

**Human Anatomy: General Anatomy and
Musculoskeletal System**

Code: 103592
ECTS Credits: 6

Degree	Type	Year	Semester
2502442 Medicine	FB	1	1

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
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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 room, 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. He must also agree in maintaining an attitude of professional ethics throughout all his actions.

Objectives and Contextualisation

The subject *Human Anatomy: generalities and locomotor apparatus* is taught in the first semester of the first year of the Degree in Medicine. The objectives are the study of the general anatomical organization of the human body, initial embryonic development principles, and the locomotor apparatus, as well as the study of the anatomy of the trunk and the limbs.

This subject has its natural continuity in the second half of the first year and in the second year. Other subjects of the degree, such as Histology, Physiology and Pathophysiology and Clinical Semiology, complement these subjects.

The student who passes this course must be able to describe, with an international anatomical nomenclature, and to recognize the general anatomical organization of the human body, the principles of its development, and the anatomical structures that integrate the trunk and extremities of healthy human beings.

Competences

- Be able to work in an international context.
- Communicate clearly, orally and in writing, with other professionals and the media.

- 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 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.
- Formulate hypotheses and compile and critically assess information for problem-solving, using the scientific method.
- Maintain and sharpen one's professional competence, in particular by independently learning new material and techniques and by focusing on quality.
- Organise and plan time and workload in professional activity.
- Recognise the professional values of excellence, altruism, sense of duty, compassion, empathy, honesty, integrity and commitment to scientific methods.
- Use information and communication technologies in professional practice.

Learning Outcomes

1. Apply knowledge of anatomy to the production of structured review texts.
2. Be able to work in an international context.
3. Communicate clearly, orally and in writing, with other professionals and the media.
4. Convey knowledge and techniques to professionals working in other fields.
5. Describe anatomical structures through inspection, palpation and/or different diagnostic imaging techniques.
6. Describe the anatomical structures, the organisation and the morphogenesis of the musculoskeletal system, respiratory system, digestive system, and urogenital system.
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. Formulate hypotheses and compile and critically assess information for problem-solving, using the scientific method.
12. 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.
13. Identify the anatomical structures that make up the different body systems in health, through inspection, palpation and / or different macroscopic methods and different diagnostic imaging techniques.
14. Identify the main techniques used in a human anatomy laboratory.
15. Identify the morphogenetic mechanisms of the main alterations to the development of the musculoskeletal system, respiratory system, digestive system, and urogenital system.
16. Identify, at a basic level, the donation system and the protocols for the use of bodies in the medicine faculty.
17. Know and make correct use of the international anatomical nomenclature.
18. Maintain and sharpen one's professional competence, in particular by independently learning new material and techniques and by focusing on quality.
19. Organise and plan time and workload in professional activity.
20. Use information and communication technologies in professional practice.

Content

CONTENTS

THEORY (TE type) (37hs)

UNIT 1: GENERAL ANATOMY (5hs)

Introduction to anatomy. Basic terms. International anatomical nomenclature. Generalities of the skeletal system: bones and cartilages. Generalities of the articular system: fibrous, cartilaginous and synovial joints. Generalities of the muscular system: skeletal muscles and annexes. Overview of the vascular system: heart, arteries, veins and lymphatic system. Overview of the nervous system: central and peripheric nervous systems. Spinal nerves.

UNIT 2: GENERAL EMBRYOLOGY AND MORPHOGENESIS OF THE LOCOMOTOR APPARATUS (5hs)

Introduction to embryology. General concepts. Fertilization and zygote formation. Cleavage of the zygote: blastomeres. Morulation. Blastocyst. Gastrulation. Main derivatives of the germ layers: ectoderm, mesoderm, endoderm. Morphogenesis of the trunk. Morphogenesis of the limbs.

