Advanced Master's Degree

High-Performance and Competitive Cycling

Endorsed by the NBA

tech technological university

tech technological university

Advanced Master's Degree
High-Performance and Competitive Cycling

- Modality: **online**
- Duration: **2 years**
- Certificate: **TECH Technological University**
- Dedication: **16h/week**
- Schedule: **at your own pace**
- Exams: **online**

Website: **www.techtitute.com/in/sports-science/advanced-master-degree/advanced-master-degree-high-performance-competitive-cycling**

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01

Introduction

Today, cycling has established itself as a high-level sport, with increasing competitive demands that demand maximum performance from professionals. Therefore, it is essential to keep up to date with the latest innovations and practical methodologies that increase the cyclist's efficiency. Thus was born this superior TECH program, which allows the student to be at the forefront of training techniques, management of specific situations and performance evaluation, among others. Thus, they will become indispensable figures in every cycling team, benefiting from the international experience of the teachers themselves. All of this, in addition, in a 100% online format free from face-to-face classes and preset schedules.

Sign up now and master the most advanced training techniques to enhance your performance cycling career”

Standing out in cycling, a sport in constant evolution, is very complicated. Even more so when not only the engineering and aerodynamics around bicycles evolve, but also the very way in which cyclists train and face competition. Therefore, it is necessary to acquire solid knowledge and advanced skills in sports planning in this discipline, allowing the professional to take a step forward and stay in the competitive elite.

Under this premise, TECH's Advanced Master's Degree in High Performance and Competition Cycling is born, where students will have the opportunity to study in depth high performance training. In this way, they will delve into the most advanced techniques and methodologies for the preparation and development of elite cyclists. To this end, they will analyze special situations of the cyclist, such as injury management, recovery and adaptation to training in different conditions and competition scenarios. They will also examine performance evaluation, delving into the tools and strategies needed to measure, monitor and improve the performance of athletes in this area.

It is, therefore, a unique opportunity for cycling professionals who wish to deepen their knowledge in this field and become highly qualified in training, planning, biomechanics, nutrition and other very important and rigorous specialties.

All this, in addition, in a 100% online mode of study, which allows students to access the program content and learning activities from anywhere in the world, without the need to attend classes in person. The Advanced Master's Degree in High Performance and Competition Cycling has no fixed schedules, thus providing the flexibility students need to adapt their learning to their own needs and pace of life.

This **Advanced Master's Degree in High-Performance and Competitive Cycling** contains the most complete and up-to-date scientific program on the market. The most important features include:

- The development of case studies presented by experts in cycling and high performance
- The graphic, schematic, and practical contents with which they are created, provide scientific and practical information on the disciplines that are essential for professional practice
- Practical exercises where self-assessment can be used to improve learning
- Its special emphasis on innovative cycling methodologies and management of cycling teams
- 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

Enjoy the convenience and flexibility of studying completely online, adapting the learning to your pace and lifestyle"

Develop in-depth knowledge of injury prevention and management, optimizing cyclists' performance"

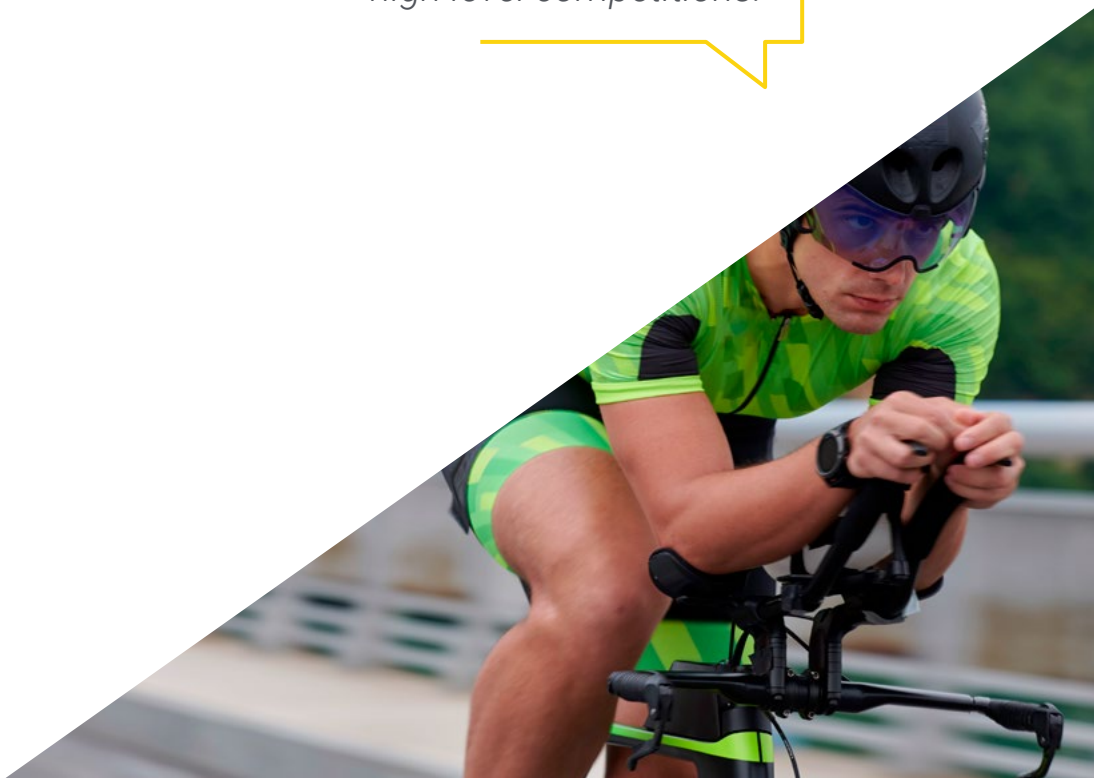
Be the future of elite cycling thanks to the skills you will acquire in this Advanced Master's Degree.

Take advantage of the opportunity to learn from expert cyclists, with experience in international teams and high level competitions.

Its teaching staff includes professionals from the field of cycling, who bring the experience of their work to this program, as well as recognized specialists from leading companies 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 an immersive learning experience designed to prepare for real-life situations.

This program is designed around Problem-Based Learning, whereby the student must try to solve the different professional practice situations that arise throughout the program. For this purpose, the professional will be assisted by an innovative interactive video system created by renowned and experienced experts.



02

Objectives

The main objectives of this Advanced Master's Degree in High-Performance and Competitive Cycling are focused on providing students with a solid and updated training in the different key areas of elite cycling. Thus, they will deepen the development of skills in advanced training techniques, data analysis and technology applied to cycling. This will prepare them to face the challenges of modern cycling and contribute to the advancement of the sport globally.

Develop advanced skills in injury prevention and management, as well as data analysis and technology applied to cycling"

General Objectives

- Master and apply with certainty the most current training methods to improve sports performance
- To effectively master statistics and thus be able to make a correct use of the data obtained from the athlete, as well as to initiate research processes
- Acquire knowledge based on the most current scientific evidence with full applicability in the practical field
- To master all the most advanced methods of sports performance evaluation
- Master the principles governing Exercise Physiology, as well as Biochemistry
- Master the principles governing Biomechanics applied directly to Sports Performance
- Master the principles governing Nutrition applied to sports performance
- Successfully integrate all the knowledge acquired in the different modules in real practice
- Understand the performance factors of sport and, therefore, learn to assess the specific needs of each athlete
- To be able to plan, periodize and develop training programs for cyclists, in short, to enable students to exercise the profession of coach
- Acquire specific knowledge related to the biomechanics of cycling
- Understand the operation of new applications used in load quantification and training prescription
- Understand the benefits of strength training and be able to apply them in concurrent training
- Acquire a specialization in nutrition oriented to cycling
- Understand the functioning of cycling structures, as well as the modalities and categories of competitions

Specific Objectives

Module 1. Physiology of Exercise on cyclists

- Address the different energy pathways and their influence on human performance
- Know the physiological milestones and how to determine them
- Analyze the role of lactate and HRV
- Understanding the physiology of women in sport

Module 2. Statistics Applied to Performance and Research

- Develop the ability to analyze data collected in the laboratory and in the field through various assessment tools
- Describe the different types of statistical analysis and their application in various situations for the understanding of phenomena that occur during training
- Develop strategies for data exploration to determine the best models to describe them
- Establish the generalities of predictive models through regression analysis that favor the incorporation of different units of analysis in the training field
- Generate the conditions for the correct interpretation of results in different types of research

Module 3. Strength training in cyclists

- Understand the concept of Velocity Based Training and its relationship to the character of effort
- Address the different devices on the market to work based on VBT
- Study the benefits of concurrent training

Module 4. Speed Training, from Theory to Practice

- Interpret the key aspects of speed and change of direction technique
- Compare and differentiate the speed of situational sport with respect to the track and field model
- Incorporate elements of observational judgment, a technique that allows discrimination of errors in the mechanics of the race and the procedures for their correction
- Become familiar with the bioenergetic aspects of single and repeated sprinting and how they relate to the training processes
- Differentiate the mechanical aspects that may influence performance impairment and the mechanisms of injury occurrence when sprinting
- Apply in an analytical way the different means and methods of training for the development of the different phases of speed
- Program speed training in situational sports

Module 5. Endurance Training from Theory to Practice

- Study the different adaptations generated by aerobic endurance
- Apply the physical demands of situational sports
- Select those tests/tests most appropriate to evaluate, monitor, tabulate and fractionalize aerobic workloads
- Carry out the different methods to organize training sessions
- Design training sessions taking the sport into account

Module 6. Power Training

- Acquire knowledge about power training
- Address the various metrics needed to prescribe and quantify by power
- Knowledge of performance modeling

Module 7. Mobility: from Theory to Performance

- Approach mobility as a basic physical capacity from a neurophysiological perspective
- Have a deep understanding of the neurophysiological principles that affect the development of mobility
- Apply stabilizing and mobilizing systems within the movement pattern
- Unpack and specify the basic concepts and objectives related to mobility training
- Develop the ability to design tasks and plans for the development of manifestations of mobility
- Apply the different methods of performance optimization through recovery methods
- Develop the ability to carry out a functional and neuromuscular assessment of the athlete
- Recognize and address the effects produced by an injury at the neuromuscular level in the athlete

