

**Human Anatomy: Locomotor System**

Code: 101935  
ECTS Credits: 6

Degree	Type	Year	Semester
2501230 Biomedical Sciences	FB	1	2

### Contact

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### Use of Languages

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

### Teachers

Alejandro Fernandez Leon  
María Luisa Ortega Sánchez

### Prerequisites

Although there are no official prerequisites, it is convenient that the student has achieved basic skills of self-learning and group work, as well as pre-college knowledge of biology. Because the students will do practices in the dissection room, they must be committed in preserving the confidentiality and professional secrecy of the data they may have access to during their learning, and in maintaining an attitude of professional ethics throughout all their actions.

### Objectives and Contextualisation

It is a basic subject, scheduled in the second semester of the first year of the Degree in Biomedical Sciences.

The objectives are the study of the general anatomical organization of the human body, the principles of the initial embryonic development and the locomotor system, as well as the study of the descriptive and topographic anatomy of the trunk and head, of the upper and lower limbs, and the descriptive and topographic anatomy of the cardiovascular system.

This subject has its natural continuation in the second year, in the subjects Human Anatomy: internal organs, Structure and Function of the Nervous System and in Biology of Development and Teratogenesis.

The student who approves this course must be able to describe, with international anatomical nomenclature, and recognize the anatomical structures that make up the different parts of the locomotor system and the cardiovascular system in health, as well as to describe the principles of embryonic development, normal and locomotor system, in order to understand their alterations.

### Competences

- Apply knowledge acquired to the planning and implementation of research, development and innovation projects in a biomedical research laboratory, a clinical department laboratory or the biomedical industry.
- Contribute to public discussions on cultural matters.
- Describe biomedical problems in terms of causes, mechanisms and treatments.
- Develop critical thinking and reasoning and communicate ideas effectively, both in the mother tongue and in other languages.
- Develop independent learning habits and motivation to continue training at postgraduate level.
- Develop scientific knowledge, critical reasoning and creativity.
- Display knowledge of the bases and elements applicable to the development and validation of diagnostic and therapeutic techniques.
- Display knowledge of the basic life processes on several levels of organisation: molecular, cellular, tissues, organs, individual and populations.
- Display knowledge of the concepts and language of biomedical sciences in order to follow biomedical literature correctly.
- Generate innovative and competitive proposals for research and professional activities.
- Identify and understand the advances and challenges of research.
- Plan and implement laboratory analysis experiments and procedures belonging to the biomedical field.
- Show respect for the ethical and legal aspects of research and professional activities.
- Work as part of a group with members of other professions, understanding their viewpoint and establishing a constructive collaboration.

## Learning Outcomes

1. Apply acquired knowledge of anatomy to the production of well-structured review articles.
2. Contribute to public discussions on cultural matters.
3. Correctly use the international anatomical nomenclature.
4. Describe the anatomical organisation of the cardiovascular system.
5. Describe the anatomical organisation of the musculoskeletal system.
6. Describe the general anatomical organisation of the systems of the human body in a healthy state.
7. Develop critical thinking and reasoning and communicate ideas effectively, both in the mother tongue and in other languages.
8. Develop independent learning habits and motivation to continue training at postgraduate level.
9. Develop scientific knowledge, critical reasoning and creativity.
10. Distinguish between normal anatomical structures by using different imaging diagnostic techniques.
11. Explain the formation of the cardiovascular system and of its principal disorders.
12. Explain the formation of the embryonic disc and its principal derivatives.
13. Explain the formation of the musculoskeletal system and of its principal disorders.
14. Generate innovative and competitive proposals for research and professional activities.
15. Identify and understand the advances and challenges of research.
16. Identify the anatomical structures that constitute the different systems in a healthy state in the main stages in an individual's life cycle.
17. Identify the principal techniques used in an anatomy laboratory.
18. Show respect for the ethical and legal aspects of research and professional activities.
19. Work as part of a group with members of other professions, understanding their viewpoint and establishing a constructive collaboration.

## Content

CONTENTS:

THEORETICAL CLASSES (TE typology) (37 hours are scheduled).

