COURSE DATA

DATA SUBJECT

Code: 44632
Name: Developments in basic science and therapeutic physical exercise
Cycle: Master's Degree
ECTS Credits: 10
Academic year: 2026-27

STUDY (S)

Degree	Center	Acad. year	Period
2220 - Master's Degree in Functional Recovery in Physiotherapy	Facultat de Fisioteràpia	1	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
2220 - Master's Degree in Functional Recovery in Physiotherapy	Developments in basic science and therapeutic physical exercise	COMPULSORY

COORDINATION

INGLES DE LA TORRE MARTA

MORENO SEGURA NOEMI

SUMMARY

This subject deals with topics of great importance in the use of physical exercise as therapy that will be necessary to consider in the specific subjects of each specialty.

The subject is divided into three sections:
1- Anatomy, biomechanics, histology and physiology applied.
2- Pharmacology applied to functional recovery.
3- Physical exercise as therapy.

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

OTHER REQUIREMENTS

COMPETENCES / LEARNING OUTCOMES

2220 - Master's Degree in Functional Recovery in Physiotherapy

Apply anatomy and biomechanics from a clinical perspective.

Applying basic and resulting physical qualities and their importance in Functional Recovery.

Being able to differentiate the specific histological characteristics of healthy and pathological tissues and their correlation with motor and functional functions.

Being able to obtain and select specific information and relevant sources for problem-solving, strategy development and action plans, advising and implementing different physiotherapy interventions in the areas of functional recovery.

Design physical activity intervention programs for people with or without pathologies in different environments and according to the person's objectives, based on scientific evidence criteria.

Increase knowledge about the effects and indications of non-prescription medications, as well as drug interactions that may influence functional recovery.

Properly plan the patient's functional recovery based on the physiological principles of physical performance.

Students should be able to integrate knowledge and address the complexity of making informed judgments based on incomplete or limited information, including reflections on the social and ethical responsibilities associated with the application of their knowledge and judgments.

Students should demonstrate self-directed learning skills for continued academic growth.

Students should possess and understand foundational knowledge that enables original thinking and research in the field.

To deepen the understanding of the body's responses and adaptations to physical exercise.

To delve deeper into the pathophysiology of the most common injuries and diseases.

To promote, in academic and professional contexts in the field of economic policy, technological, social or cultural advancement within a society based on knowledge and respect for: a) fundamental rights and equal opportunities between men and women, b) the principles of equal opportunities and universal accessibility for people with disabilities and c) the values ¿¿of a culture of peace and democratic values.

DESCRIPTION OF CONTENTS

1. Surface anatomy

Surface anatomy of the main anatomical structures related to functional recovery.

2. Physiology of functional recovery

The subject is focused on the study of the mechanisms underlying physiological adaptations and modifications that physical exercise produces in a healthy individual. The changes referred to are addressed in several areas: neurological, musculoskeletal, cardiorespiratory and metabolic. Important to analyze the mechanisms by which exercise has beneficial effects on the body are also dedicated space.

3. Biomechanics of functioanal recovery

In this subject, the main basis of joint and muscle biomechanics are presented.
In addition, there will be an overview of the main bases of biomechanics applied to tasks of daily living in different population groups.

4. Histology and pathology

This topic sets out the specific histological characteristics of healthy and pathological tissues, as well as their correlation with motor and functional functions.

5. Pharmacology and pharmacokinetics

In this topic, the basics of pharmacokinetics and pharmacodynamics, as well as those factors that influence drug response are explained. Furthermore, the main route of administration and the fundamental aspects of the drugs most commonly used in the functional recovery field (i.e. drugs that act on the autonomic nervous system and neuromuscular, psychoactive drugs (benzodiazepines), analgesics and anti-inflammatories, drugs that regulate hemostasis, drugs affecting bone- anabolic steroids).

6. The process of motor learning. Conditional and coordinating physical qualities

This topic discusses basic aspects related to learning, developing and controlling motor skills. It will distinguish between conditional (resistance, strength, speed and flexibility) and coordination physical qualities (basic, special and complex).

7. Physical activity planning, systematic of physical exercise and design of intervention programs

Early functional recovery.
Planning. General aspects of physical activity programming.
The intervention session. The motor learning process. Aspects to consider.
Specific aspects of planning therapeutic intervention programs through exercise.
Design intervention programs and prevention through physical exercise. Practical cases.

8. Health and Exercise

The importance of physical activity in the prevention and treatment of disease

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	45,00
Classroom practices	15,00
Total hours	**60,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	5,00
Individual or group project	0,00
Independent study and work	185,00
Preparation of lessons	0,00
Preparation for assessment activities	0,00
Resolution of case studies	0,00
Total hours	**190,00**

TEACHING METHODOLOGY

1. Theoretical-practical face-to-face classes in which the contents of the subjects will be worked on. In addition, discussion sessions and activities will be carried out by using different teaching resources.
2. Practical case studies and group workshops with subsequent debate, with the aim of promoting cooperative learning and reinforcing individual learning.
3. Individual and group tutorials to coordinate students in individual and group tasks.

EVALUATION

Evaluation system	Percentage of qualifying
Theoretical and practical final test.	**80%**
Assistance and participation at class	**20%**

The final grade of the subject will be the weighted sum of the marks obtained in each evaluation test, as long as the student has obtained at least 50% of the maximum mark in each of the tests.

Class attendance is compulsory and is part of the course evaluation. In this sense, a minimum attendance of 80% of the course hours is required to receive the highest grade in this evaluation category. Likewise, except for reasons of force majeure accredited to the master's degree management, a minimum attendance of 50% of the course hours is required to pass this part of the evaluation. Because face-to-face classes are non-recoverable, failing to attend 50% of the hours of the subject means it is impossible to pass the subject in either of the two calls.

REFERENCES

- American College of Sports Medicine. *ACSM's guidelines for exercise testing and prescription*. 11th ed. Philadelphia: Wolters Kluwer; 2022. ISBN: 9781975150198.
- Flórez J. *Farmacología humana*. 7ª ed. Barcelona: Elsevier; 2025. ISBN: 9788491138976.
- Hawley J, Hargreaves M, Joyner MJ, Zierath JR. Integrative biology of exercise. *Cell*. 2014;159 (4):738–49. doi:10.1016/j.cell.2014.10.029.
- Kisner C, Colby LA. *Therapeutic exercise: foundations and techniques*. 7th ed. Philadelphia: F.A. Davis Company; 2020. ISBN: 9780803661622.
- López Chicharro J, Fernández Vaquero A. *Fisiología del ejercicio*. 4ª ed. Madrid: Editorial Médica Panamericana; 2022. ISBN: 9788491107491.
- O'Donovan G, Blazevich AJ, Boreham C, Cooper AR, Crank H, Ekelund U, et al. The ABC of physical activity for health: a consensus statement from the British Association of Sport and Exercise Sciences. *J Sports Sci*. 2010;28(6):573–91. doi:10.1080/02640411003671212.
- Ovalle W, Nahirney P. Netter. *Histología esencial*. 3ª ed. Barcelona: Elsevier; 2021. ISBN: 9788491139539.
- Tixa S. *Atlas de anatomía palpatoria. Tomo 1. Cuello, tronco y miembro superior.* 5ª ed. Barcelona: Elsevier Masson; 2025. ISBN: 9788491138822.
- Tixa S. *Atlas de anatomía palpatoria. Tomo 2. Miembro inferior. 6ª* ed. Barcelona: Elsevier Masson; 2024. ISBN: 9788491138839.

Likewise, the books, scientific articles and readings of interest recommended for the preparation of the contents addressed in each topic will be specified at the end of each class.