

**PRIVATE HIGHER EDUCATIONAL ESTABLISHMENT
«INTERNATIONAL ACADEMY OF ECOLOGY AND MEDICINE»**


Department of fundamental disciplines with a course of pharmacology

SYLLABUS OF THE EDUCATIONAL DISCIPLINE

«Physiology»

LEVEL OF HIGHER EDUCATION The second (master's) level
DEGREE OF HIGHER EDUCATION Master
AREA OF KNOWLEDGE 22 "Health care"
SPECIALTY 221 "Dentistry"

Reviewed and approved
at the meeting of the Department of fundamental
disciplines with a course of pharmacology

Protocol № 1 of « 01 » 09 2020
Head of the department Doctor of Biological
Sciences, associate professor
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Kiev 2020

1. General information	
Subject	Physiology
Lector	<i>Verpolyas M.R</i>
Teacher's contact phone number	
Teacher's e-mail	<i>verpolyas@gmail.com</i>
Discipline format	Normative discipline.
The volume of the discipline	180 hours
Link to the distance learning site	maem.kiev.ua
Consultations	
2. Annotation to the course	
<p>The subject of the discipline is the patterns of functions and processes in the whole organism and its parts (systems, organs, tissues, cells), identifying the causes, mechanisms and patterns of the organism at different stages of ontogenesis and phylogeny in interaction with the environment in the dynamics of life processes.</p>	<p>Interdisciplinary links: the discipline is based on the study of medical biology, histology, cytology and embryology, Latin, ethics, philosophy, ecology, medical and biological physics, medical chemistry, biological and bioorganic chemistry and integrates with these disciplines; lays the foundations for students to study pathophysiology, pathomorphology, operative surgery and topographic anatomy, deontology and propaedeutics of clinical disciplines, which provides for the integration of teaching with these disciplines and the formation of skills to apply knowledge of physiology in further study and professional activities; lays the foundations of a healthy lifestyle and prevention of structural and functional disorders in the process of life.</p>
3. Purpose and objectives of the course	
<p>The purpose of teaching the discipline "Physiology" follows from the goals of the educational-professional training program for applicants for the second educational (master's) level of higher education and are determined by the content of those systemic knowledge and skills that must be mastered by a doctor. The knowledge that students receive from the discipline "Physiology" is basic for the block of disciplines that provide scientific and professional training.</p>	<p>The main tasks of studying the discipline "Physiology" are:</p> <ul style="list-style-type: none"> - disclosure of human physiology as a science of the vital activity of the organism in its interaction with the external environment. Human physiology is an important theoretical and biological basis of medical knowledge aimed at maintaining human health and activity.
4. Competencies and learning outcomes	
<p>Competencies and learning outcomes, the formation of which is facilitated by the discipline " Physiology ".</p> <p>According to the requirements of the Standard of Higher Education, the discipline " Physiology " provides students with the following competencies:</p> <p><i>integrated:</i></p> <p>Ability to interpret the general biological patterns that underlie the processes of human life.</p> <p><i>general:</i></p> <ul style="list-style-type: none"> - ability to abstract thinking, analysis and synthesis; - ability to learn and master modern knowledge; - ability to apply knowledge in practical situations; 	

- knowledge and understanding of the subject area and understanding of professional activity;
- ability to make informed decisions;
- skills of using information and communication technologies;
- definiteness and perseverance in terms of tasks and responsibilities.

Special (professional, substantive):

- knowledge of the principles of construction and functioning of effector tissues of the body;
- knowledge of the mechanisms of neurohumoral regulation of body functions;
- knowledge of the basic forms of innate and acquired human and animal behavior;
- knowledge of the basic principles of application of research in human physiology.

Matrix of competencies

№	Competence	Knowledge	Skills	Communication	Autonomy and responsibility
	2	3	4	5	6
General competencies					
Ability to apply knowledge of human physiology in practical situations					
Special competencies					
1	Knowledge of the principles of construction and functioning of effector tissues of the body	To know the course of the main metabolic pathways of an organism for physiological conditions, directions of their hormonal regulation and the main causes of their hereditary and acquired violations	To describe the mechanisms of functioning of physiological systems of the human body and their regulation	Clear and unambiguous communication of own conclusions, knowledge and explanations on this issue	To be responsible for quality work performance
2	Knowledge of the mechanisms of neurohumoral regulation of body functions	To know physiological underlying mechanisms of functioning of organs of the gastrointestinal tract, kidneys, nervous and muscular systems, connective tissue, endocrine glands	To be able to select adequate methods for study of physiological processes in the human body	To characterize the features of the physiological functions of various organs	To be responsible for making a decision when independent of skills of study of literature devoted to human physiology.
3	Knowledge of the basic forms of innate and acquired human and animal behavior	To have specialized knowledge of man, his organs and systems	To be able to use methods of statistical analysis of experimental results	Clear and unambiguous communication of own conclusions, knowledge and explanations on this issue	To be responsible for deciding on the evaluation of experimental research results
4	Knowledge of the basic principles of application of research in human physiology.	To know the role and features of the application of research in human physiology	To make calculations of physiological indicators	To establish links for discussion when choosing physiological indicators	To be responsible for deciding on the evaluation of laboratory test results

Learning outcomes:

Integrative final learning outcomes, the formation of which is facilitated by the discipline:

" Physiology " as an academic discipline lays the foundation for the further formation of the following program learning outcomes in accordance with the Standard of Higher Education of

Ukraine for undergraduate training of specialists of the second (master's) level of the specialty 221 "Dentistry":

1. To establish the most probable or syndromic diagnosis of the disease and to appoint a laboratory and / or instrumental examination of the patient - in relation to hereditary and parasitic diseases.
2. To plan measures to prevent the spread of infectious diseases, to detect and early diagnosis of infectious diseases.
3. To identify risk factors for the occurrence and course of the disease.
4. To identify negative environmental factors. To assess the impact of socio-economic and biological determinants on the health of the individual, family, population.
5. To adhere to a healthy lifestyle, to use the means of self-regulation and self-control.

Learning outcomes for the course: On completion of study of discipline " Physiology " students must **know:**

- Excitation processes and their indicators in excitable structures.
- Mechanisms of excitation propagation through nerves, CNS and effector systems.
- General principles of regulation of body functions and its specific mechanisms.
- Functional systems of an organism, their role in maintenance of adaptive reactions of an organism.
- Mechanisms of functioning of separate bodies and systems.
- Mechanisms of regulation of organs and systems.
- Normal indicators of the functioning of the human body.

