Information about the course

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 Training Module

Subject Matter: Biological and Mechanical Foundations of Human Motor Skills **Type:** Formación Básica

Branch of knowledge: Health Sciences

Department: Physical Preparation and Conditioning

Type of learning: Classroom-based learning

Language/-s in which it is given: Spanish

Teachers:

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Module organization

1) Basic Training Module

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

Learning outcomes

Al finalizar la asignatura, el estudiante deberá demostrar haber adquirido los siguientes resultados de aprendizaje:

R4 - Describe various sports modalities and gestures through biomechanical analysis.

Learning outcomes of the specified title

Type of AR: Habilidades o Destrezas

- Apply the principles derived from the concept of integral ecology in your proposals or actions, whatever the scope and area of knowledge and the contexts in which they are proposed.

- Develop theoretical-practical responses based on the sincere search for the full truth and the integration of all dimensions of the human being when faced with the great questions of life.

- Identify, communicate and apply scientific anatomical-physiological and biomechanical criteria at an advanced level of skills in the design, development and technical-scientific evaluation of appropriate procedures, strategies, actions, activities and guidelines; to prevent, minimize and/or avoid a health risk in the practice of physical activity and sport in all types of population.

- 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 emphasis on specific populations. special such as: older people (seniors), 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.

- Know, prepare and know how to apply the ethical-deontological, structural-organizational conditions, professional performance and the regulations of professional practice of Graduates in Physical Activity and Sports Sciences, in any professional sector of physical activity and sport (teaching formal and informal physical-sports; physical and sports training; physical exercise for health; as well as being able to develop multidisciplinary work

- Understand, know how to explain and disseminate the functions, responsibilities and importance of a good professional Graduate in Physical Activity and Sports Sciences as well as analyze , understand, identify and reflect critically and autonomously on their identity, training and professional performance to achieve the purposes and benefits of physical activity and sport in an adequate, safe, healthy and efficient manner in all physical-sports services offered and provided and in any professional sector of physical activity and sport.

Type of AR: Competencias

- Analyze, review and select the effect and effectiveness 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.

- Articulate and deploy with rigor and a scientific attitude the justifications on which to constantly and professionally prepare, support, substantiate and justify all acts, decisions, processes, procedures, actions, activities, tasks, conclusions, reports and professional performance.

- Promote education, dissemination, information and constant guidance to people and leaders on the benefits, significance, characteristics and positive effects of the regular practice of physical and sports activity and physical exercise, and the risks and harms of inadequate practice. and the elements and criteria that identify its adequate execution, as well as information, guidance and advice on the possibilities of appropriate physical activity and sport in its environment in any sector of professional intervention.

R5 - Ground motor behavior in physical laws.

Learning outcomes of the specified title

Type of AR: Habilidades o Destrezas

- Apply the principles derived from the concept of integral ecology in your proposals or actions, whatever the scope and area of knowledge and the contexts in which they are proposed.

- Articulate and deploy procedures, processes, protocols, own analysis, with rigor and scientific attitude on matters of a social, legal, economic, scientific or ethical nature, when necessary and relevant in any professional sector of physical activity and sport (formal education and informal physical-sports; physical and sports training; physical exercise for health; direction of physical activity and sport).

- Identify, communicate and apply scientific anatomical-physiological and biomechanical criteria at an advanced level of skills in the design, development and technical-scientific evaluation of appropriate procedures, strategies, actions, activities and guidelines; to prevent, minimize and/or avoid a health risk in the practice of physical activity and sport in all types of population.

- 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 emphasis on specific populations. special such as: older people (seniors), 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.

- Know, prepare and know how to apply the ethical-deontological, structural-organizational conditions, professional performance and the regulations of professional practice of Graduates in Physical Activity and Sports Sciences, in any professional sector of physical activity and sport (teaching formal and informal physical-sports; physical and sports training; physical exercise for health; as well as being able to develop multidisciplinary work

- Respect and put into practice the ethical principles and action proposals derived from the objectives for sustainable development, transferring them to all academic and professional activities.

- Understand, know how to explain and disseminate the functions, responsibilities and importance of a good professional Graduate in Physical Activity and Sports Sciences as well as analyze , understand, identify and reflect critically and autonomously on their identity, training and professional performance to achieve the purposes and benefits of physical activity and sport in an adequate, safe, healthy and efficient manner in all physical-sports services offered and provided and in any professional sector of physical activity and sport.

Type of AR: Competencias

- Analyze, review and select the effect and effectiveness 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.

- Promote education, dissemination, information and constant guidance to people and leaders on the benefits, significance, characteristics and positive effects of the regular practice of physical and sports activity and physical exercise, and the risks and harms of inadequate practice. and the elements and criteria that identify its adequate execution, as well as information, guidance and advice on the possibilities of appropriate physical activity and sport in its environment in any sector of professional intervention.

R6 - Apply different technologies and procedures to assess sports and athletes from a biomechanical perspective.

Learning outcomes of the specified title

Type of AR: Habilidades o Destrezas

- Identify, communicate and apply scientific anatomical-physiological and biomechanical criteria at an advanced level of skills in the design, development and technical-scientific evaluation of appropriate procedures, strategies, actions, activities and guidelines; to prevent, minimize and/or avoid a health risk in the practice of physical activity and sport in all types of population.

- 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 emphasis on specific populations. special such as: older people (seniors), 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.

