

|                           |                              |               |                |                                                       |     |
|---------------------------|------------------------------|---------------|----------------|-------------------------------------------------------|-----|
| Course Unit               | Biomechanics of Exercise     |               | Field of study | Sport Sciences                                        |     |
| Master in                 | Physical Exercise and Health |               | School         | School of Education                                   |     |
| Academic Year             | 2023/2024                    | Year of study | 1              | Level                                                 | 2-1 |
| Type                      | Semestral                    | Semester      | 2              | ECTS credits                                          | 6.0 |
| Workload (hours)          |                              | 162           | Contact hours  | T 10   TP 10   PL 10   TC -   S 5   E -   OT 10   O - |     |
| Code: 6125-520-1201-00-23 |                              |               |                |                                                       |     |

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. Being able to analyse and diagnose motor behaviour as well as physical exercises base on biomechanics evidence
2. Being able to prescribe motor behaviour and physical exercises base on biomechanics evidence
3. Understand the standard research steps in biomechanics of exercise
4. Be able to design and conduct biomechanics testing in lab and field settings independently

### Prerequisites

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

1. Functional anatomy or related fields
2. Information and communication technology (ICT)
3. Histology and/or Biomaterials or related fields
4. Exercise Physiology or related fields

### Course contents

A – Testing in biomechanics (experimental biomechanics and analytical biomechanics) B – Posture and locomotion C– Qualitative and quantitative assessment of human movement D – Modelling human movement

### Course contents (extended version)

1. A - techniques of assessment in biomechanics: definitions, kinematics, kinetics, EMG, modelling
2. B - Posture and locomotion: gait cycle, body sway
3. C – Qualitative and quantitative evaluation of human movement: models, steps, determinants
4. D - Modelling human movement: techniques, procedures limitations, applications

### Recommended reading

1. Robertson, G. , Caldwell, G. , Hamill, J. , Kamen, G. , & Whittlesey, S. (2014). Research Methods in Biomechanics (2nd ed. ): New York. Human Kinetics.
2. Winter, D. A. (2009). Biomechanics and motor control of human movement (3th ed. ): John Wiley & Sons Inc.
3. Enoka, R. M. (2008). Neuromechanics of Human Movement (4th ed. ): New York. Human Kinetics.
4. Hamilton N. and Luttgens K. (2007) Kinesiology: Scientific Basis of Kinesiology (11th edition) Boston, MA: McGraw-Hill.

### 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)
  - Intermediate Written Test - 50% (Classroom written test)
  - Practical Work - 50% (Team assignment)
2. Exam Evaluation - (Regular, Student Worker) (Final, 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<br>Barbosa | Pedro Miguel Monteiro Rodrigues | Pedro Miguel Queirós Pimenta<br>Magalhaes | Carlos Manuel Costa Teixeira |
| 20-12-2023                                | 25-02-2024                      | 26-02-2024                                | 27-02-2024                   |