

**Human Anatomy: Neuroanatomy**

Code: 103595  
ECTS Credits: 4

Degree	Type	Year	Semester
2502442 Medicine	OB	2	2

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

### Contact

Name: Josep Reig Vilallonga  
Email: Josep.Reig@uab.cat

### Use of Languages

Principal working language: catalan (cat)  
Some groups entirely in English: No  
Some groups entirely in Catalan: Yes  
Some groups entirely in Spanish: No

### Teachers

Josep Reig Vilallonga  
Jordi Gascón Bayarri  
David Cánovas Verge

### Prerequisites

It is recommended that the student had acquired the basic knowledge and skills from the subjects of Human Anatomy taught in the first year of the degree of Medicine, as well as the basic competences for self-learning and group work.

### Objectives and Contextualisation

The Human Anatomy course: Neuroanatomy is a subject taught in the 2nd semester of the 2nd year of the Degree in Medicine and is focused on the nervous system.

The objectives of the subject are that students:

- Study the organization of the nervous system.
- Study of the anatomical structures of the central nervous system and the autonomic nervous system.
- Learn and use correctly the anatomical nomenclature related to the nervous system
- Know and identify the different anatomical structures that integrate the nervous system
- Apply acquired knowledge of embryology and anatomy to the pathogenesis and symptomatology of congenital and / or acquired pathologies.
- Get practical skills

### Competences

- Convey knowledge and techniques to professionals working in other fields.
- Critically assess and use clinical and biomedical information sources to obtain, organise, interpret and present information on science and health.

- Demonstrate a sufficient command of English, both oral and written, for effective scientific and professional communication.
- Demonstrate basic research skills.
- Demonstrate knowledge and understanding of descriptive and functional anatomy, both macro- and microscopic, of different body systems, and topographic anatomy, its correlation with basic complementary examinations and its developmental mechanisms.
- Demonstrate understanding of the basic sciences and the principles underpinning them.
- Demonstrate understanding of the causal agents and the risk factors that determine states of health and the progression of illnesses.
- Demonstrate understanding of the structure and function of the body systems of the normal human organism at different stages in life and in both sexes.
- Demonstrate, in professional activity, a perspective that is critical, creative and research-oriented.
- Maintain and sharpen one's professional competence, in particular by independently learning new material and techniques and by focusing on quality.

## Learning Outcomes

1. Apply knowledge of anatomy to the production of structured review texts.
2. Convey knowledge and techniques to professionals working in other fields.
3. Demonstrate a sufficient command of English, both oral and written, for effective scientific and professional communication.
4. Demonstrate basic research skills.
5. Demonstrate, in professional activity, a perspective that is critical, creative and research-oriented.
6. Describe anatomical structures, organisation and morphogenesis of the cardiovascular system, central nervous system and the sense organs.
7. Describe the factors that determine the form, general aspect and proportions of the human body in health at different stages in life and in both sexes.
8. Describe the fundamental scientific principles of human anatomy.
9. Describe the general anatomical organisation of the systems of the human body in health.
10. Explain the formation of the embryonic disc and its principal derivatives.
11. Identify the anatomical structures that constitute the different body systems in good health in the major stages of the life cycle and in both sexes.
12. Identify the anatomical structures that make up the cardiovascular system, the central nervous system, and the sense organs in health, by using inspection, palpation and/or macroscopic methods and different diagnostic imaging techniques.
13. Identify the main techniques used in a human anatomy laboratory.
14. Identify the morphogenetic mechanisms of the main alterations in the development of the cardiovascular system, the central nervous system and the sense organs.
15. Know and make correct use of the international anatomical nomenclature.
16. Maintain and sharpen one's professional competence, in particular by independently learning new material and techniques and by focusing on quality.

## Content

### SECTION 1-

Unit 1 - Introduction to the nervous system: Basic terminology. Organization of the nervous system. Main components of the nervous system (neurons- neuroglia, afferent-efferent neurons, white-gray substance, nuclei-tracts).

Unit 2 - Telencephalon: external morphology of the cerebral hemispheres (lobes, sulcus, gyrus, functional areas of the cerebral cortex). Core nuclei. White telencephalic substance (association, commissural and projection fibres). Limbic system

Unit 3 - Diencephalon: Generalities. Thalamus. Hypothalamus. Epithalamus. Subthalamus. Pituitary gland

Unit 4 - Brainstem: Generalities. Reticular system, Midbrain, Pons and Bulb (external morphology, internal morphology, transverse images, clinical significance).

Unit 5 - Cerebellum: Generalities. External and internal morphology. Connections

Lectures: 13 hours.

Practical Lab in the dissection room (PLAB 1,2): 4 hours (2 hours each).

## SECTION 2-

Unit 6 - Spinal cord: Generalities. External and internal morphology, ascending and descending tracts. Clinical considerations

Unit 7 - Meninges: Generalities. Brain and spinal meninges.

Unit 8 - Cerebrospinal fluid and ventricular system.

Unit 9 - Vascularization of the central nervous system: Arterial and venous vascularization.

Unit 10- Autonomic or vegetative nervous system: Generalities. Sympathetic and Parasympathetic nervous system.

