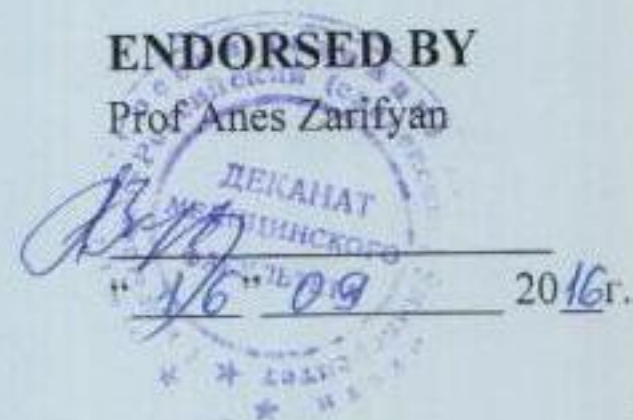


MINISTRY OF EDUCATION AND SCIENCE OF THE RUSSIAN FEDERATION
 MINISTRY OF EDUCATION AND SCIENCE OF THE KYRGYZ REPUBLIC

Government-run Educational Institution of Higher Professional Education
 Kyrgyz-Russian Slavic University
 School of Medicine

ENDORSED BY

Prof Anes Zarifyan



Physiology Practicum

Course outline (module)

31.05.01. General medicine

Assigned to
 Academic Curriculum

Mode of Study **Intramural**
 Total Credit Value **3 credit point**

Course Hours 108
 including:
 in-class learning 72
 individual work 36

Scope of Testing Semesters:
 credits 3

Course Hours Scheduling (per semester)						
Semester Academic Year	3 (2.1)		4 (2.2)		Total	
Weeks	18		18			
Type of Training	AC	CO	AC	CO	AC	CO
Lectures						
Lab Practical						
Practical Session	36	36	36	36	72	72
Including Interactive Session			2	2	2	2
Total In-class Session	36	36	36	36	72	72
Individual Work Assessment						
Face-to-face Learning	36	36	36	36	72	72
Individual Work			36	36	36	36
Total	36	36	72	72	108	108

The Course outline developed by:

PhD, Associate Professor

Dzailobaeva E.A.



Reviewers:

PhD, Associate Professor

Nartaeva A.K.



PhD, Associate Professor

Ibraeva I.G.

The Course Outline

Normal physiology (Practicum)

developed in full compliance with FSES 3+:

Federal State Education Standards of Higher Professional Education for students trained for specialty 31.05.01 (The Ministry of Education and Science of the Russian Federation Order of 09.02.2016 No.)

in accordance with Academic Curriculum:

31.05.01. General medicine

Confirmed by KRSU Board of Academics in "29.09.2015" record № 2.

The Course Outline endorsed by _____ Department Meeting

Record of 29.09. 2015. № 2

Valid for: 2015 - 2021 academic year

The Head of Department Prof Anes Zarifyan



The course outline endorsed for the following academic year

Chairman of the Educational and Methodological Board
8.09 2016 year.

The course outline has been revised, considered and endorsed for implementation
in 2016 – 2017 Academic Year at the Staff Meeting of Normal and pathological physiology Department

Record of 8. 09 2016 year. № 2
The Head of Department Prof Anes Zarifyan



The course outline endorsed for the following academic year

Chairman of the Educational and Methodological Board
8.09 2017 year.

The course outline has been revised, considered and endorsed for implementation
in 2017 – 2018 Academic Year at the Staff Meeting of Normal and pathological physiology Department

Record of 8. 09 2017 year. № 7
The Head of Department Prof Anes Zarifyan



The course outline endorsed for the following academic year

Chairman of the Educational and Methodological Board
8.09 2018 year.

The course outline has been revised, considered and endorsed for implementation
in 2017 – 2018 Academic Year at the Staff Meeting of Normal and pathological physiology Department

Record of 8. 09 2018 year. № 2
The Head of Department Prof Anes Zarifyan



The course outline endorsed for the following academic year

Chairman of the Educational and Methodological Board
04.09 2019 year.

The course outline has been revised, considered and endorsed for implementation
in 2019 – 2020 Academic Year at the Staff Meeting of Normal physiology Department

Record of 26. 08 2019 year. № 1
The Head of Department Prof Anes Zarifyan



The course outline endorsed for the following academic year

Chairman of the Educational and Methodological Board
23.09 2020 year.

The course outline has been revised, considered and endorsed for implementation
in 2020 – 2021 Academic Year at the Staff Meeting of Normal physiology Department

Record of 27. 08 2020 year. № 1
The Head of Department Prof Anes Zarifyan

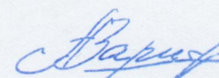


The course outline endorsed for the following academic year

Chairman of the Educational and Methodological Board
09.09 2021 year.

The course outline has been revised, considered and endorsed for implementation
in 2021 – 2022 Academic Year at the Staff Meeting of Normal physiology Department

Record of 23. 08 2021 year. № 1
The Head of Department Prof Anes Zarifyan

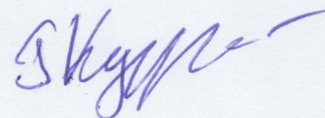


The course outline endorsed for the following academic year

Chairman of the Educational and Methodological Board
29.09 2022 year.

The course outline has been revised, considered and endorsed for implementation
in 2022 – 2023 Academic Year at the Staff Meeting of Normal physiology Department

Record of 26. 08 2022 year. № 1
The Head of Department Kurmashev R.A.

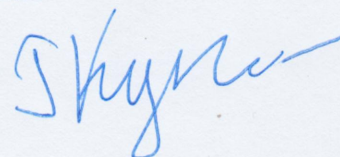


The course outline endorsed for the following academic year

Chairman of the Educational and methodological board
29.09.2023 year

The course outline has been revised, considered and endorsed for implementation
In 2023-2024 Academic year at the staff meeting of Normal physiology department

Record of 28.08.2023 year. № 1
The Head of Department Kurmashev R.A.



1. COURSE OUTLINE OBJECTIVES	
1.1	The goal of practicum complement traditional course of normal physiology and formation skills of functional diagnostics for using in clinical practice of a doctor.