To be able:

- To evaluate the indicators of fractional probing of the stomach.
- To evaluate the fractional sounding of the duodenum.
- To determine the content of hemoglobin in the blood.
- To determine the group affiliation of blood in the ABO and Rh-factor systems.
- To evaluate a general blood test.
- To evaluate the leukocyte blood formula.
- To measure blood pressure by the method of Korotkov.
- To analyze a normal electrocardiogram.
- To make the phase analysis of a cardiac cycle on the basis of the polycardiogram.
- To analyze echocardiography.
- To analyze static indicators of external respiration.
- To analyze the spirogram (assessment of static and dynamic indicators of external respiration).

5. Organization of course training

The volume of the course

Type of lesson	<i>Total amount of hours 180</i>
Lectures	20
Practical (seminar) classes	100
Independent work	60

Course signs

Semesters: The 3 rd , 4 th	Specialty 221"Dentistry"	Course (year of study) The 2 nd	Normative discipline

Course thematics

The syllabus is structured into 2 thematic modules and 16 submodules.

180 hours of 6.0 ECTS credits are for the study of the academic discipline, incl. lectures 20 hours, practical 100 hours, independent work 60 hours. Normative discipline.

The program of the discipline is structured into 2 modules, which include blocks of content modules:

Module 1. "General physiology and higher integrative functions".

Content modules:

1. Introduction to physiology.
2. Physiology of excitable structures.
3. Nervous regulation of body functions.
4. Physiology of sensory systems.
5. The role of the central nervous system (CNS) in the regulation of motor functions.
6. The role of the autonomic nervous system in the regulation of visceral functions.
7. Humoral regulation and the role of endocrine glands in the regulation of visceral functions.
8. Physiological basis of behavior. Physiology of emotions.
9. Cognitive functions.

Module 2. "Physiology of visceral systems"

Content modules:

10. Blood system.
11. Circulatory system.
12. Respiratory system.
13. Energy metabolism.
14. Thermoregulation.
15. Digestive system.
16. Excretory system.

Module 1. "General physiology and higher integrative functions".

Submodule 1. Introduction to physiology.

Tasks:

To Teach the student the rules of problem statement

To Explain the physiological basis of methods for studying the functions of the body in animal experiments and in the study of human functions in different physiological conditions

To Analyze the stages of physiology as a fundamental discipline in medicine and the contribution of individual scientists at each stage.

Submodule 2. Physiology of excitable structures.

Tasks:

To Explain the mechanisms of development of rest potential and action potential in nerve and muscle fibers and interpret their parameters

To Explain the mechanisms of action of electric current on excitable structures and interpret the influence of electric pulses with different parameters on the membrane potentials of nerve and muscle fibers

To draw conclusions about the excitability of nerve and muscle fibers based on the magnitude of the depolarization limit, membrane noise and the summation of inhibitory and excitatory processes

To Explain the mechanisms and patterns of nerve impulse conduction by nerve fibers, interpret the causes of conduction disorders

To Explain the mechanisms of chemical transmission of excitation through the neuromuscular synapse.

To Interpret the mechanisms of neuromuscular blockade

To Explain the mechanisms of conjugation of excitation and contraction in transversely striated muscle fibers, contraction and relaxation

To Interpret the dependence of the nature of muscle contraction on the strength and frequency of irritation

To Interpret the role of factors that determine the strength of muscle contraction

To Interpret the electromyogram.

Submodule 3. Nervous regulation of body functions.

Tasks:

To Explain the mechanisms of information transmission in the synapses of the central nervous system, the role of neurotransmitters, neuromodulators

To Explain the mechanisms of excitation and inhibition, their summation and the role of these processes in the integrative function of the central nervous system

To Describe the mechanisms of reflex regulation of functions and the role of the links of the reflex arc as components of the contour of biological regulation in ensuring the adaptive response of the organism

To Describe the contours of biological regulation of functions, explain the role of feedback in the interaction of the organism with the environment

To Analyze the principles of coordination of reflexes with the participation of appropriate neural circuits in ensuring the adaptive response of the organism

To Analyze the role of different levels of the central nervous system in ensuring the adaptive response of the body.

Submodule 4. Physiology of sensory systems.

Tasks:

To Analyze the state of functions of the sensor system, its structural elements and auxiliary structures on the basis of differentiated for each sensor system criteria

To Interpret the functions of the senses

To Analyze the age features of the formation and functions of sensory systems

To Explain the physiological basis of research methods of each of the sensory systems.

Content module 5. The role of the CNS in the regulation of motor functions

Tasks:

To draw conclusions about the state of motor functions of the body - posture, locomotion, motor reflexes that take place in the experiment after cross-section at different levels of the CNS and damage to motor structures

To draw conclusions about the state of the motor systems of the body, which combine the structures of different levels of the CNS, and their organization

To Analyze the regulated parameters during motor reflexes and mechanisms of activation of receptors as tracking devices

To draw conclusions about the state of motor reflexes, which are closed at different levels of the CNS, to describe the structure of their reflex arcs

To draw conclusions about the state of the conducting pathways of the CNS, to assess their role in providing sensory and motor functions

To analyze the mechanisms of influence of the structures of the forebrain, brainstem on the activity of the motor systems of the spinal cord

To Analyze the age features of the regulation of motor functions

To Explain the role of the cerebral cortex and limbic system in the formation of systemic activity of the organism

To Explain the physiological basis of electroencephalography.

Submodule 6. The role of the autonomic nervous system in the regulation of visceral functions

Tasks:

To Explain the mechanisms of influence of the autonomic nervous system on the visceral functions of the body

To Analyze changes in visceral functions during activation of the sympathetic or parasympathetic nervous system

To Interpret the mechanisms of changes in visceral functions after blockade of information transmission in the ganglionic and neuroorganic synapses of the autonomic nervous system.

Content module 7. Humoral regulation and the role of endocrine glands in the regulation of visceral functions

Tasks:

To Analyze regulated parameters and draw conclusions about the mechanisms of regulation of endocrine gland functions

To draw conclusions about the state of physiological functions of the body, its systems and organs when changing the concentration of hormones in the body

To Analyze the age-related features of the body's functions associated with the activity of the endocrine glands

To Analyze the regulated parameters and draw conclusions about the state of the mechanisms of regulation of the processes of linear body growth, physical, mental and sexual development with the participation of hormones

To Analyze the regulated parameters and draw conclusions about the state of the mechanisms of regulation of the stability of the internal environment with the participation of hormones

To Explain the mechanisms of regulation of non-specific adaptation of the organism with the participation of hormones.

Sub module 8. Physiological bases of behavior. Physiology of emotions.