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Assessment system

Modalidad presencial

Assessed learning outcomes	Granted percentage	Assessment tool
R4, R5, R6	60,00%	Written and/or practical tests.
R5, R6	30,00%	Exercises and Practices in the Classroom.
R4, R5, R6	10,00%	Non-face-to-face autonomous work.

Observations

Students may keep the assessment instruments passed during the 3 years following the first enrolment.
It is necessary to obtain 50% in all assessment instruments to pass the subject.
According to article 4.2. of the UCV Assessment Guidelines, the limit for absences that may be due to eventualities (medical consultation, bureaucratic procedures...) that do not have to be justified, is 30%.
Attendance at all the practical sessions indicated in the timetable is compulsory. Additionally for this subject, in the case of not attending 80% of these, the student will fail the two sessions of the course, having to make them up in the following enrolment.
If any of these criteria is not met, the student will be graded with a maximum of 4.5.

SPECIFICATIONS OF THE EVALUATION INSTRUMENTS

Written and/or practical tests

This consists of a single final exam on the dates of the official exam dates.
·Written test (35%): 25 multiple-choice questions with 4 answer options, each correct answer is worth 0.4. 3 wrong answers subtract one good answer (1 wrong answer subtracts 33.3%, i.e. 0.13).

A 5 out of 10 is required to obtain an average.
·Practical Test (25%): Problem solving. There are 5 practical problems worth 2 points each. A score of 5 out of 10 is required to obtain an average.
Classroom Exercises and Practical Exercises
Assessment of the practical context applied, with delivery of written practices by platform. Pass / Fail on delivery. A 5 out of 10 is required to obtain an average.
Autonomous work not in the classroom
Autonomous tasks and questionnaires delivered by platform. Pass / Fail by delivery.

The detailed explanation (procedure for the assignments) as well as the assessment tools (worksheets or rubrics) for each section will be posted on the platform of each group at the student's disposal.

Actividades formativas

The methodologies to be used so that the students reach the expected learning outcomes will be the following:

M1 Attendance at practices.

M2 Resolution of problems and cases.

M3 Discussion in small groups.

M4 Practical laboratories.

IN-CLASS TRAINING ACTIVITIES

ACTVITY	RELATIONSHIP WITH THE COURSE LEARNING OUTCOMES	METHODOLOGY	HOURS	ECTS
THEORETICAL CLASS: Presentation of contents by the teacher. Competency analysis. Demonstration of capabilities, skills and knowledge in the classroom.	R4, R5, R6	Attendance at practices.	46,00	1,84

PRACTICAL CLASS / SEMINAR: Group dynamics and activities. Resolution of problems and cases. Practical laboratories. Data search, computer classroom, library, etc. Meaningful construction of knowledge through student interaction and activity.	R4, R5	Discussion in small groups.	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.	R4, R5	Discussion in small groups. Practical laboratories.	4,00	0,16
TOTAL			**60,00**	**2,40**

TRAINING ACTIVITIES OF AUTONOMOUS WORK

ACTVITY	RELATIONSHIP WITH THE COURSE LEARNING OUTCOMES	METHODOLOGY	HOURS	ECTS
GROUP WORK: Problem solving. Preparation of exercises, memoirs, to present or deliver in classes and/or in tutoring.	R4, R5	Discussion in small groups. Practical laboratories.	10,00	0,40
SELF-EMPLOYED WORK: Study, Individual preparation of exercises, assignments, reports, to present or deliver in classes and/or in tutoring. Activities in platform or other virtual spaces.	R4, R5	Resolution of problems and cases. Discussion in small groups.	80,00	3,20
TOTAL			**90,00**	**3,60**

Description of contents

Descripción de contenidos necesarios para la adquisición de los resultados de aprendizaje.

Theoretical content:

Block of content	Contents
1. CONCEPT AND STUDY AREAS OF BIOMECHANICS	Study of the basic concepts of biomechanics such as:-The historical background and precursors.-The objectives of sports biomechanics.-The areas of application.-Sports biomechanics in Spain.-The disciplines related to biomechanics.
2. MATHEMATICAL AND PHYSICAL BASES FOR HUMAN ANALYSIS	General conceptualisation: Measurement, units of measurement, errors, magnitudes and trigonometric functions. Solving basic mathematical problems: vector operations, trigonometric operations
3. HUMAN MOVEMENT: BASES OF MECHANICS.	Study and analysis of mechanics, its applications and components: - Kinematics (linear and angular). Concepts and application by solving problems and practical cases.-Dynamics (kinetics and statics). Concepts, resolution of practical cases, and laws that compose it.
4. FLUID DYNAMICS: THE AERIAL AND AQUATIC ENVIRONMENT.	Basic concepts: Shape coefficient, boundary layer and profiles - Assessment of resistance - Types of resistance - Lifting forces (aerial) - Ascensional forces (aquatic).
5. ENERGETICS OF MOVEMENT: WORK, POWER AND ENERGY.	Study, analysis and conceptual evaluation:-Work.-Power.-Potential, kinetic and elastic energy.-Mechanical efficiency.-Simple machines: levers and pulleys.-Kinetic c
6. MECHANICAL CHARACTERISTICS OF MATERIALS.	Study and mechanical analysis of materials:-Basic concepts: Deformation, tension, elasticity, rigidity, flexibility, restitution and fatigue.-Mechanical characteristics of biological materials.-Biomechanical aspects of sports flooring.-Classification of flooring.-Theoretical aspects to be considered in normative tests.

Temporary organization of learning:

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

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