

Human Anatomy: Locomotor System

Code: 101935
ECTS Credits: 6

Degree	Type	Year	Semester
2501230 Biomedical Sciences	FB	1	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

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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

Mario Roberto Bueno Gallegos
Alejandro Fernandez Leon
María Luisa Ortega Sánchez

Prerequisites

Although there are no prerequisites established officially, it is advisable that the student has achieved basic competencies for self-learning, working in groups and pre-college Biology. Because the student will do practices in the dissection/osteotheca labs, he will acquire the commitment to preserve the confidentiality and professional secrecy of the data to which they can access because of their learning activities and have taken the good practice test. He must also agree in maintaining an attitude of professional ethics throughout all his 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

- Act with ethical responsibility and respect for fundamental rights and duties, diversity and democratic values.
- 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.
- Describe biomedical problems in terms of causes, mechanisms and treatments.
- 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.
- Make changes to methods and processes in the area of knowledge in order to provide innovative responses to society's needs and demands.
- Read and critically analyse original and review papers on biomedical issues and assess and choose the appropriate methodological descriptions for biomedical laboratory research work.
- Students must be capable of applying their knowledge to their work or vocation in a professional way and they should have building arguments and problem resolution skills within their area of study.
- Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethical relevant issues.
- Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.
- Students must develop the necessary learning skills to undertake further training with a high degree of autonomy.
- Students must have and understand knowledge of an area of study built on the basis of general secondary education, and while it relies on some advanced textbooks it also includes some aspects coming from the forefront of its field of study.
- Take account of social, economic and environmental impacts when operating within one's own area of knowledge.
- Work as part of a group with members of other professions, understanding their viewpoint and establishing a constructive collaboration.

Learning Outcomes

1. Act with ethical responsibility and respect for fundamental rights and duties, diversity and democratic values.
2. Apply acquired knowledge of anatomy to the production of well-structured review articles.
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. Distinguish between normal anatomical structures by using different imaging diagnostic techniques.
8. Explain the formation of the cardiovascular system and of its principal disorders.
9. Explain the formation of the embryonic disc and its principal derivatives.
10. Explain the formation of the musculoskeletal system and of its principal disorders.
11. Identify the anatomical structures that constitute the different systems in a healthy state in the main stages in an individual's life cycle.
12. Identify the principal techniques used in an anatomy laboratory.
13. Make changes to methods and processes in the area of knowledge in order to provide innovative responses to society's needs and demands.
14. Students must be capable of applying their knowledge to their work or vocation in a professional way and they should have building arguments and problem resolution skills within their area of study.
15. Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethical relevant issues.
16. Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.

17. Students must develop the necessary learning skills to undertake further training with a high degree of autonomy.
18. Students must have and understand knowledge of an area of study built on the basis of general secondary education, and while it relies on some advanced textbooks it also includes some aspects coming from the forefront of its field of study.
19. Take account of social, economic and environmental impacts when operating within one's own area of knowledge.
20. 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).

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.

UNIT5: 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 gridle 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 per student).

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) (12 hours per student). To access at the dissection room it is COMPULSORY to wear a gown and gloves, and have taken the good practice test. 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, venaes, ...).

Methodology

METHODOLOGY

Directed activities

Classes to teach the theory program (TE) (37h)

Seminars for bones study (SEM) (6h)

Dissection lab practices (PLAB) (12h)

Supervised activities

Virtual teaching with TIC (VIRT) through the UAB Virtual Campus

Personalized and/or group tutoring, face-to-face or virtual

Autonomous activities

Reading of texts and articles, study and creation of diagrams, summaries and conceptual assimilation of the contents. Preparation of seminars and dissection activities.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Laboratory practices (dissection lab)	12	0.48	5, 4, 7, 11, 12, 20, 3

Seminars (osteology)	6	0.24	2, 5, 6, 7, 11, 12, 20, 3
Theory	37	1.48	5, 4, 6, 7, 10, 9, 8, 11, 12, 20, 3
Type: Supervised			
Virtual classes and tutorials	12.5	0.5	2, 5, 4, 6, 7, 10, 8, 11, 12, 3
Type: Autonomous			
Preparation of the written works, self-study, comprehensive reading	75	3	2, 5, 4, 7, 11, 12, 20, 3

Assessment

EVALUATION

PARTIAL EXAMS:

The competences will be evaluated through two partial exams. Each one includes the following contents and with corresponding weight in the final score of the subject:

The first partial exam: an objective test (30% of the final score), a structured objective evaluation (practical exam) (10% of the final score) and a continuous evaluation of seminars (5% of the final score).