Module 8. Sports Performance Assessment

- Become familiar with different types of assessment and their applicability to the field of practice
- Select the most appropriate tests/exercises for the client's specific needs
- Correctly and safely administer the protocols of the different tests and the interpretation of the data collected
- Apply different types of technologies currently used in the field of exercise assessment, whether in the field of health and fitness performance at any level of demand

Module 9. Planning Applied to High Performance in Sports

- Understand the internal logic of planning, such as its proposed core models
- Apply the Dose-Response concept in training
- Clearly differentiate the impact of programming with planning and its dependencies
- Acquire the ability to design different planning models according to the work reality
- Apply the concepts learned in an annual and/or multi-year planning design

Module 10. Planning and Programming cyclists Training

- Know and apply the different training methods
- Learn how to distribute volumes and intensities, in short, to periodize
- Be able to design training sessions
- Study training loads from junior, amateur, professional and master's degree levels

Module 11. Load distribution

- Know what training load is and its applicability to cycling
- Know the relationship between training load and performance
- Learning and using new platforms to quantify and prescribe training

Module 12. Biomechanics in the cyclist

- Know the importance of biomechanics in cycling and apply different methods
- Differentiate kinematics from kinetics and the importance of kinetics in performance
- Know the importance of functional assessment in the biomechanical process
- Know the benefits of aerodynamics on performance

Module 13. Special cycling training situations

- Learn to differentiate between different adverse situations that affect performance
- Develop and apply strategies to optimize performance in adverse situations

Module 14. Nutrition in cyclists

- Deepen in the concept of nutrition
- Understand and apply nutrition periodization
- Know which ergogenic aids are useful, which are not and which are considered prohibited methods
- Getting to know new trends in nutrition

Module 15. Structure and operation of a cycling team

- Understand first-hand the structuring and functioning of professional teams
- Differentiate the roles and functions of the different team members
- Know how the day-to-day operations of a cycling structure are carried out

Module 16. Cycling modalities

- Learn about the different cycling modalities and their characteristics, idiosyncrasies and performance limitations

Sign up now and start create training programs performance-enhancing customizations sport of the most elite cyclists"

03

Skills

To remain competitive, it is essential to continue improving and incorporating competencies into one's value proposition. Therefore, students will acquire in this program a series of essential skills for their professional development in the field of elite cycling. Thus, they will be able to create distinguished training plans, putting into practice all the knowledge acquired during the program thanks to its eminently practical approach.

Acquire advanced competencies in strength, speed, endurance and mobility training for the cyclist"

General Skills

- Acquire knowledge based on the most current scientific evidence with full applicability in the practical field
- To master all the most advanced methods of sports performance evaluation
- Plan general training sessions that involve the most important facets to be considered by a cyclist
- Apply recovery strategies adapted to the needs of the athlete
- Assess and develop the cyclist's capabilities to bring them to their maximum potential
- Manage the training area or cycling specialization in a high-level team

Specific Skills

- Learn key aspects of the neuromuscular system, motor control and its role in physical training
- Describe the different types of statistical analysis and their application in various situations for the understanding of phenomena that occur during training
- Correctly interpret all theoretical aspects defining strength and its components
- Incorporate elements of judgment of technical observation that make it possible to discriminate errors in the mechanics of the race and the procedures for their correction
- Select those tests/tests most appropriate to evaluate, monitor, tabulate and fractionalize aerobic workloads
- Apply stabilizing and mobilizing systems within the movement pattern
- Unpack and specify the basic concepts and objectives related to mobility training
- Correctly and safely administer the protocols of the different tests and the interpretation of the data collected
- Apply the concepts learned in an annual and/or multi-year planning design
- Apply the basic knowledge and technologies of biomechanics as a function of physical education, sport, performance and daily life
- Handle the nutritional aspects that are associated with eating disorders and sports injuries
- Differentiate and apply the different quantification models
- Calculating basal metabolism and measuring body composition
- Quantify macros and micros
- Using strength as a capacity builder in cycling
- Interpreting hematology in the context of sports cycling
- Plan indoor and on-bike exercises for strength development
- Determine cyclists' strengths and weaknesses

Master the planning and design of personalized training programs, adapting them to the specific needs of each cyclist"

04

Course Management

This program has an exceptional teaching staff, composed of cyclists and sports technicians with vast experience in international teams and high level competitions. This gives the didactic material a unique practical approach, based on the knowledge and experience of the teachers in the world of elite cycling. After completing the program, the student will be in a privileged position to develop their skills and competencies in the field of high performance and competitive cycling, supported by athletes who have succeeded in this discipline.

Enhance your skills and knowledge with an exceptional teaching staff, with experience in international teams and elite competitions"

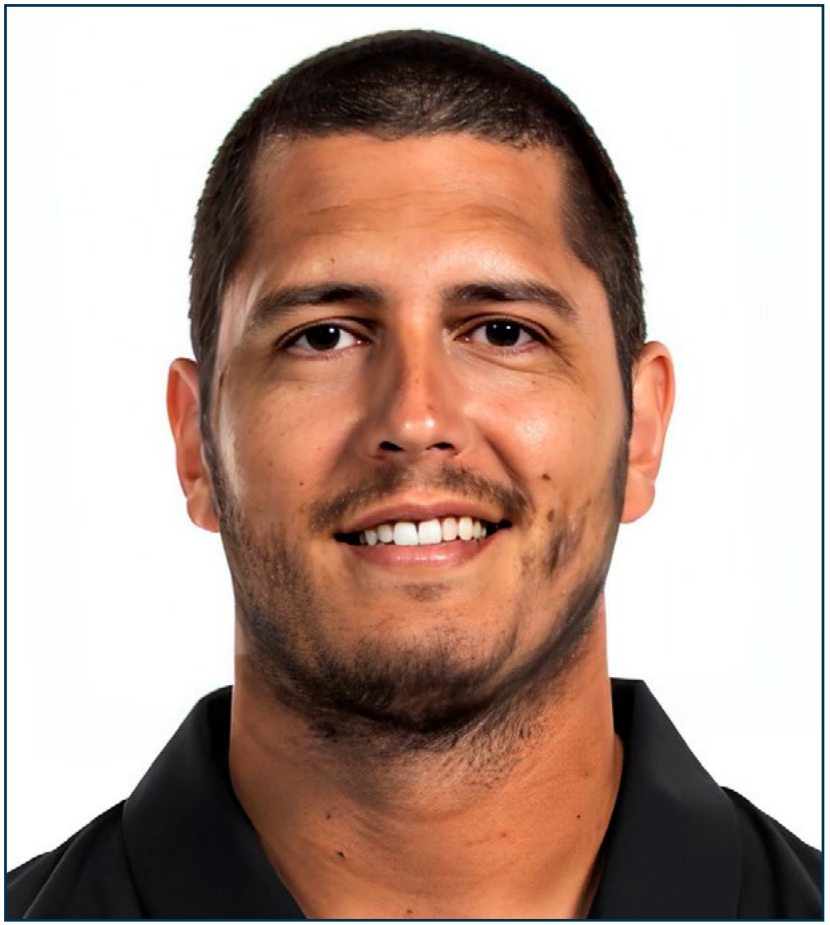
International Guest Director

Tyler Friedrich, Ph.D., is a leading personality in the international field of Sports Performance and Applied Sports Science. With a strong academic background, he has demonstrated an exceptional commitment to excellence and innovation, and has contributed to the success of numerous elite athletes internationally.

Throughout his career, Tyler Friedrich has deployed his expertise in a wide range of sporting disciplines, from football to swimming, volleyball to field hockey. His work in performance data analysis, especially through the Catapult athlete GPS system, and his integration of sports technology into performance programs, has established him as a leader in athletic performance optimization.

As Director of Sports Performance and Applied Sports Science, Dr. Friedrich has led strength and conditioning training, as well as the implementation of specific programs for several Olympic sports, including volleyball, rowing and gymnastics. Here, he has been responsible for integrating equipment services, sports performance in soccer and sports performance in Olympic sports. In addition, incorporating DAPER sports nutrition within an athlete performance team.

Also certified by USA Weightlifting and the National Strength and Conditioning Association, he is recognized for his ability to combine theoretical and practical knowledge in the development of high performance athletes. In this way, Dr. Tyler Friedrich has left an indelible mark on the world of Sports Performance, being an outstanding leader and driver of innovation in his field.

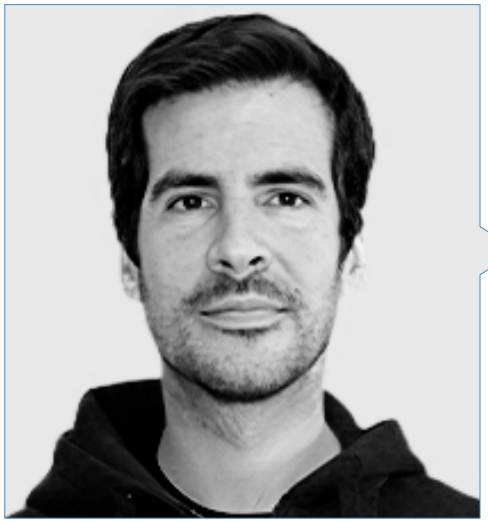


Dr. Friedrich, Tyler

- Director of Sports Performance and Applied Sports Science at Stanford University
- Sports Performance Specialist
- Associate Director of Athletics and Applied Performance at Stanford University
- Director of Olympic Sport Performance at Stanford University
- Sports Performance Coach at Stanford University
- Ph.D. in Philosophy, Health and Human Performance from Concordia University Chicago
- Master of Science in Exercise Science from the University of Dayton
- Bachelor of Science, Exercise Physiology from the University of Dayton