2. PLACE OF THE COURSE IN THE EDUCATIONAL PROGRAM	
Educational Program Units:	
2.1	Students' Preliminary Training Requirements:
2.1.1	Anatomy
2.1.2	Biology
2.1.3	Normal physiology
2.1.4	Physics
2.1.5	Latin language
2.1.6	Mathematics
2.1.7	Histology, Embryology, Cytology
2.2	Course Units and Practical Sessions imposing the prior Proficiency
2.2.1	Medical informatics
2.2.2	Neurology
2.2.3	Propaedeutics of internal diseases
2.2.4	Infectious diseases
2.2.5	Traumatology, Orthopedics
2.2.6	Polyclinic therapy
2.2.7	Gerontology

3. STUDENTS' COMPETENCIES RESULTING FROM THE COURSE UNIT (MODULE)	
C.-9: the ability to assess the morphofunctional, physiological states and pathological processes in the human body for solving professional problems.	
Knowledge:	
Level 1	the basic functions of tissues, organs and body systems
Level 2	the principle of the device work for technical classes, units of measurement and normal indicators of the functional diagnostic
Level 3	algorithm for analyzing the results of functional research
Skills:	
Level 1	to do observation of safety measures during the working with biomaterials; use medical equipment, prepare the patient for observation
Level 2	to do observation of the patient, to fill in observation protocols
Level 3	To do evaluation of visceral systems condition taking into account the functional condition of the patient's body
Expertise:	
Level 1	expertise in using medical equipment
Level 2	expertise in analyzing the results of diagnostic studies
Level 3	expertise in using system approach for analysis of medical information

Final Students' Competences

3.1	Knowledge:
3.1.1	<p>Basic principles of work with biomaterials and safety measures.</p> <p>Methods of hematological studies; the main indicators of the hemogram, blood groups determination, the Rh factor, the principles of blood transfusion.</p> <p>The mechanisms of bioelectric phenomena, the particularities of the muscle's regulation contraction processes, the theoretical and practical bases of electromyography.</p> <p>The role of various departments and structures of the central nervous system in the regulation of somatic and visceral functions of the body, the characteristics and methods of studying reflexes.</p>

	<p>Features of the organization in various departments of sensory systems; methods of research. Physiological parameters of visceral systems.</p> <p>The main processes and mechanisms to maintain the constancy of body temperature.</p> <p>The device and principle of operation of the electromyograph, electrocardiograph, phonocardiograph, spiograph.</p> <p>Principles of formulation a diet based on the categories of labor.</p> <p>Forms of higher nervous activity symptoms in humans, the classification and characterization of types of higher nervous activity.</p>
3.2	Skills:
3.2.1	<p>To do haematological studies.</p> <p>To prepare the patient for observation.</p> <p>To record Electromyography, Electrocardiography, Phonocardiography.</p> <p>To do computer analysis of EMG, FCG. To study reflexes, to evaluate vegetative homeostasis.</p> <p>To measure blood pressure, carry out auscultation of the heart and palpation of the pulse.</p> <p>To do Spirometry and Spirography.</p> <p>To make a daily ration. To do thermometry on various sites of a body.</p> <p>To evaluate the indices of visceral systems with different functional condition of the organism.</p> <p>To fill in the research protocols.</p>
3.3	Expertise:
3.3.1	<p>Skills of safe work with biomaterials and laboratory animals. Methods of sampling biological fluids for research.</p> <p>Methods of studying simple and complex reflexes, providing tests.</p> <p>Methods of auscultation and palpation. The method of EMG, ECG, FCG registration of Spirometry.</p> <p>Methods for evaluating the results of diagnostic studies.</p>

4. COURSE (MODULE) STRUCTURE AND CONTENT

Class Code	Subject Name /Type of Class/	Semester / Academic Year	Hours	Competencies	Literature	Interactive Sessions	Notes
	SECTION 1. Basics of laboratory blood testing						
1.1	Basics on laboratory studies of the blood and hemostasis (Pr.).	3	2	C.-9	L1.1, L1.3, L. 1.4, I-B.R.1.	0	Explanation of the topic and discussion
1.2	Hematologic studies. Preparation and examination of blood smears under a microscope. Counting of blood cells in Goryaev's chamber (Pr.).	3	2	C.-9	L1.1, L1.3, L. 1.4, I-B.R.1.	0	Preparing the microscope and camera Goryaeva for work. Compounding of erythrocyte and leukocyte suspensions.
1.3	Methods of determination of Eritrocytes Sedimentation Rate and Hemoglobin (Pr.).	3	2	C.-9	L1.1, L1.3, L. 1.4, I-B.R.1.	0	Preparing and studying blood smears. Haemoglobin testing by Sali.
1.4	Study of the blood coagulation system. Primary and secondary hemostasis (Pr.).	3	2	C.-9	L1.1, L1.3, L. 1.4, L.1.2, I-B.R.1.	0	Duke and Burker methods
1.5	Determination of Blood Groups and Rh-factor (Pr.).	3	2	C.-9	L1.1, L1.3, L. 1.4, I-B.R.1.	0	Working with Tsoliclons.
1.6	Evaluation and interpretation of the results of hematological studies (Pr.).	3	2	C.-9	L1.1, L1.3, L. 1.4, L.1.2, I-B.R.1.	0	Clinical analysis of blood tests.

	SECTION 2. Investigation of biopotentials of excitable tissue.						
2.1	Determination of the speed of impulses along the nerves (Pr.).	3	2	C.-9	L1.8, L1.3, I-B.R.2, I-B.R4	0	Explanation of the topic and discussion
2.2	Theoretical basis of Electromyography (EMG) (Pr.).	3	2	ОПК-9	L1.8, L1.3, I-B.R.2, I-B.R4	0	Explanation of the topic and discussion
2.3	Registration of EMG (Pr.).	3	2	C.-9	L1.8, L1.3, I-B.R.2, I-B.R4	0	Set up the Electromyograph. Registration of EMG on different muscle groups. Filling of the research protocols.
2.4	Registration of EMG with tetanic contraction (Pr.).	3	2	C.-9	L1.8, L1.3, I-B.R.2, I-B.R4	0	Set up the Electromyograph. Registration of stimulating EMG. Filling of the research protocols.
2.5	Analysis of EMG results (Pr.).	3	2	C.-9	L1.8, L1.3, I-B.R.2, I-B.R4	0	Discussion of survey results and protocol tests
	SECTION 3. Practical basics of reflexology and research of sensory functions of the body						
3.1	Methods for the determination and analysis of reflexes (Pr.).	3	2	C. -9	L1.1, L1.2, L1.3, L1.4, I-B.R.1.		Explanation of the topic and discussion
3.2	Spinal reflexes (Pr.).	3	2	C. -9	L1.1, L1.2, L1.3, L1.4, I-B.R.1.	0	The study of spinal reflexes (Play the role-game "doctor-patient")
3.3	Postural and statokinetic reflexes (Pr.).	3	2	C. -9	L1.1, L1.2, L1.3, L1.4, I-B.R.1.	0	The study of the medulla oblongata and the midbrain reflexes (Play the role-game "doctor-patient")
3.4	Vegetative reflexes (Pr.).	3	2	C. -9	L1.1, L1.2, L1.3, L1.4, I-B.R.1.	0	Observing of vegetative samples. Filling of protocols.

