



Educational Institution
"Royal Metropolitan University"

Quality Management System
Syllabus of the discipline "Normal Physiology"
Specialty 560001 "General Medicine" EI "RMU"

Educational Institution "Royal Metropolitan University"
Department "Morphological and Fundamental disciplines"


SYLLABUS
in the discipline "Normal Physiology"
for students of specialty 560001 "General Medicine"

Form of study	full-time
Course	1
Semester	1
Exam	1
Total credits according to the curriculum	4
Total hours according to the curriculum	120
Lectures	36
Practical classes	36
Independent work	48

Syllabus developer:
PhD Sadykova G.S.

Reviewed and approved at a meeting of the
department of "Morphological and
Fundamental disciplines"
Protocol No. 1 from "9" September 2024.
Head of the department PhD Jalilova A.A.

Bishkek 2024

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Teacher: G.S. Sadykova

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Discipline labor input

Year	Semester	Week	Academic hours		Independent work hours		Total hours	Mid-terms amount
			Lectures	Practical lessons	SIW	SIWT		
1	1	18	36	36	24	24	120	4

Annotation of the discipline

"Normal physiology" is a fundamental experimental and theoretical science of the functioning of the whole organism, its physiological systems, organs, cells, and individual cellular structures, and the mechanisms of regulation in the interaction of the organism with the environment, including the social environment.

Physiology is the main base of medicine, as the great Russian physiologist Ivan Petrovich Pavlov said, as deep knowledge of physiology laws provides successful mastering of clinical disciplines. Physiology is the theoretical basis for the study of traditional and alternative methods of treatment, and methods of functional diagnostics.

The purpose of the discipline "Normal Physiology"

Is to promote the formation of systemic knowledge about the vital activity of the whole organism and its parts, the basic regularities of functioning and mechanisms of their regulation in interaction with each other and with environmental factors, the study of the physiological basis of clinical and physiological methods of research used in functional diagnosis and the study of integrative human activity.

Objectives of the discipline:

- to study methods and principles of research of assessment of the state of regulatory and homeostatic systems of the organism, used for diagnostic purposes in practical medicine;
- contribute to the formation of ideas about the structure and regularities of functioning of individual organs and systems of the organism, as well as about the work of the main regulatory mechanisms of physiological functions in the formation of holistic responses;
- contribute to the formation of a systemic approach to understanding the physiological mechanisms underlying the interaction with environmental factors and



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the implementation of adaptive strategies of the human body from the perspective of the concept of functional systems;

- to familiarise with the experience of applying new scientific approaches to the practice of a general practitioner, based on the results of scientific research in related medical fields.

The planned results of mastering the study discipline "Normal Physiology" are determined by the competencies acquired by the student, i.e. his/her ability to apply knowledge, skills, and personal qualities to the objectives of the educational program and the tasks of professional activity.

After mastering the "Normal physiology" discipline students:

Will know:

– physiochemical basics and physiological properties of tissues, organs, and systems of the human body, regulation of their functions, comparative aspect of formation of functions;

– physiological processes and mechanisms of their regulation at the molecular, cellular, tissue, organ, and organismal levels, considered from the perspectives of general physiology, private physiology, and integrative, human behavioral activity;

about the theory of functional systems (P.K.Anokhin), mechanisms and features of the formation of functional systems of the organism (maintaining the constancy of the internal environment, the level of nutrients in the blood, arterial pressure, temperature of the internal environment, preservation of the integrity of the organism, etc.) in interaction with the external environment.

Will understand:

– basic principles of physiological equipment operation and safety rules when working with it;

– concept and methods of functional diagnostics, the essence of methods of research of various functions of a healthy organism used in medicine;

– general physiological laws underlying the processes occurring in the human body;

– basic mechanisms of regulation of physiological functions at molecular, cellular, tissue, organ, and organismal levels;

– basics of a healthy lifestyle of a person as a factor of his/her safe life activity;

– principles of interaction of the human body with the external environment.

Will be able to use:

– knowledge about the properties and functions of various body systems when analyzing the regularities of the formation of functional systems of a healthy person's body depending on the conditions of its existence;

– skills in organizing one's activities, initiative, mobility, skills preserving personal safety, interaction, and cooperation with others;



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- skills in elementary statistical processing of experimental data;
- educational, scientific, popular science literature, and the Internet for up-to-date information on normal physiology.

Will be able to analyze:

- regulation of activity of different systems of the organism at different functional conditions;
- dynamics of physiological processes under different types of stress;
- interpret the results of modern methods of functional and laboratory diagnostic methods to identify pathological processes in human organs and systems;
- explain the informational value of various indicators and mechanisms of regulation of organs, systems, and whole organism activity.

Will be able to synthesize:


- qualitative and quantitative assessment of the most important physiological indicators of the activity of various organs and systems at rest and under load, as well as to identify the main mechanisms of regulation of homeostatic functions.