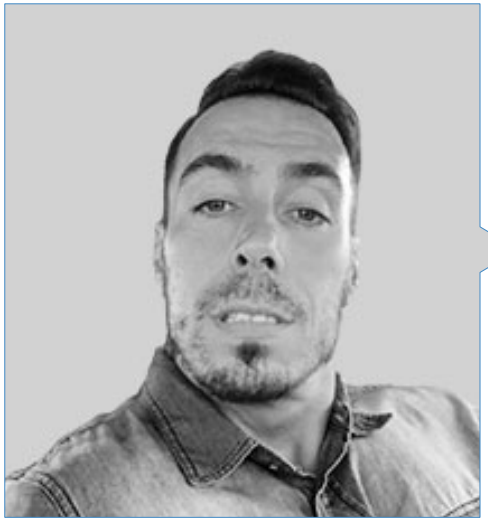
Thanks to TECH, you will be able to learn with the best professionals in the world"

Management



Mr. Javier Cortés

- CEO of Training4ll
- WT UAE Team Coach
- Massi Tactic UCI Womens Team Performance Manager
- Specialist in the biomechanical area of Jumbo Visma UCI WT
- WKO advisor to World Tour cycling teams
- Trainer at Coaches4coaches
- Associate Professor at Loyola University
- Degree in Physical Activity and Sports Sciences from the University of Seville
- Postgraduate Degree in High Performance Cycling Sports from the University of Murcia
- Sports Director Level III
- Numerous Olympic medals and medals at European championships, World Cups and national championships



Rubina, Dardo

- Specialist in High Performance Sports
- CEO of Test and Training
- Physical Trainer at Moratalaz Sports School
- Teacher of Physical Education in Football and Anatomy. CENAFE Schools Carlet
- Coordinator of Physical Preparation in Field Hockey. Club Gimnasia y Esgrima de Buenos Aires
- Doctorate in High Performance Sports
- Postgraduate Certificate in Advanced Research Studies (DEA), University of Castilla la Mancha
- Master in High Performance Sports by the Autonomous University of Madrid
- Postgraduate in Physical Activity in Populations with Pathologies by the University of Barcelona
- Competitive Bodybuilding Technician. Extremadura Federation of Bodybuilding and Fitness
- Expert in Sports Scouting and Quantification of Training Load (specialization in football), Sports Sciences. University of Melilla
- Expert in Advanced Weight Training by IFBB
- Expert in Advanced Nutrition by IFBB
- Specialist in Physiological Assessment and Interpretation of Physical Fitness by Bio
- Certification in Technologies for Weight Control and Physical Performance. Arizona State University

Professors

Mr. Xabier Artetxe Gezuraga

- Performance Manager of the WT Ineos Grenadier team
- Professor and event director of the company Fundación Ciclista Euskadi
- Coach of the WT Movistar, SKY and Ineos Grenadier teams
- Sports director and coach of Seguros Bilbao, Caja Rural, Euskaltel Development Team
- Trainer of winners of Grand Tours, World Championships, Olympic medals and national championships
- Trainer at Coaches4coaches
- Master's Degree in High Performance in Biomedicine
- Certificate World Tour Level Sports Director (Director Deportivo UCI)
- Sports Director Level III

Mr. Raúl Celdrán

- CEO of Natur Training System
- Burgos BH ProConti Team Nutrition Manager
- Performance manager of the professional MTB team Klimatizaza Team
- Trainer at Coaches4coaches
- Degree in Pharmacy from the University of Alcalá, Spain
- Master's Degree in Nutrition, Obesity and High Performance in Cyclic Sports from the University of Navarra

Mr. Aner Moreno Morillo,

- Head of Performance of the Kuwait National Cycling Team
- Auxiliary of the Euskaltel-Euskadi ProConti Team
- Graduate in Physical Activity and Sports Sciences from Isabel I University
- Master's Degree in CAFD research by Universidad Europea
- Master's Degree in High Performance Cycling Sports from the University of Murcia
- National Sports Director Level III

Mr. Mathieu Heijboer

- WT Jumbo-Visma team performance manager
- Trainer of high-level cyclists
- Former professional cyclist
- Degree in CAFD

Mr. Jon Iriberri

- CEO of Custom4us
- Biomechanics manager of the WT Jumbo Visma team
- Head of Biomechanics at Movistar Team
- UCI World Center Professor
- Degree in Physical Activity and Sports Sciences from the University of the Basque Country
- Professional Master's Degree in High Performance from Colorado State University, USA

Mr. Chema Arguedas Lozano

- CEO of Plan Your Rides
- Cycling in Depth Training and Nutrition Expert
- Trainer, fitness trainer and sports nutrition expert
- Lecturer in Sports Nutrition at the University of Leioa
- Author of titles related to cycling: Plan your pedaling, Feed your pedaling, Plan your MTB pedaling, Power your pedaling

Mr. Pablo Añon

- Physical trainer of the Women's National Volleyball Team for the Olympic Games
- Physical trainer of volleyball teams of the Argentinean Men's First Division
- Physical trainer of professional golfers Gustavo Rojas and Jorge Berent
- Swimming coach from Quilmes Athletic Club
- National Teacher of Physical Education (INEF) in Avellaneda
- Postgraduate degree in Sports Medicine and Applied Sports Sciences from the La Plata University
- Master in High Performance Sports by the Catholic University of Murcia
- Training courses oriented to the field of High Performance Sports

Mr. Juan Manuel Masse

- Physical trainer for high performance athletes
- Director of the Athlon Science Study Group
- Physical trainer for several professional football teams in South America

Mr. Leandro Carbone

- Strength Training and Fitness Teacher
- CEO of LIFT, training and education company
- Head of the Department of Sports Evaluations and Exercise Physiology. WellMets - Institute of Sports and Medicine in Chile
- CEO/ Manager at Complex I
- University Lecturer
- External Consultant for Speed4lift, a leading company in the area of sports technology
- Bachelor's Degree in Physical Activity from the Universidad del Salvador
- Specialist in Exercise Physiology, La Plata National University
- MCs. Strength and Conditioning in Greenwich University, United Kingdom

Mr. Adrián Ricardo Vaccarini

- Physical Trainer Specializing in First Level Football
- Head of the Applied Sciences Field of the Peruvian Football Federation
- Second Physical Trainer of the Peruvian Absolute Football Team
- Physical Trainer of the Peruvian National Under 23 National Team
- Responsible for the Research and Performance Analysis Area of Quilmes Atlético
- Responsible for the Research and Performance Analysis Area of Club Atlético Vélez Sarsfield
- Regular speaker at conferences from High Performance Sports
- Degree in Physical Education
- National Physical Education Teacher

Dr. Sebastian Del Rosso

- Expert researcher in Sports Biochemistry
- Postdoctoral researcher at the Clinical Biochemistry and Immunology Research Center
- Researcher in the Lifestyle and Oxidative Stress Research Group
- Co-author of numerous scientific publications
- Director of the Editorial Board of PubliCE Standard magazine
- Director of the Editorial Department of Grupo Sobre Entrenamiento
- Dr. in Health Sciences from the National University of Córdoba
- Degree in Physical Education from the National University Gral. San Martín
- Master's Degree in Physical Education from the Catholic University Gral. San Martín

Mr. César García Gastón

- Expert Hockey and Rugby Fitness Trainer
- Physical trainer of the professional field hockey player Sol Alias
- Carmen Tennis Club Hockey Team Physical Trainer
- Personal Trainer for Rugby and Hockey Athletes
- Physical Trainer for U18 Rugby Clubs
- Infant Physical Education Teacher
- Co-author of the book "Strategies for physical fitness assessment in children and adolescents"
- Degree in Physical Education from the National University Gral. San Martín
- National Professor of Physical Education from ESEF San Rafael
- Anthropometry Technician Level 1 and 2

Mr. Juan Jareño Díaz

- Physical Preparation and Sport Specialist
- Coordinator of the education and physical preparation area at the Moratalaz Sports School
- University Lecturer
- Personal Trainer and Sports Coach at 9.8. Gravity Training Studio
- Graduate in Physical Activity and Sports Sciences from the University of Castilla la Mancha
- Master's Degree in University Law and Bioethics from the University of CastillaLa Mancha
- Postgraduate degree Therapeutic Personal from University of Castilla La Mancha

Ms. González Cano, Henar

- Sports Nutritionist
- Nutritionist and Anthropometrist at GYM SPARTA
- Nutritionist and Anthropometrist at Promentium Center
- Nutritionist in Male soccer Equipment
- Lecturer in courses related to Strength and Physical Conditioning
- Speaker at training events on Sports Nutrition
- Graduate in Human Nutrition and Dietetics from the University of Valladolid
- Master's Degree in Nutrition in Physical Activity and Sport by the Catholic University San Antonio in Murcia
- Course on Nutrition and Dietetics applied to physical exercise by the University of Vich

Dr. Gustavo Daniel Represas Lobeto

- Physical trainer and researcher oriented to high performance sports
- Head of the Sports Biomechanics Laboratory of the National Center for High Performance Sports of Argentina
- Head of the Laboratory of Biomechanics, Functional Analysis of Movement and Human Performance of the San Martín National University
- Physical trainer and Scientific Advisor to the Olympic Taekwondo team for the Sydney Olympic Games
- Fitness trainer for professional rugby clubs and players
- Teacher in university studies
- D. in High Performance Sports from the University of Castilla-La Mancha
- Degree in Physical Education and Sports from the Interamerican Open University
- Master in High Performance Sports by the Autonomous University of Madrid
- National Physical Education Teacher

05

Structure and Content

The structure and content of the Advanced Master's Degree in High-Performance and Competitive Cycling have been carefully designed to comprehensively address the key areas of elite cycling. Thus, the student will find modules focused on the development of specific skills, being able to apply all the acquired knowledge to their own work methodology. All this using the Relearning methodology, with which the pedagogical process is much more effective as the most important concepts of the syllabus are reiterated in a natural and progressive way.

