same way, the university program stands out for implementing the disruptive Relearning system that avoids the memorization of concepts in an archaic way and, instead, enables their assimilation in a practical way. All of this, in addition to the advantage that specialists can plan their own schedules and delve into the contents at any time.

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

- The development of practical cases presented by experts in Nutrition and Dietetics
- The graphic, schematic and eminently practical contents with which it is conceived gather scientific and practical information on those disciplines that are indispensable 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

A renowned International Guest Director will offer an intensive Masterclass to bring you closer to the latest advances in Nutritional Supplements"

You will delve into the most cutting-edge techniques of Nutritional Monitoring of the athlete"

Do you want to specialize in nutritional counseling for Parathletes? Achieve it through this program in only 6 months.

With TECH's Relearning system you will focus on the most relevant concepts and you will enjoy a totally natural learning process.

The program's teaching staff includes professionals from the sector who contribute their work experience to this specializing 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 the professional must try to solve the different professional practice situations that arise during the course. For this purpose, students will be assisted by an innovative interactive video system created by renowned and experienced experts.

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Objectives

Through 540 teaching hours, pharmacists will have a solid understanding of Muscular and Metabolic Physiology. In this way, specialists will comprehensively manage disorders related to these systems by recommending nutritional supplements that promote both a state of health and optimal athletic performance. In turn, these professionals will be highly qualified to promote healthy lifestyles, offering advice on the relevance of sports practice or a balanced diet to prevent various chronic diseases.

You will gain advanced skills to provide your clients with nutritional strategies and supplements that optimize both their muscular and metabolic performance during physical exercise"

General Objectives

- Handle 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 various fields in order to achieve maximum sports performance
- Learn advanced knowledge about nutritional planning in professional athletes from team sports to achieve the highest sports performance
- Manage and consolidate the initiative, entrepreneurial spirit to implement projects related to nutrition in physical activity and sport
- Know how to incorporate the different scientific advances into one's own professional field
- Develop the ability to work in a multidisciplinary environment
- Manage advanced skills in the detection of possible signs of nutritional changes associated with sports activities
- Manage the necessary skills through the teaching-learning process that will allow them to continue ways and learning in the field of sports nutrition, both through the contacts established with professors and professionals in the program, as well as on their own

Specific Objectives

Module 1. Muscle and Metabolic Physiology Associated with Exercise

- Gain an in-depth understanding of the structure of skeletal muscle
- Delve into the understanding of the most important changes that occur in athletes
- Delve into the mechanisms of energy production according to the type of exercise undertaken
- Further understanding of the interaction between the different energy systems that make up the muscle energy metabolism

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

- Perform biochemical interpretation to detect nutritional deficits or overtraining states
- Perform the interpretation of the different methods of body composition, to optimize the weight and fat percentage appropriate to the sport practiced
- Perform the monitoring of the athlete throughout the season
- Plan the periods of the season according to their requirements

Module 3. Parathletes

- Delve into the differences between the various categories of parathletes and their physiological-metabolic limitations
- Determine the nutritional requirements of the different para-sportsmen in order to establish a specific nutritional plan
- Understand the body composition of para-athletes in different sport categories
- Apply current scientific evidence on nutritional ergogenic aids

03

Course Management

TECH's premise is to make available to everyone the most complete and updated university programs on the market, which is why it follows a rigorous process to constitute its teaching staff. For this program, it concentrates authentic references in the field of Nutrition and Dietetics. These specialists have accumulated an extensive work background, where they have integrated companies of international prestige. In this way, these professionals have contributed to optimize both the well-being and athletic performance of numerous athletes. Therefore, graduates have the guarantees they demand to access an academic experience that will boost their careers as pharmacists.

You will enjoy the personalized advice of the teaching team, made up of specialists with extensive experience in Nutrition and Dietetics"

International Guest Director

Jamie Meeks has demonstrated throughout her career her dedication to **Sports Nutrition**. After graduating from Louisiana State University with a degree in Sports Nutrition, she quickly rose to prominence. Her talent and commitment were recognized when she received the prestigious **Young Dietitian of the Year award** from the Louisiana Dietetic Association, an achievement that marked the beginning of a successful career.

