

Anatomy and Physiology of the Nervous System

Code: 101700
ECTS Credits: 6

2025/2026

Degree	Type	Year
Logopedia	FB	1

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Teachers

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Teaching groups languages

You can view this information at the [end](#) of this document.

Prerequisites

There are no official prerequisites.

It is advisable to have basic knowledge of cellular biology, physics, and chemistry. Due to the necessity of conducting practical work in the dissection room, students must commit to maintaining confidentiality and professional secrecy regarding the data to which they may have access during their learning activities, and must uphold a professional ethical attitude in all their actions. They must also have completed the security certificate attesting that they have passed the specific test on good practices in the dissection room.

Objectives and Contextualisation

The Anatomy and Physiology of the Nervous System course, in the first year of the degree program, focuses on studying the structure and function of the nervous system, especially the parts that control voice, speech, and language. The objectives are to teach in an integrated manner how the nervous system functions to enable the production of voice, speech, and language in humans.

Learning Outcomes

1. CM03 (Competence) Evaluate the usefulness of the main tools for the physiological assessment of the nervous system and of the organs of voice and speech.
2. CM04 (Competence) Correctly interpret the results of the examination of the nervous system and the organs of voice and speech.
3. KM05 (Knowledge) Describe the anatomical features of the nervous system and of the organs of voice and speech.
4. KM06 (Knowledge) Describe the physiology of the nervous system and of the organs of voice and speech, as well as their molecular and cellular basis.
5. KM07 (Knowledge) Describe the meaning of the main terms referring to normal and pathological structural and functional characteristics.
6. SM03 (Skill) Use the nomenclature of cell biology, human anatomy, and the main terms of physiology.
7. SM05 (Skill) Show correct diction and an adequate syntactic and discourse structure in public presentations of papers.

Content

General Justification:

The Speech Therapy Degree, as a healthcare qualification, teaches in its core courses the structure and function of organs related to voice, speech, and language. This prepares students to address clinical subjects and perform rigorous professional work based on scientific knowledge. Speech therapists prevent, detect, evaluate, diagnose, and treat speech, voice, language, and swallowing disorders across all age groups, in addition to conducting scientific research. They must have knowledge of the sensory, motor, and cognitive nervous systems to understand, diagnose, treat, prevent, and research disorders affecting voice, speech, and language.

ANATOMY BLOCK

1. ANATOMY OF THE CENTRAL NERVOUS SYSTEM

1.1 - Anatomical Organization of the Nervous System

- Concept and parts of the nervous system
- Central and peripheral nervous system
- Diencephalon structure
- Mesencephalon structure
- Spinal cord structure
- Coverings of the nervous system: meninges
- Ventricles and cerebrospinal fluid

1.2 - Telencephalon

- Morphology: sulci and gyri, lobes
- General structure of the cerebral cortex
- Functional areas of the cerebral cortex
- Morphology and functional relationships of subcortical nuclei
- Limbic system

1.3 - Brain Neural Pathways

- Intrahemispheric white matter
- Functional anatomy of language and speech pathways
- Ascending and descending projection pathways

2. PERIPHERAL NERVOUS SYSTEM AND CRANIAL NERVES. SENSE ORGANS.

- Structure and organization of the peripheral nervous system

- Autonomic nervous system: sympathetic and parasympathetic
- Nervous control of respiratory muscles
- Cranial nerves for olfaction (olfactory nerve)
- Functional structure of the sense of vision (optic nerve and optic pathway)
- Ocular nervous control (Cranial Nerves III, IV, and VI)
- Functional structure of hearing and balance (vestibulocochlear nerve)
- Nervous control of masticatory function and facial expression (trigeminal nerve and facial nerve)
- Nervous control of swallowing and articulatory function (glossopharyngeal nerve and hypoglossal nerve)
- Nervous control of phonatory function (vagus nerve)

PHYSIOLOGY BLOCK

3. PHYSIOLOGY OF THE NERVOUS SYSTEM 3.1 - Functional Organization of the Nervous System

- Functional parts of the nervous system: sensory, motor, integration
- Levels of functional organization of the nervous system: medullary, subcortical, and cortical
- Neuronal electrical phenomena: ionic transport across the neuronal membrane, membrane potentials and action potentials, propagation of action potential. Nerve conduction and conduction velocity.
- Synaptic transmission: functional organization of chemical synapses. Functional characteristics of chemical synapses. Neurotransmitters and neuromodulators. Synaptic receptors.
- Neuronal circuits.