UNIT 1: GENERAL ANATOMY. Terms of position and direction. International Anatomical terminology. General anatomical organization of the human body.

UNIT 2: GENERAL EMBRYOLOGY and PRINCIPLES OF THE LOCOMOTOR DEVELOPMENTAL. Zygote,

morula and blastula. Gastrulation: formation of the definitive embryonic leaves and their main derivatives. Principles of the development of the locomotor system.

UNIT 3: ANATOMY OF THE LOCOMOTOR SYSTEM: UPPER LIMB. General organization of the upper limb. Joints and muscles of the shoulder girdle. Elbow joint and muscles of the arm. Topographic anatomy of the shoulder and arm girdle. Wrist and hand joints. Muscles of the forearm and hand. Topographic anatomy of the forearm and hand. Vessels and nerves of the upper limb.

UNIT 4: ANATOMY OF THE LOCOMOTOR SYSTEM: TRUNK.

SPINE. General organization. Joints of the spine: syndesmosis (ligaments), synchondrosis (intervertebral disc) and synovial (zygapophyseal). Craniovertebral joints. Muscles of the trunk: classification. Short and long muscles of the medial tract. Short and long muscles of the lateral tract. Prevertebral muscles. Overview of the spine's movements.

CHEST. General organization. Joints of the thorax: synchondrosis and synovial. Muscles of the chest: supracostals, intercostals, subcostals, posterior serratus, triangular of the sternum and diaphragm muscles. Overview of the mechanical breathing.

ABDOMEN. General organization. Muscles of the abdomen: rectus, obliques and transverse. Posterior muscles: psoas and quadratus lumbar. Fascia transversalis. Inguinal canal.

PELVIS. General organization. Joints and ligaments of the pelvis: sacroiliac and symphysis. Pelvic cavity as a whole. PERINEUM. General organization. Fascias and muscles of the perineum.

UNIT 5: ANATOMY OF THE LOCOMOTOR SYSTEM: LOWER LIMB. General organization of the lower limb. Hip joint and muscles of the hip. Knee joint and thigh muscles. Topographic anatomy of the pelvic girdle and thigh. Foot and ankle joints. Muscles of the leg and foot. Topographic anatomy of the leg and foot. Vessels and nerves of the lower limb.

UNIT 6: ANATOMY OF THE LOCOMOTOR SYSTEM: HEAD AND NECK. General organization of the head. Views and cranial fossae. Internal base of the skull. Orbital and Nasal Cavities. Articulations of the skull: syndesmosis, synchondrosis and synovial (temporomandibular). Muscles of the face and the chewing. General organization of the neck: compartments and fascias. Muscles of the neck: scalenus, infrahyoids and craniozonals (sternocleidomastoid and trapezius). Cervical plexus

UNIT 7: ANATOMY OF THE CARDIOVASCULAR SYSTEM. General organization. Pulmonary and Systemic circulation. Anatomy of the heart: external and internal morphologies. Heart vessels and nerves. Pericardium. Pulmonary trunk, pulmonary arteries and pulmonary veins. Artery aorta: ascending aorta, aortic arch and descending aorta. Iliac arteries. Subclavian arteries. Carotid arteries. Superior vena cava system. Inferior vena cava system. Venous intercaval systems. Lymphatic system.

SEMINARS (SEM typology) (6 hours of 1 hour each per student are scheduled).

Seminar 1: osteology of the upper limb

Seminar 2: osteology of the trunk (1): spine

Seminar 3: osteology of the trunk (2): thorax and pelvis

Seminar 4: osteology of the lower limb

Seminar 5: osteology of the head (1)

Seminar 6: osteology of the head (2)

LABORATORY PRACTICES (in dissection room) (PLAB typology) (3 practices of 4 hours each per student are programmed). To access at the dissection room it is COMPULSORY to wear a gown and gloves, and it is NOT allowed to take photographs and/ or videos in the dissection room.

Practice 1: Identify, in anatomical preparations, the structures (joints, muscles, vessels, nerves) of the upper limb and the trunk.

Practice 2: Identify, in anatomical preparations, the structures (joints, muscles, vessels, nerves) of the pelvis, perineum, abdomen and the lower limb.