3.5	Investigation of the functions of the cerebellum (Pr.).	3	2	C. -9	L1.1, L1.2, L1.3, L1.4, I-B.R.1.	0	Observing of cerebellum samples. Filling of protocols.
	SECTION 4. Investigation of the functions of the Cardiovascular System						
4.1	Theoretical basis of Auscultation (listening to heart sounds) (Pr.).	4	2	C.-9	L1.3, L1.4 L1.5, L1.6, L2.3, I-B.R.4.	0	Explanation of the topic and discussion
4.2	Theoretical basis of Electrocardiography (ECG) (Pr.).	4	2	C.-9	L1.3, L1.4 L1.5, L1.6, L2.3, I-B.R.4.	0	Explanation of the topic and discussion
4.3	ECG recording and analysis (Pr.).	4	2	C.-9	L1.3, L1.4 L1.5, L1.6, L2.3, I-B.R.4.	0	Preparation of equipment. Registration of the ECG. Evaluation of results.
4.4	Theoretical bases of Phonocardiography (FCG) (Pr.).	4	2	C.-9	L1.3, L1.4 L1.5, L1.6, L2.3, I-B.R.4.	0	Explanation of the topic and discussion
4.5	Registration and analysis of the FCG (Pr.).	4	2	C.-9	L1.3, L1.4 L1.5, L1.6, L2.3, I-B.R.4.	0	Preparation of equipment. Registration of the FCG. Evaluation of results.
4.6	Methods of examining the pulse (Pr.).	4	2	C.-9	L1.3, L1.4 L1.5, L1.6, L2.3, I-B.R.4.	0	Studying of pulse characteristics at rest and under physical exertion
4.7	Method of measuring Arterial Blood Pressure (Pr.).	4	2	C.-9	L1.3, L1.4 L1.5, L1.6, L2.3, I-B.R.4.	0	Measurement of blood pressure at rest and after exercise.
4.8	Functional examination of Martine and Schellong (Pr.)	4	2	C.-9	L1.3, L1.4 L1.5, L1.6, L2.3, I-B.R.4.	0	Conduction functional tests and evaluation of hemodynamic parameters.
4.9	Methods of auscultation (I.W.).	4	2	C.-9	L1.3, L1.4 L1.5, L1.6, L2.3, I-B.R.4.		Procedure. Listening to heart sounds
4.10	Electrocardiograph device. ECG registration (I.W.).	4	4	C.-9	L1.3, L1.4 L1.5, L1.6, L2.3, I-B.R.4.		Electrocardiographic examination of volunteers
4.11	Phonocardiography device. Registration of the FCG (I.W.).	4	4	C.-9	L1.3, L1.4 L1.5, L1.6, L2.3, I-B.R.4.		Phonocardiographic examination of volunteers

4.12	Measurement of arterial blood pressure by the Korotkov method (I.W.).	4	2	C.-9	L1.3, L1.4 L1.5, L1.6, L2.3, I-B.R.4.		v the methodology and filling the protocols
4.13	Practical studying of the functional tests methodology (I.W.).	4	2	C.-9	L1.3, L1.4 L1.5, L1.6, L2.3, I-B.R.4.		Examination of volunteers
	SECTION 5. Examination of the Respiratory System						
5.1	Theoretical basis of Spirometry and Spirography (Pr.).	4	2	C. -9	L1.3, L1.4, L1.7, I-B.R.1.	0	Explaining the topic and discussion
5.2	Procedure of Spirometry (Pr.).	4	2	C. -9	L1.3, L1.4, L1.7, I-B.R.1.	0	Preparation of equipment. Determination of the vital capacity of the lungs.
5.3	Registration and analysis of the Spirograms (Pr.).	4	2	C. -9	L1.3, L1.4, L1.7, I-B.R.1.	0	Evaluation of actual pulmonary values and volumes. Measurement of VCL after physical activity.
5.4	Examination by Spirometry (I.W.).	4	2	C.-9	L1.3, L1.4, L1.7, I-B.R.1.		Evaluation of parameters
5.5	Spirography examining at rest state (I.W.).	4	2	C.-9	L1.3, L1.4, L1.7, I-B.R.1.		Studying and calculating of pulmonary values and volumes
5.6	Spirography examining under the influence of various (I.W.).	4	2	C.-9	L1.3, L1.4, L1.7, I-B.R.1.		Studying and calculation of pulmonary values and volumes
5.7	Evaluation of respiratory parameters (I.W.).	4	2	C.-9	L1.3, L1.4, L1.7, I-B.R.1.	0	Calculation of indicators and filling the table.
	SECTION 6. Research of the Digestive System. Determination of metabolism. Thermometry. Renal function test.						
6.1	Methods of studying the Digestive System (Pr.)	4	2	C.-9	L1.1, L1.2, L1.3, L1.4, L2.1, I-B.R.1.	0	
6.2	Diet formulation, calculating calories (Pr.).	4	2	C.-9	L1.1, L1.2, L1.3, L1.4, L2.1, I-B.R.1.		Formulation diets with allowance for the daily requirement of calories.