Will be able to assess:

- results of the most common methods of functional diagnostics used to detect pathology of blood, heart and vessels, lungs, kidneys, liver, and other organs and systems;
- data and phenomena obtained from experiments and laboratory work, using modern methodological principles.


Will be able to conduct research:

- using physical, chemical, biochemical, and electrophysiological equipment.

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Course content

№	Names of units and topics of the discipline	Classroom work				Total classroom work	SIWT	SIW	Achieved competencies	Educational technologies	Forms of assessment
		lectures	seminars	Practical lessons	Laboratory work						
	Blood physiology										
1	Introduction to physiology. Homeostasis. Blood properties.	2			2	4	2	2	IC-2 PC-15	Presentation lecture, TBL, laboratory work	Oral survey, SIW control, practice skills assessment
2	Blood cells. Erythrocytes. Hemoglobin.	2			2	4	1	1		Presentation lecture, «yes-	Oral survey, SIW control,

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										no» method, laboratory work, paper work	practice skills assessment
3	Leukocytes. Immunity. Blood typing.	2			2	4	1	1		Presentation lecture, «yes-no» method, laboratory work, paper work, TBL	Oral survey, SIW control
4	Hemostasis. Anticoagulant system.	2			1	3	1	1		Presentation lecture, laboratory work, paper work, TBL	Oral survey, SIW control
	<i>Module 1</i>		1			1					MCQ, SIW control, oral survey on control questions
	Excitable tissues physiology.										
5	Cell membrane. Resting membrane potential and action potential.	2		2		4	1	1	IC-2 PC-15	Presentation lecture, laboratory	Oral survey, SIW control



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										work, paper work, TBL	
6	Nerve fibers. Impulse conduction.	2		2		4	2	2		Presentation lecture, laboratory work, paper work, TBL	Oral survey, SIW control
7	Synapses physiology. Neurotransmitters.	2		2		4	1	1		Presentation lecture, laboratory work, paper work, TBL, «yes-no» method, PBL	Oral survey, SIW control
8	Muscular system physiology.	2		1	1	4	1	1	IC-2 PC-15	Presentation lecture, laboratory work, paper work	Oral survey, SIW control
9	Endocrine physiology. Hypothalamus. Pituitary gland. Thyroid gland.	2		1	1	4	1	1	IC-2 PC-15	Presentation lecture, laboratory work, paper	Oral survey, SIW control



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										work, TBL, PBL	
10	Endocrine function of pancreas. Adrenal glands. Reproductive hormones.	2		1	3	1	1	IC-2 PC-15		Presentation lecture, laboratory work, paper work, TBL, PBL	Oral survey, SIW control
	Module 2		1		1						MCQ, SIW control, oral survey on control questions
11	General principles of coordination in CNS. Reflex.	2		2		4	1	1	IC-2 PC-15	Presentation lecture, laboratory work, paper work, TBL, PBL	Oral survey, SIW control
12	CNS physiology. Brain stem. Spinal cord. Reticular activating system.	2		1	1	4	1	2	IC-2 PC-15	Presentation lecture, laboratory work, paper work, TBL, PBL, control task	Oral survey, SIW control



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13	Diencephalon. Cerebellum. Limbic system. Basal ganglia.	2		2		4	1	1		Presentation lecture, laboratory work, paper work, TBL, control task	Oral survey, SIW control
14	Cerebral cortex. EEG.	2		2		4	2	1		Presentation lecture, laboratory work, paper work, TBL, PBL	Oral survey, SIW control
15	Autonomic and somatic nervous system physiology.	2		1	1	4	2	2	IC-2 PC-15	Presentation lecture, laboratory work, paper work, TBL	Oral survey, SIW control
16	Physiology of senses. General and special senses. Nociception.	2		1	1	4	2	2	IC-2 PC-15	Presentation lecture, laboratory work, paper work, TBL, control task	Oral survey, SIW control
17	Visual and auditory analyzers.	2			2	4	2	2		Presentation lecture,	Oral survey, SIW control

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										laboratory work, paper work, TBL	
18	Vestibular analyzer. Olfactory and taste analyzers.	2		1		3	1	1	IC-2 PC-15	Presentation lecture, laboratory work, paper work, control task, MCQ	Oral survey, SIW control
	Module 3		1			1					MCQ, SIW control, oral survey on control questions
	Total for 1st semester	36	3	18	15	72	24	24			



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Guidelines for students on studying the discipline and performing control tasks.

The study of the theoretical part of the disciplines is designed not only to deepen and consolidate the knowledge obtained in classroom classes but also to promote the development of student's creative skills, and initiative and organize their time.

The material covered in the lectures should be regularly reviewed and supplemented with information from other sources of literature, presented not only in the discipline program but also in periodicals.

When studying the discipline it is necessary to read the recommended literature on each topic and make a brief outline of the main provisions, terms, and information that require memorization and are fundamental in this topic for mastering the subsequent topics of the course. To expand knowledge of the discipline it is recommended to use Internet resources; conduct searches in various systems and use the materials of sites recommended by the teacher.

