

**COURSE DATA****Data Subject**

|                      |                                                                                                               |
|----------------------|---------------------------------------------------------------------------------------------------------------|
| <b>Code</b>          | 44635                                                                                                         |
| <b>Name</b>          | Specialised aspects of functional neurology, neuroanatomy and pathology. Diagnostic and functional assessment |
| <b>Cycle</b>         | Master's degree                                                                                               |
| <b>ECTS Credits</b>  | 8.0                                                                                                           |
| <b>Academic year</b> | 2023 - 2024                                                                                                   |

**Study (s)**

| <b>Degree</b>                                         | <b>Center</b>            | <b>Acad. year</b> | <b>Period</b> |
|-------------------------------------------------------|--------------------------|-------------------|---------------|
| 2220 - M.U. en Recuperación Funcional en Fisioterapia | Faculty of Physiotherapy | 1                 | First term    |

**Subject-matter**

| <b>Degree</b>                                         | <b>Subject-matter</b>                                                                                             | <b>Character</b> |
|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|------------------|
| 2220 - M.U. en Recuperación Funcional en Fisioterapia | 4 - Specialised aspects of functional neurology, neuroanatomy and pathology. Diagnostic and functional assessment | Optional         |

**Coordination**

| <b>Name</b>                | <b>Department</b>   |
|----------------------------|---------------------|
| SANCHEZ SANCHEZ, MARIA LUZ | 191 - Physiotherapy |

**SUMMARY**

The subject includes the application of different aspects of the functional neurology and neuroanatomy to the clinical context. It pretends to explore the principal neurological pathologies to training the physiotherapists in the physical exercise approaches.

Furthermore, advanced techniques in the diagnostic and objective functional assessment are provided.



## PREVIOUS KNOWLEDGE

### Relationship to other subjects of the same degree

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

### Other requirements

## OUTCOMES

### 2220 - M.U. en Recuperación Funcional en Fisioterapia

- 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.
- Ser capaz de elaborar informes orales y escritos acerca de la situación funcional de las/os pacientes.
- Ser capaces de integrar conocimientos y enfrentarse a la complejidad de formular juicios a partir de una información que, siendo incompleta o limitada, incluya reflexiones sobre las responsabilidades sociales y éticas vinculadas a la aplicación de sus conocimientos y juicios, planificando un abordaje integral del paciente.
- Profundizar en la fisiopatología de las lesiones y enfermedades más frecuentes.
- Diferenciar específicamente la estructura afectada en una imagen diagnóstica y su implicación en recuperación funcional.
- Profundizar en los distintos métodos y sistemas de valoración clínica en recuperación Funcional.
- Ser capaces de aplicar correctamente las diferentes metodologías disponibles basadas en la evidencia en el tratamiento de las patologías y lesiones que nos ocupa.
- Ser capaces de realizar un adecuado razonamiento clínico en base a la evidencia clínico-científica revisada, analizada y reflexionada con el adecuado nivel de especialización.
- Establecer específicamente los factores de riesgo, etiología y características de las patologías y lesiones más frecuentes según su entorno clínico.

## LEARNING OUTCOMES

At the end of the subject the students ought to recognize the signs and symptoms of each pathology or neurological alteration described, especially those related with movement disorders and functional alterations. Thereby, the students will have enough knowledge to detect the specific necessities of the functional development in each population.



## DESCRIPTION OF CONTENTS

### 1. Basic aspects of functional neurology, neuroanatomy and pathology

#### 1.1. Movement disorders

Parkinson's disease Epidemiology. Etiology. Pathological anatomy and pathophysiology. Clinical features. Course and forecast. Differential diagnosis

Huntington's Korea. Neuropathology Prevalence and hereditary factors. Clinic: chorea, Dementia and other neurological manifestations. Differential diagnosis

Friederich's ataxia. Epidemiology. Etiology. Pathological anatomy and pathophysiology. Clinical picture Course and forecast Diagnosis.

Spinal cord injury, Ictus, Guillain Barre Syndrome. Etiology. Physiopathology. clinical picture. Impact of injury in their lifestyle and implementation of activities of daily living and exercise.

#### 1.2. Demyelinating diseases

Multiple sclerosis: definition. Symptoms: motor, sensory and sphincter disorders. Paroxysmal phenomena. Signs: motor disorders. Cerebellar and brainstem disorders. Clinical forms of presentation. Evolutionary patterns: recurrent-remitting, acute, chronic-progressive. Epidemiology. Pathogeny.