After completing her undergraduate degree, Jamie Meeks continued her education at the University of Arkansas, where she completed her internship in **Dietetics**. She then went on to earn a Master's Degree in Kinesiology with a specialization in **Exercise Physiology** from Louisiana State University. Her passion for helping athletes reach their full potential and her tireless commitment to excellence make her a leading figure in the sports and nutrition community.

Her deep knowledge in this area led her to become the first **Director** of **Sports Nutrition** in the history of Louisiana State University's athletic department. There, she developed innovative programs to meet the dietary needs of athletes and educate them on the importance of **proper nutrition** for **optimal performance**.

Subsequently, she has held the position of **Director** of **Sports Nutrition** for the NFL's **New Orleans Saints.** In this role, she is dedicated to ensuring that professional players receive the best nutritional care possible, working closely with coaches, trainers, physical trainers and medical staff to optimize individual performance and health.

As such, Jamie Meeks is considered a true leader in her field, being an active member of several professional associations and participating in the advancement of **Sports Nutrition** on a national level.
In this regard, she is also a member of the **Academy of Nutrition and Dietetics** and the **Association of Chartered and Professional Sports Dietitians.**

Ms. Meeks, Jamie

- Director of Sports Nutrition for the New Orleans Saints of the NFL, Louisiana, U.S.A.
- Sports Nutrition Coordinator at Louisiana State University, Louisiana
- Registered Dietitian by the Academy of Nutrition and Dietetics
- Certified Specialist in Sports Dietetics
- Master's Degree in Kinesiology with specialization in Exercise Physiology from the Louisiana State University
- Graduate in Dietetics from Louisiana State University
- Member of: Louisiana Dietetic Association, Association of Dietitians Collegiate and Professional, and Dietetic Practice Group of Cardiovascular Sports Nutrition and Wellness

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

Management

Dr. Marhuenda Hernández, Javier

- Professional soccer clubs Nutritionist
- Head of Sports Nutrition. Club Albacete Balompie SAD
- Head of Sports Nutrition. Catholic University of Murcia, UCAM Murcia Football Club.
- Scientific Advisor. Nutrium
- Nutritional Advisor. Impulse Center
- Teacher and Coordinator of Postgraduate Studies.
- PhD in Nutrition and Food Safety. San Antonio Murcia Catholic University
- Degree in Human Nutrition and Dietetics. San Antonio Murcia Catholic University
- Master's Degree in Clinical Nutrition. San Antonio Murcia Catholic University
- Academic Academia Española de Nutrición y Dietética (AEND)

Professors

Dr. Martínez Noguera, Francisco Javier

- Sports nutritionist at CIARD-UCAM
- Sports nutritionist at Jorge Lledó Physiotherapy Clinic
- Research assistant at CIARD-UCAM
- Sports nutritionist at UCAM Murcia Football Club
- Nutritionist at SANO Center
- Sports nutritionist at UCAM Murcia Basketball Club
- PhD in Sports Science from the Catholic University San Antonio de Murcia
- Graduate in Human Nutrition and Dietetics from the Catholic University San Antonio of Murcia
- Master's Degree in Nutrition and Food Safety from the Catholic University San Antonio of Murcia

Dr. Arcusa Saura, Raúl

- Nutritionist. Sport Club Castellón
- Nutritionist in several semi-professional clubs in Castellón.
- Researcher. San Antonio Murcia Catholic University
- Undergraduate and Graduate Faculty
- Graduate in Human Nutrition and Dietetics
- Master's Degree in Nutrition in Physical Activity and Sport

04

Structure and Content

With this program, pharmacists will understand the interrelationship between muscle function and metabolic processes, as well as their impact on both physical performance and overall health. The curriculum will delve into cardiovascular, ventilatory and hormonal adaptations related to physical exercise. Likewise, the syllabus will delve into the Nutritional Assessment of athletes during different moments of the season. The program will also delve into the dietary demands of parathletes, taking into account their metabolism, physiology and biomechanics. In this way, pharmacists will recommend to their clients the most appropriate caloric and protein intake to ensure their energy.

You will recommend the most advanced drugs to combat muscular and metabolic disorders, including nutrients to optimize sports performance"

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. Lipid Metabolism
- 1.8.1. Lipolisis
- 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. Evaluation of the Athlete at Different Times 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
- 2.5.3. Travel

2.6. Tournaments during the Season
- 2.6.1. 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. Parathletes

3.1. Classification and Categories in Parathletes
- 3.1.1. What is a Parathlete?
- 3.1.2. How are Parathletes Classified?

