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### თბილისის ჰუმანიტარული სასწავლო უნივერსიტეტი

**TBILISI HUMANITARIAN TEACHING UNIVERSITY**

**Syllabus**

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| **Name of the course /module** | **Physiology 2** |
| **Code of the course** | **PhM0410DM** |
| **Status of the course**  **(elective/compulsory)** | **C**ompulsory course  for the one-cycle higher educational Programme-Dentistry |
| **ECTS** | **4 credits.Total:100hours**  Contact Hours–49 hours (Class Meeting Time Period:15L/30Pr.) + 4 hours  ( Midterm:2h and Final Examination 2h):  Individual Work-51 hours |
| **Authors (lecturer)** | Nino Ormotsadze - Ph.D. (Biology)THTU professor  Tel 2533673, 595274835.  e–mail - ninoori @ yahoo.com  Consultation days: according to consultation schedule – Monday, Wednesday, 13.00-15.00 |
| **Aim of the course** | The aim of the course is to introduce students to the ongoing life-giving physiological processes, to teach the students the major significance and functions of the cardiovascular system; the physiology of the heart muscle and main principles of hemodynamics, to teach the students the major functions of the respiratory system, the stages of respiration, the mechanisms of gas exchange in the lungs and tissues, the transportation of gases through blood and the regulating mechanisms of respiration. |
| **Program prerequisits** | **Physiology 1** |
| **Assessment system and criteria** | **Assessment system of the Tbilisi Humanitarian Teaching University's** is divided into the following components:  The total marks of the mid term Out of the overall assessment (100 points ) is 60 points, which includes three kinds of grades:  **Student’s activity during a semester;**  **One-midterm exam;**  **Final exam**-**40 points.**  Theminimum competence requirement for mid termevaluation components is at least 18 points in total.  **The minimum competence requirement of the final evaluation is 50% of the total mark from final evaluation that means 20 points out of 40.**  Evaluation System includes:  I. Five Forms of Positive Assessment:  (A) Excellent – 91% and more from maximum evaluation  (B) Very good – 81-90% from maximum evaluation  (C) Good – 71-80% from maximum evaluation  (D) Satisfactory – 61-70% from maximum evaluation  (E) Sufficient – 51-60% from maximum evaluation  II. Two Forms of Negative Assessment:  (A)(FX) Fail (Not passed ) - 41-50 from maximum evaluation score, which means that the student will need to work more and to retake the test after additional independent work;  (B) (F) Fail – A student gets 40 points, or less from maximum evaluation, which means that the work done by him/her is not sufficient and s/he has to retake the course from the beginning.  1. One of the negative assessments: In case of not passing, the University fixes additional exam at least in 5 days, after the announcement of final examination results, which must be published in the examination table.  2. The grades, which student gets after additional test is a student's final grades, in which is not considered the negative points of the major examination.  If a student receives from 0 to 50 points after additional test, in the final exam sheet is formed (F) -0 for the student. |
| **Course description** | appendix 1 |
| **Assessment system/activities, methods**  **and criteria** | The sum of the course assessment (100 points) breaks down as follows:   * **Activities**(Participation and attendance)- **30points**   Participation (Ongoing evaluation) - is calculated in accordancewith the level of being active during each practices(once a week, total number 15) type of activities can be answering questions, participation in discussion,participation in everyday testes - is equal **2 points**.  2 points - s/he is active during classes, obtains perfect knowledge of the ongoing topic, answers all questions completely.  1.0 point- s/he is less active during classes, does not present perfect knowledge of the ongoing topic, answers questions partly.  0 -s/he is less active during classes/group works, does not present perfect knowledge of the ongoing topic, does not answer any questions.  **Midterm exam - (30 points)** administered in written form (the computer test)**.**  **Final Exam -40 points**  The examination is conducted by a combination of written testand werbalcomponents and includes:   * Thecomputertest -**20 points** * Werbal task -**20 points** / 4 brieftopics, each is equal 5points   Criteria of assessment of werbal topics are :  **5 points –**The answer is complete; Terminology is configured; student obtains perfect knowledge of the topic, s/he coveres of the material fluently, summarises core and additional literature, reveales critical thinking and logical analysis.  **4 points** -The answer is not absolutely complete; student obtains knowledge of the topic, without important mistakes, s/he coveres of the material fluently, summarises core literature, reveales critical thinking and logical analysis.  **3 points -** The answer is not complete; student obtains satisfactory knowledge of the topic, s/he coveres of the material by mistakes, summarises core literature, reveales less of critical thinking and logical analysis.  **2 points** - The answer is weak; student obtains satisfactory knowledge of the topic, makes mistakes, does not summarises core literature, cant make critical thinking and logical analysis.  **1 points -** The answer is substantially incorrect. Set out in the relevant material of the individual fragments. The student is not able to analyze the material. |
| **Core literature:** | 1. Textbook of Medical Physiology, A. Guyton &J.Hall (Eds), 2010, 2012. |
| **Additional literature** | 1. Review of Medical Physiology, W.Ganong (Ed), 2011, 2. Human Physiology, Pocock& Richards (Eds), 2013. |
| **Learning outcomes, competences**  **(general and field specific)** | **Knowledge**   1. Student describes the function of the respiratory system, the stages of respiration, their regulating mechanisms and current biochemical processes. 2. Student describes the heart wall physiology, major principles of hemodynamics and their regulating mechanisms 3. Student describes the mechanism of the cardiac cycle and the regulation of heart function. 4. Student describes Vascular Functions and changes of the Arterial and Venous Systems 5. Student defines priorities in order to clearly demonstrate the significant role of the nervous, cardiovascular and respiratory systems in our body 6. Student explains mechanisms Urine Formation Results from Glomerular Filtration, Tubular Reabsorption, and Tubular Secretion. 7. Student groups and divides the Multiple Functions of the Kidneys   **Skills**   1. Student manipulates on a living organism and evaluate the condition of the whole organism during practicums, 2. Student applies the knowledge of the theoretical part of the main laws of blood and its circulation (hemodynamics). 3. Student summarizse the process of transport of Oxygen and Carbon Dioxide in blood and tissue fluids 4. Student draws argumentative conclusions about Reproductive and Hormonal Functions of the Male and Female Physiology Before Pregnancy and Female Hormones 5. Student generalizes the acquired knowledge in order to substantiate solutions to clinical problems.   **Responsibilities**   1. Student identifies appropriate learning resources for future learning. |
| **Learning / Teaching methods** | Lecture/ practical  Individual/Group work  Verbal teaching method  Demonstration of study materials  Presentation  Explanation methods  Discussion/debate |