Each student keeps a workbook, the design of which must meet the requirements, the main ones of which are as follows:

- on the title page indicate the subject, course, group, surname, and first name of the student;
- each work is numbered by the methodological guidelines, and indicates the date of work completion;
- fully write down the title of the work, the purpose, and the principle of the method, briefly characterize the progress of the task and the object of research;
- if necessary, provide a graphical representation; the results of the tasks are presented in the form of graphical images with mandatory captions, as well as tables or described verbally;
- at the end of each activity, draw a conclusion or conclusion, which is discussed when summarising the results of the lesson.

All primary notes should be made in a notebook as the tasks are completed.

To check the academic activity and quality of the student's work, the workbook is periodically checked by the teacher.

The material covered in the lectures should be regularly reviewed and supplemented with information from other sources of literature, presented not only in the discipline program but also in periodicals.

When studying the discipline it is necessary to read the recommended literature on each topic and make a brief outline of the main provisions, terms, and information that require memorization and are fundamental in this topic for mastering the subsequent topics of the course. To expand the knowledge of the discipline it is recommended to use Internet resources; conduct searches in various systems and use the materials of the sites recommended by the teacher.



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Guidelines for practical/seminar classes and laboratory works.

Practical classes are held after lectures and are of clarifying, generalizing, and consolidating nature. They can be held not only in the classroom but also outside the educational institution.

During practical classes, students perceive and comprehend new educational material. Practical exercises are systematic, regularly following each lecture or two or three lectures.

Practical classes are carried out according to the schedule of the educational process and the independent work of students on disciplines.

When preparing for practical classes it is necessary to study in advance the methodological recommendations for its implementation. Pay attention to the purpose of the class, to the main questions to prepare for the class, and to the content of the topic of the class.

Before each practical lesson the student studies the plan of the seminar with the list of topics and questions, the list of literature, and homework on the material presented at the seminar. The student is recommended to prepare for the workshop as follows:

1. work through the lecture notes;
2. to read the main and additional literature recommended for the studied section.
3. to answer the questions of the seminar plan;
3. answer the questions of the plan of the seminar class;
4. to study the topics and select literature for writing essays, reports, etc.;

Guidelines for the completion of independent work.

When studying the discipline "Normal Physiology" the following types of independent work of students are applied:

- study of theoretical material on lecture notes and recommended textbooks, educational literature, and reference sources.
- study of theoretical material on lecture notes and recommended textbooks, educational literature, and reference sources;
- independent study of some theoretical issues not covered in the lectures, with the writing of essays, and preparation of presentations;

Students are offered to read and analyze monographs and scientific articles on public health issues. The results of work with texts are discussed in practical classes.

To develop skills of independent work, students perform tasks, independently referring to educational, reference, and scientific-methodological literature. Assignments are checked both at practical classes using students' oral presentations and their collective discussion and using written independent work.



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Independent work contributes to the student's development of such necessary skills as the choice and solution of the task, collection and analytical analysis of published data, and the ability to highlight the main things and make a reasonable conclusion.

Organization of students' independent work

№	Theme of the students' work	Students' work task (essay, report, abstract, tables, presentation, note-taking, extracts, crosswords, solving situational problems, exercises, cases, preparing for business games, testing on the topic)	Form of students' work	Deadlines (number of week)
1 st semester				
1	Functional systems	I. General principles of the functioning of the whole organism: 1.correlation 2.regulation 3.reflex 4.Self-regulation 2. Functional systems, interaction of elements	Paper	1-2
2	History of the development of physiology	1. Formation of physiology as a science 2. Development of physiological science during the Renaissance 3. Contribution of the Russian school of physiologists	Poster	1-2
3	Neurohumoral regulation of functions - as the basis of homeostasis	1. The internal environment of the body and the concept of homeostasis. 2. The role of humoral factors in maintaining homeostasis. 3. Distinctive features of humoral and nervous mechanisms of regulation. 4. Interaction of nervous and humoral mechanisms of regulation.	Essay	2-3
4	Homeostasis, mechanisms of its regulation	1. The concept of homeostasis. General laws of homeostasis of living systems. 2. Self-regulation and maintenance of homeostasis of the cellular level of the organization of living	Animation	2-3