3.2. Sports Science in Parathletes
- 3.2.1. Metabolism and Physiology
- 3.2.2. Biomechanics
- 3.2.3. Psychology

3.3. Energy Requirements and Hydration in Parathletes
- 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-Sport Athletes with Spinal Cord Injury and Cerebral Palsy and Acquired Brain Injury
- 3.5.1. Nutritional Requirements (Macro and Micronutrients)

Sweating and Fluid Replacement during Exercise

3.6. Nutritional Planning in Paraathletes with Amputations
- 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, Stagardt'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 Parathletes
  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 Parathletes
  3.9.2. Micronutrient Deficiencies in Parathletes
3.10. Ergogenic Aids
  3.10.1. Potentially Beneficial Supplements for Parathletes
  3.10.2. Adverse Effects on Health and Contamination and Doping Problems Due to the Intake of Ergogenic Aids

An academic experience without schedules or on-site classes that you can access from any device with an Internet connection. Enroll now!"

05

Methodology

This academic program offers students a different way of learning. Our methodology uses a cyclical learning approach: **Relearning.**

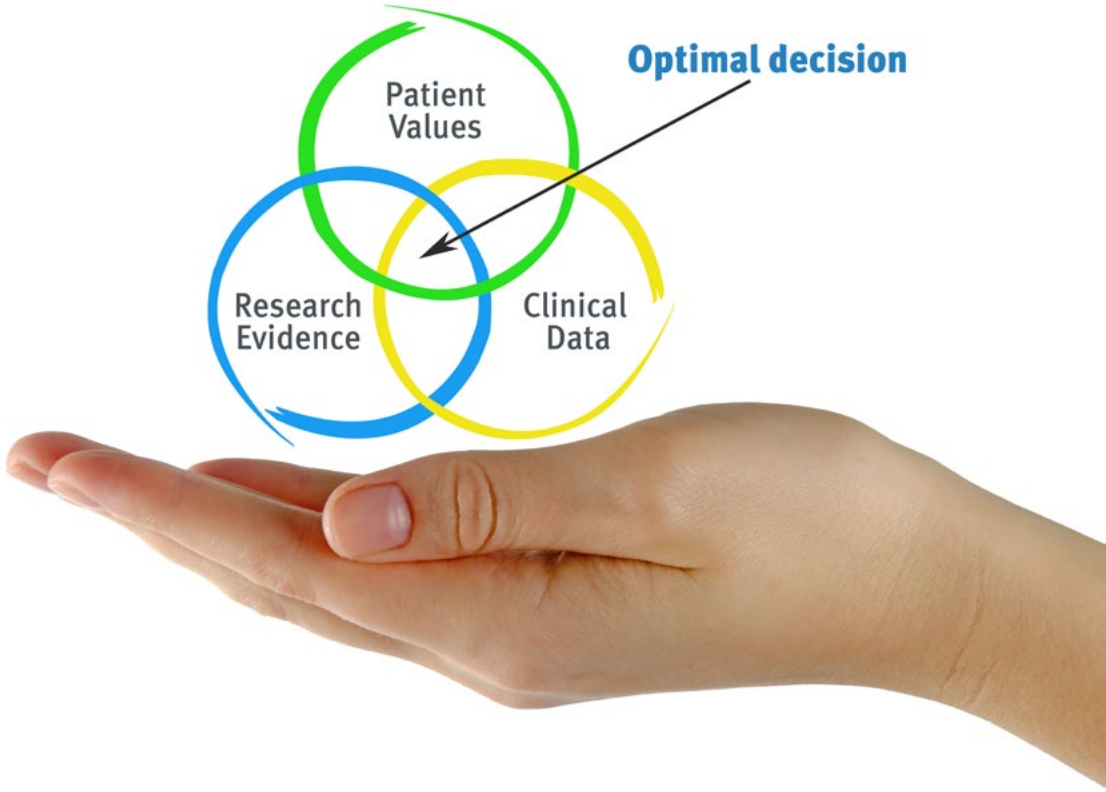
This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.

