Information about the subject

Degree: Bachelor of Sciences of Physical Activity and Sport

Faculty: Faculty of Physical Activity and Sport Sciences

Code: 281201 **Name:** Biomechanics of Physical Activity

Credits: 6,00 **ECTS Year:** 2 **Semester:** 1

Module: 1) Basic formation Module

Subject Matter: Biological and mechanical foundations of human motor skills. **Type:** Basic Formation

Field of knowledge: Ciencias de la Salud.

Department: Physical Preparation and Conditioning

Type of learning: Classroom-based learning

Languages in which it is taught: Spanish

Lecturer/-s:

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Module organization

1) Basic formation Module

Subject Matter	ECTS	Subject	ECTS	Year/semester
Biological and mechanical foundations of human motor skills.	36,00	Biochemistry and Human Physiology	9,00	1/2
		Biomechanics of Physical Activity	6,00	2/1
		Human Anatomy	9,00	1/2
		Kinesiology	6,00	2/1
		Physiology of Exercise	6,00	2/1
Behavioral and social foundations of human motor skills.	24,00	History and Sociology of Physical Activity and Sport	6,00	1/2
		Sport Psychology	6,00	1/2
		Statitics and Data Processing	6,00	2/2
		Technology Applied to Physical Activity and Sport	6,00	1/1

Learning outcomes

At the end of the course, the student must be able to prove that he/she has acquired the following learning outcomes:

R1 Describe different sports modalities and gestures through biomechanical analysis.

R2 Establish motor behavior through physical laws.

R3 Correctly apply different technologies and procedures to assess the sport and the athlete from a biomechanical perspective.

Competencies

Depending on the learning outcomes, the competencies to which the subject contributes are (please score from 1 to 4, being 4 the highest score):

GENERAL		Weighting			
		1	2	3	4
CG2	Know how to apply information and communication technologies (ICT).			x	
CG3	Develop skills to solve problems through decision making.			x	
CG4	Convey any related information properly both in writing and orally.	x			
CG7	Be able to carry out critical reasoning using the knowledge acquired.			x	
CG10	Develop skills for adaptation to new situations and for autonomous learning.			x	
CG13	Be able to apply theoretical knowledge in practice.				x
CG14	Use the internet properly as a means of communication and as a source of information.			x	
CG18	Be able to self-evaluate.	x			
CG19	Develop habits of excellence and quality in professional practice.		x		

SPECIFIC		Weighting			
		1	2	3	4

CE 2.1	Adapt the educational intervention to the individual characteristics and needs for the entire population and with emphasis on special populations such as: schoolchildren, the elderly (elderly), people with reduced mobility and Know how to guide, design, apply and technically-scientifically evaluate physical exercise and physical condition at an advanced level, based on scientific evidence, in different areas, contexts and types of activities for the entire population and with an emphasis on populations of a special nature such as: the elderly (elderly), schoolchildren, people with disabilities and people with pathologies, health problems or assimilated (diagnosed and / or prescribed by a doctor), taking into account gender and diversity. diversity.	x		
CE 2.2	Identify, communicate and apply anatomical-physiological and biomechanical scientific criteria at an advanced level of skills in the design, development and technical-scientific evaluation of procedures, strategies, actions, activities and guidelines adequate; to prevent, minimize and / or avoid a health risk in the practice of physical activity and sport in all kinds of population.			x
CE 3.4	Promote education, dissemination, information and constant orientation to people and leaders about the benefits, significance, characteristics and positive effects of the regular practice of physical and sports activity and physical exercise, of the risks and damages of an inadequate practice and of the elements and criteria that identify its adequate execution, as well as the information, guidance and advice on the possibilities of physical activity and appropriate sport in your environment in any professional intervention sector.			x
CE 6.2	Analyze, review and select the effect and efficacy of the practice of research methods, techniques and resources and Scientific work methodology, in solving problems that require the use of creative and innovative ideas.		x	
CE 6.4	Articulate and deploy procedures, processes, protocols, own analysis, with rigor and scientific attitude on matters of social, legal, economic, scientific or ethical nature, when necessary and pertinent in any professional sector of activity physical and sport (formal and informal physical-sport education; physical and sports training; physical exercise for health; direction of physical activity and sport).	x		

CE 7.2	Know, elaborate and know how to apply the ethical-deontological, structural-organizational conditions, professional performance and the regulations for the professional practice of Graduates in Physical Activity and Sports Sciences, in any sector professional of physical activity and sports (formal and informal physical-sports education; physical and sports training; exercise physical for health; direction of physical activity and sports); as well as being able to develop a multidisciplinary work	x	
CE 7.3	Understand, know how to explain and disseminate the functions, responsibilities and importance of a good professional Graduated in Sciences of Physical Activity and Sports as well as analyze, understand, identify and reflect critically and autonomously on their identity, training and professional performance to achieve the goals and benefits of physical activity and sport in an adequate, safe, healthy and efficient way in all the physical-sports services offered and provided and in any sector professional of physical activity and sports.	x	

Assessment system for the acquisition of competencies and grading system

Assessed learning outcomes	Granted percentage	Assessment method
R1, R2, R3	60,00%	Written / oral and / or practical tests.
R1, R3	30,00%	Active participation.
R1, R2, R3	10,00%	Autonomous work.