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		<p>3. Homeostasis of the molecular level of organization of living</p> <p>4. Systemic mechanisms of homeostasis regulation: nervous, endocrine, immune</p>		
5	Osmosis. Osmotic and oncotic pressure	<p>1. The role of blood proteins</p> <p>2. Osmotic and oncotic pressure</p> <p>3. Isotonic coefficient</p> <p>4. Hypo-, hyper- and isotonic solutions</p>	Presentati on	3-4
6	Erythrocyte sedimentation rate and its interpretation	<p>1. The rate of erythrocyte sedimentation.</p> <p>2. Modern methods of determination</p> <p>3. Interpretation of ESR results</p>	Informatio n cards	3-4
7	Blood coagulation system	<p>1. The role of the coagulation process in ensuring homeostasis of the liquid state of the blood.</p> <p>2. A brief history of the development of the theory of blood coagulation.</p> <p>3. The process of activation of the blood coagulation system.</p> <p>4. Causes of blood clotting disorders.</p> <p>5. Anticoagulant system and its importance in providing a liquid state.</p>	Mind map	4-5
8	Immunological mechanisms of protection of the internal environment of the body	<p>1. Immunity and its significance. History of the study of immunity.</p> <p>2. Cellular immunity and its mechanisms.</p> <p>4. Humoral immunity and its mechanisms.</p> <p>5. The nature of antigen and antibodies.</p> <p>6. Interrelation of cellular and humoral immunity.</p>	Paper	4-5
9	Natural antigens and human antibodies	<p>1. The history of the discovery of human blood groups.</p> <p>2. Types of natural antigens. AVO system.</p> <p>3. Types of natural antibodies.</p> <p>4. Geographic distribution of blood groups.</p> <p>5. Blood transfusion.</p> <p>6. Modern problems of blood transfusion.</p>	Essay	5-6
10	HIV infection. AIDS as a result of impaired immunity	<p>1. The causative agent of HIV infection.</p> <p>2. Influence of HIV on the immune system.</p> <p>3. Mechanisms of HIV transmission.</p> <p>4. HIV infection as a socio-economic problem.</p>	Abstract	5-6
11	Hematopoiesis.	<p>1. Organs of hematopoiesis</p> <p>2. Erythropoiesis</p> <p>3. Formation of leukocytes and platelets.</p> <p>4. Physiological regulation of hematopoiesis</p> <p>5. Violations of hematopoiesis</p>	Mind map	6-7



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12	Active and passive transport of various substances across membranes.	<ol style="list-style-type: none"> 1. Permeability of the plasma membrane 2. Passive transport across cell membranes, examples 3. Active transport across cell membranes. Antiports and simports 4. Endocytosis and exocytosis 	Crossword	6-7
13	Ion channels, ion pumps and their mechanism of action.	<ol style="list-style-type: none"> 1. Ionic channels, their varieties 2. Sodium, calcium, potassium and chloride channels 3. Electrogenic and electrically neutral ion pumps 	Poster	7-8
14	Electrical phenomena in excitable tissues. The history of their discovery.	<ol style="list-style-type: none"> 1. History of the discovery of electrical phenomena in excitable tissues 2. Experiments by L. Galvani and K. Matteuchi 3. The role of biological membranes 4. Electrical properties of excitable tissues 	Videopresentation	7-8
15	Excitable tissues, changes in excitability when exposed to direct electric current and when excited	<ol style="list-style-type: none"> 1. Determination of excitement, excitability. 2. Change in the magnitude of the MF during depolarization and hyperpolarization. 3. Change in excitability with short-term and long-term exposure to direct current. 4. Accommodation and its mechanism. 5. Curve of changes in the excitability of a nerve fiber when the AP passes through it. 	MCQs	8-9
16	Resting membrane potential. Action potential. Interpreting the threshold stimulus	<ol style="list-style-type: none"> 1. Biological significance of the membrane potential in living cells. 2. Ions participating in the maintenance of MF in living cells. 3. The biological significance of the action potential. 4. The sequence of events of the mechanism of occurrence of the action potential. 5. The role of the sodium-potassium pump in the mechanisms of formation of MP and PD, its energy supply. 	Cases	8-9
17	Muscle contraction and relaxation (modeling)	<ol style="list-style-type: none"> 1. The mechanism of muscle contraction and relaxation 2. Huxley-Hanson theory 3. Energy supply of muscle contraction 4. Fatigue 5. The main mechanisms of neuro-humoral regulation of muscle activity 	Modeling	10-11



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18	Types of muscle contractions.	<ol style="list-style-type: none"> 1. Types of muscle contractions: single, tone, tetanus 2. Contraction modes: isometric, isotonic, mixed 3. Laws of muscle contraction 	Picha cucha presentatio n	11-12
19	Synapses, properties. TPSP and EPSP mechanisms.	<ol style="list-style-type: none"> 1. The structure of the synapse of the central nervous system, different types of synapses. 2. The mechanism of transmission of excitation in the synapse. Formation of EPSP (excitatory postsynaptic potential). 3. Types of inhibition in the central nervous system. 4. Principle of interaction of EPSP and TPSP (inhibitory postsynaptic potential) on the neuron membrane. 	MCQs	12-13
20	Physiological properties of skeletal and smooth muscles	<ol style="list-style-type: none"> 1. Structural organization of skeletal muscle 2. Molecular mechanisms of skeletal muscle contraction 3. Structural organization and contraction of smooth muscles <p>Physiological properties of muscles</p>	Informatio n cards	13-14
21	Inhibition in the central nervous system, its types and role.	<ol style="list-style-type: none"> 1. Electrophysiological expression of the inhibition process. 2. Inhibition in the spinal cord. 3. Contribution of I.M. Sechenov in the development of ideas about the mechanism of inhibition. 4. Inhibition in the cerebral cortex. 5. Principles of interaction of excitation and inhibition. 	Abstract	1 – 2
22	Unconditional reflex activity of the brain	<ol style="list-style-type: none"> 1. The essence of the reflex. 2. Distinctive features of unconditioned reflexes, their multilevel organization. 3. Instincts and their distinctive features. The parts of the brain involved in the implementation of instincts. 4. Biological significance of unconditioned reflex regulation of body functions. 5. Analysis of the reflex arc using the example of the knee reflex 	Paper	2-3
23	Conditioned reflex activity of the brain	<ol style="list-style-type: none"> 1. The essence of the reflex. 	Presentati on	3-4