6.3	Thermometry (Pr.).	4	2	C.-9	L1.1, L1.2, L1.3, L1.4, L2.1, I-B.R.1.		Method of thermometry. Conducting cold test.
6.4	Renal function test (Pr.)	4	2	C.-9	L1.1, L1.2, L1.3, L1.4, L2.1, I-B.R.1.		Methods of quantitative evaluation of glomerular filtration. Evaluation of clinical urine analysis.
6.5	Methods of operations in the digestive tract (the works of I. Pavlov) (I.W.)	4	2	C.-9	L1.1, L1.2, L1.3, L1.4, L2.1, I-B.R.1.		Watching video
6.6	Calculation of daily diet (I.W.)	4	2	C.-9	L1.1, L1.2, L1.3, L1.4, L2.1, I-B.R.1.		Use of tables, indicating calorie products
6.7	Theoretical basis of calorimetry as a method of metabolic evaluation (I.W.)	4	2	C.-9	L1.1, L1.2, L1.3, L1.4, L2.1, I-B.R.1.	0	Watching video
6.8	Techniques for collecting urine samples (by Zimnitskiy and Nechiporenko) (I.W.)	4	2	C.-9	L1.1, L1.2, L1.3, L1.4, L2.1, I-B.R.1.		Procedure. Filling protocols.
	SECTION 7. Study of Higher Nervous Activity.						
7.1	Study of human higher nervous activity (Pr.).	4	2	C.-9	L1.2, L1.3, L2.3, L2.2, L3.1, I-B.R.3.		Reading literature, discussion
7.2	Theoretical questions of memory formation (Pr.).	4	2	C.-9	L1.2, L1.3, L2.3, L2.2, L3.1, I-B.R.3.		Reading literature, discussion
7.3	Study of the functional asymmetry of the human brain (Pr.).	4	2	C.-9	L1.2, L1.3, L2.3, L2.2, L3.1, I-B.R.3.		Testing to determine the type of interhemispheric asymmetry.
7.4	Methods for determining the types of Higher Nervous Activity (I.W.)	4	2	C.-9	L1.2, L1.3, L2.3, L2.2, L3.1, I-B.R.3.		Determination of the type of HMA by tests.
7.5	Study of memory types (I.W.)	4	2	C.-9	L1.2, L1.3, L2.3, L2.2, L3.1, I-B.R.3.	1	Methods for determining memory. Study of perception and representation images.
7.6	The importance of memory and the dominant motivation in the purposeful activity of a person (I.W.).	4	2	C.-9	L1.2, L1.3, L2.3, L2.2, L3.1, I-B.R.3.		Preparation of presentations.

5. ASSESSMENT FUND

5.1. Advancement Questions and Assignments

Questions for the level "knowledge"

1. Blood composition. Physicochemical properties of blood.
2. Morphological features and functional role of erythrocytes.
3. Hemoglobin. Properties of hemoglobin.
4. Morphological features and functional role of leukocytes.
5. Immunological characteristics of blood. Blood groups. Rh-factor. Blood transfusion.
6. Blood coagulation system. The coagulation phases. The anticoagulant system of blood.
7. Properties of excitable tissues. Membrane potential.
8. Action potential. Phases of potential. After potentials.
9. Irritability. Irritation threshold. Excitability. Phases of excitability.
10. Irritation. The effect of direct current on excitable tissues.
11. Types of nerve fibers. Mechanism of excitation.
12. Structure and function of the skeletal muscles. The mechanism of muscle contraction.
13. Structure and physiological features of smooth muscles.
14. Reflex arc is the material basis of the reflex.
15. Vegetative and somatic reflexes.
16. Characteristic of unconditioned reflexes. The study of unconditioned reflexes.
17. Structure of the spinal cord. Function of the posterior and anterior roots of the spinal cord.
18. Reflex activity of the midbrain. Participation in visual and auditory reflexes.
19. Involvement of the cerebellum in the regulation of the motor and autonomic spheres.
20. Cortex of the cerebral hemispheres. The value of the frontal, temporal and parietal cortex.
21. Autonomic nervous system. Vegetative balance.
22. Human sensory systems. The concept of analyzers.
23. Basic properties of analyzers. Types of reception.
24. The heart of mammals and humans. Cardio cycle.
25. The nature of the automatic heart. Conduction system of the heart.
26. External manifestations of the heart.
27. Electrocardiogram. Phonocardiogram.
28. Blood pressure. Methods of recording blood pressure.
29. Pulse. Characteristics of the pulse.
30. Stages of breathing. Indicators of external respiration.
31. Breathing during exercise. Breathing in hypoxic conditions.
32. Spirometry and Spirography.
33. Experimental works of I. Pavlov about digestive system.
34. Basic exchange. Factors affecting the value of basal metabolism.
35. Energy value of nutrients. Determination of energy work cost.
36. Nutrition. Rationality, regularity and nutrition.
37. Thermoregulation. Thermoregulation centers. Body temperature.
38. Formation of primary urine. Quantification of glomerular filtration..
39. General characteristics, properties and rules for the formation of conditioned reflexes.
40. Doctrine of I. Pavlov about higher nervous activity

Questions for the level "skills"

1. To prepare the erythrocyte suspension and the leukocyte suspension.
2. To prepare for work microscope and chamber of Goryaeva.
3. To calculate the number of erythrocytes and leukocytes.
4. To determine the amount of hemoglobin.
5. To prepare the microscope for a blood smear.
6. To conduct diagnostic tests to assess hemostasis.
7. To conduct the excitation propagation time along the nerve fiber
8. To conduct the study of reflexes.
9. To prepare the patient for functional examination. To apply electrodes for examination.
10. To conduct an evaluation of the parameters of breathing by Spirography.
11. To calculate the metabolic rate according to the tables of Reed and Harrison-Benedict.
12. To conduct thermometry.
13. To calculate the rate of glomerular filtration by inulin.
14. To evaluate test results for Eysenck.

Questions for the level "expertise"

1. Methods of blood sampling in animals and humans with observance of safety measures.
2. Technique of working with a microscope and blood smears.
3. Method for determining blood groups and Rh-factor.
4. Preparation of the device and registration of the Electromyogram.
5. Study of reflexes.
6. Method of conduction of cerebellum samples.
7. Demonstration of reflexes on a rabbit.
8. Auscultation of the heart.
9. Palpation and evaluation of pulse characteristics.
10. Method of measuring blood pressure.
11. Registration of an Electrocardiogram and Phonocardiogram.
12. Analysis of ECG and FCG results.
13. Method of functional tests.
14. Spirography and calculation of breathing parameters.
15. Determination of the vital capacity of the lungs with Spirometry.
16. Method of complication a daily diet with calories.
17. Technique of urine sampling for clinical analyzes.
18. Evaluation of memory types, types of higher mental activity.
19. Study of conditional reflexes.
20. Filling research protocols with conclusions.