3.2 - Physiology of Cerebral Electrical Activity

- Cerebral electrical activity. Electroencephalogram.
- Regulation of brain activity by reticular systems of the brainstem
- Neuro-hormonal control of brain activity
- Physiology of sleep: Sleep stages and functional characteristics. Physiological effects of sleep.

3.3 - Higher Functions of the Cerebral Cortex: Intellectual Functions

- Functional organization of the neocortex
- Functions of the frontal lobe: attention, conceptual association, consciousness, thinking, interpretation of reality, social filter, personality traits.
- Associative symbolic function of the Wernicke area.
- Functions of the parieto-occipito-temporal cortex (POT) in the dominant and non-dominant hemisphere.
- Lateral dominance of language. Roger Sperry's experiments.
- Functions of the corpus callosum: interhemispheric relationship
- Learning and memory.

3.4 - Physiology of Head Somatic Sensitivity

- Functional organization of the somatosensory system: types of sensory receptors and transduction. Characteristics and classification of sensory nerve fibers
- Physiology of mechanoreceptors, thermoreceptors, and nociceptors of the head
- Physiology of proprioceptors of the temporomandibular joint
- Somatosensory pathway: physiology of the spinal trigeminal nucleus, sensory trigeminal nucleus, and mesencephalic trigeminal nucleus. Integration of somatosensory information: role of primary and secondary somatosensory cortex.

3.5 - Physiology of the Motor Control System: Muscle Activity and Segmental Control

- Functional organization of smooth skeletal muscle
- Mechanism of muscle contraction: skeletal muscle vs. smooth muscle.
- Physiology of the neuromuscular junction. Motor unit.
- Segmental control of muscle activity: proprioceptive receptors of muscles and tendons. Neuronal circuits or reflex arcs. Reflex activity
- Bucofonatory reflexes: swallowing reflex, sneezing reflex, coughing reflex
- Head reflexes: corneal or palpebral reflex, direct and consensual pupillary reflex, accommodation reflex.

3.6 - Physiology of the Motor Control System: Suprasegmental Motor Control

- Motor cortex: functional organization. Ideation, planning, and execution of voluntary movements.
- Basal ganglia: functional organization. Planning and execution of automatic movements.
- Cerebellum: functional organization. Coordination of movements.

3.7- Physiology of Nervous Control of Voice and Speech

- Functional organization of nervous control of the larynx
- Functional characteristics of sensory innervation of the larynx
- Functional characteristics of segmental control of the larynx: role of the ambiguous nucleus and premotor laryngeal nuclei
- Functional organization of nervous control of speech
- Speech motor program: articulatory and neuronal events
- Role of motor cortex, basal ganglia, and cerebellum in speech production.

3.8 - Higher Functions of the Cerebral Cortex: Language

- Functional organization of cortical areas involved in language
- Mechanisms of language perception and comprehension
- Motor control mechanisms in language emission

4. PHYSIOLOGY OF THE SENSE ORGANS 4.1 - Sense of Vision

- Eye physiology. Accommodation control. Neural control of pupil diameter. Visual acuity. Visual field.
- Physiology of the retina: pigmented epithelium. Photoreceptors and phototransduction. Function of retinal neurons.
- Physiology of optic pathways: main characteristics
- Central integration of visual information: functional organization of the visual cortex.

4.2 - Sense of Hearing

- Physiology of the external ear: capture and amplification of sound waves
- Physiology of the middle ear: physiology of the transmission system. Tympanic or stapedial reflex. Tympanometry and impedance audiometry.
- Physiology of the inner ear: functional organization of the cochlea and auditory transduction. Cochlear amplifier. Endocochlear potential. Discrimination of sound frequencies and intensities.
- Physiology of the auditory pathway: function of the cochlear nuclei, superior olivary complex, and inferior colliculus. Functions of the medial geniculate body of the thalamus
- Physiology of the auditory cortex: analysis of sound wave frequencies and intensities. Auditory memory
- Examination of auditory sensitivity. Audiometry.

