

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

<b>Scientific Area/eas, Field/ds of Science</b>	Medical and health sciences (M 000): Medicine (M 001)			
<b>Faculty, Institute, Department/Clinic</b>	Faculty of Medicine Institute of Biomedical Sciences Department of Anatomy, Histology and Anthropology			
<b>Course unit title</b> (ECTS credits, hours)	<b>Clinical Anatomy of the Cardiovascular System</b> 8 credits (212 hours)			
<b>Study method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Consultations</b>	<b>Self-study</b>
Number of ECTS credits	-	-	1	7
<b>Method of the assessment</b> (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> <p>a) relevance, novelty and applicability of the material presented to the chosen topic (2 points);</p> <p>b) overall structure and content of the report, clear presentation of the material, rationale, conciseness and specificity (2 points);</p> <p>c) summary, presentation and justification of conclusions (1 point);</p> <p>d) raising problematic questions, presentation of how the reviewed material will be applicability in one’s own dissertation (3 points);</p> <p>e) organization of visual aids, ability to participate in discussion, question management, oratory skills (2 points).</p>			
<b>PURPOSE OF THE COURSE UNIT</b>				
<p>To provide knowledge about anatomical features of structure, development, normal variety of the cardiovascular system and their significance for clinical pathology. To encourage interest and research of the anatomy of cardiovascular system, as well as application of acquired knowledge, solving interdisciplinary problems of PhD research topics from various scientific fields and areas.</p>				
<b>THE MAIN TOPICS OF COURSE UNIT</b>				
<p><u>Embryogenesis</u>, development and developmental disorders of <u>cardiovascular system</u>. Extraembryonic and intraembryonic vascular development. Anatomical basis of congenital heart defects.</p> <p><u>Classification of blood vessels</u>. Histological structure of the arterial wall of elastic and muscular type. The influence of hemodynamic conditions on the structure of the vascular wall. Classification of veins. Features of the vein wall. Microcirculation, its functions and blood vessels. Structure of arterioles, venules and capillaries wall. Types of capillaries and their prevalence in the body. Endotheliocytes, their structure and functions. Arterio-venous anastomoses, their types, histological structure.</p> <p><u>Microscopic anatomy of the circulatory system</u>. Histology of blood vessels and heart: endothelium, smooth and striated cardiac muscles, cardiac conduction system, collagen and elastic fibers, pericytes. Microscopic anatomy of wall of elastic and muscular arteries, arterioles, capillaries, venules and veins.</p> <p><u>Structure and position of the heart</u>. Variations of the position of the heart, age- and sex-related characteristics. Topography of the heart and surrounding structures.</p>				

Structure, topography and functional anatomy of heart cavities and valves. Fibrous skeleton of the heart, structure and functional anatomy of myocardium and conducting system. Blood vessels of the heart and their anatomical variations. Innervation of the heart, its variations and clinical significance. Structure and topography of the pericardium, its innervation, vascularization, clinical significance. Arteries and their anatomical variants. Pulmonary trunk and blood vessels of the pulmonary circulatory circle. Structure, topography, branches, variations of the ascending aorta and aortic arch. Topography, variations and clinical anatomy of the head arteries (the most common places of aneurysms and other pathological changes, anatomical basis of hematomas, functional anatomy of arterial lesions). Structure, topography, branches, variations of carotid arteries. Vertebrobasilar basin. Structure, topography, branches, variations, anastomoses, clinical and applied anatomy of the arteries of the upper limb. Structure, topography, branches, anastomoses, clinical and applied anatomy of the subclavian artery (anatomical causes of compression, puncture sites). Structure, topography, branches, variations, anastomoses and their clinical significance of the thoracic aorta. Locations and functional anatomy of aortic coarctations. Structure, topography, branches, variations, anastomoses and their clinical significance of the abdominal aorta. Structure, topography, branches, variations, anastomoses and their clinical significance of common, internal and external iliac arteries.

Venous system, its anatomical variants, structure, topography, variations, tributaries, anastomoses and their clinical significance: pulmonary veins, cardiac veins, head and neck veins, upper extremity veins, chest veins, abdominal and pelvic veins, lower extremity veins. Portal vein system, upper and lower caval venous systems, their structure, topography, tributaries, variations, anastomoses and their clinical significance.

Lymphoid system. Lymphoid organs, their embryogenesis, development, structure, topography, functional and age-related anatomy. Primary lymphoid organs: bone marrow, hematopoietic part and sinuses; thymus, histophysiology of cortical and medullar part. Secondary lymphoid organs: spleen, structure of white and red pulp, splenic sinuses, features of blood circulation; pharyngeal lymphoid ring; regional lymph nodes, their histophysiological features. Structure, topography, clinical anatomy of lymphatic vessels, lymphatic trunks, ducts and lymph nodes.

Phylogeny, ontogeny and comparative anatomy of the cardiovascular system.

### RECOMMENDED LITERATURE SOURCES

1. Aaronson P.I., Ward J.P.T., Connolly M.J. The Cardiovascular System at a Glance, 5th Edition, Wiley-Blackwell, 2020.
2. Abrahams P.H., Spratt J.D., Loukas M., VanSchoor A. Abrahams' and McMinn's Clinical Atlas of Human Anatomy: with STUDENT CONSULT Online Access, 8th Edition, Elsevier, 2019. <https://www.clinicalkey.com/#!/browse/book/3-s2.0-C20160031704>
3. Agur A.M.R., Dalley A.F. Moore's Essential Clinical Anatomy, 6th Edition, Wolters Kluwer Health, 2019.
4. Dalley A.F., Agur M.R. Moore's Clinically Oriented Anatomy (9th Ed.). Lippincott Williams and Wilkins, 2022.
5. Drake R., Vogl A.W., Mitchell A.W.M., Tibbitts R., Richardson P. Gray's Atlas of Anatomy, 3rd Edition, Churchill Livingstone, 2020.
6. 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>
7. Mori S., Shivkumar K. Atlas of Cardiac Anatomy: Anatomical Basis of Cardiac Interventions, Volume 1, 1<sup>st</sup> Edition. Cardiotext Publishing, 2022.
8. Pawlina W., Ross M.H. Histology: A Text and Atlas: With Correlated Cell and Molecular Biology, 8th Edition, Lippincott Williams & Wilkins, 2018.

9. Sadler T.W. Langman's Medical Embryology, 14th Edition, Lippincott Williams & Wilkins, 2018.
10. Schoenwolf G.C., Bleyl S.B., Brauer P.R., Francis-West P.H. Larsen's Human Embryology, 6th Edition, Elsevier, 2021. :  
<https://www.clinicalkey.com/#!/browse/book/3-s2.0-C20180032296>
11. Spratt J.D., Salkowski L.R., Loukas M., Turmezei T., Weir J., Abrahams P.H. Weir & Abrahams' Imaging Atlas of Human Anatomy, 6th Edition. Elsevier, 2020.  
<https://www.clinicalkey.com/#!/browse/book/3-s2.0-C20180014735>
12. Stoicescu M. Medical Semiology Guide of the Cardiovascular System and the Hematologic System, 1<sup>st</sup> Edition. Academic Press, 2019.

#### **CONSULTING LECTURERS**

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

2. Arūnas Barkus (Assoc. Prof. Dr.).

3. Sigita Glaveckaitė (Prof. Dr.).

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

#### **APPROVED:**

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

Chairperson of the Board: Prof. Janina Tutkuvienė