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		<p>2. The fundamental difference between conditioned reflex activity and unconditioned reflex activity.</p> <p>3. The mechanism of formation of a conditioned reflex.</p> <p>4. The value of dominant, summation, irradiation in the closure of conditioned reflexes.</p> <p>5. The principle of feedback.</p> <p>6. The concept of a reflex ring.</p>		
24	The role of the cerebral cortex in the reflex activity of the brain	<p>1. Neuron as an integrating element of the nervous system.</p> <p>2. Features of the neuronal organization of the human cortex.</p> <p>3. Structural and functional organization of the associative zones of the cortex, their role in the work of the cerebral hemispheres.</p> <p>4. Locking function of the cerebral cortex, its importance in the adaptive activity of the organism.</p> <p>5. Functional asymmetry of the cerebral hemispheres.</p>	Cases	4-5
25	Autonomic nervous system	<p>1. General principles of structure and basic physiological properties of the autonomic nervous system.</p> <p>2. Vegetative innervation of tissues and organs.</p> <p>3. Sympathetic and parasympathetic divisions of the autonomic nervous system.</p> <p>4. Vegetative reflexes and centers of regulation of vegetative functions.</p>	Crossword	5-6
26	General senses	<p>1. I.P. Pavlov on analyzers. Analyzer as a complex system, its departments.</p> <p>2. Receptors and their types.</p> <p>3. Adaptation of receptors and its mechanism.</p> <p>4. Coding information in the nervous system.</p> <p>5. Possible functions of the primary and secondary sensory zones of the cerebral cortex.</p>	MCQs	6-7
27	Auditory analyzer	<p>1. Auditory analyzer as a complex system.</p> <p>2. Corti's organ. Electrical phenomena in the snail.</p> <p>3. Perception of auditory stimuli (frequency, pitch and strength of sounds).</p> <p>4. Cortical section of the auditory analyzer.</p> <p>5. Adaptation of the auditory analyzer.</p>	Poster	7-8



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		6. Determination of hearing acuity		
28	Visual analyzer	<ol style="list-style-type: none"> 1. Visual analyzer as a complex system. 2. The receptor system of the eye. 3. Photochemical and electrical phenomena in receptors. 4. Mechanism of accommodation and dark adaptation of the eye. 5. Color vision. 6. Coding information in the visual analyzer. 7. Determination of visual acuity 	Cahoot	8-9
29	Pain system	<ol style="list-style-type: none"> 1. Pain receptors, their regulation 2. Sensory system of pain 3. Pain relief system 		
30	Intrasecretory function of the thyroid gland	<ol style="list-style-type: none"> 1. Endocrine glands and their hormones. 2. The mechanism of action of hormones. 3. Intrasecretory function of the adenohipophysis. 4. Intrasecretory function of the neurohipophysis 5. Changes in the body with insufficient and excessive function of the pituitary gland. 	Cahoot	9-10
31	Intrasecretory function of the thyroid gland	<ol style="list-style-type: none"> 1. Endocrine glands and their hormones. 2. The mechanism of action of hormones. 3. Intrasecretory function of the thyroid gland. 4. Changes in the body with insufficient and excessive thyroid function. 	Cases	11-12
32	The endocrine role of the pancreas and its role in metabolism.	<ol style="list-style-type: none"> 1. Endocrine glands and their hormones. 2. The mechanism of action of hormones. 3. Intrasecretory function of the pancreas. 4. Changes in the body with insufficient and excessive function of the pancreas. 	Crossword	12-13
33	Intrasecretory function of the thymus and pineal gland	<ol style="list-style-type: none"> 1. Endocrine glands and their hormones. 2. The mechanism of action of hormones. 3. Intrasecretory function of the thymus. 4. Intrasecretory function of the pineal gland. 	Abstract	13-14
34	Intrasecretory function of the adrenal glands.	<ol style="list-style-type: none"> 1. Endocrine glands and their hormones. 2. The mechanism of action of hormones. 3. Intrasecretory function of the adrenal cortex. 4. Intrasecretory function of the adrenal medulla. 5. Changes in the body with insufficient and excessive adrenal function. 	Presentati on	14-15



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35	Intrasecretory function of the gonads	<ol style="list-style-type: none">1. Endocrine glands and their hormones.2. The mechanism of action of hormones.3. Hormones of the ovaries, placenta and their function.4. Hormones of the testes and their function.5. Regulation of the intrasecretory activity of the gonads.	Abstract	15-16
36	The hypothalamic-pituitary-adrenal system and its role in stress and adaptation.	<ol style="list-style-type: none">1. GNS glands2. The mechanism of action of hormones in stress3. GNS as stress system and adaptive hormones4. Physiological basis of stress	Animation	16-17

Guidelines for papers, reports, crossword puzzles, and abstracts.

