

# MACROSCOPIC ANATOMY AND EMBRYOLOGY I.

## Department of Anatomy, Histology & Embryology

Head of Department: *Dr. Alpár Alán*

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 Alán (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

1. week:	General introduction, terminology
2. week:	Joints and movements of the shoulder and shoulder girdle,
3. week:	Joints and movements of the elbow and the hand
4. week:	Joints and movements of the hip
5. week:	Pelvis. Joints and movements of the knee
6. week:	Joints and movements of the foot
7. week :	Composition of thorax, diaphragm
8. week:	Composition of the abdominal wall. Inguinal and femoral canals
9. week:	Composition and movements of the vertebral column. Muscles of the nape and back.

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
13. week:	Folding of the embryo, neurulation. Body axes, cranio-caudal and dorsoventral differentiation.
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:**

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**Macroscopic Anatomy I.**

**Musculoskeletal 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, metacarpophalangeal 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)  
Temporomandibular 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 to 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

- Sobotta Atlas of Human Anatomy, 15th English ed. Musculoskeletal system, internal organs, head, neck, neuroanatomy, By Waschke & Paulsen, ISBN-13: 9780702052507 2013
- Gray's Anatomy for students with STUDENT CONSULT Online Access, 3rd Edition by R. Drake, A. W. Vogl, A. Mitchel, Elsevier; 2014; ISBN 9780702051319
- THIEME Atlas of Anatomy, General Anatomy and Musculoskeletal System, 2014 by Schuenke, ISBN: 9781604069228
- THIEME Atlas of Anatomy, Head, Neck and Neuroanatomy, 2016 by Schuenke, ISBN: 9781626231207
- THIEME Atlas of Anatomy, Internal Organs, 2016 by Schuenke, ISBN: 9781626231665
- McMinn and Abrahams' Clinical Atlas of Human Anatomy with STUDENT CONSULT Online Access , 7th Edition By Abrahams, Spratt, Loukas & van Schoor ISBN-13: 9780723436973 , 2013
- Netter: Atlas of Human Anatomy, Including Student Consult Interactive Ancillaries and Guides, 6th Edition, 2014.
- Human Anatomy, Color Atlas and Textbook, 6th Edition by J Gosling, P Harris, J Humpherson, I Whitmore and P Willan; ISBN 9780723438274 Elsevier, 2016.
- Functional Anatomy, Histology and Embryology for medical and dental students by M. Réthelyi and J. Szentágothai, Medicina, 2018.
- Gray's Anatomy. The Anatomical Basis of Clinical Practice; 41st edition by S. Standring: 2015 ISBN : 9780702052309
- Netter's Clinical Anatomy with Online Access, 3rd Edition, by J. Hansen, 2014, eBook ISBN: 9781455770632 eBook ISBN: 9780323312899 014
- Anatomy, A Photographic Atlas, 8th Edition by Rohen, Yokochi; Wolters Kluwer, 2016, ISBN: 978-1-4963-0870-2
- Bräuer: Sobotta Flashcards (Muscles; Bones, Ligaments, and Joints) URBF, 2013.
- RMH McMinn: Last's Anatomy, Regional and Applied. Churchill Livingstone, Edinburgh 1990. ISBN 0-443-03484-4
- Regional Anatomy, by T Tömböl, Medicina 2008, ISBN 963 242 186 8
- Sectional Anatomy – Workbook, by A. Nemeskéri; István Apáthy's Foundation, 2001.
- Neuroanatomy An Illustrated Colour Text, 4th Edition by Crossman & Neary Publication Date: 13/04/2010 ISBN-13: 9780702030864
- 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](https://lib.semmelweis.hu/knowledge_base)).