

**MED 1007 - Cardiovascular and Respiratory System**

Course Name	Code	Semester	Type of course	Theory (hours)	Group work (hours)	ECTS
Cardiovascular and Respiratory System	MED 1007	I	Mandatory	28	58	6
Faculty, the educational program and education level	Faculty of Medicine, one-cycle Educational Program "Medicine"					
Author (s)	<p><b>Rusudan Vadatchkoria</b> - Associated Professor, Doctor of Biology            Mob.tel.: (+995) 551262542; e-mail: <a href="mailto:RusudanVadatchkoria@gmail.com">RusudanVadatchkoria@gmail.com</a>;</p> <p><b>Mustafa Kemal Demir</b> –invited teacher            Mob.tel.: (053) 35531246; e-mail: <a href="mailto:mustafakemal.demir@bahcesehir.edu.tr">mustafakemal.demir@bahcesehir.edu.tr</a></p> <p><b>Marina Kunchulia</b> – invited teacher            Mob.tel.: 593 42 48 49; e-mail: <a href="mailto:m.kunchulia@agruni.edu.ge">m.kunchulia@agruni.edu.ge</a>;</p> <p><b>Shorena Tukvadze</b> – invited teacher            Mob.tel.: 599 21 71 00; e-mail: <a href="mailto:shtukvadze@yahoo.com">shtukvadze@yahoo.com</a></p> <p><b>Murat Tsintsadze</b> - invited teacher, mob.tel.: 599 00 64 26; <a href="mailto:tsintsadze.murat@yahoo.com">tsintsadze.murat@yahoo.com</a></p> Consultation day – individually					
Educational course format	Lecture, Group work, laboratory lessons					
Educational course Loading	<p><b>Total:</b> 180 hours  <b>Contact hours:</b> 90 h, that includes:</p> <ol style="list-style-type: none"> <li>1. Lecture – 28 h</li> <li>2. Group work – 52 h</li> <li>3. Laboratory lessons – 6 h</li> <li>4. Midterms – 2 h</li> <li>5. Final exam -2 h</li> </ol> <p><b>Independent work</b> – 90 h</p>					
Prerequisites	No prerequisites					
The purpose (s) of tutorial course/modules	<p>The aim of this course is to gain information regarding the blood tissue, circulatory (blood and lymphatic) system, including the heart, veins, arteries and respiratory organs structure and functions. Composition and function of blood as one kind of connective tissue will be discussed. Blood and Lymph chemical composition and their structural component will be learn; the development of cells, tissues and organs of circulatory and respiratory system, their histological, anatomical structures, functions and interactions between these systems; general idea of the changes caused by the different diseases will be developed.</p>					

