

1. BASIC INFORMATION

Course	Module 1: Training I. Fundamentals, physiology and monitoring of training based on new technologies
Degree program	Master's Degree in Sports Training and Nutrition
School	Escuela Universitaria Real Madrid – Universidad Europea / Faculty of Medicine, Health and Sports
Year	First
ECTS	6
Credit type	Compulsory
Language(s)	English
Delivery mode	Face
Semester	Annual
Academic year	2025-2026
Coordinating professor	Mr. Guillermo Muñoz Andradas /Mrs. Krizia Radesca Fabiano / Mrs. Rebeca Benítez Valero / Mr. Martín Alejandro Festino

2. PRESENTATION

"Fundamentals, physiology and monitoring of training based on new technologies" is the first module of the program, with a value of 6 ECTS. This module aims to provide students with a vision different from the purely empirical one related to the fundamentals of training and nutrition methods and systems. This module addresses, from a solid scientific basis, the physiological and biochemical foundations of bioenergetics applied to sport, integrating the nutritional discipline and the discipline based on sports science. It will also deal with new aspects of training monitoring through new technologies.

Students are required to perform classroom lectures, practicals, and independent work related to energy pathways for energy production, the body's responses to exercise in hot and humid environments, and analysis of cardiovascular and respiratory responses observed before different physical workloads. The qualification of this module is composed of laboratory practicals, group work and a multiple-choice test.

3. COMPETENCIES AND LEARNING OUTCOMES

Core competencies:

- CB2. That students know how to apply the knowledge acquired and their ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study.
- CB3. That students can integrate knowledge and face the complexity of making judgments based on information that, being incomplete or limited, includes reflections on the social and ethical responsibilities linked to the application of their knowledge and judgments.

Cross-curricular competencies:

- CT1. Creativity Create new ideas and concepts from known ideas and concepts, reaching conclusions or solving problems, challenges, and situations in an original way.
- CT4. Influential leadership. Influence others to guide and direct them towards specific goals and objectives, considering their points of view, especially in situations arising from volatile, uncertain, complex, and ambiguous (VUCA) environments of today's world.
- CT6. Critical analysis. Integrate analysis with critical thinking in a process of evaluating different ideas or possibilities and their potential for error, based on evidence and objective data that lead to effective and valid decision making.

Specific competencies:

- CE1. Analyze, describe, and evaluate the adaptations of the human organism exposed to different loads of physical activity in subjects of different ages, levels of performance or belonging to special population groups.
- CE2. Analyze and apply physiological, biomechanical, psychological, and social principles to the different fields of sport and nutrition, identifying inappropriate practices that pose a risk to health, in order to avoid and correct them in different types of population.
- CE3. Research and evaluate scientific documentation related to the areas of human performance and sports nutrition.
- CE4. Interpret research and apply new technologies in the field of training and sports nutrition.

Learning outcomes:

- RA1: Analyze the form of production, application, and transmission of force in each activity or sports gesture.
- RA2: Distinguish the responses of the human organism to different physical workloads in situations of extreme heat and humidity.
- RA3: Identify the mode of interaction and predominance of each energy pathway during the performance of different physical workloads, sport, or specialty.
- RA4: Investigate the cardiovascular and respiratory responses observed before different physical workloads.
- RA5: Discriminate the adequate and inadequate cardiovascular, respiratory, and muscular responses experienced by different population groups classified by age, sex, performance level and sports specialty to different physical workloads.
- RA6: Monitoring training through new technologies

The following table shows the relationship between the competencies developed during the course and the learning outcomes pursued:

Competencies	Learning outcomes
CB2, CB3, CT1, CT6, EC1, EC2, EC3, EC4	RA1
CB2, CB3, CT1, CT4, CT6, EC1, EC2, EC3	RA2
CB2, CB3, CT1, CT4, CT6, EC1, EC2, EC3	RA3
CB2, CB3, CT1, CT4, CT6, EC1, EC2, EC3	RA4
CB2, CB3, CT1, CT4, CT6, EC1, EC2, EC3	RA5
CB2, CB3, CT1, CT4, CT6, EC4	RA6