**Appendix1**

**Course description:**

**Topics of the lecture, practical classes/laboratory work/working group, literature**

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| **Week №** | **Type of**  **the class** | **Topics** | **Contact hours** | **literature** |
| **Iweek** | Lect. | Cardiac Muscle; The Heart as a Pump and Function of the Heart Valves | **1** | **1** |
| Pract. | Physiology of Cardiac Muscle. Cardiac Cycle. Relationship of the Heart Sounds to Heart Pumping. Work Output of the Heart. Chemical Energy Required for Cardiac Contraction: Oxygen Utilization by the Heart. Regulation of Heart Pumping | **2** | **1** |
| **IIweek** | Lect. | The circulation. The heart. The initiation of the heartbeat. The heart as a pump. | **1** | **1** |
| Pract. | The cardiac cycle. The regulation of heart function. Tachicardy. Bradicardy. Premature contraction (extrasystola). Arrhythmias. | **2** | **1** |
| **IIIweek** | Lect. | Rhythmical Excitation of the Heart, The Normal Electrocardiogram. Electrocardiographic Interpretation of Cardiac Muscle and Coronary Blood Flow Abnormalities. | **1** | **1** |
| Pract. | Specialized Excitatory and Conductive System of the Heart. Control of Excitation and Conduction in the Heart. Characteristics of the Normal Electrocardiogram. Methods for Recording Electrocardiograms. Flow of Current Around the Heart during the Cardiac Cycle. Electrocardiographic Leads. | **2** | **1** |
| **IVweek** | Lect. | Cardiac Arrhythmias and Their Electrocardiographic Interpretation | **1** | **1** |
| Pract. | |  | | --- | | Abnormal Rhythms That Result from Block of Heart Signals Within the Intracardiac Conduction Pathways. Premature Contractions. Paroxysmal Tachycardia. Ventricular Fibrillation. Atrial Fibrillation. Atrial Flutter, Cardiac Arrest | | **2** | **1** |
| **V week** | Lect. | Overview of the Circulation; Biophysics of Pressure, Flow, and Resistance. Vascular Functions and changes of the Arterial and Venous Systems | **1** | **1** |
| Pract. | The Microcirculation and Lymphatic System: Capillary Fluid Exchange, Interstitial Fluid, and Lymph Flow. Local and Humoral Control of Tissue Blood Flow, Nervous Regulation of the Circulation, and Rapid Control of Arterial Pressure. | **2** | **1** |
| **VI week** |  | Phisiology of blood, blood groups. Homeostasis system. Peculiarities of blood circulation | **1** | **1** |
| Lect. | Haemopoiesis, overview of the immune and blood producing organs. Immunity, Immune reactions, allergic reactions. | **2** | **1** |
| **VII week** | Pract. | Pulmonary Ventilation. Mechanics of Pulmonary Ventilation. Pulmonary Volumes and Capacities. Minute Respiratory Volume Equals Respiratory Rate Times Tidal Volume. Alveolar Ventilation, Functions of the Respiratory Passageways. | **2** | **1** |
| Pract. | Physical Principles of Gas Exchange; Diffusion of Oxygen and Carbon Dioxide Through the Respiratory Membrane, Pulmonary Circulation, Pulmonary Edema, Pleural Fluid. | **2** | **1** |
| **VIII week** | **MIDTERM** | | **2** |  |
| **IXweek** | Lect. | Transport of Oxygen and Carbon Dioxide in Blood and Tissue Fluids, Regulation of Respiration. | **1** | **1** |
| Pract. | Transport of Oxygen from the Lungs to the Body Tissues. Transport of Carbon Dioxide in the Blood. Respiratory Exchange Ratio. Respiratory Center. Chemical Control of Respiration. Peripheral Chemoreceptor System for Control of Respiratory Activity-Role of Oxygen in Respiratory Control. Regulation of Respiration During Exercise. Other Factors That Affect Respiration | **2** | **1** |