Tasks:

To Explain the mechanisms of biological needs and motivations and their role in the formation of congenital and acquired forms of behavior

To Explain the physiological basis of methods for the study of higher nervous activity: the formation, preservation and inhibition of conditioned reflexes; irritation and damage to the structures of the forebrain involved in higher integrative functions of the CNS; registration of evoked potentials and EEG

To Explain the mechanisms of emotion formation, their role in the behavioral reactions of the body on the basis of physiological criteria of emotions

To Interpret the properties of the main nervous processes - excitation and inhibition, which determine the type of nervous system (strength, balance and mobility)

To Analyze the age characteristics of higher nervous activity (behavioral reactions) of the body.

Content module 9. Cognitive functions.

Tasks:

To Explain the mechanisms of cognitive activity based on the analysis of the role of different brain structures

To Explain the physiological basis of methods for studying the cognitive state of man

To Explain the mechanisms of brain activity in the formation of language in humans and assess its condition on the basis of physiological criteria

To Explain the mechanisms of integrative activity of the brain, which determine the processes of consciousness, thinking, sleep and its types.

Module 2. "Physiology of visceral systems"

Submodule 10. Blood system

Tasks:

To interpret the concept of blood system, mechanisms of its regulation based on the analysis of homeostasis parameters: blood volume, acid-base balance, osmotic pressure, quantitative and qualitative composition of plasma and blood cells.

To Interpret the physiological patterns of blood system functions: respiratory, transport, protective.

To interpret physiological regularities of functions of maintenance of a liquid state of blood and development of a hemostasis at damage of blood vessels

To draw conclusions about the state of physiological functions of the body, which are carried out with the participation of the blood system, based on quantitative and qualitative indicators of blood: hematocrit, erythrocytes, hemoglobin, leukocytes, platelets, leukocyte formula, color index, erythrocyte sedimentation rate (ESR) blood clotting, duration of bleeding

To Analyze age-related changes in blood composition, functions and mechanisms of regulation

To Explain the physiological basis of methods for studying the functions of the blood system: the number of formed elements of blood, hemoglobin, ESR, osmotic stability of erythrocytes, duration of bleeding, blood clotting time, determination of blood group in the system AB0 and CDE.

Submodule 11. Circulatory system

Tasks:

To interpret the concept of the circulatory system, the mechanisms of regulation of minute blood volume (MBV) as an integral indicator of blood circulation based on the analysis of homeostasis parameters according to the level of metabolism

To interpret the physiological properties of the heart that provide its pumping function (automatism, excitability, conductivity, contractility), based on the analysis of the electrocardiogram (ECG), (MBV) and mechanisms of their regulation

To interpret the function of the heart as a pump on the basis of the duration of the cardiac cycle, the structure of its phases and periods, the magnitude of HOC, blood pressure in the chambers of the heart and aorta and pulmonary artery, heart sounds

To Analyze the regulated parameters of the heart as a pump and draw conclusions about the mechanisms of its regulation

To Analyze the main parameters of blood circulation and draw conclusions about the condition of blood vessels (compression, resistance, exchange, capacity) and mechanisms of regulation of the tone of arterial and venous vessels

To Analyze the condition of the vessels of the microcirculatory tract and draw conclusions about the physiological mechanisms of fluid metabolism at the level of blood and lymphatic capillaries, metabolism of other substances

To Analyze the regulated parameters of blood circulation and draw conclusions about the mechanisms of regulation of systemic circulation

To Analyze the state of blood circulation and mechanisms of its regulation in humans during functional tests (when changing body position, exercise)

To Explain the features of regional blood circulation (coronary, cerebral, pulmonary, abdominal) and draw conclusions about the state of blood vessels in these regions and their regulation

To Analyze age-related changes in circulatory parameters and draw conclusions about the physiological properties of the heart as a pump, blood vessel function and mechanisms of blood circulation regulation

To Explain the physiological basis of methods of research of the circulatory system: determination of HOC, arterial and venous pressures, pulse, ECG registration, phonocardiography (FCG), echocardiography, sphygmography (SFG).

Submodule 12. Respiratory system

Tasks:

To interpret the concept of the respiratory system and mechanisms of regulation of gas homeostasis parameters on the basis of the analysis of physiological criteria of functions of executive structures of the system providing respiratory processes

To Draw conclusions about the state of each stage of the respiratory process based on the analysis of parameters that characterize external respiration, diffusion of gases through the respiratory membrane, transport of gases through blood, diffusion of gases between blood and tissues according to metabolism

To draw conclusions about the state of regulation of respiratory processes on the basis of the analysis of parameters of external respiration at standard physical activity and tests with respiratory delay

To Analyze the regulated parameters that characterize the state of gas exchange, and draw conclusions about the mechanisms of regulation of human respiration under different conditions.

To draw conclusions about the resistance of the respiratory tract and the regulation of their lumen on the basis of the analysis of the results of pneumotachometry (pneumotachography)

To Explain the age features of the respiratory process and their regulation

To Explain the physiological basis of spirometry, spirometry, pneumotachometry, determination of gas exchange parameters.

Submodule 13. Energy metabolism

Tasks:

To Draw conclusions about the intensity of metabolism based on the analysis of energy costs that characterize the basic metabolism

To draw conclusions about the predominant oxidation of proteins, fats, carbohydrates in the process of metabolism based on the analysis of the respiratory rate

To draw conclusions about the mechanisms of regulation of metabolic intensity based on the analysis of the value of the basic human metabolism

To draw conclusions about the daily energy expenditure of people of different professions and compliance with the energy expenditure of their diets, the need for proteins, fats, carbohydrates

To Analyze age-related changes in the body's energy expenditure and their regulation

To Explain the physiological basis of direct and indirect calorimetry methods.

Submodule 14. Thermoregulation

Tasks:

To Analyze the body temperature of homoyothermic organisms and draw conclusions about the mechanisms of regulation of the balance between heat generation and heat transfer

To analyze the state of thermoregulation in humans under different conditions (depending on the physiological state of the organism and the temperature and humidity of the environment) on the basis of body core temperature and heat generation and heat transfer processes

To draw conclusions about the state of thermoregulation in humans during its hardening

To analyze the age features of thermoregulation in humans and its regulation

To Explain the physiological basis of research methods of thermoregulation: thermometry, thermography, sweating, infrared radiation

Submodule 15. Digestive system

Tasks:

To interpret the concept of the digestive system and the mechanisms of regulation of its physiological functions (secretory, motor, absorption).

