Universidad Europea

1. BASIC INFORMATION

Course	Module 3: Biomechanics of Physical Activity and Sports
Degree program	Master's Degree in Sports Training and Nutrition
School	Real Madrid Graduate School/School of Sports Sciences
Year	First
ECTS	3 ECTS
Credit type	Mandatory
Language(s)	English
Delivery Mode	Campus-Based
Semester	Annual
Academic Year	2019/2020
Coordinating professor	Dr. SERGIO LORENZO JIMENEZ SAIZ

2. PRESENTATION

"Biomechanics of Physical Activity and Sports" is a module complementary to sports training in which students learn to assess the importance of biomechanical analysis of weightlifting, weight training and bodybuilding exercises, as well as biomechanical movements in sporting activities.

Thus, the students receive training in upper body and auxiliary strengthening exercises and running, jumping and throwing techniques in a range of sporting disciplines.

3. COMPETENCIES AND LEARNING OUTCOMES

Core competencies:

- *CB1. Students should possess and understand knowledge that provides a basis or opportunity to be innovative in the development and/or application of ideas, often in a research context.*
- *CB2. Students should be able to apply their acquired knowledge and problem-solving ability in new or little-known environments within broader (or multidisciplinary) contexts related to their area of study.*

- *CB3. Students should be able to integrate knowledge and tackle the complexity of formulating judgements based on information that, being incomplete or limited, includes reflections on social and ethical responsibilities related to the application of their knowledge and judgements.*
- *CB4. Students should be able to communicate their conclusions –and the ultimate reasons that support them– to specialized and non-specialized audiences in a clear and unambiguous way.*
- *CB5. Students should possess learning skills that allow them to continue studying in a largely self-directed or autonomous way.*

Cross-curricular competencies:

- *CT1. Self-learning skills:* being able to choose the most effective strategies and tools at the most appropriate time to learn and autonomously put our learning into practice.
- *CT3. Capacity to adapt to new situations:* being able to assess and understand different situations, adapting our own approach insofar as is necessary or appropriate.
- *CT7.* Responsibility: being able to fulfill the commitments a person makes to themselves and to others when performing a task and trying to achieve a set of goals as part of the learning process. The ability of any individual to acknowledge and accept the consequences of their own actions.
- *CT8. Information management:* being able to find, select, analyze, and integrate information from different sources.
- *CT9: Teamwork: being able* to participate and cooperate actively with other people, areas and/or organizations in order to achieve common goals.
- *CT10. Initiative and entrepreneurial spirit: being able* to decisively undertake difficult or risky actions. The ability to anticipate problems, suggest improvements and persevere in carrying them out. A preference for initiating activities and seeing them through to completion.

Specific competencies:

- CE2. Analyzing and applying physiological, biomechanical, psychological and social principles to different sporting fields and nutrition, identifying unsuitable practices that represent a health risk, in order to avoid them and correct them in the different types of population.
- CE3: Understanding and knowing how to access scientific documentation related to the areas of human performance and sports nutrition.

- CE7: Exchanging knowledge and leading research and development projects with the rest of the scientific community, based on a cooperative and multidisciplinary approach.
- CE11. Acquiring knowledge independently (self-learning).

Learning outcomes:

- RA1: Understanding of biomechanical principles and the different mechanical parameters used to assess each physical capacity or performance model in any sporting discipline.
- RA2: In-depth analysis and synthesis based on searches in fundamental bibliographic sources related to the assessment of mechanical parameters involved in a physical movement in sports.
- RA3: Using new technologies for quantifying the mechanical parameters of human movement.
- RA4: Solving problems related to the effect of forces generated by and/or acting on the musculoskeletal system.

The table below shows the relationship between the competencies developed in the course and the learning outcomes pursued:

Competencies	Learning outcomes
CB1, CB2, CB3, CB4, CB5 CT1, CT3, CT7, CT10 CE2, CE7, CE11	RA1
CB1, CB2, CB3, CB4, CB5 CT1, CT3, CT8, CT9, CT10 CE2, CE3, CE7, CE11	RA2
CB1, CB2, CB3, CB4, CB5 CT3, CT7, CT8, CT9, CT10 CE2, CE3, CE11	RA3
CB1, CB2, CB3, CB4, CB5 CT1, CT3, CT7, CT8, CT9 CE2, CE3, CE7,	RA4

4. COURSE CONTENT

1. Kinematic, kinetic and static fundamentals.
2. Biomechanical principles.

3. Fundamentals for analyzing a physical movement.
4. Systems and technologies used for mechanical assessment.
5. Biomechanics of strengthening exercises.
6. Biomechanics of weight training and bodybuilding exercises and their variants.
7. Biomechanical principles of running, jumping and throwing.

5. LEARNING METHODOLOGIES

The types of teaching methodologies are listed below:

- Master Class
- Case Method
- Cooperative learning
- PBL

6. LEARNING ACTIVITIES

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

Learning activity	Number of hours
Biomechanical analysis of weightlifting, weight training and bodybuilding exercises	15 hours on campus 30 hours of self-directed learning
Biomechanical analysis of physical movements in sports	10 hours on campus 20 hours of self-directed learning
TOTAL	**75 h**

7. ASSESSMENT

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

Assessment system	Weight
Activity 1. Biomechanical analysis of weightlifting, weight training and bodybuilding exercises	50%
Activity 2. Biomechanical analysis of physical movements in sports	25%
Activity 3. Multiple-choice exam	25%
Activity 4. Visit to the Madrid weightlifting federation for groundwork	PASS or FAIL

When you access the course on the *Campus Virtual*, you'll find a description of the activities you have to complete, as well as the deadlines and assessment procedures 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.

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. 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 section indicates the schedule with delivery dates of evaluable activities of the subject:

Assessable activity	Date
Activity 1. Biomechanical analysis of weightlifting, weight training and bodybuilding exercises	February
Activity 2. Biomechanical analysis of physical movements in sports	February
Activity 3. Multiple-choice exam	February
Activity 4. Visit to the Madrid weightlifting federation for groundwork	February

This schedule may undergo modifications for logistical reasons of the activities. Any modification will be notified to the student in a timely manner. The activities can be changed due to The activities can be changed due to master´s needs.

9. BIBLIOGRAPHY

1. ARTEAGA ORTÍZ, Rafael; VICTORIA DÍAZ, José (2001). Problemas de biomecánica para estudiantes de educación física. Las Palmas de Gran Canaria: Universidad de Las Palmas de Gran Canaria. ISBN:978-84-95286-75-8.

2. GUTIÉRREZ DÁVILA, Marcos (2006). Biomecánica deportiva: bases para el análisis. Edición: Madrid: Síntesis. ISBN: 978-84-7738-610-0

3. IZQUIERDO, Mikel (2008). Biomecánica y bases neuromusculares de la actividad física y el deporte. Edición: Madrid: Panamericana. ISBN: 978-84-9835-023-4.

4. NORDIN, Margarita; FRANKEL, Victor H. (2004). Biomecánica básica del sistema musculo esquelético. Madrid: McGraw-Hill/ Interamericana de España. ISBN: 84-486-0635-3.

10. DIVERSITY ATTENTION UNIT

Students with specific educational support needs:

Adaptations or curricular adjustments for students with specific educational support needs, in order to guarantee equal opportunities, will be guided by the Diversity Attention Unit (UAD).

The issuance of a report of curricular adaptations / adjustments by said Unit will be essential, so students with specific educational support needs should contact through: unidad.diversidad@universidadeuropea.es at the beginning of each semester

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.