UNIT 3: ANATOMY OF THE LOWER LIMB (9hs)

Pelvic girdle: joints and ligaments. Hip joint. Muscles: organization. Dorsal-anterior group (iliopsoas, psoas minor, pectineus). Dorsal-posterior group (piriformis, gluteus muscles, tensor fasciae latae). Ventral group (obturator muscles, gemellus muscles, quadratus femoris, adductor muscles, and gracilis). Topographic anatomy of the pelvic girdle. Lumbar and sacral plexuses. Internal and external iliac arteries and veins. Knee joint. Muscles: organization. Dorsal group or anterior region (quadriceps femoris, and sartorius). Ventral group or posterior region (popliteus, biceps femoris, semitendinosus, and semimembranosus). Topographic anatomy of the thigh. Femoral artery and vein. Nerves: femoral, obturator, lateral femoral cutaneous, genitofemoral, posterior femoral cutaneous and sciatic. Foot and ankle joints. Archs of the foot. Muscles: organization and compartments. Dorsal-anterior group or anterior compartment (tibialis anterior, extensor hallucis longus, extensor digitorum longus, and fibularis tertius). Dorsal-lateral group or lateral compartment (fibularis longus and fibularis brevis). Ventral group or posterior compartment (tibialis posterior, flexor hallucis longus, flexor digitorum longus, and triceps surae muscles). Topographic anatomy of the leg and ankle. Popliteal artery and vein. Nerves: tibial and common fibular. Muscles: organization. Dorsal region (extensor digitorum brevis and extensor hallucis brevis). Plantar region (plantar aponeurosis; flexor digitorum brevis, flexor accessorius or quadratus plantae, lumbrical muscles and interossei muscles; abductor hallucis, flexor hallucis brevis and adductor hallucis muscles; abductor digiti minimi and flexor-opponens digiti minimi muscles). Arteries and veins: tibioperoneal trunk, anterior tibial, posterior tibial and fibular vessels. Dorsalis pedis, medial and lateral plantar vessels. Deep plantar arch. Nerves: superficial and deep fibular nerves, tibial nerve, medial and lateral plantar nerves. Overview of the superficial venous system, lymphatic system and cutaneous innervation of the lower limb.

UNIT 4: ANATOMY OF THE UPPER LIMB (9hs)

Shoulder girdle joints: sternoclavicular, acromioclavicular and glenohumeral joints. Muscles: organization. Dorsal muscles (rotator cuff: subscapularis, supraspinatus, infraspinatus and teres minor muscles; teres major, latissimus dorsi and deltoid). Ventral muscles (subclavius, pectoralis muscles, and coracobrachialis). Trapezius, levator scapulae, rhomboid minor and major and serratus anterior muscles. Topographic anatomy of the shoulder girdle. Brachial plexus. Axillary artery and vein. Elbow joint and radio-ulnar syndesmoses. Muscles: organization and compartments. Posterior compartment (triceps and anconeus). Anterior compartment (brachialis and biceps brachii). Topographic anatomy of the arm. Nerves: axillary, radial, median, musculocutaneous, ulnar, medial cutaneous of the forearm and medial cutaneous of the arm. Brachial (humeral) artery and veins. Wrist and hand joints. Muscles: organization and compartments. Posterior compartment (supinator, abductor pollicis longus, extensor pollicis brevis, extensor pollicis longus, and extensor indicis; extensor digitorum, extensor digiti minimi and extensor carpi ulnaris). Postero-lateral compartment (brachioradialis, extensor carpi radialis longus, and extensor carpi radialis brevis). Anterior compartment (pronator quadratus, flexor digitorum profundus, flexor pollicis longus, flexor digitorum superficialis, pronator teres, flexor carpi radialis, palmaris longus, and flexor carpi ulnaris). Topographic anatomy of the forearm and wrist. Hand muscles: organization. Tenar muscles (adductor pollicis, flexor pollicis brevis, opponens pollicis, and abductor pollicis brevis). Hypothenar muscles (opponens digiti minimi, flexor digiti minimi brevis, abductor digiti minimi and palmaris brevis). Intermediate muscles (dorsal and palmar interossei muscles and lumbricals). Palmar aponeurosis. Radial, ulnar and interosseous arteries and veins. Arterial palmar arches. Median, ulnar (cubital) and radial nerves. Overview of the superficial venous system, lymphatic system and cutaneous innervation of the upper limb.

