

**DESCRIPTION OF COURSE UNIT FOR DOCTORAL STUDIES
AT VILNIUS UNIVERSITY**

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|--|---|-----------------|----------------------|-------------------|
| Scientific Area/eas, Field/ds of Science | Medical and health sciences (M 000): Medicine (M 001) | | | |
| Faculty, Institute, Department/Clinic | Faculty of Medicine Institute of Biomedical Sciences Department of Anatomy, Histology and Anthropology | | | |
| Course unit title (ECTS credits, hours) | Clinical Anatomy of the Limbs 8 credits (212 hours) | | | |
| Study method | Lectures | Seminars | Consultations | Self-study |
| Number of ECTS credits | - | - | 1 | 7 |
| Method of the assessment (in 10 point system) | <p><u>Presentation of the report and its evaluation</u>: the report is presented on a target topic that is agreed upon with the coordinating lecturer of the course (the doctoral student must analyze, review, and present the latest scientific publications related to the chosen topic).</p> <p><u>Report evaluation criteria</u> (minimal passing score – 5 points):</p> <ul style="list-style-type: none"> a) relevance, novelty and applicability of the material presented to the chosen topic (2 points); b) overall structure and content of the report, clear presentation of the material, rationale, conciseness and specificity (2 points); c) summary, presentation and justification of conclusions (1 point); d) raising problematic questions, presentation of how the reviewed material will be applicability in one’s own dissertation (3 points); e) organization of visual aids, ability to participate in discussion, question management, oratory skills (2 points). | | | |
| PURPOSE OF THE COURSE UNIT | | | | |
| <p>To provide deeper knowledge of systemic, topographic and applied anatomy about different structures of the limbs (upper and lower extremities), their development, variations, developmental disorders and structural features that are relevant to the clinic. To encourage interest and research of the anatomy of human limbs, as well as application of acquired knowledge, solving interdisciplinary problems of PhD research topics from various scientific fields and areas.</p> | | | | |
| THE MAIN TOPICS OF COURSE UNIT | | | | |
| <p><u>Embryogenesis of limbs</u>, morphogenetic zones of limbs, their significance and interaction, development, developmental stages, sensitive (critical) periods. Thalidomide embryopathies of the limbs, their anatomical and clinical aspect. Features of the development of different limb segments. Congenital limb malformations and defects, their phenotypes, anatomical and clinical aspects, causes, potential mechanisms of abnormal development. Osteogenesis of limb bones, development of joints, histogenesis of muscles, connective tissues. Developmental defects of joints, their phenotypes, anatomical and clinical aspects, causes. Microscopic structure of skeletal striated muscles, bones, joints, tendons, ligaments.</p> <p><u>Clinical anatomy of the upper extremity</u>. Surface anatomy of the upper extremity, main topographical points and areas of muscles, blood vessels, nerves and bony structures on the surface of the upper extremity; applied anatomy of the upper extremity (points of nerve blockades, venipunctures, optimal incision sites).</p> | | | | |

Relationship between bones, muscles, blood vessels and nerves of the shoulder girdle. Muscles of the rotator cuff and their clinical significance. Collateral circulation of the shoulder girdle. Topography, applied and clinical anatomy of *fossa axillaris et art. humeri*. Relationship between humerus, muscles, blood vessels and nerves of the upper arm. Relationship between bony structures, blood vessels, nerves, and muscles at *fossa cubiti*, collateral circulation. Topography and clinical anatomy of *art. cubiti*. Relationship between bones of the forearm, muscles, blood vessels and nerves of the forearm. Relationship between bony structures, muscles, tendons, arteries and nerves of the hand. Content and clinical anatomy of the carpal tunnel. Structure and clinical significance of palmar aponeurosis. Sections of the upper limb at various levels and planes, radiographic anatomy, CT, MRI. Functional anatomy of the upper limb, biomechanics, significance of interdisciplinary research.

