

STUDENT GUIDE

MODULE:

Bases Neurocientíficas

Coordinator: Dr. Xavier Navarro Acebes

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UAB Code : 44134

Modality: mandatory

6 ECTS

Presential classes:

1st semester of the 2021-2022 academic year

Dates: from November 08nd to November 12th and from
November 15th to November 19th, 2021

Schedule: from 9 a.m. to 2:30 p.m.

Objective

To deepen in the knowledge of the nervous system: structural, anatomical and functional bases, methods of exploration and evaluation, physiopathology and lesion mechanisms and the main therapeutic strategies used in the treatment of the pathologies of the central nervous system.

Workload

6 ECTS: equivalent to 150 hours of student work, of which 52 h are presential.

Competences and learning outcomes

- E01 Demonstrate an advanced domain of knowledge and technologies in Neurorehabilitation, as well as techniques of patient care and attention to improve the quality of life of people affected by a disability of neurological origin.
- E01.10 Recognize in detail the structure of the nervous system.
 - E01.11 Recognize the mechanisms and neural circuits responsible for motor, sensory and autonomic functions.
 - E01.12 Identify the neuropsychological mechanisms that relate the structural characteristics with the functional properties of the nervous system.
 - E01.13 Identify the intrinsic pathophysiological mechanisms of nervous system injuries.
 - E01.14 Describe the mechanisms of neuroplasticity in normal and pathological conditions.
- E02 Analyze the physical, psychological and social causes and consequences of neurological disability.
- E02.07 Identify the bio-psycho-social consequences derived from the disability of neurological origin.
 - E02.08 Analyze the functional deficits resulting from the lesions of circuits of the nervous system.
 - E02.09 Describe the main therapeutic strategies that substitute and rehabilitate neurological injuries.
- E03 Perform and interpret the explorations and apply the advanced techniques that allow the diagnosis and definition of therapeutic strategies in neurorehabilitation.
- E03.03 Identify the neural systems that are evaluated in the different diagnostic explorations.
 - E03.04 Interpret the correct functioning of the nervous system and all its systems.
 - E03.05 Perform and interpret the most advanced diagnostic tests and techniques in neurorehabilitation.
 - E03.06 Interpret and use the main scales of motor and sensory neurological assessment.
 - E03.07 Apply the semiological data to the diagnostic analysis and the definition of neurorehabilitation protocols.
- E04 Apply the knowledge in neurorehabilitation to solve problems about the treatment and specialized rehabilitation of people with spinal cord injury or with acquired brain injury, as well as the complications of their pathology.
- E04.05 Recognize the most convenient surgical techniques for the treatment of the consequences of nervous system injuries.

- E04.06 List the effective and innovative strategies for the treatment and rehabilitation of injuries and pathologies of the nervous system.
- E04.07 Identify and apply appropriate techniques for the treatment of pain and spasticity.
- E05 Use the necessary methodological bases to plan, design and develop research projects oriented to the clinical practice of neurorehabilitation that generate new knowledge in this field.
 - E05.01 Analyze the cellular and functional mechanisms underlying neurological disabilities.
 - E05.02 Identify known elements that contribute to nervous system responses to injuries.
 - E05.03 Identify the bases of the neurophysiological methods of diagnosis.

Transversal Competences

- GT01 Analyze, synthesize and make decisions reasoning critically about the different professional actions.
- GT02 Raise work protocols through the search of information in the scientific literature.
- GT03 Work according to professional ethics and responsibility.
- GT04 Integrate into multidisciplinary teams in diverse cultural and scientific environments, creating and maintaining a climate of open collaboration and teamwork.

Teaching methodology

The methodological approach of the module starts from considering the student as the protagonist of his teaching and learning process. The student must be active and autonomous throughout the process and the teacher will give support by providing the information and resources necessary to facilitate learning.

The module is presential and have an obligatory attendance of the 80% of the scheduled sessions. The methodology in class is an expository presentation with audiovisual support and workshops.

On the e-learning Guttman platform there are access, among others, to the calendar and class schedules, to bibliographic support documentation, and you can use it to do a collaborative work between the students and, between the students and teachers to clarify doubts, to share interesting findings, news, articles or books, etc.

The information presented in this document provides a summary of the main features of the program and learning outcomes that you can reasonably expect and achieve if you make the most of the learning opportunities provided to you.