Practice 3: Identify, in anatomical preparations, the heart and the vascular system (arteries, venae, ...).

## **Methodology**

### METHODOLOGY

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

#### DIRECTED ACTIVITIES

##### Theory (TE type) (37 hours)

Direct teaching that is usually done in a schedule and in a previously programmed classroom. The student acquires knowledge of the subject by attending the theoretical classes and complementing them by personal study.

##### Seminars (SEM type) (6 hours)

Teaching conducted by a teacher, in which the student actively participates in the treatment of a predetermined topic through the exchange of partial information, collective analysis and the corresponding debate. Presentations of group works can be included. Seminars are held in a classroom and in a predetermined schedule.

Each student must conduct a script of the contents of the seminar (available on the website of the subject). To carry out this work, it is recommended to consult books and atlases, the didactic material of the website and, if appropriate, to voluntarily go to the osteoteca (it is necessary to request it previously at [sala.disseccio@uab.cat](mailto:sala.disseccio@uab.cat)). In each seminar, the teacher will supervise the achievement of the established objectives and will clarify the problems that have not yet been solved correctly. At the beginning of each session, the student must submit the completed script for an evaluation that will be individual (the scripts of students who do not attend the whole session, who are photocopied, who have evidence of having copied or are presented in a format other than established will not be evaluated). From each script, 5 questions will be corrected at random by the teacher, whose note will give the continuous evaluation of the seminar. The student who decides not to do the seminars will have the option to perform an examination of these contents in the recovery exam of the subject.

##### Laboratory practices (in dissection lab) (PLAB type)(12 hours)

Laboratory practices are activities that require specific equipment and/or instruments. They are carried out with the permanent assistance of the teaching staff and are carried out in the dissection lab (in Faculty of Medicine). In each laboratory practice, the contents will be studied through anatomical preparations. In the dissection lab it is mandatory to wear lab coat and gloves, and it is totally prohibited to take photographs and / or videos.

#### SUPERVISED ACTIVITIES:

##### Virtual classes (VIRT type).

Teaching delivered without assistance to the classroom, under the permanent and personalized supervision of the student and the use of information and communication technologies (ICT). The student has didactic material (for seminars, for dissection practices and / or for self-learning activities) in the Virtual Campus of the UAB.

##### Tutorials.

The teacher will make them at the request of the student in a personalized way. The aim is to clarify concepts, establish the knowledge acquired and facilitate the study.

## AUTONOMOUS ACTIVITIES:

Individual work: Comprehensive reading of texts and articles, study and realization of schematic outline, summaries and conceptual assimilation of the contents. Preparation of practical activities (seminars, dissection practices).

## Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Laboratory practices (dissection lab)	12	0.48	18, 2, 5, 4, 9, 8, 7, 10, 14, 16, 17, 19, 3
Seminars (osteology)	6	0.24	18, 1, 2, 5, 6, 9, 8, 7, 10, 14, 15, 16, 17, 19, 3
Theory	37	1.48	18, 2, 5, 4, 6, 9, 8, 10, 13, 12, 11, 14, 15, 16, 17, 19, 3
Type: Supervised			
Virtual classes and tutorials	12.5	0.5	18, 1, 5, 4, 6, 9, 8, 7, 10, 13, 11, 16, 17, 3
Type: Autonomous			
Preparation of the written works, self-study, comprehensive reading	75	3	18, 1, 2, 5, 4, 9, 8, 7, 10, 14, 15, 16, 17, 19, 3

## Assessment

### ASSESSMENT OF THE SUBJECT

The competencies of the subject will be evaluated through two partial exams, each of which will have different evaluation activities with the corresponding weighting in the final grade of the subject:

The first partial will consist of an objective test (30% of the final grade), a structured objective evaluation (practical exam) (10% of the final grade) and a continuous evaluation of seminars (5% of the final grade). The second partial will consist of an objective test (30% of the final grade), a structured objective evaluation (practical exam) (20% of the final grade) and a continuous evaluation of seminars (5% of the final grade).

Format of each partial exam:

Objective test of the contents taught in the theoretical classes: 30 test questions with 5 answer options, of which only 1 will be valid. The answers answered incorrectly discount 0.25.