Unit 11 - Cranial nerves: Generalities. Sensory nerves (n.I-olfactory, n.II-optic, n.III-vestibulocochlear).

Oculomotors Nerves (n.III-oculomotor, n.IV-trochlear, n.VI-abducens). Trigeminal nerve (n.V). Facial nerve (n.VII). Other nerves (n.IX- glossopharyngeal nerve, n.X-vagus nerve, n.XI-accessory nerve, n.XII- hypoglossal nerve).

Lectures: 13 hours.

Practical Lab in the dissection room (PLAB 3,4): 4 hours (2 hours each).

Seminar of clinical anatomy (SEM 1): 1,5 hours.

## **Methodology**

In accordance with the objectives of the subject, the teaching methodology of the course is based on the following activities:

### DIRECTED ACTIVITIES

Lectures (26 hours): Systematic exhibition of the subject, giving relevance to the most important concepts. The student acquires basic knowledge of the subject attending master classes and complementing them with personal study of the topics explained.

Seminars (1.5 hours): Sessions with a smaller number of students for the discussion and resolution of exercises. Students apply the knowledge acquired to solve clinical cases.

Practical Labs (8 hours): The students attend in small groups to the dissection room to study the different contents of the subject. Students identify different anatomical structures in dissections, prosections and imaging diagnostic techniques (radiology, computed tomography, magnetic resonance, arteriography, etc.). The objective is to consolidate the knowledge acquired in lectures, tutorials and the autonomous activities.

### SUPERVISED ACTIVITIES

Tutorials: The tutorials will be made in a personalized way in the teacher's office (hours to be arranged) or by email. The aim of the tutorials is to clarify concepts, establish the knowledge acquired and facilitate the study by the students. They can also be used to solve doubts that the students have about the preparation of the seminars.

### AUTONOMOUS ACTIVITIES

Comprehensive reading of texts and articles. Personal study, schemes and summaries preparation. Conceptual assimilation of the contents of the subject.

"N.B. The proposed teaching and assessment methodologies may experience some modifications as a result of the restrictions on face-to-face learning imposed by the health authorities. The teaching staff will use the Moodle classroom or the usual communication channel to specify whether the different directed and assessment activities are to be carried out on site or online, as instructed by the Faculty".

Learning activities

Type: Directed

Practical Labs (PLAB)

Seminars (SEM)

Lectures-Theoretical classes (TE)

Type: Supervised

Tutorials

Type: Autonomous

Autonomous activities- personal study

Reading of articles

Preparation of summaries

## Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Practical Labs	8	0.32	1, 15, 3, 4, 5, 7, 2, 12, 11, 13, 16
Seminars	1.5	0.06	1, 15, 3, 4, 5, 9, 6, 2, 14, 12, 11, 13, 16
Theory	26	1.04	1, 15, 8, 9, 6, 10, 12, 11, 13
Type: Supervised			
Tutorships	13	0.52	1, 3, 4, 5, 7, 2, 10, 16
Type: Autonomous			
Autonomous activities-personal study. Reading of articles. Preparation of summaries	44	1.76	1, 15, 3, 4, 5, 8, 9, 6, 2, 10, 12, 11, 13, 16

## Assessment

All students will have two opportunities to achieve the established learning objectives. One exam during the semester (after the end of the teaching activities) and a recovery exam (at the end of the semester).

EXAM AT THE END OF THE TEACHING ACTIVITIES:

In order to take this exam, it is mandatory for the student attend all practical labs and seminars programmed. Only one absence in each partial will be allowed without justification.

This exam will consist of written evaluations: objective tests based in lectures, SEM and PLAB contents.

Theoretical evaluation - Multiple-choice questions: test with 5 answers, only 1 true and with a penalty of 0.25 points for incorrect answer. This test represents 70% of the mark (section 1 = units 1-5 represents 35% and section 2 = units 6-11 represents 35%).

Practical evaluation - Restricted questions raised on preparations or anatomical images. Wrong or blank answers are not penalized. This test represents 30% of the mark.

The mark of this exam = theoretical evaluation (70%) + practical evaluation (30%). Provided that it fulfils with the two premises to eliminate matter.

To eliminate matter of a partial, it is necessary to fulfil the two premises:

- 1) Theoretical evaluation: minimum mark 5.00
- 2) Practical evaluation: minimum mark 5.00

In the event that a student has a good grade in one of the exams but in the other has a grade below 5.00, the student will NOT have eliminated partial matter (regardless of whether the weighted sum of the two types of exams are greater than or equal to 5.00). In these cases, the student will have to submit to the recovery exam.

#### RECOVERY EXAM:

The students who have achieved the competences and objective of the subject in the evaluation at the end of the teaching activities will not be obligated to take the final evaluation or recovery.

The subject will schedule a final assessment, in accordance with the Faculty's teaching calendar, at the end of the academic year. All those students enrolled in the subject can be presented, although they have not attend any of teaching activity programmed during the semester.

Students with the following criteria have to attend the final evaluation:

- Students who have not eliminated material in 1 or 2 partials (students who do not meet the two premises to eliminate matter of the partial).