Observations

·The student will be able to keep the evaluation instruments passed during the 3 years following the first registration.

·It is necessary to obtain a 50% in the following instruments (if this criterion is not fulfilled, the student will be graded with a maximum of 4.5 in that exam):

·Written/oral and/or practical tests.

·Active participation

·Attendance to at least 4 of the 5 practical sessions in the laboratory is mandatory.

Learning activities

The following methodologies will be used so that the students can achieve the learning outcomes of the subject:

M2 Group dynamics and activities.

M3 Practical lesson.

M4 Presentation of content by the teacher.

M5 Laboratory practices.

M7 Small group discussion.

M8 Resolution of problems and cases.

IN-CLASS LEARNING ACTIVITIES

	LEARNING OUTCOMES	HOURS	ECTS
THEORETICAL CLASS: Presentation of contents by the teacher. Competency analysis. Demonstration of capabilities, skills and knowledge in the classroom. M4	R1, R2, R3	46,00	1,84
PRACTICAL CLASS / SEMINAR: Group dynamics and activities. Resolution of problems and cases. Practical laboratories. Data search, computer room, library, etc. Meaningful construction of knowledge through interaction and student activity. M2, M3, M5, M8	R3	10,00	0,40
EVALUATION: Set of oral and / or written tests used in the evaluation of the student, including the oral presentation of the final degree project. M2, M7, M8	R1, R2, R3	4,00	0,16
TOTAL		**60,00**	**2,40**

LEARNING ACTIVITIES OF AUTONOMOUS WORK

	LEARNING OUTCOMES	HOURS	ECTS
GROUP WORK: Problem solving. Preparation of exercises, memoirs, to expose or deliver in classes and / or in tutoring. M2, M5, M7, M8	R2, R3	10,00	0,40
SELF-EMPLOYED WORK: Study, individual preparation of exercises, works, memories, to expose or deliver in classes and / or in tutoring. Platform activities or other virtual spaces. M8	R3	80,00	3,20
TOTAL		**90,00**	**3,60**

Description of the contents

Description of the necessary contents to acquire the learning outcomes.

Theoretical contents:

Content block	Contents
1 CONCEPT AND AREAS OF STUDY OF BIOMECHANICS	Study of basic biomechanical contents such as:- Historical precedents and precursors.- Aims of the sportbiomechanics.- Applied areas.- Sport biomechanics inSpain.- Topics related to the biomechanics.
2 MATHEMATICAL AND PHYSICAL BASES FOR HUMAN ANALYSIS.	- General concept: measurement, measurement units,magnitudes and trigonometric functions…- Resolution ofbasic mathematical situations: vectorial and trigonometricoperations…
3 HUMAN MOVEMENT: BASES OF MECHANICS.	- Study and analysis of the mechanics (applied andcomponent):- Kinematic (lineal and angular). Concept andapplication by practice situations and problems resolution.-Dynamic (Kinetic and Static). Concept, laws and problemsresolution.
4 FLUID DYNAMICS: THE AIR AND AQUATIC ENVIRONMENTS.	- Basic concepts: Form coefficient, boundary layer andoutline.- Resistance assessment:- Types of resistance.- Liftforces (air).- Buoyancy forces (aquatic).
5 ENERGY OF MOVEMENT: WORK, POWER AND ENERGY.	Study, analysis and concept measurement:- Work.- Power.-Potential, kinetic and elastic energy.- Mechanical efficiency.-Simple machines: lever and pulley.- Kinetic links.
6 MECHANICAL CHARACTERISTICS OF THE MATERIALS.	- Mechanical study and analysis of materials:- Basicconcept: deformation, tension, elasticity, stiffness, flexibility,restitution and fatigue.- Mechanical characteristics ofbiological materials.- Mechanical characteristics of sportsurfaces.- Sport surface classification.- Theoretical aspectsin normalized test.

Temporary organization of learning:

Block of content	Number of sessions	Hours
1 CONCEPT AND AREAS OF STUDY OF BIOMECHANICS	2,00	4,00
2 MATHEMATICAL AND PHYSICAL BASES FOR HUMAN ANALYSIS.	2,00	4,00
3 HUMAN MOVEMENT: BASES OF MECHANICS.	14,00	28,00
4 FLUID DYNAMICS: THE AIR AND AQUATIC ENVIRONMENTS.	5,00	10,00
5 ENERGY OF MOVEMENT: WORK, POWER AND ENERGY.	5,00	10,00
6 MECHANICAL CHARACTERISTICS OF THE MATERIALS.	2,00	4,00

References

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