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 be confronted with multiple simulated clinical cases based on real patients, in which they will have to investigate, establish hypotheses and ultimately, resolve the situation. There is an abundance of scientific evidence on the effectiveness of the method. Pharmacists learn better, more quickly 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. Gérvas, 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, attempting to recreate the actual conditions in a pharmacist'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:

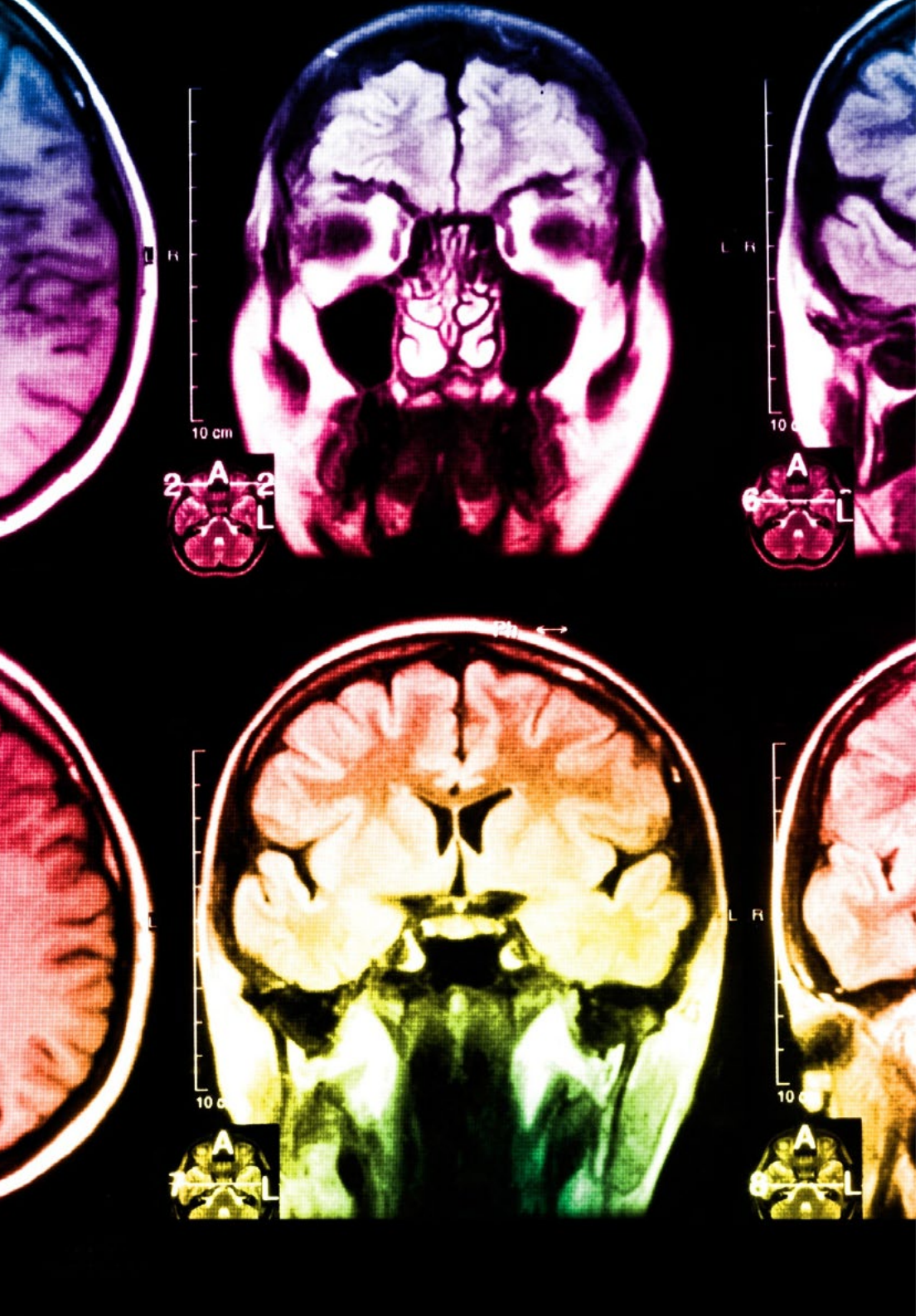
1. Pharmacists who follow this method not only grasp concepts, but also develop their mental capacity, by evaluating real situations and applying their knowledge.
2. Learning is solidly translated into practical skills that allow the student to better integrate into the real world.
3. Ideas and concepts 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.