Paper - a brief written summary of the content of scientific work on a given topic. This is an independent research work, where the student reveals the essence of the researched problem with elements of analysis on the topic of the abstract.

Gives different points of view, as well as their views on the problems of the topic of the abstract. The content of the abstract should be logical, and the presentation of the material should be of a thematic and problematic nature.

Requirements for the design of the abstract:

The volume of the abstract may vary within 9-10 printed pages.

The main sections: table of contents (outline), introduction, main content, conclusion, list of references.

The text of the abstract should contain the following sections:

- title page indicating: the name of the university, department, topic of the abstract, name of the author, and name of the teacher
- introduction, relevance of the topic.
- main section.
- conclusion (analysis of the results of the literature search); conclusions.
- the list of literary sources should have at least 10 bibliographic titles, including network resources.

The text part of the abstract is drawn up on a sheet of the following format:

- top indent - 2 cm; left indent - 3 cm; right indent - 1.5 cm; bottom indent - 2.5 cm;
- text font: Times New Roman, font height - 14, space - 1.5;
- page numbering - from the bottom of the page. The number is not placed on the first page.

The abstract should be completed competently with observance of the culture of presentation. There should be references to the literature used, including periodical literature for the last 5 years.



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A *report* is a type of brief but informative communication about the essence of the issue under consideration, and different opinions about the subject under study. In some cases, it is allowed to present the author's point of view within the framework of thematic issues.

Requirements for the design of the report:

The volume of the abstract should not exceed five printed pages.

A quality report has four main structural elements:

- 1) Introduction;
- 2) Introduction (at this stage the speaker should interest the audience, formulate the relevance and novelty of the research, and emphasise the importance and purpose of the work done).
- 3) Main part (it tells about the research methods used, the work done, analyses the results obtained);
- 4) Conclusion (it summarises the results of the work).

The text part of the report is drawn up on a sheet of the following format:

- top indent - 2 cm; left indent - 3 cm; right indent - 1.5 cm; bottom indent - 2.5 cm;
- text font: Times New Roman, font height - 14, space - 1.5;
- page numbering - from the bottom of the page. No number should be placed on the first page.

Crossword - is a puzzle task; its essence is to fill the intersecting rows of cells (vertically and horizontally) with words solved by the given list of definitions of the meaning of these words (questions).

Requirements for the design of the crossword puzzle:

- Type of crossword puzzle - classical;
- is not allowed to have blank cells in the grid crossword puzzle;
- are not allowed random letter combinations and crossings;
- puzzled words must be nouns in the nominative case;
- two-letter words must have two crossings;
- abbreviations are not allowed;
- no abbreviations are allowed;
- all texts must be written legibly;
- each sheet must have the author's surname;
- the drawing of the crossword puzzle must be clear;
- grids of all crossword puzzles should be made in duplicate: with filled words and only with numbers of positions;
- answers to the crossword puzzle published separately, they are designed to check the correctness of the solution of the crossword puzzle.



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Abstract - a type of extracurricular independent work of the student to create an overview of the information contained in the object of outlining, in a more concise form.

The abstract should reflect the main principle provisions of the source, the new things that the author has introduced, the main methodological provisions of the work, arguments, stages of proof and conclusions. The value of the outline is greatly enhanced if the student presents his/her thoughts in his/her own words, in a concise form.

The abstract should begin with the details of the source (author's surname, full name of the work, place and year of publication). Particularly significant places, examples are highlighted by colour underlining, framing, notes in the margins to draw attention to them and to remember them more firmly.

Guidelines for preparation for final examination.

Final examination in the form of a credit for the discipline "Normal Physiology" is carried out based on the results of attendance, and current and end-of-term (modular) control.

In this regard, to successfully pass the final control is recommended to attend all classes actively participate in classroom lessons, and the completion of independent work of the student.

All modules are conducted according to the module schedule. The tests themselves have three sections: exam, module, and practice mode. The exam and module are available according to the schedule, the training mode is available on the electronic educational platform www.test.edu.kg, where students can practice solving tests online.


Methodological materials are also available on the e-learning platform www.test.edu.kg. Each student has his/her ID number and password to log in to this platform. The student has the opportunity to log in from a computer, tablet, and phone, select a discipline for each topic of the selected discipline, and perform a test task (MCQ).

Methodological recommendations on students' research work.

The research work aims to develop the intellectual abilities of students using studying the algorithm of scientific research and acquiring initial experience of research project implementation on the educational material of the chosen speciality.

