

**COURSE DATA****DATA SUBJECT****Code:** 44637**Name:** Functional recovery and new neurorehabilitation technology**Cycle:** Master's Degree**ECTS Credits:** 6**Academic year:** 2025-26**STUDY (S)**

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

**SUBJECT-MATTER**

Degree	Subject-matter	Character
2220 - Master's Degree in Functional Recovery in Physiotherapy	Functional recovery and new neurorehabilitation technology	ELECTIVES

**COORDINATION**

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**SUMMARY**

This course primarily aims to train students in the functional needs of patients with neurological conditions to adapt therapeutic interventions in the most efficient and successful as possible. This subject will be introduced in the field of neurorehabilitation and therefore the use of technology for therapeutic purposes depending on the disease or syndrome with the patient.

**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**



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Acquire specific knowledge about the factors influencing adherence to physical activity and appropriate techniques to enhance it.

Acquire sufficient scientific methodology to develop research projects in the field of functional recovery.

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.

Develop the ability to effectively use therapeutic physical exercise across all areas of functional recovery intervention.

Develop the ability to prepare and deliver both oral and written reports on the functional status of patients

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.

## DESCRIPTION OF CONTENTS

### 1. Physical activity

Recommended levels of physical activity for maintaining the health of the patients with neurological conditions.

### 2. Assisted therapy and/or robotics

Assisted therapy and/or robotics: application of these therapies (with torque feedback platforms, functional electrostimulation, Armeo ®, exoskeletons [eLegs, ReWalk, etc]) for recovery of certain functional capabilities.

### 3. Virtual reality

Virtual reality as a tool for therapeutic support and dynamic exercise.



#### 4. Mirror neurons and motor imagery

Training techniques based on mirror neurons and motor imagery for motor recovery and treatment of neuropathic pain.

#### 5. Transcranial magnetic electro-stimulation

Transcranial magnetic electro-stimulation as a method to evoke movements in the neurological patient.

### WORKLOAD

#### PRESENCIAL ACTIVITIES

Activity	Hours
Theory	24,00
Laboratory	12,00
<b>Total hours</b>	<b>36,00</b>

#### NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	5,00
Individual or group project	15,00
Independent study and work	50,00
Preparation of lessons	20,00
Preparation for assessment activities	24,00
Resolution of case studies	0,00
<b>Total hours</b>	<b>114,00</b>

### TEACHING METHODOLOGY

Theoretical-practical face-to-face classes in which the contents of the subject will be worked on, discussed and carried out using different teaching resources.

The purpose of group work is to promote cooperative learning and reinforce the individual.

Individual and group tutorials will serve as a means of coordinating students in individual and group tasks, as well as for resolving doubts and expanding on content of interest.

Clinical simulation, which facilitates learning in safe environments, will be used as a teaching learning strategy to integrate fundamental knowledge, competencies, and skills into the clinical practice of physical therapy in neurological conditions.

### EVALUATION



<b>Assessment system</b>	<b>Percentage of qualification</b>
<p><b>Individual work.</b> The individual work may consist, depending on the characteristics of the subject received, in a bibliographic search on a specific subject of the subject taught, in a work on clinical cases, in activities on solving practical cases, a critical work.</p> <p>Students will solve and defend a clinical case taking into account the clinical reasoning guidelines studied and the issues discussed in classroom. Therefore, this evaluation test will consist of a written part and an oral presentation that the student will perform in order to pass the subject.</p>	<b>10%</b>
<p><b>Assistance and participation at class.</b> This evaluation system takes into account the implication of the student in the classroom. It will be taken into account that the student responds to the questions formulated by the teacher, raises interesting debates about the information imparted in class, formulates doubts after having reviewed the previously received concepts and/or proposes activities that may be of interest for the dynamics of classroom.</p>	<b>20%</b>
<p><b>Theoretical-practical final test.</b> This test will integrate the knowledge acquired during each of the subjects. Contents that may be conceptual or procedural. The exam may be written or oral depending on the nature of the subject taught.</p>	<b>80%</b>

The final mark of the subject will be the weighted average of the different parts of the evaluation, as long as the student has obtained at least a 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

- Ali A, Tabassum D, Baig SS, Moyle B, Redgrave J, Nichols S, et al. Effect of exercise interventions on health-related quality of life after stroke and transient ischemic attack: a systematic review



- and meta-analysis. *Stroke*. 2021 Jul;52(7):2445–55. doi: 10.1161/STROKEAHA.120.032979.
- Carr J, Shepherd R. *Neurological rehabilitation: optimizing motor performance*. 2nd ed. Edinburgh; New York: Churchill Livingstone; 2010.
  - Du L, Xi H, Zhang S, Zhou Y, Tao X, Lv Y, et al. Effects of exercise in people with multiple sclerosis: a systematic review and meta-analysis. *Front Public Health*. 2024 Apr 10;12:1387658. doi: 10.3389/fpubh.2024.1387658.
  - Ernst M, Folkerts AK, Gollan R, Lieker E, Caro-Valenzuela J, Adams A, et al. Physical exercise for people with Parkinson's disease: a systematic review and network meta-analysis. *Cochrane Database Syst Rev*. 2023 Jan 5;1(1):CD013856. doi: 10.1002/14651858.CD013856.pub2. Update in: *Cochrane Database Syst Rev*. 2024 Apr 8;4:CD013856. doi: 10.1002/14651858.CD013856.pub3.
  - Hao Z, Zhang X, Chen P. Effects of different exercise therapies on balance function and functional walking ability in multiple sclerosis disease patients—a network meta-analysis of randomized controlled trials. *Int J Environ Res Public Health*. 2022 Jun 11;19(12):7175. doi: 10.3390/ijerph19127175.

Likewise, each topic will specify the books, scientific articles and readings of interest recommended for the preparation of the contents addressed.