To Draw conclusions about the role of the taste sensory system in determining the suitability of food for consumption and regulation of motor and secretory functions of the digestive system

To Evaluate the state of the digestive system based on the analysis of the parameters of hydrolysis of nutrients, the speed of their movement in the digestive tract, the parameters of homeostasis that reflect the processes of absorption

To draw conclusions about the state of digestive processes in each of the departments of the digestive tract on the basis of analysis of the state of secretory, motor, absorption functions and their regulation

To Analyze the regulated parameters of homeostasis and draw conclusions about the state of the processes of absorption of substances in the digestive tract and mechanisms of regulation

To Analyze the age characteristics of the functions of the digestive system and their regulation

To Explain the physiological basis of modern methods for studying the secretory, motor, absorption functions of the digestive system

To Explain the mechanisms of formation of motivations for hunger and satiety based on the analysis of homeostatic indicators of nutrients in the blood and the state of the digestive tract.

Submodule 16. Excretory system

Tasks:

To interpret the concept of the excretory system, the mechanisms of regulation of homeostasis with its participation based on the analysis of homeostasis constants: circulating blood volume, ion concentration, osmotic pressure, acid-base state

To draw conclusions about the state of the processes underlying the formation of urine in the kidneys based on the analysis of clearance (glomerular filtration rate, secretion and reabsorption of substances and water in different parts of the nephron).

THEMATIC PLAN OF LECTURES

The 3rd semester		
№	TOPIC	Hours
MODULE 1 “General physiology and higher integrative functions”		
1	Introduction to the course of physiology. Excitable tissues. Biopotentials.	2
2	Contours of biological regulation of functions. Reflex principle of CNS activity	2
3	Analyzers. Somato-sensory system. Physiological basis of pain.	2
4	Humoral regulation, its factors, mechanisms of action of hormones on target cells, regulation of hormone secretion	2
5	The concept of GNI. Cognitive functions. Sleep physiology.	2
TOTAL		10
The 4th semester		
MODULE 2 “Physiology of visceral systems”		
1.	General characteristics of the blood system. Blood as a means of transport and the internal environment of the body. Vascular-platelet and coagulation hemostasis. The role of anticoagulants and plasmin.	2
2.	Regulation of blood flow through the vessels. Regulation of systemic circulation	2
3.	Respiratory system. The main stages of respiration. Regulation of respiration	2
4.	Digestive system. The role of taste and olfactory sensory systems. Digestion in the oral cavity	2
5.	Excretory system. Regulation of urine formation and excretion. The role of the kidneys in maintaining homeostasis	2
TOTAL		10

THEMATIC PLAN OF PRACTICAL CLASSES

The 3 rd semester		
№	TOPIC	Hours
Module 1 "General physiology and higher integrative functions"		
1	Subject and tasks of physiology. Methods of physiological research. Excitability. Excitation. Laws of irritation	3
2	Investigation of resting potential and action potential of nerve and muscle fibers.	3
3	Investigation of excitation by nerve fibers and through neuromuscular synapse.	3
4	Research on the mechanisms of skeletal muscle contraction	3
5	Research of a reflex arch. Physiology of receptors.	3
6	Investigation of excitation and inhibition processes in the central nervous system	3
7	Research of somato-sensory system	3
8	Study of the visual sensory system. Investigation of the auditory sensory system.	3
9	Study of the role of the spinal cord in the regulation of motor functions of the body	3
10	Study of the role of the brainstem in the regulation of motor functions of the body	3
11	Research of mechanisms of nervous regulation of visceral functions of an organism	3
12	Humoral regulation, its factors, the mechanism of action of hormones on target cells, regulation of hormonal secretion.	3
13	The role of hormones in the regulation of physical, mental and sexual development	3
14	The role of hormones in the regulation of homeostasis and adaptation of the body to the action of stressors	3
15	Physiological bases of behavior. Research of formation and inhibition of conditioned reflexes. Research of the role of motivations and emotions in behavioral reactions. The condition of the maxillofacial area and human behavior.	3
16	Research of GNI types. Research of cognitive functions	3
17	FMC 1	2
Module 2 "Physiology of visceral systems"		
18	Blood system. Study of physical and chemical properties of blood	3
19	Study of the number of erythrocytes and hemoglobin in the blood	3
20	Diff.credit	3
Total		60
The 4 th semester		
1	Protective properties of blood. Study of blood groups. Blood coagulation studies.	3
2	Circulatory system. Study of the physiological properties of the heart muscle	3
3	Study of the dynamics of cardiac excitation. ECG registration and analysis	3
4	Research of regulation of work of heart	3

5	The role of blood vessels in blood circulation. Human blood pressure test	3
6	Research of blood circulation regulation	3
7	Respiratory system. Study of external respiration	3
8	Research of diffusion, transport of gases by blood. Study of respiratory regulation	3
9	Research of energy metabolism. Thermoregulation research	3
10	Digestive system. Study of digestion in the oral cavity. The role of taste and olfactory sensory systems in digestion	3
11	Study of digestion in the stomach	3
12	Study of digestion in the duodenum. Study of digestion in the intestines	3
13	Study of the mechanisms of urine formation by the kidneys. Research of regulatory work of kidneys	2
14	Final test control	2
	Total	40

THEMATIC PLAN OF INDEPENDENT WORK OF STUDENTS (IWS)

The 3rd semester			
№	MODULE 1	Hours	Type of control
TOPIC			
1	Preparation for practical classes - theoretical preparation and working off the practical skills.	14	Current control in practical classes
2	Elaboration of topics that are not included in the lesson plan:		
	History of physiology development in the XIX century	1	Final modular control
	The contribution of the works of IM Sechenov, IP Pavlov, YV Chagovets, PG Kostyuk in the development of world physiology. Ukrainian School of Physiology	1	-“-
3.	Preparation for the final modular control	4	Final modular control
	TOTAL	20	
The 4th semester			
№	MODULE 2	Hours	Type of control
TOPIC			
1.	Preparation for practical classes - theoretical preparation and working off the practical skills.	26	Current control in practical classes
2	Elaboration of topics that are not included in the lesson plan:		

	Dynamics of lymph circulation	2	Final modular control
	Physiology of regional blood circulation	2	-“-
3.	Individual IWS:	4	Current control
	Development a scheme of regulation of homeostasis with the participation of the kidneys		
4	Preparation for the final modular control	6	<i>Final modular control</i>
	TOTAL	40	

THE LIST OF THEORETICAL QUESTIONS FOR PREPARATION OF STUDENTS FOR THE FINAL MODULAR CONTROL.

Module 1 “General physiology and higher integrative functions”

List of theoretical questions

Semantic module 1: Introduction to physiology.