- Students who have not submitted to the exam at the end of the teaching activities.

- Students who have eliminated material but want to upgrade. In these cases:

- a) An email must be sent to the coordinator of the subject at least 1 week before the recovery exam.
- b) The student will have to submit to the theoretical + practical evaluation.
- c) Although the student presents to the recovery exam to upgrade, it is mandatory to have a minimum grade of 5.0 on the theoretical examination and a minimum grade of 5.0 on practical examination of the recovery exam. Otherwise, the student will have suspended the subject.
- d) Once the student has a minimum grade of 5.0 in both exams (theoretical and practical) of the recovery exam, the final grade will be calculated, using the highest score obtained by the student (exam at the end of the teaching activities and recovery exam).

The recovery exam of each partial will consist of written evaluations: objective tests based in lectures, SEM and PLAB contents.

Theoretical evaluation - Multiple-choice questions: test with 5 answers, only 1 true and with a penalty of 0.25 points for incorrect answer. This test represents 70% of the mark (section 1 = units 1-5 represents 35% and section 2 = units 6-11 represents 35%).

Practical evaluation - Restricted questions raised on preparations or anatomical images. Wrong or blank answers are not penalized. This test represents 30% of the mark.

To pass the recovery exam, it is necessary to fulfil these two premises:

- 1) Theoretical evaluation: minimum mark 5.0
- 2) Practical evaluation: minimum mark of 5.0

In case the student has a good grade in one part of the exam but the other does not have a minimum grade of 5.0, the student will NOT have approved the recovery exam and therefore the student will have suspended the subject.

### STUDENTS REGISTERED MORE THAN ONCE (REPEATERS):

Students enrolled two or more times in the subject and have not eliminated the entire subject in the evaluation at the end of the teaching activities, can ask the coordinator (through email) for an oral exam (instead of a multiple-choice test), at least 1 week before the recovery exam. The practical exam in the dissection room will be the same as the rest of the students enrolled in the subject.

### MARK OF THE SUBJECT:

Students will be penalized with 0.1 points in the final mark of the subject for each practice and / or seminar that has been reserved in the PSG and has not attended. Students, who do not attend the practice and/or seminar and are not included in the PSG at the time when the lists are printed, will not be penalized with 0.1 points. The lists are printed the same day as the teaching activity, 3 hours before the first practice and seminar of the day.

Grade of the subject = Theoretical evaluation (70%) + practical evaluation (30%).

The final grade of the subject will have a numerical expression, with a decimal on the scale of 0-10 and with the qualitative equivalence in accordance with the criteria of the UAB, of "fail" (0-4.9), "pass" (5.0-6.9), "good" (7.0 -8.9) and "merit" (9.0-10.0). Following indications of the UAB will be rounded off to the nearest whole number when it is one tenth of a value that entails a qualitative change of qualification. The honour distinction will be among students who have achieved an excellent qualification. The number of license plates awarded may not exceed 5% as established by the academic regulations of the UAB.

To pass the subject it is necessary to obtain a minimum grade of 5.0 in each exam (theoretical and practical evaluations). In case that a student has a good mark in one exam but in the other, the mark is less than 5.0, the student's mark will be 4.8 points maximum, although the weighted sum of the two exams is greater than or equal to 5.0.

It is considered non-evaluable student, who has NOT performed any evaluation test.

### ANNOUNCEMENTS, REVISIONS:

Exams (day, hour, classroom ...) and revision of the marks will be announced through the UAB moodle. The procedure for reviewing marks will be in accordance with the current regulations of the UAB and in any case be individually.

#### Evaluation activities

- A) Theoretical evaluation (section 1 = units 1-5): represents 35%
- B) Theoretical evaluation (section 2 = units 6-11): represents 35%.
- C) Practical evaluation: represents 30%

## Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
A) Theoretical assessment number 1 written, objective test, multiple choice titres	35%	1.25	0.05	1, 15, 3, 4, 5, 7, 6, 10, 14, 12, 11, 13
B) Theoretical assessment nº 2 written, objective test, multiple choice items	35%	1.25	0.05	1, 15, 3, 4, 5, 7, 6, 10, 14, 12, 11, 13
C) Written practical assessment, objective test, multiple choice titres	30%	5	0.2	1, 15, 3, 5, 8, 9, 6, 2, 10, 12, 11, 13, 16

## Bibliography

Llibres de text (per ordre alfabètic)

- Crossman AR; Neary D (2015). Neuroanatomia. Ed.Elsevier-Masson. 5ª edición. Format e-book a la UAB
- Snell RS (2019). Neuroanatomia clínica. Ed. Wolters Kluwer. 8ª edición. Format e-book a la UAB

Atles d'Anatomia (per ordre alfabètic)

- Rohen JW, Yokochi C, Lütjen-Drecoll E (2015). Atlas de Anatomía Humana. 8ª edición. Ed. Elsevier Science, Madrid

- Schünke M, Schulte E, Schumacher U (2015). PROMETHEUS. Texto y atlas de Anatomía. 3ª edición. Ed. Panamericana: Buenos Aires. Format e-book a la UAB