Contents description:

- Structure and function of the nervous system
 - General anatomy of the CNS
 - Skeletal muscle
 - Segmental Motor Nervous System
 - Suprasegmental Motor Nervous System
 - Somatosensory Nervous System
 - Special senses: hearing, vestibular, vision

- Methods of evaluation of the nervous system
 - Clinical examination of the Nervous System
 - Electrophysiological evaluation methods
 - Neuroradiological techniques
- Physiopathology and mechanisms of nervous system injuries
 - Injury and regeneration of the PNS
 - CNS injury and regeneration
 - Reparative therapies in SCI
 - Neurogenesis and stem cells
 - CNS plasticity
 - Neuromodulation
 - Substitutive and rehabilitation therapies in PNS
 - Pathophysiology of neuropathic pain
 - Pathophysiology of spasticity

Competences evaluation

The evaluation activities will be carried out through and at the end of the module. These are activities that you must work individually and consists of:

1. **Theoretical tests:** It has a value of **80% of the final grade of the module** and will consist of two questionnaires of multiple answer or open short questions, on the subjects taught, one for each block por week of teaching. Once the module in finished, the tests will be accessed through the e-learning.guttman platform
2. **Test of resolution cases.** It has a value of **10% of the final grade of the module**. It will consist of physiopathological evaluation of clinical cases and research proposals. It will be done in the classroom and through the e-learning.guttman platform.
3. **The attendance and participation** in class has a weight of **10% in the final mark of the module**.

The maximum date for the delivery of the test is **December 5th, 2021**.

- If you do not present evidence of learning or you have not attended the minimum number of hours of the programmed activities of the module (80%), the subject will be “not evaluable”. The qualification of not evaluable in the final evaluation report implies exhausting the inherent right in the module’s enrollment.
- You will pass the module if you obtain a minimum score of 5 points (scale 0-10) as the average mark of the two evaluative tests of learning.

Procedure and recovery criteria

The re-evaluation is a process that will be put into operation once the period of publication of the final grades has ended.

- You will be entitled to a re-evaluation if you have obtained between 3.5 and 4.9 in the average grade of the two evaluative tests of the module.

- The test submitted to the re-evaluation process may not exceed 5.0 points (approved) in the final grade.

The module's web

In the web of each module you Will find information of interest for the follow-up of the study:

- Forum of the module. Through this space you can keep in touch with the teachers or among the other students, to provide suggestions, answer questions, etc.
- News. It is the space from where you Will receive news and announcements about the evolution of the module.
- Programs. The module can be downloaded in PDF format, indicating the subjects, schedules and the teaching staff.
- Documentation. Here you Will find information and bibliography of interest that you can consult for the later study of the topics.
- Evaluation of competences. In this space you Will find all the necessary information and the delivery dates of the evaluation that will be done for this module

Satisfaction surveys

It is very important that students send us your comments, complaints and suggestions regarding the module. That's why we put at your disposal two evaluation surveys. The surveys are **anonymous**:

- Teacher evaluation. Daily, at the end of the classes, you Will receive an email (on your computer or on your mobile) that Will link you to a brief satisfaction questionnaire about the teachers that have taught that day. The objective of these surveys is to collect your opinion that will be a great help for the improvement of this module.
- Module evaluation. Also, at the end of the course you can answer the general evaluation survey of the module.

Coordination

For any aspect of the organization and planning of the module you can contact

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RECOMMENDED BIBLIOGRAPHY

Program of the 1st block:

- Purves D. *Neurociencia*. (5ª ed). Panamericana.
- Haines DL. *Principios de Neurociencias*. (2ª ed.). Elsevier.
- Netter F. *Atlas de Neurociencia*. Elsevier Masson.
- Clínica Mayo (aut.). *Exploración Clínica en Neurología*. Editorial JIMS, 1999.

Program of the 2nd block:

- Selzer M, Dobkin B. *Spinal Cord Injury*. AAN Press, 2008
- SERMEF. *Evaluación Clínica y Tratamiento de la Espasticidad*. Panamericana, 2009.
- Serra J. *Tratado de dolor neuropático*. Panamericana, 2007.
- Taub E (ed). *Neuroplasticity and Neurorehabilitation*. Frontiers Human Neuroscience, 2015