1. Physiology as a science. The concept of function. Methods physiological research.
2. The formation and development of physiology in the nineteenth century.
3. Contribution work I.M. Syechenov, I.P.Pavlov, P.C. Anohin, P.H. Kostyuk to the world of Physiology.
4. Ukrainian physiological school.

Semantic module 2: Physiology of excitable structures.

1. The resting potential mechanisms of origin, its parameters, physiological role.
2. Action potential mechanisms of origin, its parameters, physiological role.
3. The excitability. The critical level of depolarization threshold depolarization of the cell membrane.
4. Changes in excitability of the cells in a single action potential.
5. The alocs of electric stimulus for the emergence of agitation.
6. Mechanisms of excitation of nerve fibres.
7. Patterns of excitation of nerve fibres.
8. Mechanisms of excitation transfer through the neuromuscular synapse.
9. The coupling of excitation and contraction. Mechanisms of contraction and relaxation of skeletal muscles
10. Types of muscle contractions, single and titanium; isotonic and isometric.

Semantic module 3. Nervous regulation of body functions.

1. Biological regulation, its types and for the body. The contours of biological regulation. The role of feedback in connection regulation.
2. The concept of reflex. The structure of the reflex arc and functions of its parts.
3. Receptors, their classification, mechanisms of arousal.
4. Proprioceptors, their types, functions. Structure and function of muscle spindles.
5. Mechanisms and patterns of transmission of excitation in the central synapses.
6. Types of central inhibition. Mechanisms of presynaptic and postsynaptic inhibition.
7. Summation of excitation and inhibition of neurons in the central nervous system.

Semantic module 4. Physiology of sensory systems.

1. Sensory systems, their structure and function.
2. Taste sensory system, its structure, functions, methods.
3. Olfactory sensory system, its structure and function.
4. Somato-sensory system, its structure and function.
5. Physiological mechanisms of pain.
6. Opiate and nonopiate ant nociceptive body systems and their importance.
7. Physiological mechanisms of anaesthesia.
8. Auditory sensory system, its structure and function.

9. The functions of the external and middle ear. The inner ear, frequency analysis of audio signals.

10. Visual sensory system, its structure and function.

11. The basic visual functions and their research methods.

Semantic module 5: The role of the central nervous system in the regulation of motor functions.

1. Motor spinal reflexes, their reflex arch, the physiological significance.

2. Conduction function of the spinal cord. Dependence of spinal reflexes centres of the brain. Spinal shock.

3. Motor reflexes hindbrain, Decerebrational rigidity.

4. Motor reflexes midbrain, their physiological significance.

5. The cerebellum, its function, symptoms of.

6. Thalamus and its functions.

7. The limbic system, hypothalamus, their function.

8. Basal nuclei, their functions, symptoms of.

9. Sensory, motor and associate cortex and their functions.

10. Interactions different levels of the central nervous system in the regulation of motor functions. Locomotion, their regulation. The functional structure of voluntary movements. Age-related changes in motor function.

Semantic module 6: The role of the autonomic nervous system in the regulation of visceral functions.

1. General plan of the autonomic nervous system. Autonomic reflexes their reflex arc.

2. Synapses autonomic nervous system and their mediators cytoceptors blockers and transfer of excitation in the synapses.

3. Effect of the sympathetic nervous system in visceral functions.

4. The influence of the parasympathetic nervous system in visceral functions.

5. The role metasympatetic system in the regulation of visceral functions

6. Unity sympathetic and parasympathetic systems in the regulation of the

Semantic module 7. Humoral regulation of visceral functions, hormones role in visceral functions regulation.

1. Humoral regulation, its difference from nervous. Characteristics factors humoral regulation.

2. Properties hormones, their main influences. The mechanism of action of hormones on target

3. Outline humoral regulation. Regulation of hormone secretion by endocrine glands.

4. The role of the hypothalamic-pituitary system in regulation of the endocrine glands.

5. The role of somatotropin, tryiodothyronine and thyroxine, insulin regulation linear growth of the body, the processes of physical, mental development of the organism.

6. The role of calcitonin, parathyroid hormone, calcitriol sustainability in the regulation of ion concentration of calcium and phosphate in the blood.

7. The role of hormones in the regulation of pancreatic functions.

8. The role of thyroid hormones (T3, T4) in the regulation of body functions.

9. Physiology of the female reproductive system, its functions, the role of sex hormones.

10. Physiology of the male reproductive system, the role of sex hormones.

11. Understanding nonspecific adaptation to stressful situations. The role of hormones in non-specific adaptation.

12. The role of the sympathoadrenal system in the regulation of non-specific adaptation to stressful situations.

13. The role of pituitary-adrenal system in the regulation of non-specific adaptation to stressful situations. The main effects of glucocorticoids and mineralocorticoids on the body.

Semantic module 8. Physiological basis of behavior. Physiology of emotions.

1. Biological behaviour. Congenital behaviour. Instincts and their physiological role.

2. Acquired behaviour. Terms formation of conditioned reflexes, their differences of course.

4. The needs and motivations, their role in shaping behavior.

5. Emotions mechanisms of biological role.

Semantic module 9. Cognitive functions.

1. The functions of the neocortex of the brain and human higher nervous activity.
2. The functional asymmetry of the cerebral cortex of the brain, its integrate e function.
3. Language, its functions, the physiological basis of formation
4. Thinking. The development of abstract thinking in humans. Role of brain structures in the process of thinking.
5. Memory types and mechanisms of formation.
6. Type of higher nervous activity. Temperament and character.
7. Sleep, its types, phases, electrical activity of the cortex, physiological mechanisms.

List of practical tasks

1. Provide estimates of parameters and functions graphically depict processes in excitable structures.
2. Draw diagrams and explain the structure and mechanisms:
 - Regulation of biological circuits, motor reflexes reflex arcs,
 - Development of excitation and inhibition in the central nervous system, the processes of summation and coordination reflexes,
 - Reflex arcs motor reflexes at all levels and CNS pathways that provide different levels of interaction CNS,
 - Reflex arcs autonomous reflexes, providing regulation of visceral functions,
 - The action of various hormones on target cells and the regulation of secretion contours regulation of visceral functions in hormones.
3. Assess the state of sensor systems for research performance of their functions.
4. Draw the circuit structure specific information channels in sensory systems and mechanisms to explain the formation of the feelings and images of external reality.
5. Draw diagrams to explain the formation of biological behaviours and mechanisms to interpret each of its stages, the role of emotions in behaviour.
6. Evaluate and interpret the results of studies describing the types of GNI person.
7. Evaluate the state of the body during exercise on indicators functions.

Module 2 «Physiology of visceral Systems»

List of theoretical questions

Semantic module 10. Blood system.

