MACROSCOPIC ANATOMY AND EMBRYOLOGY I.

Department of Anatomy, Histology & Embryology

Head of Department: Dr. Alpár Álán

Course Director: Dr. Andrea D. Székely

Credit value: 7
Number of lessons per week: 7 lectures: 1 practical course: 6 seminars: 0

Subject type: compulsory course
Subject code: AOKANT853_1A
Name of the course leader: Dr. Alpár Álán (full professor)

Objectives of the subject, its place in the medical curriculum:
Demonstration of the macroscopical composition of the human body specifically to provide the future clinicians/medical doctors with a valid body of information with relevance to clinically significant morphological structures. General Embryology describes the intrauterine development of a human embryo/fetus and introduces the development of the locomotor system. Teaching is done in the form of lectures and dissection classes.

Place where the subject is taught (address of the auditorium, seminar room, etc.):
Semmelweis University, Department of Anatomy, Histology and Embryology
Budapest 1094, Tűzoltó utca 58.

Successful completion of the subject results in the acquisition of the following competencies:
Understanding the macroscopical composition of the human body together with the position and topographical relation of organs. Clear understanding of structure and function. Ability to perform basic preparatory tasks during dissection. Identification of general directions/landmarks on the cadaver together with the recognition of significant organs/body parts. Acquiring knowledge of surface features and/or sectional anatomy forming basis for clinical diagnostics (palpation, auscultation, etc.) and the use of radiological imaging methods. Clear understanding of the beginning of human development (general embryology) together with the development of the musculoskeletal system.

Course prerequisites:
None (subject is offered in the 1st semester)

Number of students required for the course (minimum, maximum) and method of selecting students:
obligatory for all registered students, on the basis of registration via the NEPTUN system

How to apply for the course:
Via the NEPTUN system.

Detailed curriculum:
List of lectures

<table>
<thead>
<tr>
<th>Week</th>
<th>Lecture</th>
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<tr>
<td>1.</td>
<td>General introduction, terminology</td>
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<td>2.</td>
<td>Joints and movements of the shoulder and shoulder girdle,</td>
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<td>3.</td>
<td>Joints and movements of the elbow and the hand</td>
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<td>4.</td>
<td>Joints and movements of the hip</td>
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<td>5.</td>
<td>Pelvis. Joints and movements of the knee</td>
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<td>6.</td>
<td>Joints and movements of the foot</td>
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<td>7.</td>
<td>Composition of thorax, diaphragm</td>
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<td>8.</td>
<td>Composition of the abdominal wall. Inguinal and femoral canals</td>
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<tr>
<td>9.</td>
<td>Composition and movements of the vertebral column. Muscles of the nape and back.</td>
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10. week: Gametes, fertilization, cleavage

11. week: Implantation, structure of the placenta, placentar circulation. Fetal membranes

12. week: Gastrulation, formation and derivatives of germinal layers


14. week: Development of the skull, vertebral column and limbs

Topics for the dissection classes

| 1-6 weeks: | Bones, joints and muscles of the limbs. Dissection of the limbs. |
| 7-9. weeks: | Cadaver dissection. Dissection of the superficial layers of the trunk, inspection of the structure of the body wall on prosected specimens (torso). |
| 8-12. weeks: | Inspection of the bony skull together with head and neck prosections |
| 13-14. weeks: | Embryology consultations, revision |

Other subjects concerning the border issues of the given subject (both compulsory and optional courses). Possible overlaps of themes: Microscopic Anatomy and Embryology I - II.

Special study work required to successfully complete the course: All students are required to demonstrate their knowledge and motivated practical work by the completion and demonstration of a dissected specimen or region once during the two semesters of the Academic year.

Requirements for participation in classes and the possibility to make up for absences: Active participation in practical lessons is obligatory. Students should attend at least 75% of the scheduled hours, absences therefore are limited in 25%. Attendance will be recorded in the dissection room classes.

Methods to assess knowledge acquisition during term time: During the semester, both practical and theoretical knowledge will regularly be evaluated. Attendance is obligatory at the two mid-term tests (held approximately on weeks 7 and 12). Anatomy mid-terms may be oral or written (computer based) exams. Students absent from the mid-term test should reattend at one of the two further occasions or their semester will not be accepted. The time and topics of midterm tests will be announced in the departmental homepage at the beginning of the semester (http://semmelweis.hu/anatomia).

Requirements for signature: Active participation in at least 75% of dissection room sessions, including the midterm tests (irrespective of the result) is obligatory for every student.

Type of examination: Semifinal (written and oral) examination, topics: subject matter of the semester.

Semifinal examinations consist of written (theoretical) and oral (practical) parts. Examiners are delegated by the Course Director with the consent of the Head of Department.

