

Course Unit	Biomechanics		Field of study	Sport Sciences	
Bachelor in	Sports - Minor in Recreation and Leisure		School	School of Education	
Academic Year	2022/2023	Year of study	2	Level	1-2
Type	Annual	Semester	-	ECTS credits	8.0
Code	9563-625-2001-00-22				
Workload (hours)	216	Contact hours	T 30	TP 30	PL 20
			TC -	S -	E -
			OT 10	O -	

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s) Tiago Manuel Cabral dos Santos Barbosa

### Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:

1. Analyse and diagnose motor behaviour based on the most updated evidence in biomechanics
2. Prescribe human motor behaviour based on the most updated evidence in biomechanics
3. Understand the research steps in sports biomechanics
4. Design and conduct biomechanic testing in field and laboratory settings

### Prerequisites

Before the course unit the learner is expected to be able to:

1. Technical English
2. Information and communications technology
3. Functional Anatomy and Physiology
4. Research Methods in Sport Sciences
5. Background or previous exposure to physical exercise and sports programmes

### Course contents

Module I - Fundamentals of human movement: basic terminology of movements; neuromuscular adaptations; bone adaptations. Module II - Biomechanic analysis of human movement: linear and angular kinematics; linear and angular kinetics; balance; fluid mechanics. Module III - Kinesiology: functional analysis of the upper limb, lower member and trunk. Module IV - Assessment techniques in biomechanics

### Course contents (extended version)

- Course content
  - Module I: Reference terminology Kinematic and kinetic concepts
  - Module I: Neuromuscular and bone adaptations
  - Module II - linear/angular kinematics: distance, displacement, speed, velocity, acceleration
  - Module II - linear/angular kinetics: Force, torque, Newton's laws
  - Module II - Balance: Levers, static and dynamic equilibrium
  - Module II - Fluid Mechanics: buoyancy, drag, lift, thrust
  - Module III - functional analysis of the upper limb: shoulder, elbow, wrist, hand
  - Module III - functional analysis of the lower limb: hip, knee, ankle, foot
  - Module III - functional analysis of the torso: trunk, vertebral column
  - Module IV: Techniques of assessment in biomechanics

### Recommended reading

1. Carr, G. (1997). Mechanics of sport. Human Kinetics.
2. Hall, S. (2011) Basic Biomechanics. McGraw-Hill Higher Education, New York
3. Knudson, D. V. , & Morrison, C. S. (1997). Qualitative Analysis of Human Movement. Human Kinetics.
4. McGinnis, P. M. (2013). Biomechanics of sport and exercise. Human Kinetics.

### Teaching and learning methods

Theoretical sessions: Lectures will provide background information about key concepts and theories Theoretical-practical sessions: applications in different settings of the content covered in lectures. Laboratory sessions: hands-on experiential learning Tutorial sessions: students' consultation and supervision

### Assessment methods

1. Continuous evaluation - (Regular, Student Worker) (Final)
  - Laboratory Work - 40% (One team assignment (group size is capped to 3 students))
  - Intermediate Written Test - 60% (Three classroom written tests (3x20%))
2. Sit-down exam paper - (Regular, Student Worker) (Supplementary, Special)
  - Final Written Exam - 100% (Sit-down exam paper)

### Language of instruction

1. Portuguese
2. Portuguese, with additional English support for foreign students.

### Electronic validation

Tiago Manuel Cabral dos Santos Barbosa	Pedro Miguel Monteiro Rodrigues	Pedro Miguel Queirós Pimenta Magalhaes	Carlos Manuel Costa Teixeira
07-12-2022	03-01-2023	03-01-2023	05-01-2023