1. Overview of the blood system. Structure and function of blood. The concept of homeostasis.
2. Plasma electrolytes. Osmotic pressure of blood and its regulation.
3. Plasma proteins and their functional significance. Erythrocyte sedimentation rate (ESR).
4. Oncotic pressure plasma and its role.
5. The acid-base status of the blood, the blood of a buffer to maintain its sustainability.
6. Red blood cells and their functions. Regulation of erythropoiesis.
7. Types of haemoglobin and its compounds, their physiological role.
8. White blood cells and their functions. Regulation leucopoiesis. Physiological leucocytosis.
9. Platelets, their physiological role.
10. Vessel-platelet homeostasis, its mechanisms and physiological significance.
11. Coagulation homeostasis, its mechanisms and physiological significance.
12. Coagulants, anticoagulants, fibrinolysis factors and their physiological significance.
13. Physiological characteristics of ABO blood. Terms compatibility of blood donor and recipient. Samples before blood transfusion.
14. Physiological characteristics of Rh blood system (CDE). The value of Rh affiliation with blood and pregnancy.

Semantic module 11. Circulatory system.

1. Overview of the circulatory system. Factors that provide blood flow through the vessels, its orientation and continuity.
2. Automatism heart. Gradient automatism. Experiment of Stanius.

3. The action potential of cardiomyocytes atypical Sino-atrial node origin mechanisms, physiological role.
4. Conducting system of the heart. The sequence and speed of conduction of excitation in the
5. The action potential of ventricular cardiomyocytes typical mechanisms of origin, the physiological role. Value at the time of AP reduction and single attack.
6. Refractory periods in the development of AP model cardiomyocytes their value.
7. The coupling of excitation and contraction in the myocardium. Mechanisms of contraction and relaxation of the myocardium.
8. Vector theory formation ECG. Electrocardiographic leads. The origin of teeth, segments of ECG intervals.
9. The cardiac cycle, its phases, their physiological role.
10. The role of the heart valves. Cardiac mechanisms of origin. PCG and its analysis.
11. Arterial pulse of origin. SFG and its analysis.
12. Myogenic regulatory mechanisms of the heart.
13. The nature and mechanism of the effect of sympathetic nerves on heart activity. The role of sympathetic reflexes in the regulation of cardiac activity.
14. The nature and mechanism of the effect of parasympathetic nerve activity to the heart. The role of the parasympathetic reflexes in the regulation of cardiac activity.
15. Humoral regulation of the heart. Dependence of the heart to change the ionic composition of the blood.
16. Features of the structure and functions of various parts of the blood vessels, the Basic Law hemodynamics.
17. The value for the viscosity of blood circulation.
18. Linear and volumetric blood flow velocity in different parts of the vascular bed. Factors that affect their value.
19. Blood pressure and its changes in different parts of the vascular bed.
20. Blood pressure, factors that determine its value. Methods registration blood pressure.
21. Blood circulation in the capillaries. Mechanisms of fluid exchange between blood and tissues.
22. Blood circulation in the veins, the effect of gravity on it. Factors that determine the value of venous pressure.
23. Tone arterioles and venules, its value. Effect of vascular-motor nerves on vascular tone.
24. Myogenic and humoral regulation of vascular tone. The role of substances that emit vascular endothelium in the regulation of vascular tone.
25. Hemodynamic centre. Reflex regulation of vascular tone. Pressor and depressor reflexes.
26. The reflex regulation of blood flow by changing the body position in space (orthostatic test).
27. Regulation of blood flow during muscular work.
28. Features of blood flow in the vessels of the brain and its regulation.
29. Features of blood flow in the vessels of the heart and its regulation.
30. Features of pulmonary circulation and its regulation
31. Mechanisms of lymph. The movement of lymph vessels.

Semantic module 12. Respiratory system.

1. Overview of the respiratory system. The main stages of breathing. Biomechanics of inhalation and exhalation.
2. Flexible traction lung negative pressure in the pleural gap.
3. External respiration. Indicators of respiratory and evaluation.
4. Anatomical and physiological "dead space", its physiological role.
5. Diffusion of gases in the lungs. Diffusion capacity of the lungs and the factors on which it depends.
6. Transport of oxygen in blood. The oxygen capacity of blood.
7. Oxyhemoglobin dissociation curve, factors that influence its course. The role of red blood cells in the transport of carbon dioxide.
8. Transport of carbon dioxide through blood.
9. The physiological role of the respiratory tract, the regulation of their lumen.

10. The respiratory centre, its structure, regulation of breathing rhythm.
11. The mechanism of the first breath of a new-born baby.
12. The role of receptor stretching lungs and afferent fibers of the vagus nerve in the regulation of breathing.
13. The role of central and peripheral chemoreceptors in the regulation of breathing. Blood components that stimulate external breathing.
14. Regulation of respiratory exertion.

Semantic module 13. Energy metabolism.

1. Sources and ways of energy in the body.
2. Methods for determining energy person. Respiratory rate.
3. Basal metabolism and conditions determine the factors that affect its value.
4. Working exchange value of its definition.

Semantic module 14. Thermoregulation.

1. The temperature of the human body, its daily fluctuations.
2. The physiological significance of homothermy. Heat regulating center, thermoreceptors.
3. The heat in the body, its regulation.
4. Heat the body and its regulation.
5. Regulation of body temperature constancy at different ambient temperatures.
6. Physiological basis quenching

Semantic module 15. Digestive system.

1. Overview of the digestive system. Digestion in the mouth. Chewing, swallowing.
2. The composition of saliva, its role in digestion.
3. Mechanisms of saliva, saliva primary and secondary.
4. Regulation of salivation. Effect of stimulus properties on the quantity and quality of saliva.
5. Methods secretory function of the stomach in humans. Structure and properties of gastric juice. Mechanisms of secretion of hydrochloric acid.
6. Difficult reflex ("cephalic") phase regulation of gastric secretion.
7. Neurohumoral ("gastric and intestinal") phase regulation of gastric secretion. Enteral stimulators and inhibitors of gastric secretion.
8. Nervous and humoral mechanisms of inhibition of gastric secretion.
9. The motor function of the stomach and its regulation. Transition mechanisms of gastric contents into the duodenum.
10. Methods of pancreatic juice secretion in humans. Structure and properties of pancreatic juice.
11. Phase regulation of the secretory function of the pancreas.
12. Methods bile secretion in humans. Structure and properties of bile.
13. Regulation of formation and secretion of bile. Mechanisms flow of bile into the duodenum.
14. The composition and properties of intestinal juice. Regulation of its secretion. Cavity and membrane digestion.
15. The absorption in the gastrointestinal tract. Mechanisms of absorption of sodium and water, carbohydrates, proteins and fats.
16. Motor function of intestines, types of cuts, their regulation.
17. Physiological mechanisms of hunger and satiety.