UNIT 5: TRUNK ANATOMY (9hs)

Vertebral column: general organization. Intervertebral joints. Craniovertebral joints. Lumbosacral and sacrococcygeal joints. Muscles: organization and classification. Short and long muscles of the medial tract (interespinales, spinalis, rotatores, multifidus and semispinalis muscles). Short and long muscles of the lateral tract (intertransversarii, longissimus, iliocostalis and splenius muscles). Suboccipital muscles (rectus capitis posterior major and minor, obliquus capitis inferior and superior). Prevertebral muscles (rectus capitis anterior and lateralis, longus capitis and longus colli). Innervation.

Thorax: general organization. Joints: costovertebral, sternocostal and interchondral joints. Muscles: intercostal muscles, subcostales, transversus thoracic, levatores costarum, and serratus posterior muscles. Diaphragm. Innervation.

Abdomen: general organization. Muscles: anterolateral (rectus, pyramidalis, external oblique, internal oblique and transversus abdominis muscles) and posterior (psoas and quadratus lumborum muscles) muscles. Inguinal canal.

Perineum: general organization. Perineal body and anococcygeal ligament. Pelvic diaphragm: levator ani and ischiococcygeus muscles. Anal triangle: external anal sphincter. Urogenital triangle: urethral sphincter muscle, deep and superficial transverse perineal muscles, bulbospongiosus and ischiocavernosus muscles. Innervation: pudendal nerve.

SEMINARS (SEM type)

Seminar 1: general anatomy and osteology of the pelvis.

General anatomy: planes, directions, and relationships. Bones and joints. The terminology applied in descriptive anatomy. Introduction to the techniques applied to imaging diagnosis of the musculoskeletal system.

Osteology of the pelvis: coxal, sacral and coccyx. Pelvis as a whole. Differential characters between the male and the female pelvis. Correlation of the osteology of the pelvis with techniques of diagnosis by imaging.

Seminar 2: osteology of the lower limb.

Bones: femur, patella, tibia, fibula, tarsus, metatarsus, sesamoid and phalanges bones. Plantar arch. Correlation of the osteology of the lower limb with techniques of diagnosis by imaging.

Seminar 3: osteology of the upper limb.

Bones: clavicle, scapula, humerus, radius, ulna, carpus, metacarpus, sesamoid and phalanges bones. Correlation of the osteology of the upper limb with techniques of diagnosis by imaging.

Seminar 4: osteology of the spine and thorax.

Vertebral column. Vertebrae: general features. Cervical, thoracic and lumbar vertebrae. Curvatures. Correlation of the osteology of the vertebral column with techniques of diagnosis by imaging. Thorax. Bone and cartilage: sternum and ribs. The thoracic wall as a whole. Correlation of the osteology of the thorax with techniques of diagnosis by imaging.

PRACTICAL LABS (in dissection room) (PLAB type)

Practice 1 (general anatomy).

Content: general organization of the musculoskeletal system (bones, joints, muscles, and annexes). General organization of the cardiovascular system (heart, arteries, veins and lymphatic). General organization of the nervous system (brain, spinal cord, meninges, cranial and spinal nerves). Correlation of the anatomical preparations with techniques of diagnosis by imaging.

Practice 2 (anatomy of the lower limb).

Content: pelvis, hip, knee, ankle and foot joints. Muscles of the pelvic girdle, thigh, leg, ankle, and foot. Arteries and veins of the lower extremity. Lumbar and sacral plexus: constitution, collateral and terminal branches. Superficial venous and lymphatic systems of the lower limb. Correlation of the anatomical preparations with techniques of diagnosis by imaging.

Practice 3 (anatomy of the upper limb).

Content: shoulder girdle, elbow, wrist and hand joints. Muscles of the shoulder girdle, arm, forearm, and the hand. Arteries and veins of the upper limb. Brachial plexus: constitution, collateral and terminal branches. Superficial venous and lymphatic systems of the upper limb. Correlation of the anatomical preparations with techniques of diagnosis by imaging.

Practice 4 (anatomy of the back, thorax, abdomen, and perineum).