Structured objective exam of the contents taught in the dissection practices: 10 questions in the first partial and 20 in the second partial of recognition of anatomical structures indicated on the studied preparations to the dissection practices. To obtain the grade of 5.0 in this exam it is necessary to answer correctly 60% of the questions (6 in the first partial and 12 in the second partial). In this exam DO NOT discount the answers answered incorrectly or blank.

Continuous assessment of osteology seminars: each student must answer a series of questions of a script that will be available on the UAB Virtual Campus. The script of each seminar must be answered directly (with a pen) in the format downloaded from the UAB Virtual Campus. The teacher at the beginning of the seminar will pick up each script and 5 of the questions (chosen at random by the teacher) will be corrected. The scripts of students who do not attend the entire face-to-face session, deliver photocopied scripts and / or with evidence of having been copied, and in a format different as previously established will NOT BE evaluated.

For the calculation of the grade of each partial exam, the following weighting will be applied: note objective test type x 0.6 + note practical exam x 0.3 + note continuous evaluation x 0.1.

If the student reaches a score greater than or equal to 5.0 in each partial evaluation it will be eliminatory for the respective contents, in accordance with the following requirements (without exceptions): have a minimum of 4.00 in the objective test of the theory contents and not having a qualification equivalent to 0,00 in none of the three parts of the assessment.

The final grade of the subject of the students WHO HAVE EXCEEDED the two partials will be obtained by applying the following weight: note objective test of first partial x 0.3, note objective test of second partial x 0.3, note practical exam of first partial x 0.1, note practical exam of second partial x 0.2, note continuous evaluation of first partial x 0.05, note continuous evaluation of second partial x 0.05.

## RECOVERY EXAM

Students WHO HAVE NOT PASSED one or both partial exams, can opt for a recovery exam, according to the current UAB evaluation regulations: "To participate in the recovery, students must have been previously evaluated in a set of activities, the weight of which equals a minimum of two thirds of the total qualification of the subject. Therefore, the students will obtain the qualification of "Not evaluable" when the evaluation activities carried out have a weight lower than 67% in the final qualification".

The recovery exam, of one or both of the partial exams, will be applied the same format and the same requirements established for the evaluation by partial exams. In addition, students that for any other reason have not done the continuous evaluation of seminars will have an objective test exam of the seminar contents (20 questions with 4 answer options and only 1 will be correct; each question wrongly answered will discount 1/3).

Students who wish to improve a grade of one or both of the two partial exams (each partial includes objective test and practical exam) and / or continuous evaluation of seminars (through objective test) may also be submitted to the recovery exam. In these cases, the student must expressly request it from the coordinator, in writing and within the established deadline, waiving the previously obtained grade.

The following percentages will be applied to determine the global mark of the recovery exam:

- mark obtained in the objective test about the contents of theory classes: 60%
- mark obtained from the structured objective evaluation of practical contents: 30%
- mark obtained of continuous evaluation of the seminars: 10%.

To apply this percentage, the following requirements (without exceptions) must be accomplished: have a minimum of 4.00 in the objective test exam of the theory contents and don't have a qualification equivalent to 0.00 in none of the three parts of the assessment.

The final mark of the subject will have a numerical expression, with a decimal, on the 0-10 scale and with the qualitative equivalence in accordance with the criteria of the UAB, fail, pass, good and merit (with the option of obtaining honor distinction).

Partials and/or recovery revisions: location and dates will be announced through the UAB Campus Virtual. The revision process will be done according to the current regulations of the UAB.

## Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Continuous evaluation of seminars	5% + 5%	1	0.04	18, 1, 2, 5, 9, 8, 7, 10, 14, 16, 17, 19, 3
Objective test (of the theoretical contents)	30% + 30%	4	0.16	18, 2, 5, 4, 6, 9, 8, 7, 10, 13, 12, 11, 14, 15, 16, 17, 3

Structured objective evaluation (practical exam)	10% + 20%	2.5	0.1	18, 2, 5, 4, 6, 9, 8, 10, 15, 16, 17, 19, 3
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## Bibliography

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