The main objectives and results of the research work are:

- acquiring scientific methods of cognition and deepening the theoretical knowledge of students in the speciality;
- mastering of modern methods of scientific research;

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- development of students' practical skills of independent search of scientific and technical information, conducting theoretical and/or experimental work;
- gaining the students' ability to analyze the results of the conducted research, and formulate conclusions and recommendations;
- development of students' ability to independent, creative, and active activity for continuous updating and enrichment of scientific baggage;
- identification of students with a pronounced motivation for scientific activity;
- development of analytical abilities and non-standard thinking.

When performing research work should master the following basic steps:

- independent search for information on a given topic;
- selection of essential information necessary for complete coverage of the studied problem, separation of this information from secondary information (within the given topic);
- analysing and synthesizing knowledge and research on the problem;
- summarising and classifying information on research problems;
- logical and consistent disclosure of the topic;
- summarising psychological knowledge on the problem and formulating conclusions from the literature review of the material;
- stylistically correct design of scientific thought of abstract type;
- competent design of scientific paper.

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- www.iprbookshop.ru.
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Course policy

- Obligatory attendance at classes.
- Compulsory presence of uniform (white medical gown and change of slippers, during laboratory classes, among other things, it is necessary to have a cap and non-sterile gloves).
- Active participation of the student in practical classes, preliminary preparation, and performance of homework.
- Qualitative and timely performance of tasks on SIW and SIWT.
- Participation in all types of control (current, midterm, final).

Additional requirements:

- Each missed class and/or leaving before the end of class for any reason counts as one missed class to be worked out,
- 2 points will be subtracted from the attendance score for each missed class, except for classes missed due to illness with a doctor's note from ISM IUK.
- The following will not be tolerated: the use of cell phones during classes, failure to submit assignments on time, and failure to comply with the subordination and rules of conduct.

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Assessment criteria

The control of students' knowledge is carried out according to the point-rating system in accordance with the standard "Regulations on the modular point-rating system for assessing the knowledge of students at the "Royal Medical University".

The discipline "Normal Physiology" includes 7 modules in 1-2 semesters, each module is evaluated by 100 points system:

Scoring Policy	Module 1	Module 2
Classroom work (activity in discussions, oral questioning)	40 points	40 points
Independent work	20 points	20 points
Report, etc.	40 points	40 points
Total per module:	100 points	100 points

Oral survey assessment criteria:

- The grade "excellent" is awarded to a student if he/she has given a logically structured, detailed, and correct answer to all the questions asked, with the demonstration of knowledge of the lecture material and additional literature, has given comprehensive answers to clarifying and additional questions;
- a grade of "good" is awarded to a student who has given a fully correct answer to the seminar questions with observance of the logic of the presentation of the material, but has made some inaccuracies in his/her answer that are not fundamental, as well as to a student who has not answered the additional questions clearly and exhaustively enough;
- a grade of "satisfactory" is awarded to a student who has shown incomplete knowledge, made mistakes and inaccuracies in answering the seminar questions, demonstrated the inability to logically build the material of the answer, and formulate a clear answer to additional or clarifying questions;
- the grade "unsatisfactory" is given to a student if he/she has not given an answer to the given questions, has given incorrect answers to all questions, has given incorrect answers containing factual errors, has not been able to answer additional and clarifying questions or has refused to answer.

PBL/TBL assessment criteria:

- the "excellent" grade is given to the student if the answer to the problem question is given correctly. Explanation of the course of its decision is detailed, consistent, and competent, with theoretical justifications (including from a lecture course), with the necessary schematic image and demonstration, with correct and free knowledge of physiological terminology; the answers to additional questions are correct, clear;



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- the "good" score is given to the student if the answer to the problem question is given correctly. An explanation of the course of its decision is detailed, but not logical enough, with isolated errors in details, some difficulties in theoretical justification (including from lecture material), with isolated errors in the use of physiological terms; the answers to additional questions are correct, but not clear enough;
- the "satisfactory" score is given to the student if the answer to the problem question is given correctly. The explanation of the course of its decision is not complete enough, inconsistent, with errors, weak theoretical justification (including lecture material), the answers to additional questions are not clear enough, with errors in detail;
- the "unsatisfactory" score is given to the student if the answer to the task question is incorrect. An explanation of the course of its decision is given incomplete, inconsistent, with gross errors, and without theoretical justification (including lecture material); The answers to additional questions are incorrect or missing.

Laboratory work assessment criteria:

- The grade "excellent" is given to the student if the laboratory work is performed with observance of safety rules; the protocol of laboratory work is executed during the class, it contains a detailed description of all stages of laboratory work. The correct detailed conclusion is given, confirmed by the signature of the teacher;
- The grade "good" is given to the student if the laboratory work is performed in compliance with safety rules; the protocol of the laboratory work is executed during the class; and the stages of the laboratory work are not described in sufficient detail. The conclusion, confirmed by the signature of the teacher, contains minor errors;
- the grade "satisfactory" is given to the student if the laboratory work is performed with minor violations of safety rules; the protocol of the laboratory work is executed during the class, but it lacks a description of some stages of the laboratory work. The conclusion, confirmed by the signature of the teacher, contains no gross errors;
- the grade "unsatisfactory" is given to the student if the laboratory work is performed with serious violations of safety rules, the protocol of the laboratory work is not executed during the class, or contains gross errors in the design and conclusion, as well as for failure to complete the laboratory work.