<p><b>Teaching and learning methods</b></p>	<p><b>Lecture - Face-to-Face;</b> direct verbal interactive contact. PowerPoint slides for the lecture will be provided for each lecture as a PDF file, one slide per page, to facilitate notes taking.</p> <p><b>Demonstration</b> –anatomical atlases, models including plastinated cadavers, illustrations, slides and other visual aids; Cardiovascular and Respiratory System (CV&amp;R System )organs structures visualization;</p> <p><b>Laboratory work</b> ( anatomical, cytological /histological laboratories)- learning of microscopic prepares of (CV&amp;R System ) organs, microscopic prepares preparation performing the cross-section of fixed cadaver or parts of cadaver; <b>Analyses and synthesis</b> – obtained prepares visualization, comparing, detailed discussion of observed structures, learning and assessment of prepares quality;</p> <p><b>Work in group</b> - theoretical knowledge will be analysed and supported by working with anatomical models, including plastinated cadavers, illustrations and other vision aids. On the base of the diagnostic/radiology area of clinic the imagines of (CV&amp;R System ) organs will be learn (ECG, USI, spyrometry, cardio-USI, CT, MRI);</p> <p><b>Discussion</b> – questions and answers, answers analysis supported with visual aids.</p> <p><b>Abstract preparation and presentation</b> - Students choose material from offered problematic topics or independently, search for appropriate material, will work with the books and present about 10 printed pages in PowerPoint format in auditorium for estimation.</p> <p><b>Brief-inquire</b> –short questions and answers;</p> <p><b>Work with anatomical literature:</b> atlases, anatomical manuals and internet information technology sources;</p> <p><b>Consultation</b> –individual support work with students (weekly)</p>
<p><b>Assessment criteria</b></p>	<p><b>Maximum score- 100:</b></p> <p><b>1. Midterm assessment -60 scores, that includes:</b></p> <p>1.1. Attendance -10 scores (K=0.36);</p> <p>1.2. Work in group – 30 scores:</p> <p>1.2.1 Group work Activity =10 scores;</p> <p>1.2.2. Laboratory work -5 scores;</p> <p>1.2.3.Abstract preparation and presentation – 10 scores;</p> <p>1.2.4. Discussion – 5 scores;</p> <p>1.3.Midterm exam – 20 scores.</p> <p>The final scores for group work activity is calculated by the arithmetic average and correspondently to Appendix 1- Scores calculation Program</p> <p><b>Group Work are Assessed Based on the Following Criteria</b> (maximum 10 scores)</p> <p><b>10 scores-</b> Student is able to present complete and thorough knowledge of the subject, a substantial amount of detailed and relevant information; to demonstrate considerable depth of understanding of the studied main and additional literature, to bring forward a balanced view of the main arguments on the issues.</p> <p><b>9 scores</b> - Student is able to bring forward a consistent number of deductions on most of the topics tackled; to make appropriate comments on the different perspectives for the most of issues, to demonstrate knowledge of the main literature within the subject and the ability to apply received knowledge.</p> <p><b>8 scores</b> - Student is able to bring forward a consistent knowledge, has properly developed terminology; to demonstrate knowledge of the main literature within the subject and the ability to</p>

apply received knowledge.

**7 scores** - Student is able to present some factual information sufficiently linked with the topic, to demonstrate a good understanding of the topics selected; to make a good attempt to bring forward a balanced view of some arguments on the issues. Terminology is partially developed.

**6 scores** - Student is able to make some good comments on the different perspectives on some of the issues; makes poor deductions on most of the topics tackled, analyses some causes and results of human interactivity related to the issues.

**5 scores** - Student is able to demonstrate inconsistent comments on the different perspectives on some of the issues, Student has middle level of knowledge, terminology is developed partially, makes weak conclusions.

**4 scores** - Student demonstrates general overview of the topics. Information generally are linked with the subject, but terminology is not developed sufficiently, student demonstrates irrelevant understanding of the literature.

**3 points** - Student demonstrates general/superficial and inconsistent knowledge of the subject, has insufficient knowledge of the literature.

**2 scores** - Student demonstrates general comments, but has no knowledge of the terminology, no consistency.

**1 score** - Student demonstrates insufficient answer, does not know terminology, does not follow to chronologic manner of the answer, mostly wrong, no knowledge of literature.

**0 score** - Student demonstrates not even elementary knowledge of the subject.

#### **Laboratory work assessment criteria (max 5scores):**

**5 scores:** laboratory method is properly planned; student applies laboratory tools and equipment precisely; Student is able to record data accurately, to determine mistake and knows the way to correct them; Is able to analyze applied method and interpret the results. Laboratory work is performed accurately and thoroughly.

**4 scores:** laboratory method is properly planned; student applies laboratory tools and equipment precisely; is able to record accurately, determine mistakes and correct them. However, he lacks the skills to analyze results. Laboratory work is performed with minor faults.

**3 scores:** laboratory method is properly planned; student cannot demonstrate relevant knowledge of laboratory tools and applied equipment; makes minor mistakes in the tools using procedure; makes records, but is not able to notice the mistakes; thus, has some difficult to correct them. Laboratory work is performed with minor faults.

**2 scores:** laboratory method is planned with minor faults; student cannot demonstrate relevant knowledge in laboratory tools and equipment application; makes minor mistakes in the tools using; student makes records, but is not able to notice the mistakes; thus, is difficult to find any ways to correct mistakes. Laboratory work is performed with essential faults.