Examines thematic modules covering fundamental areas of elite cycling, from sports performance assessment to the structure and operation of a cycling team"

Module 1. Physiology of Exercise on cyclists

1.1. Energy Systems
- 1.1.1. Phosphagen Metabolism
- 1.1.2. Glycolysis
- 1.1.3. Oxidative System

1.2. HR (Heart Rate)
- 1.2.1. Basal HR
- 1.2.2. Reserve FC
- 1.2.3. Maximum HR

1.3. The role of lactate
- 1.3.1. Definition
- 1.3.2. Lactate Metabolism
- 1.3.3. The role in physical activity and threshold determination

1.4. Determination of ventilatory thresholds (physiological milestones)
- 1.4.1. VT1
- 1.4.2. VT2
- 1.4.3. Vo2max

1.5. Performance markers
- 1.5.1. FTP/ CP
- 1.5.2. VAM
- 1.5.3. Compund Score

1.6. Performance test
- 1.6.1. Laboratory Test
- 1.6.2. Field Test
- 1.6.3. Power profile test

1.7. HRV (Heart Rate Variability)
- 1.7.1. Definition
- 1.7.2. Measurement methods
- 1.7.3. HRV-based adaptations

1.8. Adaptations
- 1.8.1. Generalities
- 1.8.2. Central
- 1.8.3. Peripherals

1.9. Blood Analysis
- 1.9.1. Biochemistry
- 1.9.2. Hematology
- 1.9.3. Hormones

1.10. Physiology of women
- 1.10.1. Characteristics of women
- 1.10.2. Training and menstrual cycle
- 1.10.3. Specific supplementation

Module 2. Statistics Applied to Performance and Research

2.1. Notions of Probability
- 2.1.1. Simple Probability
- 2.1.2. Conditional Probability
- 2.1.3. Bayes' Theorem

2.2. Probability Distributions
- 2.2.1. Binomial Distribution
- 2.2.2. Poisson distribution
- 2.2.3. Normal Distribution

2.3. Statistical Inference
- 2.3.1. Population Parameters
- 2.3.2. Estimation of Population Parameters
- 2.3.3. Sampling Distributions Associated with the Normal Distribution
- 2.3.4. Distribution of the Sample Mean
- 2.3.5. Point Estimators
- 2.3.6. Properties of Estimators
- 2.3.7. Estimator Comparison Criteria
- 2.3.8. Estimators by Confidence Regions
- 2.3.9. Method of Obtaining Confidence Intervals
- 2.3.10. Confidence Intervals Associated With Normal Distribution
- 2.3.11. Central Limit Theorem

2.4. Hypothesis Test
- 2.4.1. P-Value
- 2.4.2. Statistical Power

2.5. Exploratory Analysis and Descriptive Statistics
- 2.5.1. Graphs and Tables
- 2.5.2. Chi-Square Test
- 2.5.3. Relative Risk
- 2.5.4. Odds Ratio

2.6. The T-Test
- 2.6.1. One-Sample T-Test
- 2.6.2. T-Test for Two Independent Samples
- 2.6.3. T-Test for Paired Samples

2.7. Correlation Analysis

2.8. Simple Linear Regression Analysis
- 2.8.1. The Regression Line and its Coefficients
- 2.8.2. Residuals
- 2.8.3. Regression Assessment Using Residuals
- 2.8.4. Coefficient of Determination

2.9. Variance and Analysis of Variance (ANOVA)
- 2.9.1. One-way ANOVA
- 2.9.2. Two-Way ANOVA
- 2.9.3. ANOVA for Repeated Measures
- 2.9.4. Factorial ANOVA

Module 3. Strength training in the cyclists

3.1. Introduction to strength
- 3.1.1. Definition
- 3.1.2. Concepts related to the expression of force
- 3.1.3. Strength and cycling

3.2. Benefits of strength training for cyclists
- 3.2.1. Molecular and physiological adaptation
- 3.2.2. Neural adaptations
- 3.2.3. Improved efficiency
- 3.2.4. Improved body composition

3.3. Methods for measuring force
- 3.3.1. Linear measuring systems
- 3.3.2. Dynamometer
- 3.3.3. Force and contact platforms
- 3.3.4. Optical platforms and apps

3.4. Limitations
- 3.4.1. Concept of RM
- 3.4.2. Concept of NRM
- 3.4.3. Concept of effort character

3.5. Speed of Execution
- 3.5.1. CE defined by speed of execution
- 3.5.2. Isoinertial strength assessment
- 3.5.3. Force-velocity/power curve

3.6. Strength training planning and programming
- 3.6.1. Strength programming
- 3.6.2. Programming of an exercise
- 3.6.3. Scheduling a session

3.7. Strength training on the bike
- 3.7.1. Startups
- 3.7.2. Sprints
- 3.7.3. Neruomuscular Work
- 3.7.4. Is torque work equal to strength training?

3.8. Concurrent Training
- 3.8.1. Definition
- 3.8.2. Strategies to maximize adaptations
- 3.8.3. Advantages and Disadvantages

3.9. Recommended exercises
- 3.9.1. Generalities
- 3.9.2. Specific
- 3.9.3. Sample session

3.10. Core Training
- 3.10.1. Definition
- 3.10.2. Benefits
- 3.10.3. Mobility exercises
- 3.10.4. Types of Exercise

Module 4. Speed Training, from Theory to Practice

4.1. Speed
- 4.1.1. Definition
- 4.1.2. General Concepts
  - 4.1.2.1. Manifestations of Speed
  - 4.1.2.2. Factors that Determine Performance
  - 4.1.2.3. Difference Between Speed and Quickness
  - 4.1.2.4. Segmental Speed
  - 4.1.2.5. Angular Speed
  - 4.1.2.6. Reaction Time

4.2. Dynamics and Mechanics of Linear Sprint (100m Model)
- 4.2.1. Kinematic Analysis of the Take-off
- 4.2.2. Dynamics and Strength Application During Take-off
- 4.2.3. Kinematic Analysis of the Acceleration Phase
- 4.2.4. Dynamics and Strength Application During Acceleration
- 4.2.5. Kinematic Analysis of Running at Maximum Speed
- 4.2.6. Dynamics and Strength Application During Maximum Speed

4.3. Phases of Sprinting (Technique Analysis)
- 4.3.1. Technical Description of the Take-off
- 4.3.2. Technical Description of the Race During the Acceleration Phase
  - 4.3.2.1. Technical Model of the Kinogram for the Acceleration Phase
- 4.3.3. Technical Description of the Race During the Maximum Speed Phase
  - 4.3.3.1. Technical Kinogram Model (ALTIS) for Technique Analysis
- 4.3.4. Speed Endurance

4.4. Speed Bioenergetics
- 4.4.1. Bioenergetics of Single Sprints
  - 4.4.1.1. Myoenergetics of Single Sprints
  - 4.4.1.2. ATP-PC System
  - 4.4.1.3. Glycolytic System
  - 4.4.1.4. Adenylate Kinase Reaction

4.4.2. Bioenergetics of Repeated Sprints
4.4.2.1. Energy Comparison Between Single and Repeated Sprints
4.4.2.2. Behavior of Energy Production Systems During Repeated Sprints
4.4.2.3. Recovery of PC
4.4.2.4. Connection Between Aerobic Power and Recovery Processes of CP
4.4.2.5. Determinants of Performance in Repeated Sprints
4.5. Analysis of Acceleration Technique and Maximum Speed in Team Sports
4.5.1. Description of the Technique in Team Sports
4.5.2. Comparison of Sprinting Technique in Team Sports vs. Athletic Events
4.5.3. Timing and Motion Analysis of Speed Events in Team Sports
4.6. Methodological Approach to Teaching the Technique
4.6.1. Technical Teaching of the Different Phases of the Race
4.6.2. Common Errors and Ways to Correct Them
4.7. Means and Methods for Speed Development
4.7.1. Means and Methods for Acceleration Phase Training
4.7.1.1. Connection of Force to Acceleration
4.7.1.2. Sled
4.7.1.3. Slopes
4.7.1.4. Jumpability
4.7.1.4.1. Building the Vertical Jump
4.7.1.4.2. Building the Horizontal Jump
4.7.1.5. Training the ATP/PC System
4.7.2. Means and methods for Top Speed training
4.7.2.1. Plyometry
4.7.2.2. Overspeed
4.7.2.3. Interval-Intensive Methods
4.7.3. Means and Methods for Speed Endurance Development
4.7.3.1. Interval-Intensive Methods
4.7.3.2. Repetition Method
4.8. Agility and Change of Direction
4.8.1. Definition of Agility
4.8.2. Definition of Change of Direction
4.8.3. Determinants of Agility and COD
4.8.4. Change of Direction Technique
4.8.4.1. Shuffle
4.8.4.2. Crossover
4.8.4.3. Agility and COD Training Drills
4.9. Assessment and Control of Speed Training
4.9.1. Strength-Speed Profile
4.9.2. Test With Photocells and Variants With Other Control Devices
4.9.3. RSA
4.10. Programming Speed Training

Module 5. Endurance Training from Theory to Practice

5.1. General Concepts
5.1.1. General Definitions
5.1.1.1. Education
5.1.1.2. Trainability
5.1.1.3. Sports Physical Preparation
5.1.2. Objectives Endurance Training
5.1.3. General Principles of Training
5.1.3.1. Principles of Load
5.1.3.2. Principles of Organization
5.1.3.3. Principles of Specialization
5.2. Physiology of Aerobic Training
5.2.1. Physiological Response to Aerobic Endurance Training
5.2.1.1. Responses to Continuous Stress
5.2.1.2. Responses to Intervallic Stress
5.2.1.3. Responses to Intermittent Stress
5.2.1.4. Responses to Stress in Small-Space Games
5.2.2. Factors Related to Aerobic Endurance Performance
5.2.2.1. Aerobic Power
5.2.2.2. Anaerobic Threshold