5.2. Course Papers Themes

Course Papers Themes isn't requires

5.3. AssessmentFund

Demo version of test

1. Homeostasis is:
 - a) the destruction of red blood cells
 - b) the ratio of plasma and blood cells
 - c) the formation of a blood clot
 - d) the constancy of the internal environment's parameters
2. The amount of proteins in blood plasma is:
 - a) 3-2%
 - b) 8-10%
 - c) 8 - 6%
 - d) 10-15%
3. The isotonic solution is a solution containing:
 - a) a certain number of red blood cells
 - b) the amount of salts corresponding to blood plasma;
 - c) the amount of nutrients corresponding to plasma
 - d) count the amount of red blood cells.
4. Hemolysis is called:
 - a) the destruction of red blood cells
 - b) the destruction of white blood cells
 - c) the formation of a blood clot
 - d) the ratio of plasma and formed elements.
5. The function of blood does not apply:
 - a) trophic
 - b) protection
 - c) synthesis of hormones
 - d) respiratory
6. Blood plasma proteins do not have following such function:
 - a) protective
 - b) trophic
 - c) transport of gases
 - d) plastic
7. Oncotic pressure of blood plays a crucial role in:
 - a) transport of proteins between blood and tissues
 - b) transport of water between blood and tissues
 - c) maintaining the pH of the blood
 - d) all variant untrue
8. Plasma proteins do not include:
 - a) albumins
 - b) globulins
 - c) fibrinogen
 - d) hemoglobin
9. The highest buffering capacity has buffer:
 - a) carbonate
 - b) phosphate
 - c) hemoglobin
 - d) protein
10. The normal hematocrit values is:
 - a) 40-45%
 - b) 35-40%
 - c) 50-55%
 - d) 65-70%
11. Osmotic pressure of blood is the force:
 - a) cooperation of the blood cells with each other
 - b) cooperation of the blood cells with the vessel wall
 - c) providing the movement of solvent molecules through a semipermeable membrane.
 - d) ensuring the movement of blood.
12. Hemolysis occurs in solution:
 - a) hypertonic
 - b) hypotonic
 - c) izoionical
 - d) saline
13. The active reaction of the blood (pH) in the norm is:
 - a) 8.0
 - b) 7.34
 - c) 1.02
 - d) 5.0
14. The respiratory function of blood is:
 - a) the oxygen transport to the tissues and carbon dioxide from the tissues
 - b) the oxygen consumption by red blood cells
 - c) transport of glucose to the tissues
 - d) transport of proteins, fats, carbohydrates
15. The percentage of plasma in the blood is:
 - a) 40-45%
 - b) 55-60%
 - c) 45-50%
 - d) 65-70%

16. Most of the plasma osmotic pressure creates ions:
- sodium and chloride
 - potassium and calcium
 - the sodium and magnesium
 - hydrocarbonate and phosphate
17. Blood cells provides all the nutrients the body due to:
- respiratory function
 - excretory function
 - thermoregulatory function
 - trophic function.
18. Red blood cell increase is:
- erythropenia
 - erythrocytosis
 - erythropoiesis
 - macrocytosis
19. Combination of hemoglobin with carbon dioxide is :
- oxyhemoglobin
 - carbhemoglobin
 - carboxyhemoglobin
 - methemoglobin
20. The functions of basophils are:
- macrophages have chemotaxis
 - possess anthelmintic action
 - synthesized bioactive agents, regulate vascular tone and bronchi
 - participate in specific immunity
21. Count of leukocytes in blood of adult men:
- $2 - 5.0 \times 10^{12} / \text{ml}$
 - $3.5 - 10 \times 10^{12} / \text{l}$
 - $4 - 9 \times 10^9 / \text{l}$
 - $2 - 9 \times 10^7 / \text{l}$
22. The concentration of hemoglobin (Hb) in the blood of a healthy man is:
- 120 - 160 g / l
 - 100 - 120 g / l
 - 160 - 180 g / l
 - 110 - 150 g / l
23. Main function of T-killers is:
- phagocytosis
 - the formation of antibodies
 - the destruction of foreign cells and antigens
 - participate in tissue regeneration
24. The function of B – lymphocytes is:
- providing humoral form of immune response
 - responsible for the development of cellular immune responses
 - participation in non-specific immunity
 - producing of heparin, histamine, serotonin
25. The color index of blood is called:
- the volume ratio of erythrocytes to the blood volume
 - the ratio of red blood cells to the reticulocyte
 - the relative saturation of red blood cells by hemoglobin
 - the ratio of plasma volume to blood volume
26. Leukocyte formula is?
- the percentage of types of leukocytes
 - the percentage ratio of erythrocytes to leukocytes
 - the percentage of all blood cells
 - the percentage of monocytes and basophils
27. The color index of adult is:
- 0.65-0.75
 - 0.85-1.0
 - 0.9-1.3
 - 1.5-2.0
28. Combination of hemoglobin with oxygen is:
- carbhemoglobin
 - oxyhemoglobin
 - methemoglobin
 - carboxyhemoglobin
29. Lymphocytes play the most important role in the process of:
- blood coagulation
 - hemolysis
 - fibrinolysis
 - immunity
30. This element is contained in hemoglobin:
- phosphorus
 - potassium
 - ferum
 - copper
31. Volume of lymphocytes in blood is:
- 20-40 % of all types of leukocytes
 - 0.5 - 1% of all types of white blood cells
 - 2 – 10% of all types of leukocytes
 - 60 - 70% of all types of leukocytes
32. Volume of monocytes in blood is:
- 20-40 % of all types of leukocytes

