Biophysics and Biomechanics

Code: 103008
ECTS Credits: 6

2025/2026

Degree	Type	Year
Physiotherapy	FB	1

Contact

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Teachers

Alejandro Peralvarez Marin

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Teaching groups languages

You can view this information at the end of this document.

Prerequisites

Basic knowledge is required on thermodynamics, mechanics, wave theory, electricity, electromagnetic waves, radiation as well as math and basic trigonometry.

Objectives and Contextualisation

The subject of Biophysics and Biomechanics is within the first year of the degree of Physiotherapy and is part of the basic training subjects.

The general objective is to deepen in the knowledge of various aspects of the human body function and instrumentation in the field of physiotherapy, in relation to the laws of physics.

Note: 15 minutes of a class will be reserved, within the calendar established by the center/degree, for students to fill in the teacher performance and evaluation surveys of the subject/module.

Competences

- Analyse and synthesise.

- Display knowledge of the sciences, models, techniques and instruments around which physiotherapy is structured and developed.
- Make changes to methods and processes in the area of knowledge in order to provide innovative responses to society's needs and demands.
- Solve problems.
- Take sex- or gender-based inequalities into consideration when operating within one's own area of knowledge.

Learning Outcomes

1. Analyse a situation and identify its points for improvement.
2. Analyse and synthesise.
3. Apply the anthropometric principles.
4. Communicate using language that is not sexist.
5. Determine the physical bases of the different physical agents and their applications to physiotherapy.
6. Determine the principles and applications of physiotherapy measurement procedures used in biomechanics and electrophysiology.
7. Explain the principles and theories of physics, biomechanics and kinesiology applicable to physiotherapy.
8. Identify situations in which a change or improvement is needed.
9. Propose new methods or well-founded alternative solutions.
10. Propose new ways to measure success or failure when implementing innovative proposals or ideas.
11. Solve problems.
12. Weigh up the risks and opportunities of suggestions for improvement: one's own and those of others.

Content

Contents

Part 1 / Thermodynamics

Part 2 / Electricity and Electrophysiology

Part 3 / Mechanical waves and ultrasounds

Part 4 / Electromagnetic waves and radiation

Part 5 / Biomechanics I

Part 6 / Biomechanics II

PRACTICAL SESSIONS

Practicum 1. Indirect calorimetry.

Practicum 2. Biomechanics and Anthropometry

Practicum 3. Ankle biomechanics.

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes

Type: Directed			
CLASSROOM PRACTICES (PLAB)	8.5	0.34	2, 6, 11
SEMINARS (SEM)	11	0.44	2, 3, 6, 11
Theory (TE)	26	1.04	3, 6, 5, 7
Type: Supervised			
ORAL PRESENTATION/EXPOSITION OF WORKS	7	0.28	
Type: Autonomous			
SELF-STUDY	89.5	3.58	

- The master classes with audiovisual support will be carried out in a single group of students. The group will be divided into four for laboratory practices (PLAB) and for classroom practices (seminars, SEM).

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Evaluation of deliverables	10%	0	0	2, 1, 3, 4, 6, 5, 7, 8, 12, 9, 10, 11
Evaluation of practical sessions	10%	0	0	2, 6
Two multiple-choice exams	55%	5	0.2	2, 1, 3, 4, 6, 5, 7, 8, 12, 9, 10, 11
Two short-answer test	25%	3	0.12	2, 1, 7, 8, 12, 9, 10, 11

Continued avaluation

The subject will be evaluated during the course in two subject eliminatory
To pass the subject by continuous assessment using the average of the
a) Having obtained a minimum score of 4.5 in each of the two subject eli
b) Have attended at least 66% of the practice sessions and have submitt
Students who have not passed the subject through continuous assessme
c) They have appeared in the two elimination exams (which correspond t
d) They have attended at least 66% of the laboratory practices and subm
Students who do not meet the three points above (c and d) will be classif
The minimum score required to pass any exam will be 5.0.

Setting up the tests

With regard to the two eliminatory subject exams (80% of the assessmer
e) A test type with 40-50 theory questions and short problems to be solve
f) A written paper with questions related to laboratory practices and nume
In relation to the evaluation of the laboratory practice session, it will be ba
In relation to the evaluation of the students' assignments, a guideline ma
Final qualification
Weighted sum of the assessment of theoretical and practical knowledge.
Numerical expression: note with one decimal place, from 0.0 to 10.0.
Qualitative grade: non-evaluable, failed, passed, notable, excellent, honc
In the event of not passing the subject, the practical notes will be kept, bu

UNIQUE ASSESSMENT

Students who take the single assessment must do the laboratory practice
The single assessment consists of a single summary test (with test-type
The grade obtained in the synthesis test is 80% of the final grade of the s
The single assessment test will coincide with the same date fixed in the c
To pass the subject, you must obtain a minimum final grade of 5.0 out of

Examination review system

Exams will be reviewed individually with the student.

Bibliography

BIOFÍSICA

A.S. Frumento (1995). Mosby/Doyma Libros

ELECTROTERAPIA EN FISIOTERAPIA [Recurso electrónico de las bibliotecas de la UAB]

J. M. Rodríguez Martín (2014). Ed. Médica Panamericana. FÍSICA

J. N .Kane y M. M. Sternheim (1994). Ed. Reverté. FÍSICA

P.A. Tipler. (1992). Ed. Reverté.

BIOMECÁNICA BÁSICA DEL SISTEMA MUSCULOESQUELÉTICO

M. Nordin y V. H. Frankel (2004). McGraw-Hill Interamericana.

Fundamentals of Biomechanics.

D. Knudson (2021). Springer Books.

FÍSICA PARA CIENCIAS DE LA VIDA

D. Jou, J.E. Llebot, C.Perez-García. (1994) Ed. McGraw-Hill.

Recursos d'Internet

http://www.asbweb.org (web de la American Society of Biomechanics)

http://ww3.haverford.edu/physics-astro/course_materials/phys320/biophysicsCourses.html

https://ocw.mit.edu/

http://hyperphysics.phy-astr.gsu.edu/hbase/index.html

Software

No specific software is required.

Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this link. To consult the language you will need to enter the CODE of the subject.

Name	Group	Language	Semester	Turn
(PLAB) Practical laboratories	101	Catalan	first semester	morning-mixed
(PLAB) Practical laboratories	102	Catalan/Spanish	first semester	morning-mixed
(PLAB) Practical laboratories	103	Catalan/Spanish	first semester	morning-mixed
(PLAB) Practical laboratories	104	Catalan/Spanish	first semester	morning-mixed
(SEM) Seminars	101	Catalan/Spanish	first semester	morning-mixed
(SEM) Seminars	102	Catalan/Spanish	first semester	morning-mixed
(SEM) Seminars	103	Catalan/Spanish	first semester	morning-mixed
(SEM) Seminars	104	Catalan/Spanish	first semester	morning-mixed
(TE) Theory	101	Catalan/Spanish	first semester	morning-mixed