5.2.2.3. Maximum Aerobic Speed
5.2.2.4. Economy of Effort
5.2.2.5. Use of Substrates
5.2.2.6. Characteristics of Muscle Fibers
5.2.3. Physiological Adaptations to Aerobic Endurance
5.2.3.1. Adaptations to Continuous Stress
5.2.3.2. Adaptations to Intervallic Stress
5.2.3.3. Adaptations to Intermittent Stress
5.2.3.4. Adaptations to Stress in Small-Space Games
5.3. Situational Sports and Their Relation to Aerobic Endurance
5.3.1. Group I Situational Sport Demands; Football, Rugby and Hockey
5.3.2. Group II Situational Sport Demands; Basketball, Handball, Futsal
5.3.3. Group III Situational Sport Demands; Tennis and Volleyball
5.4. Monitoring and Assessment of Aerobic Endurance
5.4.1. Direct Treadmill Versus Field Evaluation
5.4.1.1. VO2max Treadmill Versus Field
5.4.1.2. VAM Treadmill Versus Field
5.4.1.3. VAM versus VFA
5.4.1.4. Time Limit (VAM)
5.4.2. Continuous Indirect Tests
5.4.2.1. Time Limit (VFA)
5.4.2.2. 1,000m Test
5.4.2.3. 5-Minute Test
5.4.3. Incremental and Maximum Indirect Tests
5.4.3.1. UMTT, UMTT-Brue, VAMEVAL and T-Bordeaux
5.4.3.2. UNCa Test; Hexagon, Track, Hare
5.4.4. Indirect Back-and-Forth and Intermittent Tests
5.4.4.1. 20 m. Prueba de carrera con lanzadera (Course Navette)
5.4.4.2. YoYo Test
5.4.4.3. Intermittent Test; 30-15 IFT, Carminatti, 45-15 Test
5.4.5. Specific Tests With Ball
5.4.5.1. Hoff Test
5.4.6. Proposal Based on the VFA
5.4.6.1. VFA Contact Points for Football, Rugby and Hockey
5.4.6.2. FSR Contact Points for Basketball, Futsal and Handball
5.5. Planning Aerobic Exercise
5.5.1. Exercise Model
5.5.2. Training Frequency
5.5.3. Duration of the Exercise
5.5.4. Training Intensity
5.5.5. Density
5.6. Methods to Develop Aerobic Endurance
5.6.1. Continuous Training
5.6.2. Interval Training
5.6.3. Intermittent Training
5.6.4. SSG Training (Small-Space Games)
5.6.5. Mixed Training (Circuits)
5.7. Program Design
5.7.1. Preseason Period
5.7.2. Competitive Period
5.7.3. Postseason Period
5.8. Special Aspects Related to Training
5.8.1. Concurrent Training
5.8.2. Strategies to Design Concurrent Training
5.8.3. Adaptations Generated by Concurrent Training
5.8.4. Differences Between Genders
5.8.5. De-Training
5.9. Aerobic Training in Children and Youth
5.9.1. General Concepts
5.9.1.1. Growth, Development and Maturation
5.9.2. Evaluation of VO2max and VAM
5.9.2.1. Indirect Measurement
5.9.2.2. Indirect Field Measurement
5.9.3. Physiological Adaptations in Children and Youth
5.9.3.1. VO2máx and VAM Adaptations
5.9.4. Design of Aerobic Training

5.9.4.1. Intermittent Method
5.9.4.2. Adherence and Motivation
5.9.4.3. Games in Small Spaces

Module 6. Power Training

6.1. ¿Qué es la potencia?
6.1.1. Definition
6.1.2. What is a W?
6.1.3. What is a July
6.2. Power meters
6.2.1. Meter operation
6.2.2. Types
6.2.3. Dual
6.2.4. Psuedodual
6.3. What is FTP?
6.3.1. Definition
6.3.2. Estimation methods
6.3.3. Application to training
6.4. Determination of strengths
6.4.1. Competition analysis
6.4.2. Data Analysis
6.5. Power profile
6.5.1. Classic power profile
6.5.2. Advanced power profile
6.5.3. Power profile test
6.6. Performance Monitoring
6.6.1. What is performance
6.6.2. MMP monitoring
6.6.3. Monitoring of physiological parameters
6.7. Power management chart (PMC)
6.7.1. External load monitoring
6.7.2. Internal load monitoring
6.7.3. Integración de todos los sistemas
6.8. Metrics
6.8.1. CP
6.8.2. FRC/ w'
6.8.3. Pmax
6.8.4. Stamina/ durability
6.9. Fatigue resistance
6.9.1. Definition
6.9.2. Based on KJ
6.9.3. Based on KJ/kg
6.10. Pacing
6.10.1. Definition
6.10.2. Normative values for time trials
6.10.3. Estimation software

Module 7. Mobility: from Theory to Performance

7.1. Neuromuscular System
7.1.1. Neurophysiological Principles: Inhibition and Excitability
7.1.1.1. Adaptations of the Nervous System
7.1.1.2. Strategies to Modify Corticospinal Excitability
7.1.1.3. Keys to Neuromuscular Activation
7.1.2. Somatosensory Information Systems
7.1.2.1. Information Subsystems
7.1.2.2. Types of Reflexes
7.1.2.2.1. Monosynaptic Reflexes
7.1.2.2.2. Polysynaptic Reflexes
7.1.2.2.3. Muscle-Tendinous-Articular Reflexes
7.1.2.3. Responses to Dynamic and Static Stretches
7.2. Motor Control and Movement
7.2.1. Stabilizing and Mobilizing Systems
7.2.1.1. Local System: Stabilizer System
7.2.1.2. Global System: Mobilizing System
7.2.1.3. Respiratory Pattern

7.2.2. Movement Pattern
7.2.2.1. Co-Activation
7.2.2.2. Joint by Joint Theory
7.2.2.3. Primary Motion Complexes
7.3. Understanding Mobility
7.3.1. Key Concepts and Beliefs in Mobility
7.3.1.1. Manifestations of Mobility in Sport
7.3.1.2. Neurophysiological and Biomechanical Factors Influencing Mobility Development
7.3.1.3. Impact of Mobility on Strength Development
7.3.2. Objectives of Training Mobility in Sport
7.3.2.1. Mobility in the Training Session
7.3.2.2. Benefits of Mobility Training
7.3.3. Mobility and Stability by Structures
7.3.3.1. Foot-Ankle Complex
7.3.3.2. Knee-Hip Complex
7.3.3.3. Spine-Shoulder Complex
7.4. Training Mobility
7.4.1. Fundamental Block
7.4.1.1. Strategies and Tools to Optimize Mobility
7.4.1.2. Specific Pre-Exercise Scheme
7.4.1.3. Specific Post-Exercise Scheme
7.4.2. Mobility and Stability in Basic Movements
7.4.2.1. Squat and Dead Lift
7.4.2.2. Acceleration and Multidirection
7.5. Methods of Recovery
7.5.1. Proposal for Effectiveness Based on Scientific Evidence
7.6. Methods for Training Mobility
7.6.1. Tissue-Centered Methods: Passive Tension and Active Tension Stretching
7.6.2. Methods Focused on Arthro-Coinematics: Isolated Stretching and Integrated Stretching
7.6.3. Eccentric Training
7.7. Mobility Training Programming
7.7.1. Effects of Stretching in the Short and Long Term
7.7.2. Optimal Timing for Applying Stretching
7.8. Athlete Assessment and Analysis
7.8.1. Functional and Neuromuscular Assessment
7.8.1.1. Key Concepts in Assessment
7.8.1.2. Evaluation Process
7.8.1.2.1. Analyze the Movement Pattern
7.8.1.2.2. Identify the Test
7.8.1.2.3. Detect the Weak Links
7.8.2. Athlete Assessment Methodology
7.8.2.1. Types of Tests
7.8.2.1.1. Analytical Assessment Test
7.8.2.1.2. General Assessment Test
7.8.2.1.3. Specific-Dynamic Assessment Test
7.8.2.2. Assessment by Structures
7.8.2.2.1. Foot-Ankle Complex
7.8.2.2.2. Knee-Hip Complex
7.8.2.2.3. Spine-Shoulder Complex
7.9. Mobility in Injured Athletes
7.9.1. Pathophysiology of Injury: Effects on Mobility
7.9.1.1. Muscle Structure
7.9.1.2. Tendon Structure
7.9.1.3. Ligament Structure
7.9.2. Mobility and Prevention of Injuries: Practical Case
7.9.2.1. Ruptured Ischialis in the Runner

Module 8. Sports Performance Assessment

8.1. Assessment
8.1.1. Definitions: Test, Assessment, Measurement
8.1.2. Validity, Reliability
8.1.3. Purposes of the Evaluation

8.2. Types of Tests
- 8.2.1. Laboratory Test
  - 8.2.1.1. Strengths and Limitations of Laboratory Tests
- 8.2.2. Field Tests
  - 8.2.2.1. Strengths and Limitations of Field Tests
- 8.2.3. Direct Tests
  - 8.2.3.1. Applications and Transfer to Training
- 8.2.4. Indirect Tests
  - 8.2.4.1. Practical Considerations and Transfer to Training