Semantic module 16. Excretory system.

1. Overview of system selection. The role of the kidneys in the process of selection. Features of the blood supply to the kidneys.
2. Mechanisms of urine formation. Filtration in the glomerulus and the factors on which it depends.
3. Reabsorption and secretion in the nephron, their physiological mechanisms.
4. Tilt - multiple system nephrons, its physiological mechanisms and role.
5. Regulation reabsorption of sodium and water in the tubules of nephrons.
6. The role of the kidneys in ensuring isonomic. Mechanisms thirst.
7. The role of the kidneys in ensuring isovolumic.
8. The role of the kidneys in ensuring the sustainability of the acid-base balance of blood.

9. Urination and its regulation.

List of practical tasks.

1. Identify in their lung capacity by spirometry. Make a conclusion
2. Identify yourself breathing volume by spirometry. Make a conclusion
3. Identify yourself inspiratory reserve volume by spirometry. Make a conclusion
4. Identify at volume expiratory reserve by spirometry. Make a conclusion
5. Calculate for spirograme volume breathing, lung capacity. Make a conclusion
6. Calculate by spirograme reserve for inhalation and exhalation volume. Make a conclusion
7. Calculate the per minute spirografic volume breathing. Make a conclusion
8. Calculate spirograme for maximum ventilation, draw conclusions.
9. Calculate spirografic reserve for breathing. Make a conclusion
10. Define by spirograme investigated oxygen consumption at rest and during the first minute after exercise, draw conclusions.
11. Define by spirograme investigated oxygen consumption at rest and within three minutes after exercise, draw conclusions.
12. Determine hemoglobin in the blood by the method of Sali, reevaluate results.
13. Identify the study group ABO blood draw conclusions.
14. Calculate the color index of blood draw conclusions
15. Determine the haematocrit index draw conclusions.
17. Determine the duration of ventricular strain on the analysis polikardiogram conclude.
18. Determine the length of the expulsion of blood from the entricles of the heart on the analysis polikardigrame conclude.
19. Determine the total duration of ventricular systole of the heart on the analysis polikardiohgrame conclude.
20. Determine the duration isometric contraction phase of the heart on the analysis polikardiogram conclude.
21. Determine the direction and amplitude of the teeth in the standard ECG leads. Draw conclusions.
22. Determine the duration of the cardiac cycle based ECG analysis. Make a conclusion.
23. Estimate based on analysis of ECG inter al length PQ. Make a conclusion.
24. Estimate based on analysis of ECG inter al length Q-T. Make a conclusion.
25. Calculate based ECG analysis duration complex QRS. Make a conclusion
26. Determine based ECG analysis, which is the heart pacemaker. Argue conclusion
27. Calculate the basal metabolic investigated by determining oxygen consumption by spirograme registered under standard conditions, conclude.
28. Run the sample of breath. To analyze the results.
29. How and why change salivation after administration of atropine for man?
30. Evaluate the secretory function of the stomach in humans.
31. Why does the acidity of gastric juice is recommended dairy diet?
32. How and why change the secretion of pancreatic juice for reducing gastric acidity?
33. How will the process of digestion reduction of bile acids in bile? Why?
34. Invite means an increase in motor function of the intestines. Give them a physiological arguments.
35. How and why change the number and composition of gastric and pancreatic juices in revenues duodenal fat?
36. How and why change the quantity and composition of gastric and pancreatic juices on admission to the stomach cabbage juice?
37. Define the filtration rate of glomeruli conclude.
38. Determine the amount of water reabsorption in the nephron. Make a conclusion.
39. Evaluate the results of the study of renal function method by Zimnycky.

6. Course evaluation system

General course evaluation system

Current control is performed based on the control of theoretical knowledge, skills and abilities in practical classes. Independent study students are assessed in practical classes, and is an integral part of the final grade of the student. Current control is performed during the training sessions and aims at checking the assimilation of students learning the material. Forms of current control are:

- a) test tasks with a choice of one correct answer, with the definition of the correct sequence of actions, with determination of the conformity, defining the specific portion of the photo or diagram ("detection");
- b) individual oral questioning, interview;
- c) the solution of typical situational tasks;
- g) identification of pathogens and carriers of pathogens of parasitic diseases in the photographs, macro - and micropreparats;
- d) control of practical skills;
- e) the typical problems of genetics and medical genetics.

Grades on the national scale ("excellent" - 5, "good" - 4, "satisfactory" - 3, "unsatisfactory" - 2), received by students, are displayed in the journals of attendance and academic group performance.

Final control

The final control is the form of a differentiated credit at the end of the 1st semester and an exam at the end of the 2nd semester upon completion of the course of medical biology.

The semester exam is a form of final control of mastering by the student of theoretical and practical material on academic discipline. The final control (exam) is carried out at the last control lesson.

Students are admitted to the FC who have attended all the classes provided by the curriculum in the discipline and while studying the module scored the number of points not less than the minimum (**72 points**). A student who, for good or bad reasons, has missed classes, is allowed to rework academic debt for a certain period of time.

Evaluation of current educational activities. During the assessment of mastering each topic for the current educational activity of the student scores are set on a 4-point (national) assessment scale. This takes into account all types of work provided by the discipline program. The student must receive a score on each topic. Scores on the traditional scale are converted into points. The final assessment of the current academic activity

is the arithmetic mean (the sum of scores for each lesson is divided by the number of lessons per semester) and translated into points according to **Table 2.**

Table 2. Conversion of the average score for the current activity into a multi-point scale (for disciplines completed by diff.credit, exam)

4-point scale	120-point scale	4-point scale	120-point scale	4-point scale	120-point scale	4-point scale	120-point scale
5	120	4,45	107	3,91	94	3,37	81
4,95	119	4,41	106	3,87	93	3,33	80
4,91	118	4,37	105	3,83	92	3,29	79
4,87	117	4,33	104	3,79	91	3,25	78
4,83	116	4,29	103	3,74	90	3,2	77
4,79	115	4,25	102	3,7	89	3,16	76
4,75	114	4,2	101	3,66	88	3,12	75
4,7	113	4,16	100	3,62	87	3,08	74
4,66	112	4,12	99	3,58	86	3,04	73
4,62	111	4,08	98	3,54	85	3	72
4,58	110	4,04	97	3,49	84	<3	N er
4,54	109	3,99	96	3,45	83		
4,5	108	3,95	95	3,41	82		

The maximum number of points that a student can collect for current educational activity during semester in order to be admitted to the exam is 120 points.