Clinical anatomy of the lower extremity. Surface anatomy of the lower extremity, main topographical points and areas of muscles, blood vessels, nerves and bony structures on the surface of the lower extremity; topography of grooves, skin innervation, applied anatomy of the surface (localization of nerve blockades, arthroscopic points, punctures of blood vessels and joints, skin incisions). Clinical anatomy of the superficial and deep veins and arteries of the lower extremity. Shape and proportions of the lower limb, norm and variations, anatomical basis of congenital and acquired deformities. Relationship between pelvic bones, muscles, blood vessels and nerves, vascular anastomoses in pelvic and inguinal areas, their clinical significance. Topography and clinical anatomy of *regio glutea et art. coxae*. Topography and clinical significance of *trigonum femorale, lacuna musculorum et vasorum, canalis femoralis et obturatorius*. Relationship between femur, *regio femoralis et canalis adductorius* muscles, blood vessels and nerves. Topography and clinical significance of the thigh fascias. Topography and clinical anatomy of *fossa poplitea et art. genus* (anatomical basis of localizations of fractures and dislocations, clinical significance of anatomical arrangement of ligaments and menisci, "X" and "O" shaped joints). Relationship between *regio cruris* bones, muscles, blood vessels and nerves of the lower leg, canals of the calf area, their content, clinical anatomy. Topography and clinical significance of the calf fascias. Relationship between *regiones talocruralis et pedis* bones, muscles, blood vessels and nerves of the foot, aponeuroses and fascias of the foot, its canals, fibrous and synovial sheaths of tendons, their clinical significance. Topography and clinical anatomy of *art. talocruralis et pedis* (anatomy of foot shape and arrangement, "X" and "O" shaped joints, anatomical basis of other congenital and acquired anomalies). Sections of the lower limb at various levels and planes, radiographic anatomy, CT, MRI. Functional anatomy of the lower limb, biomechanics, significance of interdisciplinary research.

RECOMMENDED LITERATURE SOURCES

1. Assi, A., Bakouny, Z., Karam, M., Massaad, A., Skalli, W., & Ghanem, I. Three-dimensional kinematics of upper limb anatomical movements in asymptomatic adults: Dominant vs. non-dominant. *Human Movement Science*. 2016; 50, 10-18.
2. Cleland J., Koppenhaver S., Su J. *Netter's Orthopaedic Clinical Examination (an evidence-based approach)*, 4th edition. Elsevier, 2020.
3. Dalley A.F., Agur M.R. *Moore's Clinically Oriented Anatomy (9th Ed.)*. Lippincott Williams and Wilkins, 2022.
4. *Gray's Anatomy: The anatomical basis of clinical practice*. 42nd edition (edited by S.Standring). Elsevier, 2022. <https://www.clinicalkey.com/#!/browse/book/3-s2.0-C20170037291>
5. Kim E.E., Murad V., Paeng J.-C., Cheon G.-J. *Atlas and Anatomy of PET/MRI, PET/CT and SPECT/CT (eBook)*, 2nd Edition. Springer, 2022.
6. Lampignano J. and Kendrick L.E. *Bontrager's Textbook of Radiographic Positioning and Related Anatomy*, 10th Edition. Mosby, 2020.

7. Magee D.J. and Manske R.C. Orthopedic Physical assessment, 7th Edition; Saunders, 2018.
<https://www.clinicalkey.com/#!/browse/book/3-s2.0-C20160024105>
8. Mirjalili S., Fogg Q. A Companion Guide to Last's Anatomy, 1st Edition. Elsevier, 2021.
9. Pawlina W., Ross M.H. Histology: A Text and Atlas: With Correlated Cell and Molecular Biology, 8th Edition, Lippincott Williams & Wilkins, 2018.
10. Rigoard P. Atlas of Anatomy of the peripheral nerves: The Nerves of the Limbs – Expert Edition, 1st Edition. Springer, 2020.
11. Sadler T.W. Langman's Medical Embryology, 14th Edition, Lippincott Williams & Wilkins, 2018.
12. Weber E.C., Vilensky J.A., Carmichael S.W. Netter's Concise Radiologic Anatomy Updated Edition, 2nd edition; Elsevier, 2018.

CONSULTING LECTURERS

1. Coordinating lecturer: Janina Tutkuvienė (Prof. Dr. HP).

2. Renata Šimkūnaitė - Rizgelienė (Prof. Dr.).

3. Andrej Suchomlinov (Assoc. Prof. Dr.).

4. Vytautas Tutkus (Assoc. Prof. Dr.).

APPROVED:

By Council of Doctoral School of Medicine and Health Sciences at Vilnius University:
29th of September 2022

Chairperson of the Board: Prof. Janina Tutkuvienė