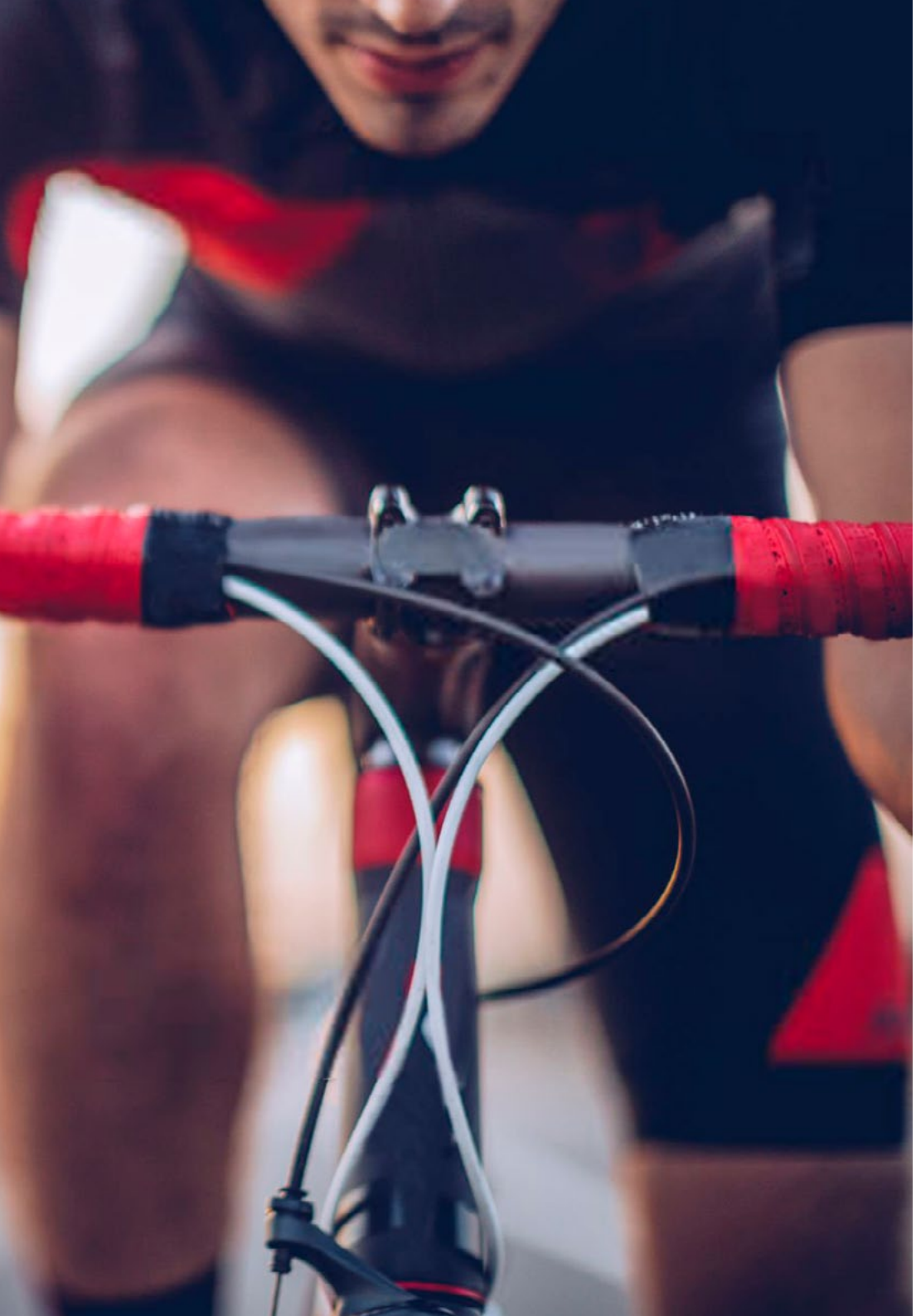
8.3. Assessment of Body Composition
- 8.3.1. Bioimpedance
  - 8.3.1.1. Considerations in its Application to Field
  - 8.3.1.2. Limitations on the Validity of Its Data
- 8.3.2. Anthropometry
  - 8.3.2.1. Tools for its Implementation
  - 8.3.2.2. Models of Analysis for Body Composition
- 8.3.3. Body Mass Index (IMC)
  - 8.3.3.1. Restrictions on the Data Obtained for the Interpretation of Body Composition

8.4. Assessing Aerobic Fitness
- 8.4.1. Vo2max Test on the Treadmill
  - 8.4.1.1. Astrand Test
  - 8.4.1.2. Balke Test
  - 8.4.1.3. ACSM Test
  - 8.4.1.4. Bruce Test
  - 8.4.1.5. Foster Test
  - 8.4.1.6. Pollack Test
- 8.4.2. Cycloergometer VO2max Test
  - 8.4.2.1. Astrand. Ryhming
  - 8.4.2.2. Fox Test
- 8.4.3. Cycloergometer Power Test
  - 8.4.3.1. Wingate Test
- 8.4.4. Vo2max Test in he Field
  - 8.4.4.1. Leger Test
  - 8.4.4.2. Montreal University Test
  - 8.4.4.3. Mile Test
  - 8.4.4.4. 12-Minute Test
  - 8.4.4.5. 2.4Km Test
- 8.4.5. Field Test to Establish Training Areas
  - 8.4.5.1. 30-15 IFT Test
- 8.4.6. UNca Test
- 8.4.7. Yo-Yo Test
  - 8.4.7.1. Yo-Yo Endurance YYET Level 1 and 2
  - 8.4.7.2. Yo-Yo Intermittent Endurance YYEIT Level 1 and 2
  - 8.4.7.3. Yo-Yo Intermittent Recovery YYERT Level 1 and 2

8.5. Neuromuscular Fitness Evaluation
- 8.5.1. Submaximal Repetition Test
  - 8.5.1.1. Practical Applications for its Assessment
  - 8.5.1.2. Validated Estimation Formulas for the Different Training Exercises
- 8.5.2. 1 RM Test
  - 8.5.2.1. Protocol for its Performance
  - 8.5.2.2. Limitations of 1 RM Assessment
- 8.5.3. Horizontal Jump Test
  - 8.5.3.1. Assessment Protocols
- 8.5.4. Speed Test (5m,10m,15m, Etc.)
  - 8.5.4.1. Considerations on the Data Obtained in Time/Distance Assessments
- 8.5.5. Maximum/Submaximum Incremental Progressive Tests
  - 8.5.5.1. Validated Protocols
  - 8.5.5.2. Practical Applications
- 8.5.6. Vertical Jump Test
  - 8.5.6.1. SJ Jump
  - 8.5.6.2. CMJ Jump
  - 8.5.6.3. ABK Jump
  - 8.5.6.4. DJ Test
  - 8.5.6.5. Continuous Jump Test

8.5.7. Strength/Speed Vertical/Horizontal Profiles
8.5.7.1. Morin and Samozino Assessment Protocols
8.5.7.2. Practical Applications from a Strength/Speed Profile
8.5.8. Isometric Tests With Load Cell
8.5.8.1. Voluntary Isometric Maximal Strength Test (IMS)
8.5.8.2. Bilateral Deficit Isometry Test (%BLD)
8.5.8.3. Lateral Deficit (%LD)
8.5.8.4. Hamstring/Quadriceps Ratio Test

8.6. Assessment and Monitoring Tools
8.6.1. Heart Rate Monitors
8.6.1.1. Device Characteristics
8.6.1.2. Training Areas by Heart Rate
8.6.2. Lactate Analyzers
8.6.2.1. Device Types, Performance and Characteristics
8.6.2.2. Training Zones According to the Lactate Threshold Limit (LT)
8.6.3. Gas Analyzers
8.6.3.1. Laboratory vs Portable Laptops
8.6.4. GPS
8.6.4.1. GPS Types, Characteristics, Strengths and Limitations
8.6.4.2. Metrics Established to Interpret the External Load
8.6.5. Accelerometers
8.6.5.1. Types of Accelerometers and Characteristics
8.6.5.2. Practical Applications of Data Obtained From an Accelerometer
8.6.6. Position Transducers
8.6.6.1. Types of Transducers for Vertical and Horizontal Movements
8.6.6.2. Variables Measured and Estimated by of a Position Transducer
8.6.6.3. Data Obtained from a Position Transducer and its Applications to Training Programming
8.6.7. Strength Platforms
8.6.7.1. Types and Characteristics.of Strength Platforms
8.6.7.2. Variables Measured and Estimated by Means of a Strength Platform
8.6.7.3. Practical Approach to Training Programming
8.6.8. Load Cells
8.6.8.1. Cell Types, Characteristics and Performance
8.6.8.2. Uses and Applications for Sports Performance and Health



8.6.9. Photoelectric Cells
8.6.9.1. Characteristics , and Limitations of the Devices
8.6.9.2. Practical Uses and Applicability
8.6.10. Mobile Applications
8.6.10.1. Description of the Most Used Apps on the Market: My Jump, PowerLift, Runmatic, Nordic
8.7. Internal and External Load
8.7.1. Objective Means of Assessment
8.7.1.1. Speed of Execution
8.7.1.2. Average Mechanical Power
8.7.1.3. GPS Device Metrics
8.7.2. Subjective Means of Assessment
8.7.2.1. PSE
8.7.2.2. sPSE
8.7.2.3. Chronic/Acute Load Ratio
8.8. Fatigue
8.8.1. General Concepts of Fatigue and Recovery
8.8.2. Assessments
8.8.2.1. Laboratory Objectives: CK, Urea, Cortisol, Etc
8.8.2.2. Field Objectives: CMJ, Isometric Tests, etc
8.8.2.3. Subjective: Wellness Scales, TQR, etc
8.8.3. Recovery Strategies: Cold-Water Immersion, Nutritional Strategies, Self-Massage, Sleep
8.9. Considerations for Practical Applications
8.9.1. Vertical Jump Test Practical Applications
8.9.2. Maximum/Submaximum Incremental Progressive Test Practical Applications
8.9.3. Vertical Strength-Speed Profile. Practical Applications

Module 9. Planning Applied to High Performance in Sports

9.1. Basic Fundamentals
9.1.1. Adaptation Criteria
9.1.1.1. General Adaptation Syndrome
9.1.1.2. Current Performance Capability, Training Requirement

9.1.2. Fatigue, Performance, Conditioning as Tools
9.1.3. Dose-Response Concept and its Application
9.2. Basic Concepts and Applications
9.2.1. Concept and Application of the Plan
9.2.2. Concept and Application of Periodization
9.2.3. Concept and Application of Programming
9.2.4. Concept and Application of Load Control
9.3. Conceptual Development of Planning and its Different Models
9.3.1. First Historical Planning Records
9.3.2. First Proposals, Analyzing the Bases
9.3.3. Classic Models
9.3.3.1. Traditional
9.3.3.2. Pendulum
9.3.3.3. High Loads
9.4. Models Focused on Individuality and/or Load Concentration
9.4.1. Blocks
9.4.2. Integrated Macrocycle
9.4.3. Integrated Model
9.4.4. ATR
9.4.5. Keeping in Shape
9.4.6. By Objectives
9.4.7. Structural Bells
9.4.8. Self-Regulation (APRE)
9.5. Models Focused on Specificity and/or Movement Capacity
9.5.1. Cognitive (or Structured Microcycle)
9.5.2. Tactical Periodization
9.5.3. Conditional Development by Movement Capacity
9.6. Criteria for Correct Programming and Periodization
9.6.1. Criteria for Programming and Periodization in Strength Training
9.6.2. Criteria for Programming and Periodization in Endurance Training
9.6.3. Criteria for Programming and Periodization in Speed Training
9.6.4. "Interference" Criteria in Scheduling and Periodization in Concurrent Training
9.7. Planning Through Load Control With a GNSS Device (GPS)
9.7.1. Basis of Session Saving for Appropriate Control
9.7.1.1. Calculation of group session average for correct load analysis
9.7.1.2. Common Errors in Saving and Their Impact on Planning
9.7.2. Relativization of the Load, a Function of Competence
9.7.3. Load Control by Volume or Density, Range and Limitations
9.8. Integrating Thematic Unit 1 (Practical Application)
9.8.1. Construction of a Real Model of Short-Term Planning
9.8.1.1. Selecting and Applying the Periodization Model
9.8.1.2. Designing the Corresponding Planning
9.9. Integrating Thematic Unit 2 (Practical Application)
9.9.1. Producing a Pluriannual Plan
9.9.2. Producing an Annual Plan