Content: vertebral column and craniovertebral joints. Thorax joints. Muscles of the spine: paravertebrals, suboccipitals, and prevertebrals. Muscles and fascia of the thorax. Muscles and fascia of the abdomen. Inguinal canal. Muscles and fascia of the perineum. Correlation of the anatomical preparations with techniques of diagnosis by imaging.

Methodology

METHODOLOGY

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

DIRECTED ACTIVITIES

Theory (TE typology) (37 hours)

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

Seminars (SEM typology) (8 hours)

Teaching conducted by a teacher, in which the student actively participates in dealing with 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 with a predetermined schedule. The standard size of the group is 20 students, previously registered in the PSG program. Four seminars of 2 hours each per group are programmed.

Each student must conduct a script of the contents of the seminar (available on the subject's website). In order to do this work it is recommended to consult books and atlases (see bibliography of the subject), the didactic material of the web page of the subject and, if applicable, go voluntarily to the osteotheca (must request time at sala.disseccio@uab.cat). In each seminar, the teacher will oversee the achievement of the previously established objectives and clarify the issues that have yet not been correctly resolved. At the beginning of each session, the previously completed script will be collected for individualized evaluation (students' scripts that do not attend the whole session, photocopied, with indications of copying, or in a format other than the one set will not be evaluated). From each script, 5 questions will be corrected, randomly chosen by the teacher, who will give a continuous assessment of the seminar. The student who decides not to attend the seminars will have the option to take an exam of these contents at the recovery exam.

Laboratory practices (in dissection lab) (PLAB type) (8 hours)

Laboratory practices are activities that require specific equipment or instruments, with the permanent assistance of the teaching staff. They are scheduled for specific times in the dissection lab. The standard size of the group is of 20 students, previously registered in the PSG program.

In each laboratory practice, the contents will be studied in anatomical preparations and in their correlation with techniques of diagnosis by image.

In dissection lab is mandatory to bring a laboratory coat and examination gloves, and it is prohibited to take photographs and/or videos. Four practices of 2 hours each per group are programmed.

SUPERVISED ACTIVITIES:

Virtual classes (VIRT typology).

Teaching delivered without class attendance in the classroom under the permanent and personalized supervision of the student and using intensive information and communication technologies (ICT). The student has didactic material at his disposal (for seminars, for dissection practices and/or for self-learning activities) on the website of the subject (access to 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 of the subject.

AUTONOMOUS ACTIVITIES:

Individual work: Comprehensive reading of texts and articles, study and realization of schematic outlines, 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)	8	0.32	3, 17, 7, 9, 5, 6, 4, 11, 13, 12, 14, 16, 19
Seminars (SEM)	8	0.32	1, 3, 17, 7, 9, 5, 6, 4, 11, 13, 12, 14, 19, 20
Theory (TE)	37	1.48	3, 17, 7, 8, 9, 5, 6, 10, 11, 15, 13, 12, 14, 16, 18, 19, 20
Type: Supervised			
Virtuals classes (VIRT) and tutorials	15	0.6	1, 17, 7, 9, 5, 6, 11, 13, 12, 14, 18, 19, 2, 20
Type: Autonomous			
Reading articles, preparation of works, self-study	75	3	1, 3, 17, 7, 8, 9, 5, 6, 4, 10, 11, 15, 13, 12, 14, 16, 18, 19, 2, 20

Assessment

EVALUATION

Partial exams:

The competencies will be evaluated in two partial exams, each one including different activities:

first, an objective test about theoretical contents that represents the 27,5% of the final mark of the subject;

second, a structured objective evaluation (practical exam) about practical contents that represents the 15% of the final mark;

third, an objective test about seminar contents that represents the 3.75% of the final mark of the subject;

and finally, the mark for continuous evaluation of seminars (assistance and presentation of deliverables) which represents 3.75% of the final mark of the subject.

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 criteria established in this section.

Continuous evaluation of seminars:

Consists in the correction of 5 of the questions included in each seminar script. Each question will be scored with a 0 - 0.5 - 1 point.

The student must solve the questions formulated in the script before attending the session. At the beginning of each session, the teacher will pick up the scripts for its evaluation. The responses in the script must reflect the personal work of the student, therefore the scripts of students that do not attend the whole session, those photocopied or delivered in a different format from the established one, will not be evaluated.