The second partial exam: an objective test (30% of the final score), a structured objective evaluation (practical exam) (20% of the final score) and a continuous evaluation of seminars (5% of the final score).

Format of each partial exam: objective test type exam of 30 questions with 4 answer options, only 1 valid. Incorrect answers penalize 1/3 of a point. Structured objective evaluation (practical exam) of 10 questions in the first partial and 20 questions in the second partial related to structures indicated in anatomical preparations, each question is scored with 1 or 0 point. Incorrect answers or questions left blank do not penalize. But to achieve the sufficiency (5.0 score) it is necessary to obtain a 60% of the questions (6 of the 10 points in first partial and 12 of the 20 points in second partial). Evaluation of the seminar: students will have, on the UAB Virtual Campus, a script and didactic material to carry out a personal study of the contents of each seminar. Before attending the session, of each seminar, the student must prove that have completed, and passed, an *on line* questionnaire of the learning achieved (essential requirement). In addition, before each partial exams is scheduled another on line evaluation will be made of the contents of the 3 seminars that each partial includes.

To calculate the score for each partial evaluation, the following formula will be applied: objective test mark x 0.6 + practical exam mark x 0.3 + seminars mark x 0.1.

To release the contents of each partial it is necessary to achieve a score equal or greater than 5.0. Additionally, the following requirements must be applied (without exceptions): minimum score of 4.00 in the objective test of the theory program contents and not having a mark of 0.00 in any of the other parts of the evaluation (practical and two *on line* seminar questionnaires).

Calculation of the final score for students who have passed the two partial exams: mark of the theory program contents of the first partial x 0,3 + mark of the theory program contents of the second partial x 0,3 + mark of the dissection program contents of the first partial x 0,1 + mark of the dissection program contents of the second partial x 0,2 + mark of the seminar program contents of the first partial x 0,05 + mark of the seminar program contents of the second partial x 0.05.

RECOVERY (FINAL) EXAM

This exam is intended for students who have not achieved the sufficiency in one or both partial exams, according to the UAB evaluation regulations: "To participate in the recovery, students must have been previously evaluated in a set of activities, the weight of which is equals to a minimum of two thirds of the total qualification of the subject. Therefore, 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 same format and the same requirements established for partial exams will be applied in the recovery exam for one or both partial exams. Students who for any reason have not carried out continuous evaluation of the contents of the seminar program will have to take a specific test of these contents (20 questions with 4 answer options, only 1 valid, and incorrect answers penalize 1/3).

Students who wish to improve their score in one or both partial exams (includes both the objective test and practical exam) and/or the seminars mark can also take the recovery exam. In these cases, the students must expressly request it to the coordinator within the established deadline, stating that they waive the previously obtained marks.

The following percentages will be applied to determine the final score of the recovery exam: mark of the test of the theory program contents (60%), mark of the practical program contents (30%), and mark of the seminar program contents (10%). To apply these percentages, the following requirements must be applied (without exceptions): minimum score of 4.00 in the objective test of the theory program contents and not having a mark of 0.00 in any of the other parts of the evaluation (practical and two *on line* seminar questionnaires).

The final mark of the subject will have a numerical expression, with one decimal, on the 0 to 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 honour distinction if the mark is equal to or greater than 9,3).

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 the seminars program	5% + 5%	1	0.04	2, 5, 7, 11, 12, 18, 17, 16, 14, 20, 3
Objective test (of the theoretical contents)	30% + 30%	4	0.16	1, 19, 2, 5, 4, 6, 7, 10, 9, 8, 11, 12, 13, 18, 17, 16, 14, 15, 3
Structured objective evaluation (practical exam) of the practical program contents	10% + 20%	2.5	0.1	1, 19, 5, 4, 6, 7, 11, 12, 17, 16, 14, 15, 20, 3

Bibliography

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