**1 scores:** Laboratory work is planned with essential faults; student is almost unfamiliar with laboratory tools and equipment application; makes records, but is not able to notice the mistakes; thus, is hard to find ways to correct. Laboratory work is performed with essential faults.

**0 score:** Student is absolutely unfamiliar with laboratory methods, tools and equipment. The assignment is not performed.

#### **Abstract preparation and presentation's criteria (10 scores max.):**

1. Actuality of appointed problem – 1 score;
2. Academic content - 1 score;

	<p>3. Literature data's observation in the frame of subject -1scores;  4. Correspondence between the research methods and research purpose -1 scores;  5. Coherence of argumentation- 1 scores;  6. Correctness of conclusion and the connection with the main text - 1 score;  7. The presented matter's visual and technical aspects - 1 score;  8. Debating and listening culture - 1 score;  9. Accuracy and reliability of indicated references and literature sources – 1 scores;  10. Proper language and speaking style – 1scores.</p> <p><b>Discussion assessment criteria (10 score- max.)</b></p> <p>1. Argumentativeness of represented factual material -2 scores;  2. Complexity of represented factual material -2 scores;  3. Discussion activity – 2 scores;  4. Debating and listening culture - 2 scores;  5. Keeping within the time-limit – 2 scores.</p> <p style="text-align: center;"><b>Midterm Exam – 20 scores</b></p> <p>Written test - 40 questions, (0,5 score for each) –20 scores total;  Minimal score of midterm assessment (for final exam admission) – is 11.</p> <p><b>Final Exam -40</b></p> <p>Is held in the written test form (test consists of 80 questions, each question is rated as 0,5 score) total 40 scores.  The final exam would accounted as passed in case of maximum 70% or more (40X70 / 100 = 28 scores).  Credit will be given to the student if he has collected at minimum 51 scores out of 100.  Student's assessment has to be done in the following way:</p> <p><b>Positive rate:</b></p> <p>(A) Excellent- 91 or more scores;  (B) Very Good- 81-90 scores;  (C) Good- 71-80 scores;  (D) Satisfactory- 61-70 scores;  (E) Enough- 51-60 scores; (FX) Failure - 41-50 scores,</p> <p><b>Negative rate:</b></p> <p>(FX) Failure - 41-50 scores, which means that a student needs to work more and an independent and considerable further work is required to pass the exam once again to be re-awarded;  (F) Fail - 40 scores or less, which means that the student's diligence is not sufficient and student has to learn the subject all over again.  Student can pass the additional exam during the same semester.  The time interval between the final and the additional exams should be not less than 10 days</p>
<p><b>The basic literature</b></p>	<p><b>Anatomy</b></p> <p>1. Editor –in-chief Susan Standring, <b>Cray's Anatomy</b>. The anatomical Basis of Clinical Practice, Churchill Livingstone Elsevier, XIV-th edition, 2014;  2. Keith L.Moore, Arthur F.Dalley. Anne M.R.Agur -Clinically Oriented Anatomy, Wolters Cluwer</p>