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Laboratory classes	15	0.6	CM03, CM04, KM05, KM06, KM07, SM03, SM05, CM03
Lectures	31.5	1.26	CM03, CM04, KM05, KM06, KM07, SM03, CM03
Workshops	6	0.24	CM03, CM04, KM05, KM06, KM07, SM03, SM05, CM03
Type: Supervised			
Face-to-face and/or virtual supervision	16	0.64	CM03, CM04, KM05, KM06, KM07, SM03, SM05, CM03

Type: Autonomous

Oral Workshops	12	0.48	CM03, CM04, KM05, KM06, KM07, SM03, SM05, CM03
Practical classes	9	0.36	CM03, CM04, KM05, KM06, KM07, SM03, SM05, CM03
Self-study	41	1.64	CM03, CM04, KM05, KM06, KM07, SM03, CM03
Workshops	16	0.64	CM03, CM04, KM05, KM06, KM07, SM03, SM05, CM03

Educational Activities and Methodology

Lectures: The subject matter will be systematically presented, emphasizing key concepts. Attendance at these lectures, while not mandatory, is recommended to reinforce basic scientific knowledge acquired through personal study.

Case Studies: Cases related to the subject will be presented for individual or collective study, complementing personal study.

Practical Sessions: Practical work in the laboratory will be conducted to observe anatomical structures and learn physiological techniques, promoting group work and active self-learning. Access to the dissection room requires wearing a gown, gloves, and other current protective measures, as well as completing the safety certificate. Any form of imaging in the dissection room is prohibited.

Preparation and Presentation of a Review Paper: Students will form groups of no more than four people to prepare a review paper on proposed topics. This paper will be presented and orally defended, with a maximum four-page summary submitted.

Use of IA

In this subject, the use of Artificial Intelligence (AI) technologies is allowed as an integral part of the development of the work, provided that the final result reflects a significant contribution of the student in the analysis and personal reflection. The student must clearly identify which parts have been generated with this technology, specify the tools used and include a critical reflection on how these have influenced the process and the final result of the activity. The lack of transparency in the use of AI will be considered a lack of academic honesty and may lead to a penalty in the grade of the activity, or greater sanctions in serious cases.

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
EV1 i EV3; Test of answers	60	1.5	0.06	KM05, KM06, KM07, SM03
EV2 i EV4; Test of practical classes	20	0.5	0.02	KM05, KM06, KM07, SM03
EV5; Evaluation of the portfolio of laboratory and practical classes	10	0	0	CM03, CM04, KM05, KM06, KM07, SM03
EV6; Preparation and presentation of workshops	10	1.5	0.06	CM03, CM04, KM05, KM06, KM07, SM03, SM05

Evaluation Model:

Each program block will be individually evaluated, both in theoretical content and practical application (laboratory practices and case studies). The evidence will be returned at the end of the corresponding evaluation period as indicated in the table by publishing the results on the virtual campus:

Code	Timing	Feedback	Denomination	Weight	Format	Authorship	Via
EV1	First evaluation period	Week 8-9	Objective test multiple response on knowledge of structure	30%	Written	Individual	face-to-face
EV2	First evaluation period	Week 8-9	Objective practice test	10%	Written	Individual	face-to-face
EV3	Second evaluation period	Week 19-20	Objective multiple-choice test on Function knowledge	30%	Written	Individual	face-to-face
EV4	Second evaluation period	Week 19-20	Objective practice tes	10%	Written	Individual	face-to-face
EV5	Second evaluation period	Week 19-20	Portfolio and cases	10%	Both	Both	both
EV6	Second evaluation period	Week 19-20	Oral presentation	10%	Written	Collective	both

EV1: Objective multiple-choice test on theoretical knowledge of the Anatomy block

Return Type	Assessment (EV) and Type	Week
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Written 8-9

Written EV2: Objective multiple-choice test on practicals of the Anatomy block

8-9

Written	EV3: Objective multiple-choice test on theoretical knowledge of the Physiology block	8-9
Written	EV4: Objective multiple-choice test on practicals of the Physiology block	19-20
In-class and written	EV5: Portfolio and cases	19-20
In-class and written	EV6: Assignments	19-20

Evaluation Blocks:

- Block 1: Anatomy of the central nervous system and sense organs.
- Block 2: Physiology of the central nervous system and sense organs.