Module 10. Planning and Programming cyclists Training

10.1. Training methods
10.1.1. Continuous (uniform and variable)
10.1.2. Intervallic Fractionator
10.1.3. Fractionated repetitions
10.2. Intensity distribution
10.2.1. Forms of distribution
10.2.2. Pyramidal
10.2.3. polarized
10.3. Recovery Strategies
10.3.1. Activate
10.3.2. Passive
10.3.3. Means of recovery
10.4. Session design
10.4.1. Heating
10.4.2. Main part

10.4.3. Back to calm
10.5. Capacity building
10.5.1. VT1 upgrade
10.5.2. VT2 upgrade
10.5.3. Vo2max upgrade
10.5.4. Improvement of Pmax and anaerobic capacity
10.6. Long-term cyclist development
10.6.1. Learning to train
10.6.2. Learning to compete
10.6.3. Training to compete
10.7. Master's Degree Cyclist Training
10.7.1. Competitive demands of Master's Degree programs
10.7.2. Competitive calendar
10.7.3. Load distribution
10.8. U23 cyclist training
10.8.1. Competitive demands
10.8.2. Competitive calendar
10.8.3. Load distribution
10.9. Professional cyclist training
10.9.1. Competitive demands
10.9.2. Competitive calendar
10.9.3. Load distribution

Module 11. Load distribution

11.1. Traditional quantification model
11.1.1. Definition of quantification
11.1.2. Three-phase model
11.1.3. Advantages and Disadvantages
11.2. Banister Model
11.2.1. Definition
11.2.2. Why this model
11.2.3. Second Banister model
11.3. TRIMP model
11.3.1. Definition
11.3.2. Application factors
11.3.3. Advantages and Disadvantages
11.4. Lucia TRIMPs
11.4.1. Definition
11.4.2. Application factors
11.4.3. Advantages and Disadvantages
11.5. CTL, ATL and TSB
11.5.1. Definition
11.5.2. Application factors
11.5.3. Advantages and Disadvantages
11.6. ECOs Model
11.6.1. Definition
11.6.2. Application factors
11.6.3. Advantages and Disadvantages
11.7. Quantification based on sRPE
11.7.1. Definition
11.7.2. Application factors
11.7.3. Advantages and Disadvantages
11.8. Training Peaks
11.8.1. Explanation of the platform
11.8.2. Characteristics and Functions
11.8.3. Advantages and Disadvantages
11.9. Quantification of training in professional cycling
11.9.1. Communication as a daily basis
11.9.2. Quantification models
11.9.3. Limitations
11.10. Teun Van Erp and Daho Sanders Ph.D. Thesis
11.10.1. Quantification of professional competitions
11.10.2. Correlations between internal and external load
11.10.3. Limitations

Module 12. Biomechanics in the cyclist

12.1. What is biomechanics? What are its objectives?
- 12.1.1. Definition
- 12.1.2. History
- 12.1.3. Application for performance and injury prevention

12.2. Methods for biomechanics
- 12.2.1. Static
- 12.2.2. Dynamics
- 12.2.3. Accelerometry

12.3. Podal assessment, plantar arch, ROM, dysmetria
- 12.3.1. Plantar arch (ALI)
- 12.3.2. First radio
- 12.3.3. Types of feet

12.4. Functional Assessment
- 12.4.1. ROM
- 12.4.2. Dysmetries
- 12.4.3. compensation

12.5. Choice of shoes and bike size (stack and reach)
- 12.5.1. Types of slippers
- 12.5.2. Choice of frame size
- 12.5.3. Differences between road, MTB and time trial bicycles

12.6. Goniometry (optimal angulations)
- 12.6.1. Saddle height
- 12.6.2. Backspace
- 12.6.3. Complementary angles

12.7. Q-factor and shim adjustment
- 12.7.1. Advances
- 12.7.2. Factor Q
- 12.7.3. Cove turn

12.8. Torque
- 12.8.1. Definition
- 12.8.2. Application to training
- 12.8.3. Evaluation of pedaling

12.9. Electromyography
- 12.9.1. Definition
- 12.9.2. Musculature involved in pedaling
- 12.9.3. Pedaling evaluation with EMG systems

12.10. Most Common Injuries
- 12.10.1. Low back injuries
- 12.10.2. Knee injuries
- 12.10.3. Hand and foot injuries

Module 13. Special cycling training situations

13.1. Heat
- 13.1.1. Heat performance
- 13.1.2. Responses to training and adaptation protocols
- 13.1.3. Damp Heat vs. Dry Heat
- 13.1.4. Strategies to promote benefits

13.2. Altitude
- 13.2.1. Performance and altitude
- 13.2.2. Responders and non-responders
- 13.2.3. Benefits of altitude

13.3. Train High-Live Low
- 13.3.1. Definition
- 13.3.2. Advantages
- 13.3.3. Inconveniences

13.4. Live High-Train Low
- 13.4.1. Definition
- 13.4.2. Advantages
- 13.4.3. Inconveniences

13.5. Live High–Compete High
- 13.5.1. Definition
- 13.5.2. Advantages
- 13.5.3. Inconveniences

13.6. Hypoxia
- 13.6.1. Definition
- 13.6.2. Advantages
- 13.6.3. Inconveniences

13.7. Intermittent hypoxia
- 13.7.1. Definition
- 13.7.2. Advantages
- 13.7.3. Inconveniences

13.8. Atmospheric pollution
- 13.8.1. Contamination and performance
- 13.8.2. Adaptation Strategies
- 13.8.3. Disadvantages of training

13.9. Jet lag and performance
- 13.9.1. Jet lag and performance
- 13.9.2. Adaptation Strategies
- 13.9.3. Supplementation

13.10. Adaptability to nutritional changes
- 13.10.1. Definition
- 13.10.2. Loss of performance
- 13.10.3. Supplementation

Module 14. Nutrition in the cyclists

14.1. Concept of sports nutrition
- 14.1.1. What is sports nutrition?
- 14.1.2. Clinical nutrition vs. Sports Nutrition
- 14.1.3. Food and supplements

14.2. MB calculation
- 14.2.1. Components of Energy Expenditure
- 14.2.2. Factors influencing energy expenditure at rest
- 14.2.3. Energy consumption measurement

14.3. Body composition
- 14.3.1. BMI and traditional ideal weight. Is there such a thing as an ideal weight?
- 14.3.2. Subcutaneous fat and thickness of skin folds
- 14.3.3. Other methods for determining body composition

14.4. Macro and micronutrients
- 14.4.1. Definition of macro and micronutrients
- 14.4.2. Macronutrient requirements
- 14.4.3. Micronutrient requirements

14.5. Macro and micro periodization
- 14.5.1. Nutritional periodization
- 14.5.2. Periodization in macrocycles
- 14.5.3. Periodization in microcycles

14.6. Sweating rate and hydration
- 14.6.1. Sweat rate measurement
- 14.6.2. Hydration needs
- 14.6.3. Electrolytes

14.7. Stomach and digestive system training
- 14.7.1. Need to train the stomach and digestive system
- 14.7.2. EEySD Phases
- 14.7.3. Application in training and racing

14.8. Supplementation
- 14.8.1. Supplementation and ergonutritional aids
- 14.8.2. ABCD system of supplements and ergonutritional aids
- 14.8.3. Individual supplementation needs

14.9. Trends in sports nutrition
- 14.9.1. Trends
- 14.9.2. Low Carb-High Fat
- 14.9.3. High carbohydrate diet

14.10. Software and applications
- 14.10.1. Methods for macronutrients control
- 14.10.2. Softwares for nutrition control
- 14.10.3. Applications for the athlete

Module 15. Structure and operation of a cycling team

15.1. Equipment categories
- 15.1.1. Professional categories (WT and ProContinental)
- 15.1.2. Continental Category
- 15.1.3. Elite and U23 categories

15.2. Competition categories
- 15.2.1. Stage competitions
- 15.2.2. Classics
- 15.2.3. Categories according to level of participation

15.3. Lower categories
- 15.3.1. Schools
- 15.3.2. Cadets
- 15.3.3. Juveniles

15.4. Manager's role
- 15.4.1. Cycling structure manager
- 15.4.2. Sponsorships
- 15.4.3. Cyclist manager/representative

15.5. Director's role
- 15.5.1. Director's role as coordinator
- 15.5.2. Director's role as organizer
- 15.5.3. Director's role in competition

15.6. Role of mechanics
- 15.6.1. Professional equipment
- 15.6.2. Role of the ship mechanic
- 15.6.3. Role of the race mechanic

15.7. Role of assistants, masseurs and physiotherapists
- 15.7.1. Auxiliaries
- 15.7.2. Physiotherapists
- 15.7.3. Masseurs

15.8. Role of the rest of the staff
- 15.8.1. Office
- 15.8.2. Ship
- 15.8.3. Press

15.9. How to structure the competition
- 15.9.1. Competition analysis
- 15.9.2. Define competition objectives
- 15.9.3. Development of the planning for the competition

15.10. Day-to-day competition within a team
- 15.10.1. Precompetition
- 15.10.2. During competition
- 15.10.3. After the Competition