- b) 0.5 - 1% of all types of white blood cells
 - c) 2 - 10% of all types of leukocytes
 - d) 60 - 70% of all types of leukocytes
33. Select pathologic combination of Hb:
- a) deoxyhemoglobin
 - b) oxyhemoglobin
 - c) methemoglobin
 - d) karbgemoglobin
34. Tick the granulocytes:
- a) monocytes
 - b) neutrophils
 - c) T lymphocytes
 - d) B-lymphocytes
35. The greatest affinity for oxygen has:
- a) fetal hemoglobin (HbF)
 - b) adult hemoglobin (HbA)
 - c) carbhemoglobin
 - d) carboxyhemoglobin
36. The second stage of coagulation ends with the formation:
- a) prothrombin
 - b) prothrombinase
 - c) thrombin
 - d) plasmin
37. What method is for test clotting time:
- a) method of Sali
 - b) method of Duke
 - c) method of Buerger
 - d) chamber of Goryaev
38. The cascade reaction – is:
- a) autoactivation of clotting factors.
 - b) sequential activation of coagulation factors
 - c) inactivation of coagulation factors.
 - d) activation of the previous phase
39. Substances causing vasospasm:
- a) serotonin, adrenaline
 - b) histamine, acetylcholine
 - c) nitrous oxide, prostacyclin
 - d) lactic acid, CO₂
40. Arrange the following events in the order in which they occur during platelet plug formation:
- 1) platelet adhesion
 - 2) platelet aggregation
 - 3) platelet release reaction
 - a. 1,2,3
 - b. 1,3,2
 - c. 2,1,3
 - d. 2,3,1
 - e. 3,1,2
41. Which of the following is involved in the final phase of blood clotting?
- a) formation of fibrin
 - b) formation of prothrombin
 - c) activation of blood clotting factor X
42. Calcium ions were the _____ substance discovered to be involved in the process of blood clotting:
- a) 4 th
 - b) 10 th
 - c) 13 th
43. The process of platelets production is called:
- a) hemopoiesis
 - b) leukopoiesis
 - c) erythropoiesis
 - d) trombocytopenoiesis
44. The function of platelets are:
- a) respiratory, protective
 - b) angiotrophic, participate in hemostasis
 - c) excretory
 - d) development of antibodies
45. The duration of the clot retraction:
- a) 1-2 min.
 - b) several seconds
 - c) 2-3 hours
 - d) several days
46. Rh disease could be occur at first pregnancy if:
- a) mother and fetus have Rh negative and during pregnancy placental barrier is destroyed
 - b) mother and fetus have Rh positive
 - c) mother has Rh negative, fetus has Rh positive and during pregnancy placental barrier is destroyed
 - d) all above are true
47. In serum of A blood group could be occur agglutinins:
- a) B -antibodies
 - b) A and B -antibodies
 - c) no agglutinins
 - d) A –antibodies
48. Blood groups is differ by:
- a) saline plasma composition

- b) contain of fibrinogen
 - c) types of proteins, which contain in plasma and erythrocytes
 - d) contain of glucose in plasma
49. Human body produce Rh antibodies during transfusion:
- a) Rh positive blood to Rh negative recipient
 - b) Rh positive blood to Rh positive recipient
 - c) Rh negative blood to Rh negative recipient
 - d) Rh negative blood to Rh positive recipient
50. Antibodies A and B is contained:
- a) in plasma of I group
 - b) in plasma of II group
 - c) in plasma of III group
 - d) in plasma of IV group
1. Oxygenated blood flows through _____ in the systemic circuit but through _____ and the opposite heart chambers in the pulmonary circuit.
 - a. arteries and the left atrium and ventricle; veins;
 - b. arteries and the right atrium and ventricle; veins;
 - c. veins and the left atrium and ventricle; arteries;
 - d. veins and the right atrium and ventricle; arteries.
 2. Blood from the systemic circuit returns to the right atrium through:
 - a. the superior vena cava;
 - b. the inferior vena cava;
 - c. the coronary sinus;
 - d. all of the above.
 3. The cardiac muscle fibers of the _____ act as the pacemaker, the rhythmic center that initiates the heartbeat.
 - a. AV node;
 - b. sinoatrial node;
 - c. atrioventricular bundle;
 - d. ventricular myocardium.
 4. In the heart, an action potential originates in the...
 - a. bundle branches.
 - b. atrioventricular bundle.
 - c. atrioventricular node.
 - d. sinoatrial node.
 5. Excitability is the ability of myocardium:
 - a. to produce its own impulses regularly;
 - b. to give response to a stimulus;
 - c. to shorten in length (contraction) after receiving a stimulus;
 - d. to conduct the excitation from one area to another.
 6. Staircase phenomenon is about:
 - a. the strength of myocardial contraction depends on the threshold and suprathreshold stimulus;
 - b. the strength of myocardial contraction doesn't depend on the threshold and suprathreshold stimulus;
 - c. the strength of myocardial contraction depends on the frequency of the applied stimuli;
 - d. the strength of myocardial contraction depends on the initial length of the muscle fibers.
 7. Choose a function which characterizes atrial systole:
 - a. ejection of blood into circulation
 - b. ejection of blood to the ventricles;
 - c. complete filling of the cardiac chamber with blood
 - d. suction of blood in the atrium by type of "syringe".
 8. In which of the following pairs do the events start almost simultaneously?
 - a. ventricular systole, first heart sound ("lubb")
 - b. atrial diastole, ventricular systole
 - c. ventricular diastole, closing of semilunar valves
 - d. all of the above
 9. The semilunar valves close during...
 - a. ventricular systole.
 - b. ventricular diastole.
 - c. atrial diastole.
 - d. both atrial and ventricular systole.
 10. Choose incorrect option for slow ejection phases of cardiac cycle:
 - a. ventricles are still contracting but due to ejection of blood intraventricular pressure starts falling.
 - b. the pressure increase in the aorta - to 120 mm Hg, pulmonary artery - 25-30 mm Hg;
 - c. AVV and SV close,
 - d. the blood is ejected slowly with much less force blood.
 11. Exchange vessels are:
 - a. buffered vessels; c) capillaries;
 - b. resistance vessels; d) venules and veins.
 12. The low pressure area include everything except:
 - a. the aorta, left ventricle;
 - b. pulmonary artery, right ventricle;
 - c. the left atrium, the pulmonary veins;
 - d. the right atrium, vena cava.
 13. In which vessels velocity of blood flow is highest?
 - a. large arteries; c) capillaries;
 - b. arterioles; d) small arteries.
 14. Volume of blood flow at rest is:
 - a) 3,5 - 5 liters / min.; c) 25-30 liter / min
 - b) 9-10 liters / min.; d) 1.5-2 liter / min
 15. Hemodynamic characteristics of capillaries:
 - a. P = 40 - 20 mm Hg, R - High, V = 0,5 mm / sec.
 - b. P = 20 - 0 mm Hg, R - Low, V = 0,2-0,3 mm / sec.