Our 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, which represent a real revolution with respect to simply studying and analyzing cases.

Pharmacists will learn through real cases and by solving 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 115,000 pharmacists have been trained with unprecedented success in all clinical specialties, regardless of the surgical load. This pedagogical methodology is developed in a highly demanding environment, with a university student body with a high socioeconomic 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 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 created specifically for the course by specialist pharmacists who will be teaching the course, so that the didactic development is highly specific and accurate.

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.

Video Techniques and Procedures

TECH introduces students to the latest techniques, to the latest educational advances, to the forefront of current pharmaceutical care procedures. All of this, first hand, and explained and detailed with precision to contribute to assimilation and a better understanding. And best of all, you can watch them as many times as you want.

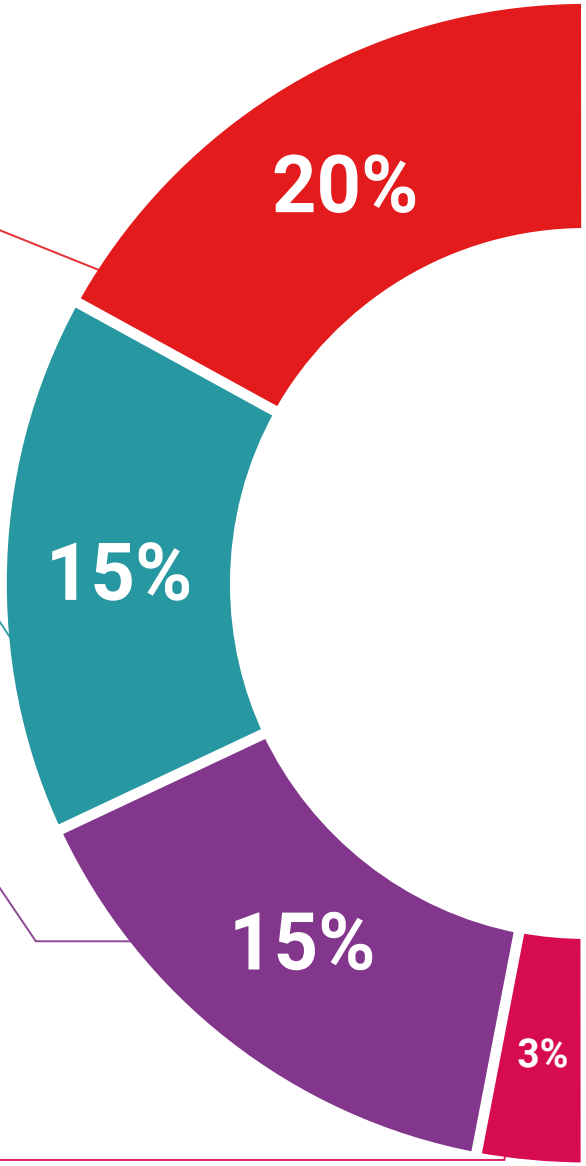
Interactive Summaries

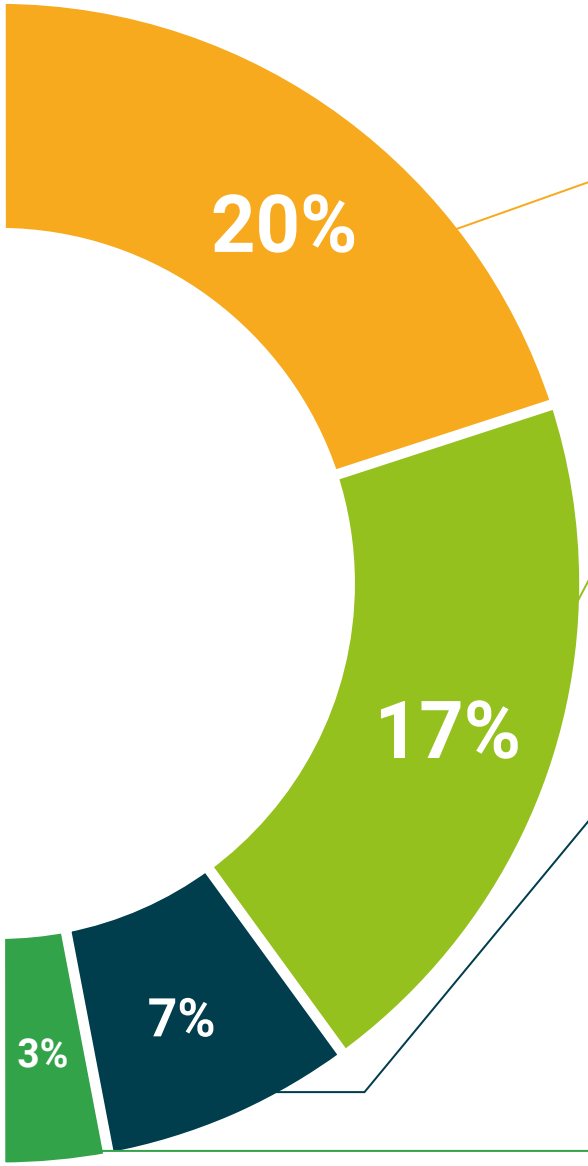
The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