4. CONTENT

- Neuromuscular system

- Energy pathways for energy production: phosphagen system, glycolytic pathway, oxidative pathway.
- Cardiorespiratory system: responses and adaptations to exercise
- Analysis of energy expenditure
- Metabolic responses and adaptations to exercise
- Responses of the organism to the practice of exercise in environmental conditions of extreme heat and humidity.
- Training monitoring through new technologies

5. TEACHING-LEARNING METHODOLOGIES

The types of teaching-learning methodologies used are indicated below:

- Master class
- Case method.
- Cooperative learning.
- Problem-based learning.
- Learning based on workshop teachings
- Simulation environments

6. LEARNING ACTIVITIES

Listed below are the types of learning activities and the number of hours the student will spend on each one:

Campus-based mode:

Learning activity	Number of hours
Master classes (face-to-face modality)	30
Case analysis (face-to-face modality)	4
Problem solving (face-to-face modality)	5
Preparation of written reports (face-to-face modality)	27
Activities in workshops and/or laboratories (face-to-face modality)	6
Self-employment (face-to-face modality)	50
Debates and colloquiums (face-to-face modality)	8
Tutoring (face-to-face modality)	18
Knowledge tests (face-to-face modality)	2
TOTAL	150

7. ASSESSMENT

Listed below are the assessment systems used and the weight each one carries towards the final course grade:

Campus-based mode:

Assessment system	Weight
Face-to-face knowledge tests (face-to-face modality)	60-60%
Reports and writings (face-to-face modality)	5-20%
Case/problem (face-to-face mode)	5-20%
Notebook of laboratory practices (face-to-face modality)	10-20%

When you access the course on the *Campus Virtual*, you'll find a description of the assessment activities you must complete, as well as the delivery deadline and assessment procedure for each one.

7.1. First exam period

To pass the course in the first exam period, you must obtain a final course grade of at least 5 out of 10 (weighted average).

7.2. Second exam period

To pass the course in the second exam period, you must obtain a final grade of at least 5 out of 10 (weighted average).

The student must deliver the activities not successfully completed in the first exam period after having received the corresponding corrections from the professor, or those that were not delivered in the first place.

8. SCHEDULE

This table shows the delivery deadline for each assessable activity in the course:

Assessable activities	Deadline
Face-to-face knowledge tests	February
Reports and writings	October/November
Case/problem	October/November
Notebook of laboratory practices	February

This schedule may be subject to changes for logistical reasons relating to the activities. The student will be notified of any change as and when appropriate.

9. BIBLIOGRAPHY

The bibliographic search is part of the autonomous work of the student on the theme of the seminar. The teacher will be able to guide the student in this search.

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10. EDUCATIONAL GUIDANCE AND DIVERSITY UNIT

From the Educational Guidance and Diversity Unit we offer support to our students throughout their university life to help them reach their academic achievements. Other main actions are the students'

inclusions with specific educational needs, universal accessibility on the different campuses of the university and equal opportunities.

From this unit we offer to our students:

1. Accompaniment and follow-up by mean of counselling and personalized plans for students who need to improve their academic performance.
2. In terms of attention to diversity, non-significant curricular adjustments are made in terms of methodology and assessment for those students with specific educational needs, pursuing an equal opportunity for all students.
3. We offer students different extracurricular resources to develop different competences that will encourage their personal and professional development.
4. Vocational guidance through the provision of tools and counselling to students with vocational doubts or who believe they have made a mistake in their choice of degree.

Students in need of educational support can write to us at:

orientacioneducativa@universidadeuropea.es

11. ONLINE SURVEYS

Your opinion matters!

The Universidad Europea encourages you to participate in several surveys which help identify the strengths and areas we need to improve regarding professors, degree programs and the teaching-learning process.

The surveys will be made available in the “surveys” section in virtual campus or via e-mail.

Your assessment is necessary for us to improve.

Thank you very much for your participation.