Module 16. Cycling modalities

16.1. Track
- 16.1.1. Definition
- 16.1.2. Track testing
- 16.1.3. Competition demands

16.2. Road
- 16.2.1. Definition
- 16.2.2. Modalities and categories
- 16.2.3. Competitive demands

16.3. CX (Cyclocross)
- 16.3.1. Definition
- 16.3.2. Competition demands
- 16.3.3. CX Technique

16.4. Time Trial
- 16.4.1. Definition
- 16.4.2. Individual Therapy
- 16.4.3. Equipment
- 16.4.4. Preparation for a time trial

16.5. MTB (Mountain Bike)/BTT (All Terrain Bicycle)
- 16.5.1. Definition
- 16.5.2. MTB Tests
- 16.5.3. Competition demands

16.6. Gravel
- 16.6.1. Definition
- 16.6.2. Competition demands
- 16.6.3. Specific Materials

16.7. BMX
- 16.7.1. Definition
- 16.7.2. BMX Tests
- 16.7.3. BMX demands

16.8. Adapted cycling
- 16.8.1. Definition
- 16.8.2. Eligibility Criteria
- 16.8.3. Competition demands

16.9. New modalities regulated by the UCI
- 16.9.1. eBike
- 16.9.2. eSports
- 16.9.3. Artistic cycling

16.10. Cyclotourism
- 16.10.1. Definition
- 16.10.2. Cycling tourism demands
- 16.10.3. Strategies for coping with tests

You will be able to access complementary readings, interactive guides and more high-quality multimedia resources 24 hours a day, whenever and however you want"

06

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

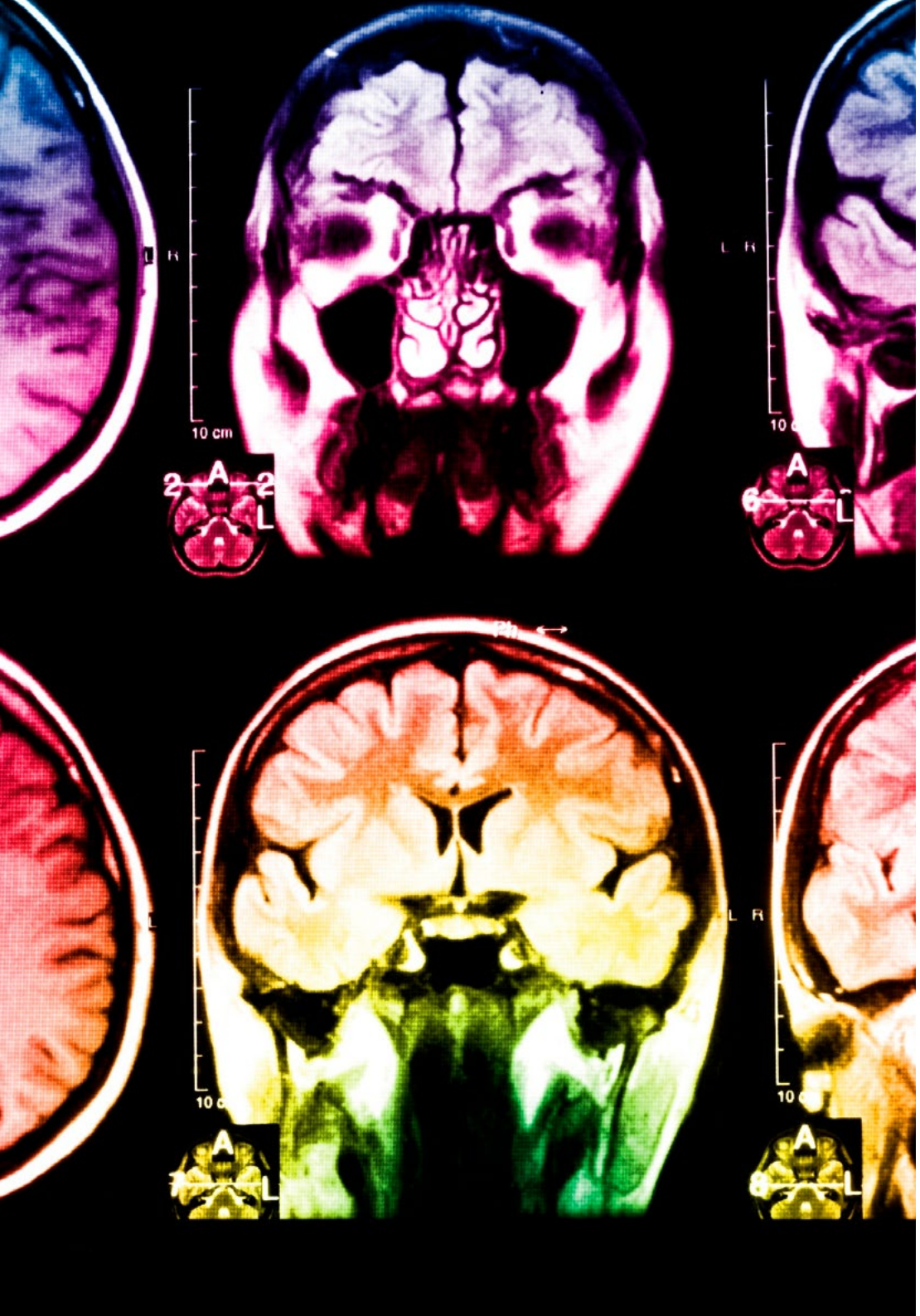
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines 8 different teaching elements in each lesson.

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.

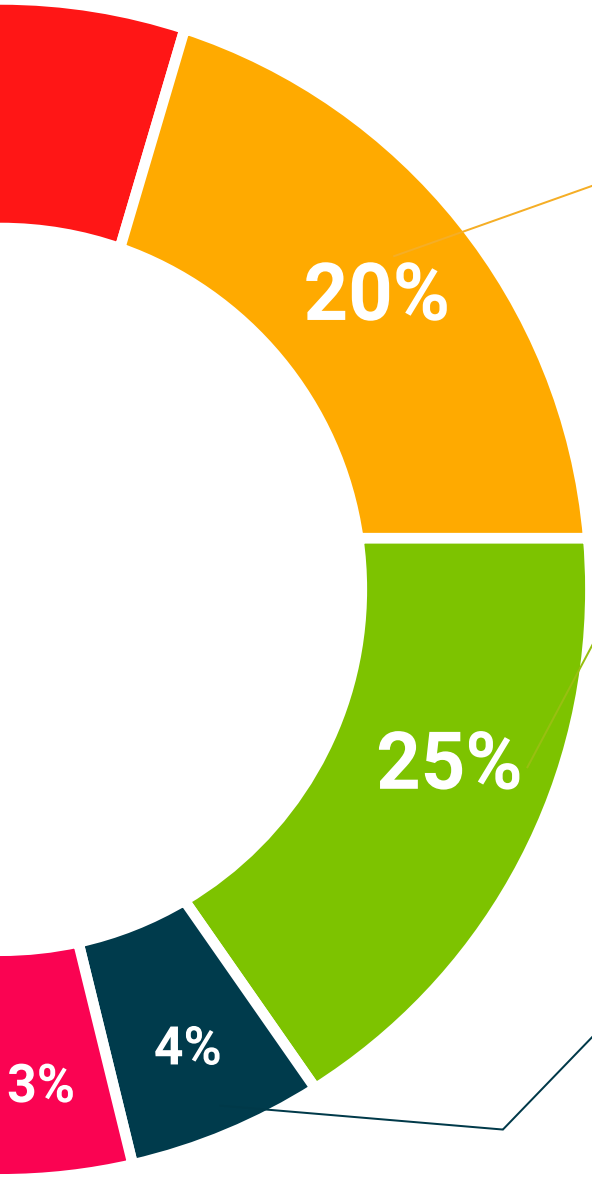
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

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.

07

Certificate

The Advanced Master's Degree in High-Performance and Competitive Cycling guarantees students, in addition to the most rigorous and up-to-date education, access to a Professional Master's Degree issued by TECH Technological University.

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

This **Advanced Master's Degree in High-Performance and Competitive Cycling** 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 **Advanced Master's Degree** issued by **TECH Technological University** via tracked delivery*.

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

Title: **Advanced Master's Degree in High-Performance and Competitive Cycling**

Official Nº of hours: **3,000 h.**

Endorsed by the NBA


tech technological university

Awards the following

CERTIFICATE

to

Mr./Ms. _____, with identification number _____.

For having successfully passed and accredited the following program

ADVANCED MASTER'S DEGREE

in

High-Performance and Competitive Cycling

This is a qualification awarded by this University, equivalent to 3,000 hours, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH is a Private Institution of Higher Education recognized by the Ministry of Public Education as of June 28, 2018.

June 17, 2020

Tere Guevara Navarro
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


Advanced Master's Degree in High-Performance and Competitive Cycling

General Structure of the Syllabus

Year	Subject	Hours	Type
1º	Physiology of Exercise on cyclists	200	CO
1º	Statistics Applied to Performance and Research	200	CO
1º	Strength training in cyclists	200	CO
1º	Speed Training, from Theory to Practice	200	CO
1º	Endurance Training from Theory to Practice	200	CO
1º	Power Training	200	CO
1º	Mobility: from Theory to Performance	200	CO
1º	Sports Performance Assessment	200	CO

Year	Subject	Hours	Type
2º	Planning Applied to High Performance in Sports	175	CO
2º	Planning and Programming cyclists Training	175	CO
2º	Load distribution	175	CO
2º	Biomechanics in the cyclist	175	CO
2º	Special cycling training situations	175	CO
2º	Nutrition in cyclists	175	CO
2º	Structure and operation of a cycling team	175	CO
2º	Cycling modalities	175	CO

Tere Guevara Navarro
Dean

tech technological university

*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.

tech technological university

Advanced Master's Degree
High-Performance and Competitive Cycling

- Modality: **online**
- Duration: **2 years**
- Certificate: **TECH Technological University**
- Dedication: **16h/week**
- Schedule: **at your own pace**
- Exams: **online**

Advanced Master's Degree

High-Performance and Competitive Cycling

Endorsed by the NBA

tech technological university