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 Training Module

Subject Matter: Biological and Mechanical Foundations of Human Motor Skills **Type:** Basic Formation

Field of knowledge: Health Sciences

Department: Physical Preparation and Conditioning

Type of learning: Classroom-based learning

Languages in which it is taught: English, Spanish

Lecturer/-s:

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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	36,00	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 various sports modalities and gestures through biomechanical analysis.

R2 Ground motor behavior in physical laws.

R3 Apply different technologies and procedures to assess sports and athletes from a biomechanical perspective.

Assessment system for the acquisition of competencies and grading system

Assessed learning outcomes	Granted percentage	Assessment method
R1, R2, R3	60,00%	Written and/or practical tests.
R2, R3	30,00%	Exercises and Practices in the Classroom.
R1, R2, R3	10,00%	Non-face-to-face autonomous work.

Observations

This course is NOT eligible for a single assessment request in accordance with Article 10.3 of the GENERAL REGULATIONS FOR ASSESSMENT AND GRADING OF OFFICIAL COURSES AND UCV DEGREE PROGRAMS.
Students may keep the assessment instruments they have passed for three years after their first enrolment.
It is necessary to obtain 50% in all assessment instruments to pass the subject.
Attendance at all practical sessions indicated in the schedule is compulsory. If students do not attend 80% of these sessions, they will fail both exam sessions for the course and will have to retake them in the following enrollment period.
If any of these criteria are not met, students 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.

Use of Artificial Intelligence Tools in the CAFD Degree Program

Use of Artificial Intelligence tools in the CAFD degree program In the Bachelor's Degree in Physical Activity and Sports Sciences (CAFD), the use of Artificial Intelligence (AI) tools is permitted in a complementary and responsible manner, as long as it contributes to active learning, the development of critical thinking, and the improvement of students' professional skills. Under no circumstances should AI replace personal effort, direct practice, or independent reflection, which are fundamental pillars of this degree program.

Permitted Uses of AI:
·Obtaining alternative explanations of theoretical or methodological concepts.
·Generating outlines, concept maps, or summaries to support study.
·Simulating interviews, questionnaires, or training sessions as part of methodological or research practices.
·Receiving feedback on report writing, provided that the original content is the student's own.
·Supporting the search for bibliography or scientific references, always contrasting with reliable and real academic sources, and respecting the CAFD regulations for the presentation of university work.

Prohibited Uses of AI:
·Writing complete sections of academic papers, classroom exercises and practices, internship reports, journals, or portfolios, as well as the Final Degree Project.
·Formulating hypotheses, objectives, or conclusions for academic work.
·Replacing qualitative or quantitative data analysis with automated tools without human validation.
·Creating videos, presentations, or avatars with AI as a substitute for the student's oral or practical presentation.
·Obtaining automatic answers to tests, rubrics, or assessable activities through the use of AI.

Citation and Attribution Guidelines:
·Any use of AI tools must be explicitly acknowledged in the submitted document (e.g., in a footnote or appendix).
·The name of the tool, the purpose of use (e.g., grammatical review, organization of ideas, interview simulation), and where it was used in the work must be indicated.
·Responsible use of AI will be evaluated within the framework of originality, academic honesty, and digital competence.

Additional recommendations:
Students are encouraged to combine the use of AI with traditional methods (manual problem solving, practical session design, direct observation, etc.) to ensure the comprehensive development of their skills.

If there are any doubts about the permitted use of AI in a specific activity, students should consult the faculty responsible for the course.

Learning activities

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

M1 Attendance at practices.

M2 Resolution of problems and cases.

M3 Discussion in small groups.

M4 Practical laboratories.

M5 Presentation of content by the teacher.

M6 Practical lesson.

M7 Group dynamics and activities.

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. M1	R1, R2, R3	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. M3	R1, R2	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. M3, M4	R1, R2	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 present or deliver in classes and/or in tutoring. M3, M4	R1, R2	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. M2, M3	R1, R2	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 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	Number of sessions	Hours
1. CONCEPT AND STUDY AREAS 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 AERIAL AND AQUATIC ENVIRONMENT.	5,00	10,00
5. ENERGETICS OF MOVEMENT: WORK, POWER AND ENERGY.	5,00	10,00
6. MECHANICAL CHARACTERISTICS OF MATERIALS.	2,00	4,00

References

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