- c. P = 90 - 40 mm Hg, R - very high, V = 5 m / sec.
d. P = 100 - 120 mm Hg, R - slight, V = 0,5 m / sec.
16. Which vessel wall sheet is correctly matched with a statement about its tissue structure?
a. tunica externa (adventitia) - consists of smooth muscle tissue
b. tunica interna (intima) - consists of a thin layer of connective tissue only
c. tunica media - consists of simple squamous epithelium
d. tunica media - consists of smooth muscle and elastic connective tissue, the amounts and proportions of each depending on vessel type
17. A continuous capillary has _____ but not _____.
a. tight junctions; fenestrations
b. intercellular clefts; tight junctions
c. intercellular clefts; endothelial cells
d. fenestrations; tight junctions
18. Pulse pressure is calculated by
a. adding diastolic pressure to systolic pressure
b. subtracting diastolic pressure from systolic pressure
c. adding the diastolic and systolic pressure, then dividing by 2
d. adding one-third of the difference between the diastolic and the systolic pressure to the diastolic pressure.
19. The oncotic pressure of blood is caused by
a. contraction of the heart ventricles
b. the presence of proteins in the plasma
c. the presence of sodium in the plasma
d. the presence of water in the plasma
20. A positive inotropic agent is something that
a. reduces the heart rate in positive feedback loop.
b. increases the heart rate in positive feedback loop.
c. increases the contractility of myocardial fibers.
d. decreases the contractility of myocardial fibers.
21. During exercise or stress, the sympathetic nervous system causes vasodilation in the skeletal muscle but vasoconstriction in the skin. It is able to achieve these opposite effects because
a. sympathetic fibers secrete epinephrine in the muscle and acetylcholine in the skin.
b. bradykinin stimulates constriction of arterioles in the dermis.
c. the muscles have cholinergic sympathetic fibers and the skin has adrenergic fibers.
d. the muscles have α -adrenergic receptors and the skin has β -adrenergic receptors.
22. The auscultatory method is used for
a. correcting orthostatic hypotension.
b. reducing tachycardia.
c. restoring blood volume.
d. measuring blood pressure.
23. Bainbridge reflex begins with:
a. baroreceptors of the aortic arch;
b. baroreceptors of the carotid sinus;
c. chemoreceptors of the aortic arch;
d. baroreceptors of the hollow veins;
e. baroreceptors of the pulmonary veins.
24. Hering's reflex begins with:
a. baroreceptors of the aortic arch;
b. baroreceptors of the carotid sinus;
c. chemoreceptors of the aortic arch;
d. baroreceptors of the hollow veins;
e. baroreceptors of the pulmonary veins.
25. The main cardiovascular (vital) center is located in:
a. the spinal cord;
b. the middle brain;
c. the medulla oblongata;
d. the cerebral cortex;
e. the hypothalamus.
26. The QRS complex of a typical electrocardiogram (ECG) tracing denotes the beginning of
a. depolarization of the atria
b. repolarization of the atria
c. depolarization of the ventricles
d. repolarization of the ventricles
27. On a normal ECG/EKG, atrial depolarization occurs during the:
a. P wave c. T wave
b. P-Q interval d. QRS complex

Demo version of question cards

Card 1

1. Action potential. Phases of potential. After potentials.
2. The nature of the automatic heart. Conduction system of the heart.
3. To conduct an evaluation of the parameters of breathing by Spirography.
4. To conduct an evaluation of the parameters of breathing by Spirography.

Card 2

1. Immunological characteristics of blood. Blood groups. Rh-factor. Blood transfusion.
2. The involvement of the cerebellum in the regulation of the motor and autonomic spheres.
3. To prepare the patient for functional examination. To apply electrodes for examination.
4. Technique of urine sampling for clinical analyzes.

Card 3

1. The structure and function of the skeletal muscles. The mechanism of muscle contraction.

2. External manifestations of the heart.
 3. To conduct the study of reflexes.
 4. The reflex arc is the material basis of the reflex.
- Card 4
1. Irritability. Irritation threshold. Excitability. Phases of excitability.
 2. Basic properties of analyzers. Types of reception.
 3. To prepare for work microscope and chamber of Goryaeva.
 4. Demonstration of reflexes on a rabbit.
- Card 5
1. Morphological features and functional role of leukocytes.
 2. Electrocardiogram. Phonocardiogram
 3. To conduct the excitation propagation time along the nerve fiber
 4. Thermoregulation. Thermoregulation centers. Body temperature.
- Card 6
1. Blood pressure. Methods of recording blood pressure.
 2. Breathing during exercise. Breathing in hypoxic conditions.
 3. Formation of primary urine. Quantification of glomerular filtration.
 4. Registration of an Electrocardiogram and Phonocardiogram.

5.4. List of Assessment Tools

Scale of assessment the test (Midterm Examination)

1. The test is consisted of 30 questions
2. Questions include 4 answers (1 correct answer)
3. Correct answer is 0.66 points
4. The total mark is the sum of the collected percentages.
5. Percentage is converted into points.

Test topic: Basics of laboratory blood testing »

- 10-50% - (0-15 correct answers) 10 points – the mark is "unsatisfactory"
- 60-70% - (20-23 correct answers) 13-15 points - the mark is "satisfactory"
- 71-85% (24-28 correct answers) 16-18 points - the mark is "good"
- 86-100% (29-30 correct answers) 19-20 points – the mark is "excellent".

Scale for assessment the colloquium and interview (Midterm Examination)

- 85-100% - 13 points the mark is "excellent". The student answers correctly for all questions.
- 75-84% - 10-12 points the mark is "good". The student answers with minor errors, which he corrects after leading questions.
- 60- 74% - 7-9 points the mark is "satisfactory". The student answers with errors and couldn't correct them after leading questions.
- less than 60% - 5-6 points the mark is "unsatisfactory". The student does not know the material.

Scale of control "differential credit" mark

Assessment of oral responses (control - "TO KNOW")

Criteria:

1. Knowledge of the basic processes of the discipline
2. Knowledge and using of terminology.
3. Knowledge of the physiological processes mechanisms.
4. Consistency of answer

85-100% - 6 points: the student answers perfectly, explaining the mechanisms of physiological processes, and know the terminology.

75-84% -5 points: the student answers, explains the mechanisms of physiological processes, and knows the terminology. One or two incorrectness in the answer are possible.

60-74% - 4 points: the student answers, but couldn't explain the mechanisms of physiological processes.

0-59% - 0-3 points: the student demonstrates ignoranc of the main theory issues.