	<p>Health Lippincott Williams&amp;Wilkins, 2008; (Cardiovascular and Respiratory System) (p. 106-171);</p> <p><b>Physiology</b></p> <p>1.Guyton and Hall <b>Textbook of Medical Physiology</b>, Saunders Elsevier, XII-th edition, 2011.</p> <p>2.Robin R.Preston, Thad E.Wilson <b>Edited by:</b> Richard A.Harvey - Physiology Lippincott's Illustrated Rewiews, Wolters Cluwer Health Lippincott Williams&amp;Wilkins, 2013; (Cardiovascular and Respiratory System). Chapter 17-24;</p> <p>3. Richard L.Drake, A.Wayne Vogl, Adam W.M.Mitchel, Richard Tibbitts, Paul Richardson-<b>Cray's of Anatomy</b>, Churchill Livingstone Elsevier, III, 2009;</p> <p><b>Histology &amp; Cells Biology</b></p> <p>Abraham L.Keirszenbaum, Laura L.Tres - Histology and Cell Biology, Elsevier Saunders, 2012; Chapter 12-13;</p> <p><b>Radiology</b></p> <p>Learning Radiology: Recognizing the Basics (With Student Consult Online Access), 2e William Herring. Saunders; 2 edition, April 14, 2011;</p>
<b>The auxiliary literature</b>	<p><b>Anatomy</b></p> <p>1. Michail Schuenke, Erik Schulte, Udo Schumacher -<b>Atlas of Anatomy</b> (Neck and Internal Organs), Thieme, 2006;</p> <p>2. Richard S. Snell - <b>Clinical Anatomy</b> (An Illustrated review with Questions and explanations, Lippincott Williams&amp;Wilkins, 2003; Chapter I;</p> <p>3. Richard L.Drake, A.Wayne Vogl, Adam W.M.Mitchel, Richard Tibbitts, Paul Richardson-Cray's <b>Atlas of Anatomy</b>, Churchill Livingstone Elsevier, 2008;</p> <p><b>Physiology</b></p> <p>1.Kim E.Barret, Susan M.Barman Scott Boitano, Heddwen L.Brooks - <b>Ganong's Review of Medical Physiology</b>, McGrawHill Lange, 2012; Section IV-V, Chapter 29-36;</p> <p>2. Stefan Silbernagl, Agamemnon Dispopoulos - Color Atlas of Physiology, Thieme, 2009;</p> <p><b>Histology &amp; Cells Biology</b></p> <p>1.Leslie P.Gartner James L.Hiatt - <b>Color Atlas of Histology</b>, Lippincott Williams&amp;Wilkins, 2012, Chapter 5, 8, 12;</p> <p>2. Bruce Alberts, Alexander Johnson, Julian Levis, Martin Raff keith Roberts Peter Walter - <b>Molecular Biology of the Cell</b>, Garland Science Taylor &amp; Francis Group, 2008</p>

#### The tutorial/training course content

Nº	Subjects	Lecture (hour)	Labor (h)	Work in group (hour)
1	Histology of blood and bone marrow cells. Blood formation and immune system organs: Bone marrow. Thymus. Lymphoid tissue of different organs. Lymphoid nodes. Spleen: form, structure, topography. Functions, composition and properties of blood (blood cells) and body fluids.	2	2	4
2	Cardia-vascular system general observation, its organs variety, forms, location, anatomical structure and features. Histology of heart and blood vessels, lymphatic organs, and development of CVS. Human heart and blood vessels in ontogenesis.	2		4
3	Blood vessels variety, forms and classification (arteries, veins, capillaries), structure, function,	2		4

	topography. Images of the circulatory system.			
4	Anatomy of the heart, cardiac skeleton, atria, ventricles, valves, heart wall and pericardium structure. CVS valves forms, structures and functions. (ECG )	2	1	4
4	Anatomy of the heart vessels, nerves and cardiac conduction system. Signal transduction in heart muscle. Physiology of the heart. Cardiac cycle. Cardiac output, regulation of the cardiac functions. Heart muscle contraction and echocardiography.	2		4
6	Lesser (pulmonary) circulation blood vessels: pulmonary trunk and its collateral branches. Pulmonary veins. Systemic (greater) circulation blood vessels: aorta, its structure and branches. Precava 's system. Postcava 's system. (ECG, CardioUZI)	4		4
	<b>Midterm exam</b>			2
7	Smooth muscles of vascular system, mechanism of blood flow, blood pressure and their regulation. Capillary fluid exchange, lymphatic circulation, edema. Measurement of blood pressure and flow.	2	1	4
8	Respiratory system observation (upper airways and lungs). Histology and development of respiratory system and its components.	2	2	4
9	Respiratory system organs forms, structure, topography: nasal cavity, pharynx, larynx (voice box), trachea, bronchi, bronchioles. The upper respiratory system components structure and functions. Images of the upper respiratory system	4		4
10	Anatomy of acinus, alveoli, lungs, lungs pleura, mediastinum and its contents and diaphragm. Images of the lower respiratory system.	2		4
11	Physiology of breathing. Respiration mechanism, lung volume and capacities. Structural and functional interaction between CVS and RS systems. Spirometry.	2		4
12	Regulation of respiration, gas exchange and gas transport, genetic control of respiration. Clinical skills on the base of cardiology and pulmonology/therapy department.	2		4
	<b>Final Exam</b>			2