Each PARTIAL exam will include:

1. An objective test of the contents taught in the theory classes (30 questions with 5 possible responses and only 1 correct; for each wrong answer 0.25 points will be discounted).
2. An objective test of the contents of the seminars (10 questions with 5 possible responses and only 1 correct; for each wrong answer 0.25 points will be discounted).
3. A structured objective evaluation of the contents of the dissection practices, through the recognition of 15 anatomical structures indicated in the anatomical preparations studied during practical sessions. Each answer will be scored with 0 or 1 point and wrong or unanswered questions will not discount. To achieve a score equivalent to 5.00 it will be necessary to answer correctly 9 of the questions.

Each partial score will be determined through the application of the following percentages:

objective test of the theory contents (55%), structured objective evaluation of the practical contents (30%) and seminars qualification (15%, of which 7.5% will be of the objective test and 7.5% will correspond to the continuous evaluation of the seminars).

In order to apply this percentage, the following requirements (without exceptions) must be accomplished: 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 four parts of the assessment.

For those students that have carried out the continuous evaluation of the seminars and have passed the two partial exams the following percentages will be applied to calculate the global mark of the subject:

- 55% corresponding to the average of the first and second partial scores obtained in the objective tests about theory classes contents,
- 30% corresponding to the average of the first and second partial scores obtained in the structured objective evaluation (contents of practical sessions),
- 15% corresponding to the average of the first and second partial scores obtained in the objective test about seminars contents (7,5%) and the marks corresponding to continuous evaluation an attendance to the seminars (7.5%).

Those students who do not reach an average score of 5.00 in the partial exams can attend to the recovery exam.

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") will include:

1) an objective test including 60 questions of the contents given in the theory classes. Each question will have 5 choices with only 1 valid. Each question not answered correctly will discount 0.25 points.

2) an objective test including 20 questions about the contents of the seminars. Each question will have 5 choices with only 1 valid. Each question not answered correctly wrongly discounts 0.25 points.

3) a structured objective evaluation of the contents of the practical session. This will be conducted in the dissection lab and will consist in the recognition of 30 anatomical structures indicated in exposed preparations, which have been studied during practical sessions. It is necessary answer correctly 18 of the 30 questions to reach a score equivalent to 5.00. Each answer will be scored with 0 or 1 point, and wrongly or not answered questions will not discount points.

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

- mark obtained in the objective test about the contents of theory classes: 55%
- mark obtained from the structured objective evaluation of practical contents: 30%
- evaluation of the seminars: 15% (7.5% will be the mark of the objective test about the contents and the other 7.5% will be the mark from continuous evaluation).

To apply this percentage, the following requirements (without exceptions) must be accomplished:

have a minimum of 4.00 in the objective test of the theory contents and don't have a qualification equivalent to 0.00 in none of the four parts of the assessment.

Important points regarding the recovery exam:

To conduct the recovery exam the following conditions must be met:

- students who have not passed or have not conducted the partial evaluations.

- students who have not passed or have not conducted one of the two partial exams (in these cases, the format of the exam will be the same as that established for each of the partial exams).

- students who wish to improve a grade of one or both partial exams, they must expressly request it to the coordinator within the established deadline, stating that they waive the previously obtained marks in theory and practical exams.

- students who for any reason have opted for not to conduct the continuous evaluation of the seminars have the option of doing, in the recovery exam, an objective test about the contents of the seminars. This exam will consist of 20 questions, with 4 answer options and only 1 of the options will be correct (each question wrongly answered will discount 1/3). The mark obtained in this test will represent 7.5% of the seminars mark.

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
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Continuous evaluation of seminars	7,5%	1	0.04	1, 3, 17, 5, 6, 4, 11, 13, 14, 18, 19, 2
Objective test (of the theoretical and seminars contents)	62,5%	3	0.12	3, 17, 7, 8, 9, 5, 6, 4, 10, 11, 15, 13, 12, 14, 16, 18, 19, 2, 20
Structured objective evaluation (practical exam)	30%	3	0.12	1, 3, 17, 9, 5, 6, 4, 11, 13, 12, 14, 16, 18, 19, 2

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