| **Xweek** | Lect. | General Principles of Gastrointestinal Function-Motility, Nervous Control, and Blood Circulation | **1** | **1** |
| Pract. | General Principles of Gastrointestinal Motility. Neural Control of Gastrointestinal Function-Enteric Nervous System. Functional Types of Movements in the Gastrointestinal Tract. Gastrointestinal Blood Flow-"Splanchnic Circulation" | **2** | **1** |
| **XIweek** | Lect. | Digestion and Absorption in the Gastrointestinal Tract | **1** | **1** |
| Pract. | Digestion of the Various Foods by Hydrolysis. Basic Principles of Gastrointestinal Absorption. Absorption in the Small Intestine. Absorption in the Large Intestine: Formation of Feces | **2** | **1** |
| **XIIweek** | Lect. | Urine Formation by the Kidneys: I. Glomerular Filtration, Renal Blood Flow, and Their Control, II. Tubular Reabsorption and Secretion | **1** | **1** |
| Pract. | Multiple Functions of the Kidneys. Transport of Urine from the Kidney Through the Ureters and into the Bladder. Micturition Reflex. Abnormalities of Micturition. Urine Formation Results from Glomerular Filtration, Tubular Reabsorption, and Tubular Secretion. Glomerular Filtration-the First Step in Urine Formation. Determinants of the GFR. Renal Blood Flow. Physiologic Control of Glomerular Filtration and Renal Blood Flow. | **2** | **1** |
| **XIIIweek** | Lect. | Introduction to Endocrinology | **1** | **1** |
| Pract. | Coordination of Body Functions by Chemical Messengers. Chemical Structure and Synthesis of Hormones. Hormone Secretion, Transport, and Clearance from the Blood. Mechanisms of Action of Hormones. | **2** | **1** |
| **XIVweek** | Lect. | Thyroid Metabolic Hormones. Parathyroid Hormone, Calcitonin,  Calcium and Phosphate Metabolism, Vitamin D, Bone, and Teeth | **1** | **1** |
| Pract. | Synthesis and Secretion of the Thyroid Metabolic Hormones. Physiological Functions of the Thyroid Hormones. Regulation of Thyroid Hormone Secretion. Diseases of the Thyroid. Parathyroid Hormone. Calcitonin. Pathophysiology of Parathyroid Hormone, Vitamin D, and Bone Disease | **2** | **1** |
| **XVweek** | Lect. | Adrenocortical Hormones. Insulin, Glucagon, and Diabetes Mellitus | **1** | **1** |
| Pract. | Synthesis and Secretion of Adrenocortical Hormones. Functions of the Mineralocorticoids-Aldosterone. Functions of the Glucocorticoids. Adrenal Androgens. Abnormalities of Adrenocortical Secretion. Insulin and Its Metabolic Effects. Glucagon and Its Functions. Diabetes Mellitus | **2** | **1** |
| **XVIweek** | Lect. | Reproductive and Hormonal Functions of the Male (and Function of the Pineal Gland), Female Physiology Before Pregnancy and Female Hormones | **1** | **1** |
| Pract. | Physiologic Anatomy of the Male Sexual Organs. Spermatogenesis. Testosterone and Other Male Sex Hormones. Pineal Gland-Its Function in Controlling Seasonal Fertility in Some Animals. Physiologic Anatomy of the Female Sexual Organs. Female Hormonal System. Monthly Ovarian Cycle; Function of the Gonadotropic Hormones. Functions of the Ovarian Hormones-Estradiol and Progesterone. Regulation of the Female Monthly Rhythm-Interplay Between the Ovarian and Hypothalamic-Pituitary Hormones. Pregnancy and Lactation | **2** | **1** |
| **XVII- XVIII**  **week** | **Final Exam** | | **2** |  |
| **XIX-XXweek** | **Additional exam** | |  |  |