Requirements of the examination: During the semifinal examination the knowledge of students will be tested. The examination starts with a written pretest (e-learning module “Moodle”) to be followed by an oral test in Macroscopic Anatomy (identification of structures on true anatomical specimens) including relevant theoretical questions from the subject matter of the semester.

Topic list for the semifinal examination:

Macroscopic Anatomy I

Musculooskeletal Anatomy
- General osteology, classification of bones
- Continuous connections of bones. Classification of joints; components, movements and mechanisms
- General myology
- Structure of the vertebral column, the gross anatomy of the muscles acting upon it
- Movements and muscles of the head&neck (atlantooccipital and atlantoaxial joints)
- Joints of the shoulder girdle, the gross anatomy of the muscles acting upon them
- Shoulder joint, the gross anatomy of the muscles acting upon it
- Axillary fossa, quadrangular and triangular spaces
- Muscle compartments and cross section of the arm
- Elbow joint, the gross anatomy of the muscles acting upon it. Cubital fossa
- Muscles and cross section of the forearm
Structure and movements of the radiocarpal joint, gross anatomy of the muscles acting upon it
Osteofibrous spaces and muscle compartments of the hand, tendinous sheaths
Carpometacarpal, metacarpoaphalangeal and interphalangeal joints of the thumb and fingers, the gross anatomy of the muscles concerned with the movements
Osteofibrous structure of the thoracic cage (bones, joints, ligaments, movements)
Thoracic muscles
Diaphragm
Muscles and spaces of the abdominal wall, rectus sheath
Composition of the pelvis (bones, ligaments and membranes)
Muscles of the buttock, the posterior abdominal wall and the pelvis (external and internal muscles of the hip)
inguinal canal, femoral canal
Subinguinal hiatus, vascular and muscular compartments; adductor canal, femoral canal
Hip joint and the gross anatomy of the muscles concerned with the movements
Osteofibrous compartments, muscles and cross section of the thigh
Knee joint and the gross anatomy of the muscles concerned with the movements. Popliteal fossa
Osteofibrous compartments, muscles and the cross section of the leg
Ankle joint together with the gross anatomy of the muscles acting upon it
Subtalar and talocalcaneonavicular joints, the muscles acting upon them
Osteofibrous compartments and structure of the foot, arches of the foot
Bones, spaces and connections of the skull, external and internal skull bases
Neurocranium, components and cavities (anterior, middle and posterior cranial fossae)
Viscerocranium, components and cavities (walls and connections of the nasal cavity, orbit, oral cavity, pterygopalatine and infratemporal fossae)
Temporal mandibular joint and the gross anatomy of the muscles of mastication
Superficial muscles of the neck, muscle triangles
Deep muscles of the neck and the laminae of the cervical fascia
Muscles of facial expression

Further topics with relevance to the musculoskeletal system
Lymphatic drainage of the thoracic wall including the mamma
Dorsal branches of the spinal nerves, intercostal nerves
Cervical plexus, brachial plexus, lumbar plexus, sacral plexus.
Innervation of limbs
Innervation of the trunk
Cutaneous innervation
Axillary artery and branches. Arteries and veins of the arm, forearm, and hand
Arteries and veins of the lower limb
Lymph nodes and lymphatic drainage of the upper and lower limbs

General Embryology and development of the musculoskeletal system
Spermatogenesis, spermiogenesis
Oogenesis
Fertilization, cleavage of the zygote
Blastocyst formation; the bilaminar embryonic disc
Implantation
Formation of body axes, parts of the early embryo (yolk sac, amnion, chorion, body stalk)
Gastrulation
Formation of the intraembryonic mesoderm; the notochord
Neurulation (neural tube and neural crest)
Derivatives of ectoderm, endoderm and mesoderm
Folding of the embryo
The structure and function of the placenta
Development of the fetal membranes (chorion and amnion), umbilical cord
Twin formation
Membranous and cartilaginous neurocranium and viscerocranium
Development of the limbs and vertebral column
Development of the muscular system

Method and type of evaluation:
Semifinal examinations are composed of written theoretical and oral practical parts.
Students are given separate marks for each part of the examination. Unsuccessful partial examinations result in the failure of the semifinal examination. When failing at the practical part, the written test will not have to be repeated in case the result was a 4 or a 5 only. Upon the termination of the examination the Chairman of the Examination Committee composes the final mark from the partial marks earned in the written and practical parts.

How to register for the examination?
Via the NEPTUN system.

Possibilities for exam retake:
According the Study and Examination Policy
Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:
Recommended textbooks


The Developing Human – Clinically Oriented Embryology, 10th ed. by KL Moore, TVN Persaud and M Torchia, Saunders, 2015; ISBN 9780323313384

Further study aids:

To be downloaded from the homepage of the Department of Anatomy, Histology and Embryology (http://semmelweis.hu/anatomia) or from Knowledgebase on the Library homepage: (https://lib.semmelweis.hu/knowledge_base).