The minimum number of points that a student can collect for current educational activity during semester in order to be admitted to the exam is 72 points.

Calculating of the number of points is based on obtained marks of student according to traditional scale while learning subject during the semester, by calculating the arithmetic mean (AM) that is rounded to two signs after comma.

Evaluation of independent work of students. Independent work of students, which is provided by the topic of the lesson together with the classroom work, is evaluated during the current control of the topic in the relevant lesson. Assimilation of topics that are submitted only for independent work is checked during the final module control.

Evaluation of final control.

The maximum number of points that a student can score during the exam is 80 points.

The final control is considered credited if the student scored at least 60% of the maximum amount of points (for a 200-point scale - at least 50 points).

Determining the number of points that a student scored in the discipline: the number of points that

	<p>a student scored in the discipline is defined as the sum of points for the current academic activity (Table1) and for the final control (diff.credit, exam) (Table 3).</p> <p>Table 3. Scale of assessment of differentiated (exam) credit:</p> <table border="1"> <thead> <tr> <th>Traditional scale</th> <th>Points</th> </tr> </thead> <tbody> <tr> <td>«5»</td> <td>70-80</td> </tr> <tr> <td>«4»</td> <td>60-69</td> </tr> <tr> <td>«3»</td> <td>50-59</td> </tr> </tbody> </table>				Traditional scale	Points	«5»	70-80	«4»	60-69	«3»	50-59
Traditional scale	Points											
«5»	70-80											
«4»	60-69											
«3»	50-59											
Requirements for written work	The final written work is performed in the form of a test.											
Practical classes	Classroom work											
<i>The 3rd semester</i>												
Module 1. "General physiology and higher integrative functions"												
Topics 1-16: Classroom work - score from 2 to 5 for each topic.												
Topic 17: Test control. Written test control consists of 40 tasks.												
Evaluation criteria												
	Score	«3»	«4»	«5»								
	Number of correct answers	20-29	30-34	35-40								
Topics 18-19: Classroom work - score from 2 to 5 for each topic.												
Topic 20: Diff.credit is evaluated from 50 to 80 points and consists of: Test control - 40 tests = 40 points (1 point for the correct answer to 1 test). Answer to 2 theoretical questions of 20 points for each = 40 points. Amount: 80.												
Calculation of the arithmetic mean for 19 topics and recalculation in points according to table 2. Amount: minimum $72 + 50 = 122$, maximum $120 + 80 = 200$												
<i>The 4th semester</i>												
Module 2. "Physiology of visceral systems"												
Topics 1-13: Classroom work - from 2 to 5 points for each topic, the calculation of the arithmetic mean for 5 topics and conversion into points according to Table 2.												

Topic 14: Final test control. Written test control consists of 40 tasks.

Evaluation criteria

Score	«3»	«4»	«5»
Number of correct answers	20-29	30-34	35-40

At the end of the course there is an exam.

The structure of the examination card:

1. Theoretical question
2. Theoretical question
3. Theoretical question
4. Situational task

**THE CRITERIA FOR EVALUATION
PRACTICAL SKILLS AND THEORETICAL QUESTIONS**

Number of Situational task	«5»	«4»	«3»	The answer a card to the practical skills	For each answer to the practical skill student receives from 10 to 16 points: «5» - 16 points; «4» - 13 points; «3» - 10 points.
1	16	13	10		
Number of Theoretical question	«5»	«4»	«3»	Oral answer the card on theoretical questions	For each answer to the practical skill student receives from 10 to 16 points: «5» - 16 points; «4» - 13 points; «3» - 10 points.
1	16	13	10		
2	16	13	10		
3	16	13	10		
The sum of points	80	65	50		

Students who have completed all types of work provided by the curriculum and scored the number of points for the current success not less than the minimum (72) are admitted to the exam. The total grade for the module and the discipline consists of a total grade for the activities in the current classes and the final control of student knowledge. Current activity is estimated from 72 to 120 points. Thus, the minimum number of points per module should be: $72 + 50 = 122$ points. Maximum number: $120 + 80 = 200$ points.

Rating scale:

National scale	Points scale
«5»	70-80
«4»	60-69
«3»	50-59

Amount: minimum $72 + 50 = 122$, maximum $120 + 80 = 200$

Circumstance of admission to the final control

1. Semester control at the end of the 1st semester is provided in the form of a differential credit. (Table 2) Provides a final score on a 120-point scale as the sum of scores for the current control of knowledge (oral examination, written survey, tests, verification of identification of micropreparations,

	<p>abstracts), the results of 2 content modules.</p> <p>2. Students are allowed to take the differentiated credit, exam only if there is no debt for the implementation of the curriculum.</p>
7. Course policy	
<p>The organization of the educational process is carried out with the use of the European Credit Transfer System (ECTS) to assess student performance. The points gained in the current survey, independent work and points of the final control are credited. This must take into account the student's presence in class and his activity during practical work. Inadmissible: absences and late classes; use of a mobile phone, tablet or other mobile devices during the lesson (except for the cases provided by the curriculum and methodical recommendations of the teacher); copying and plagiarism; untimely performance of the task, the presence of unsatisfactory grades for 50% or more of the submitted theoretical and practical material.</p>	
8. RECOMMENDED LITERATURE	
<p>Basic:</p> <ol style="list-style-type: none"> 1. Textbook of medical physiology / Arthur C. Guyton, John E. Hall. – 10th ed. 2000. 2. Concise Physiology / Guyton-Ganong-Chatterjee. Ed. By Dr Gull R. Sh. -Lahore: K.E. Medical College.- 1998. 3. Kapit W., Macey R.I., Meisami E. The Physiology Colouring Book: Harpers Collins Publishers, 1987. 4. Bullock J., Boyle III J., Wang M.B. Physiology.- 1991. 	<p>Additional:</p> <ol style="list-style-type: none"> 1. Stuart Ira Fox. Human Physiology.-8th ed.-Mc Graw Hill, 2004.- 726p. 2. Stuart Ira Fox. A Laboratory Guide to Human Physiology. Concepts and Clinical Applications.-10th ed.-Mc Graw Hill, 2004.-430p. 3. Guyton&Hall. Textbook of Medical Physiology: Tenth Edition.- Harcourt International Edition.-2000.- 1064p. 4. Ganong W.F. Review of Medical Physiology.-21st Ed., 2003. 5. P Metting, PreTest – Physiology, 12th ed, McGraw-Hill Medical, 2008. 6. RG Carroll, Problem-Based Physiology, Saunders-Elsevier, 2010.

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