### Learning Outcomes

Criteria	Competences
<b>Knowledge and Understanding</b>	<p>Student will have the deep and consistent knowledge of the following issues, regarding the human body and can:</p> <p>1. Describe the cellular and non-cellular components of blood including erythrocytes, leukocytes and platelets, cells of immune system and their functions. Describe the composition and function</p>

	<p>of blood cells and body fluids and molecules.</p> <p>2. Describe the development and structural properties of blood cells, lymphoid organs, hemostatic mechanisms and disorders related to blood cells. Define the circulatory system, its functions and related diseases.</p> <p>3. Define the development of cardiovascular system, inner and outer surface of heart, location and projections of heart, cardiac skeleton, valves and locations and auscultation, images of the heart and the mediastinum, heart muscle. Define the histology and anatomy of vessels of the heart, coronary circulation, nerves and cardiac conduction system.</p> <p>4. Define the signal transduction in heart muscle, rhythmical excitation of the heart, heart cycle and heart sounds, cardiac output, regulation of the cardiac functions, biochemistry of muscle contraction, electrocardiography, smooth muscles, vascular system, regulation of blood flow, short- and long-term regulation of blood pressure, measurement of blood pressure and flow</p> <p>5. Define the development of respiratory system and its components, cavum nasi, paranasal sinuses, pharynx, images and histology of the upper and lower respiratory system. Define the structure, components and functions of larynx, trachea, lungs, pleura, mediastinum and its contents, diaphragm.</p> <p>6. Define the respiratory mechanics; lung volume and capacities, gas exchange and gas transport and regulation of respiration. Define the genetic control of respiration and receptors in respiratory system.</p>
<b>Applying knowledge</b>	<p>Student will be able to:</p> <ul style="list-style-type: none"> <li>• Understand microscopic prepares of CVS&amp; RS organs' tissue in practice.</li> <li>• Strengthen the theoretical knowledge about human cardiovascular and respiratory system using the anatomical atlases, models, illustrations and other visual aids;</li> <li>• Strengthening of the human cardiovascular and respiratory system theoretical knowledge on the basis of trainings in diagnostic department of hospital (ECG, Cardio- UZI, CT MRT, Spirometry)</li> <li>• Activate the received knowledge and widely apply for other biological and medical disciplines on the basis of the close logical and systematic connections</li> </ul>
<b>Judgment Ability</b>	<p>Student will be able to collect and interpret properly the incomplete and abstract data of cardiovascular and respiratory system anatomy, embryology, histology and physiology, with the following drawing of the valid conclusions.</p> <p>Student will have the completed imagination about human organism as a complex system, where each components are in the logical structural and functional interaction with each together.</p> <p>On the base of the theoretical and practical knowledge the scientific thinking and logical reasoning skills will be developed to allow the student working out the appropriate strategy in the concrete academic and clinical situation</p>
<b>Communication Skills</b>	<p>Student will be able to:</p> <ul style="list-style-type: none"> <li>• manage the different form of academic and scientific information from different sources (classic and electronic library, the Internet) to work fast and look for the relevant information effectively. These found materials will be planned, processed, analyzed, and to make the best use for the report with the proper conclusions as in in writing, as well as in verbal form.</li> <li>• work in group, watching, listening, summarizing, asking and answering questions abilities, is able to participate in the discussion.</li> </ul> <p>During the education process the professional and friendly relationship will be formed with the older (professors / teachers) and younger (this and other groups students) colleagues,</p>

	communication with any person regardless of their social, cultural, religious or ethnic affiliation.
--	--