This unique multimedia content presentation training system 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, we will present you with real case developments in which the expert will guide you through 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 Diploma in Muscular and Metabolic Physiology guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Diploma issued by TECH Global University.

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

This private qualification will allow you to obtain a **Postgraduate Diploma in Muscular and Metabolic Physiology** 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.

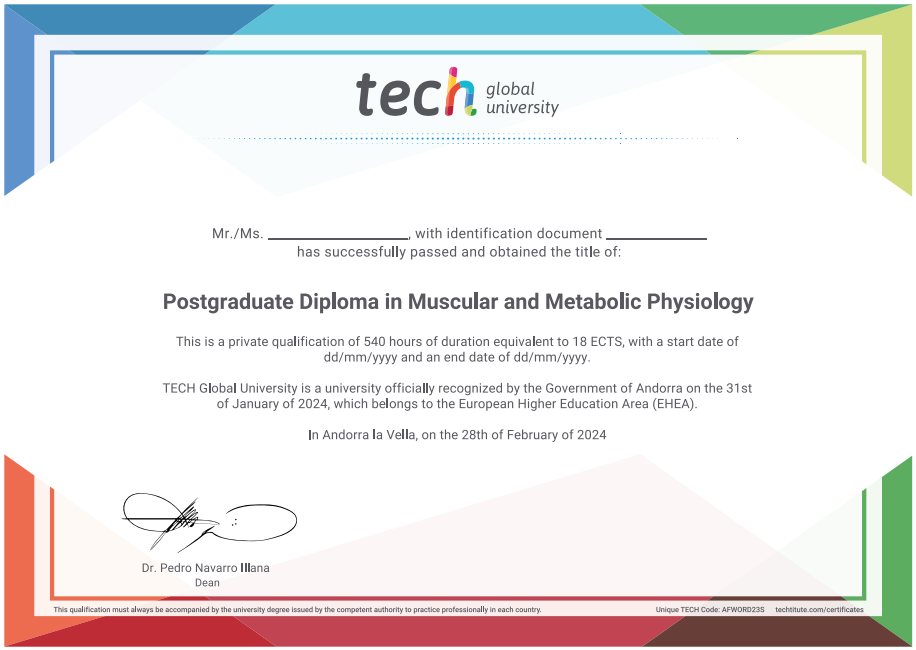
This **TECH Global University** private qualification, is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Postgraduate Diploma in Muscular and Metabolic Physiology**

Modality: **online**

Duration: **6 months**

Accreditation: **18 ECTS**


tech global university

Mr./Ms. _____, with identification document _____
has successfully passed and obtained the title of:

Postgraduate Diploma in Muscular and Metabolic Physiology

This is a private qualification of 540 hours of duration equivalent to 18 ECTS, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH Global University is a university officially recognized by the Government of Andorra on the 31st of January of 2024, which belongs to the European Higher Education Area (EHEA).

In Andorra la Vella, on the 28th of February of 2024

Dr. Pedro Navarro Illana
Dean

This qualification must always be accompanied by the university degree issued by the competent authority to practice professionally in each country. Unique TECH Code: AFWORD23S techtitute.com/certificates

*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.

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Muscular and Metabolic Physiology

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