To pass the subject, each block must be passed with a minimum grade of 5.0 within the same academic year.

Continuous Assessment:

Includes:

A. Partial Exam with:

- Multiple-choice items and/or restricted written questions to assess theoretical knowledge (EV1 and EV3, for Anatomy and Physiology blocks, respectively). These scores will account for 30% of the overall grade.
- Multiple-choice items and/or restricted written questions to assess practical concepts (EV2 and EV4, for Anatomy and Physiology blocks, respectively). These scores will account for 10% of the overall grade.

B. Tests during the course on knowledge acquired in laboratory practices, case studies, and presentation of the paper. These tests will account for 20% of the final grade, distributed as follows:

- Portfolios evaluating laboratory practices for both blocks (EV5), representing 10% of the overall grade.
- Presentation of a bibliographic review paper (EV6), representing 10% of the overall grade.

The subject will be considered passed with an average grade of 5 or higher across all assessments. To calculate the average, a grade of 5 or higher is required in EV1 and EV3, and a grade of 4 or higher in EV2, EV4, EV5, and EV6.

Final Recovery Exam:

A final recovery exam will be administered for students who did not pass any block in the continuous assessment. Students wishing to improve their grade must request it, forfeiting the previous grade and considering only the final recovery exam grade.

Exam Review Procedure:

Claims regarding the exam questions can be submitted within two days following the exams. Grade reviews will be conducted during the announced period along with grade publication.

Single Assessment:

Students may opt for a single assessment, based on the same content and competencies as continuous assessment. This will involve completing all evaluative tests in a single session, coinciding with the EV3 date of continuous assessment. A minimum grade of 5 in the theoretical exam is required to pass each block.

THE SINGLE ASSESSMENT IS REQUESTED TELEMATICALLY (E-FORM) DURING THE SPECIFIC PERIOD (more information on the Faculty's website). There is no provision for a synthesis test for second registration students.

Exam translation:

THE DELIVERY OF THE TRANSLATION OF THE ON-SITE ASSESSMENT TESTS WILL BE CARRIED OUT IF THE REQUIREMENTS ESTABLISHED IN ARTICLE 263 ARE COMPLETED AND YOUR REQUEST IS MADE IN WEEK 4 TELEMATICALLY (EFORM) (more information on the Faculty's website).

More information about the examination regulations at the Faculty of Psychology:
<https://www.uab.cat/web/estudiar/graus/graus/evaluaciones-1345722525858.html>

Bibliography

Main Bibliography

1. Tortora. Derrikson. Principios de Anatomía y Fisiología. Ed. Panamericana. Madrid. 2018
2. Crossman AR, Neary D. Neuroanatomía: texto y atlas en color. 3^a edición, Elsevier-Masson, Barcelona 2019

Complementary Bibliography

1. Cuetos F. Neurociencia del Lenguaje. Ed. Panamericana, Madrid. 2012.
2. Anthony Seikel, David G. Drumright, Anatomy and Physiology for Speech, Language, and Hearing. 6th edition. 2019
3. MacKenna BR, Callander R. Fisiología Ilustrada. 5^a ed. Ed. Churchill Livingstone. 1990.
4. McFarland . Atlas de Anatomía en Ortoponía. Elsevier-Masson, Barcelona, 2008.
5. Rodríguez S, Smith-Agreda JM. Anatomía de los órganos del lenguaje, visión y audición. 2^a edición. Ed. Panamericana. Madrid, 2004.
6. Webb WG, Adler RK. Neurología para el logopeda. 5^a edición, Elsevier-Masson, Barcelona, 2010.

Software

non applicable

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
(PAUL) Classroom practices	11	Spanish	second semester	afternoon
(PAUL) Classroom practices	12	Spanish	second semester	afternoon
(PAUL) Classroom practices	13	Spanish	second semester	afternoon
(PLAB) Practical laboratories	111	Spanish	second semester	afternoon

(PLAB) Practical laboratories	112	Spanish	second semester	afternoon
(PLAB) Practical laboratories	113	Spanish	second semester	afternoon
(PLAB) Practical laboratories	114	Spanish	second semester	afternoon
(PLAB) Practical laboratories	115	Spanish	second semester	afternoon
(TE) Theory	1	Spanish	second semester	morning-mixed