Scale for assessment recitation (control "TO DO")

Criteria:

85-100% - 9 points: Student demonstrates a complete understanding of the assignment.

75-84% - 7 points: Student demonstrates a good understanding of the assignment. There are minor errors.

60-74% - 6 points: the student demonstrates a partial understanding of the assignment.

0-59% - 4 points: the student do not complete the assignment.

Scale for assessment recitation (control - "To MASTER")

Criteria:

85-100% - 15 points: the student fully do the practical task.

75-84% - 12 points: the student do task with minor errors.

60-74% - 11 points: the student do task with a large number of errors.

0-59% - 7 points: the student couldn't complete the assignment.

6. COURSE (MODULE) METHODOLOGICAL AND INFORMATIONAL SUPPORT

6.1 Recommended Reading

6.1.1 Required Reading List

	Authors, Compliers	Title	Bookpublisher, Year
L1.1	Bebinov E.M, Zarifyan A.G, Ilyichev V.P, Makimbetova Ch.E.	Physiological basis of functional diagnostics: Textbook	Bishkek: KRSU 2011
L1.2	Zubdinov Y.I.	ABC of the ECG and Pain in the Heart: A Training Manual	Rostov on the Don: Phoenix 2013
L1.3	John E. Hall	Guyton and Hall y Textbook of Medical Physiolog	A South Asian Edition. 2013
L1.4	Dr K Sembulingam and Dr Prema Sembulingam	Essentials of Medical Physiology, 6th Edition	Jaypee-essentials.2012
L1.5	Jackie L. Butler, David Shier	Hole's Human Anatomy and Physiology	SUNY – Albany. 2011
L1.6	Galen S. Wagner	Marriott's Practical Electrocardiography	Lippincott Williams & Wilkins, 2008
L1.7	Barbara Martin	Spirometry: A Handbook for Health Professionals	2014
L1.8	Jay M. Weiss	Easy EMG: A Guide to Performing Nerve Conduction Studies and Electromyography	Elsevier. 2006

6.1.2 Advanced Reading

	Authors, Compliers	Title	Bookpublisher, Year
L2.1	Kiskun A.A.	Guide to laboratory diagnostic methods: guidelines	GEOTAR-M GEOTAR-Media 2014
L2.2	Remizov A.N, Maxina A.G, Potapenko A.Ya.	Medical and Biological Physics:textbook	M.: Drofa 2008
L2.3	Zenkov L.R.	Functional Diagnosis of Nervous Diseases: A Guide	M: MEDPress Info 2013

6.1.3 Guidance Papers

	Authors, Compliers	Title	Bookpublisher, Year
L3.1	Oransky I.E.	Manual on functional diagnostics for laboratory assistants: a methodical manual	Medicine 1973

6.2 Online Resources

I-B.R 1	Student Internet portal	http://studopedia.ru
I-B.R 2	Atlas of electromyography	http://joseph.topsmarts.net
I-B.R 3	Electronic Library System Znanium	www.znanium.com
I-B.R4	Electronic library KRSU	www.lib.krsu.edu.kg

6.3. List of Information and Education Technologies

6.3.1 Competence-based Educational Technologies

6.3.1.1	Traditional educational technologies. Practical exercises are focused on the process of transfer of knowledge, methods of action, consolidation, generalization, monitoring and evaluation of knowledge.
6.3.1.2	Information educational technologies. The first place among the new technologies is occupied by network information technologies, which allow students to have independent access to the world's Internet resources, which contributes to increasing the level of knowledge in the discipline under study.
6.3.1.3	Innovative educational technologies. Use in the educational process of active and innovative forms of training: teaching and research work, conducting classes using professional software on the topics of the workshop (EMG, ECG, FVD, REG, CIG), the analysis of specific situations based on the survey results ensures the high quality of the educational process, forms system thinking and technology analysis of the situation.

6.3.2 List of Information Reference Systems and Software

6.3.2.1	Information resource for students www.studopedia.ru Electronic Library of the KRSU - www.lib.krsu.edu.kg Electronic Library System - znanium.com Diseases of the neuromuscular system - listid.ru
6.3.2.2	Electronic Library of the KRSU www.lib.krsu.edu.kg
6.3.2.3	Electronic Library System znanium.com
6.3.2.4	Diseases of the neuromuscular system listid.ru

7. COURSE (MODULE) LOGISTICS

7.1	Study rooms -2
7.2	Boards-2
7.3	Computers with the practicum software – 4
7.4	Printers-2
7.5	Brush dynamometers -3
7.6	Neurological malleus -4
7.7	Photoelectric calorimeter -2
7.8	Tripods with test-tubes-2
7.9	Goryaev chamber – 6
7.10	Electrocardiograph – 1
7.11	Phonendoscopes -4
7.12	Tonometers – 4
7.13	Spirometer and Spirograph – 2
7.14	Set of tables
7.15	Computer programs-EMG, ECG, FCG
7.16	Bank of tests and tasks
7.17	Vivarium (rabbits, rats)

8. COURSE (MODULE) PROFICIENCY METHODOLOGICAL GUIDELINES (FOR STUDENT)

Routing. ANNEX 1
 Training includes practical classes and independent work of students. Firstly, teacher explains topic of the lesson, tells the characteristics of the operation of the devices and the general description of the method software. Demonstration of techniques is accompanied by a detailed analysis of the functions of the organ and evaluation of the indicators. Models of organ functions are created, possible options for the work of organs with adequate and large loads. are discussed
 Independent work of students is work with literature, studying for modules using the university library and Internet resources.

Technological map of the discipline "Physiology Practicum" (4 semester)

Appendix №1

The name of the modules discipline according to the WPD	Control Form of control	Control Form of control	Minimum credit Graph of control	Maximum credit	Graph of control
Module 1. Hematologic studies. Investigation of excitable tissue.	Current control	Testing, attendance is taken into account IWS: performing written homework.	1	3	26
	Midterm control	Colloquim	10	15	
Module 2. Cardiovascular System. Respiratory System.	Current control	Testing, attendance is taken into account IWS: performing written homework.	1	3	34
	Midterm control	Interview	10	19	
Module 3. Renal physiology. Digestive system.	Current control	Testing, attendance is taken into account IWS: performing written homework.	3	5	39
	Midterm control	Interview	15	25	
Per semestrer			40	70	
Intermediate control			20	30	
Semester rating on discipline			60	100	