Subacute disseminated encephalomyelopathy. Definition. Clinic. Evolution and prognosis Laboratory studies. Pathogeny.

### 2. Diagnostic and functional assessment in the Neurology context

2.1. Structural, functional imaging and video and electroencephalography. Description of the main findings in different neurological pathologies and their implications for the therapeutic approach as well as its evolutionary control.

Muscle electrical activity assessment: surface electromyography. Analysis of movement patterns and neuromuscular characteristics.

Analysis of muscle quality in neurological patients by ultrasound.

Analysis of musculoskeletal disorders in the neurological patient by thermography.

2.2. Biomechanics: kinetic techniques (dynamometric platforms, load cells and portable dynamometers) and kinematic (photogrammetry and inertial sensors). Description of functional alterations (upper and lower limbs, gait and functional gestures) caused by neurological disease and their implications for the therapeutic approach as well as its progression control.

Analysis of the alterations of the muscle chains due to the use of support products.

**WORKLOAD**

| ACTIVITY                        | Hours         | % To be attended |
|---------------------------------|---------------|------------------|
| Theory classes                  | 24,00         | 100              |
| Laboratory practices            | 24,00         | 100              |
| Study and independent work      | 112,00        | 0                |
| Readings supplementary material | 25,00         | 0                |
| Preparing lectures              | 15,00         | 0                |
| <b>TOTAL</b>                    | <b>200,00</b> |                  |

**TEACHING METHODOLOGY**

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

The individual and collective tutorials should serve as a means to coordinate the students in the individual tasks and group.

Study, realization of tasks and individual works and others of cooperative nature, oriented to the preparation of the theoretical-practical classes, the individual and group work and the oral and written tests that can be done for the evaluation of the acquisition of individual learning.

**EVALUATION**

| Assessment system                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Percentage of qualification |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| Assistance and participation at class. 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. | 20%                         |
| Theoretical-practical final test. 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.                                                                                                                                                                                                                         | 80%                         |



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.

## REFERENCES

### Basic

- Harvey L. 2010. Tratamiento de la lesión medular: guía para fisioterapeutas. Elsevier.
- M. Stokes and E. Stack. 2013. Fisioterapia en la rehabilitación neurológica. 3ª Ed. España, Elsevier.
- L. López de Val and G. Linazaroso. 2012. Parkinson y discinesias. Abordaje diagnóstico y terapéutico. España. Editorial Médica Panamericana S.A.
- Merletti R, Farina D. 2016. Surface electromyography: physiology, engineering and applications. John Wiley & Sons.
- Fukumoto Y, Ikezoe T, Yamada Y, et al. Skeletal muscle quality assessed from echo intensity is associated with muscle strength of middle-aged and elderly persons. Eur J Appl Physiol., 2012.112(4):p.1519-1525.
- Pillen S, van Keimpema M, Nievelstein RA, et al. Skeletal muscle ultrasonography: visual versus quantitative evaluation. Ultrasound Med Biol., 2006. 32(9):p.1315-1321.
- Sanchis-Sánchez E, Vergara-Hernández C, Cibrián RM, et al. Infrared thermal imaging in the diagnosis of musculoskeletal injuries: a systematic review and meta-analysis. AJR Am J Roentgenol. 2014 Oct;203(4):875-82.
- Neves EB, Vilaça-Alves J, Rosa C. Thermography in Neurologic Practice. Open Neurol J. 2015 Jun 26;9:24-7.
- Cano, R., Martínez, R. & Miangolarra, J. C. 2016. Control y aprendizaje motor. Madrid, Médica Panamericana.
- Micheli, F. 2010. Neurología. 2ª ed. Madrid, Médica Panamericana

### Additional

- Joan Montaner. 2009. Tratamiento del ictus isquémico; Avances en patología neurovascular. MARGE BOOKS. Volumen 3
- Carlos Cruz-Montecinos, Carlos Guajardo, Eloisa Montt, Antonio Cuesta-Vargas, Ultrasound measurement of quadriceps muscle in chronic obstructive pulmonary disease patients: functional and clinical implications. Journal of ultrasound in medicine. In press





SERMEF. 2009. Evaluación Clínica y Tratamiento de la Espasticidad. Madrid, Médica Panamericana