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MCQ testing assessment criteria:

- A grade of "excellent" is given to a student if he/she has given a correct answer to all questions;
- A "good" grade is given to a student if he/she gives one wrong answer out of five or two wrong answers out of ten;
- a "satisfactory" grade is given to a student if no more than two incorrect answers out of five or four incorrect answers out of ten are given;
- an "unsatisfactory" grade is given to a student if he/she gives more than half of the wrong answers.

Paper work assessment criteria:

- A grade "excellent" is given to a student if the topic of the abstract is fully disclosed, excellent mastery of the material is demonstrated, appropriate sources are used in the right amount, the structure of the work corresponds to the set tasks, the degree of independence of the work is high;
- A grade of "good" is given to a student, if the topic of the essay is disclosed, good mastery of the material is demonstrated, appropriate sources are used, the structure of the work corresponds to the set tasks, the degree of independence of the work is average;
- A grade of "satisfactory" is given to the student if the topic of the essay is poorly disclosed, satisfactory mastery of the material is demonstrated, the sources used and the structure of the work partially correspond to the tasks set, the degree of independence of the work is low;
- An "unsatisfactory" is given to a student if the topic of the abstract is not disclosed, unsatisfactory mastery of the material is demonstrated, the sources used are insufficient, the structure of the work does not correspond to the tasks set, and the work is not independent.

Report assessment criteria:

- A grade "excellent" is given to the student if the report has high relevance, the content of the report corresponds to the topic, the material is deeply elaborated, the sources are used competently and completely, the report is decorated in accordance with the requirements when defending the report the student demonstrated an excellent ability to lead a discussion and answer questions;
- a grade of "good" is given to a student if the report has high relevance, the content of the report corresponds to the topic, the material is sufficiently elaborated, the sources



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are used competently, minor errors are made in the design of the report, the student demonstrated a good ability to lead a discussion and answer questions when defending the report;

- the grade "satisfactory" is given to the student if the report is relevant, the content of the report corresponds to the topic, the material is sufficiently elaborated, the sources are used incompletely, minor mistakes are made in the design of the report, the student demonstrated insufficient skills in discussion and answering questions when defending the report;

- the grade "unsatisfactory" is given to the student if the report is not relevant, the content of the report does not correspond to the topic, the material is not sufficiently elaborated, the sources are used incompletely, gross errors are made in the design of the report, the student demonstrated insufficient skills in discussion and answering questions when defending the report.


Abstract assessment criteria:

- the "excellent" score is given to the student if the completeness of the use of educational material, the logic of presentation (the presence of schemes, the number of semantic connections between concepts), clarity (the presence of drawings, symbols, etc.; accuracy of execution, readability of the summary, literacy (terminological and spelling);

- the "good" score is given to the student if the use of educational material is not complete, it is not sufficiently logical to present (the presence of schemes, the number of semantic connections between concepts), clarity (the presence of drawings, symbols, etc.; accuracy of execution, readability of the summary, literacy (terminological and spelling), lack of related sentences;

- the "satisfactory" score is given to the student if the use of educational material is not complete, it is not sufficiently logical to present (the presence of schemes, the number of semantic connections between concepts), clarity (the presence of drawings, symbols, etc.; accuracy of execution, readability of the summary, literacy (terminological and spelling), lack of independence during compilation can be traced;

- the "unsatisfactory" score is given to the student if the use of educational material is not complete, there are no schemes, the number of semantic connections between concepts, there is no clarity (presence of drawings, symbols, etc.; accuracy of execution, readability of the summary, terminology and spelling errors, lack of independence in drafting were made.

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Crossword assessment criteria:

- A grade "excellent" is given to the student if the crossword puzzle successfully fits into any figure or image, all words of the crossword puzzle correspond to the topic, questions are formulated clearly, there are no spelling, grammatical, and speech errors;
- grade "good" is assigned to the student if the crossword puzzle fits well enough in any figure or image, all the words of the crossword puzzle correspond to the theme, questions are formulated clearly, there are spelling, grammatical and speech errors;
- A grade "satisfactory" is assigned to the student if the crossword puzzle does not fit into any figure or image, not all the words of the crossword puzzle correspond to the theme, questions are not formulated clearly enough, there are spelling, grammatical and speech errors;
- A grade "unsatisfactory" is assigned to the student if the crossword puzzle is not completed or does not fit into any figure or image, most of the words of the crossword puzzle do not correspond to the topic, questions are not formulated, there are spelling, grammatical and speech errors.

Assessment criteria for table completion:

- grade "excellent" is assigned to a student if the table is filled in accurately, all cells contain the correct information, and is designed neatly and graphically, with high independence of work performance;
- a grade "good" is awarded to a student if the table is filled in completely, there are single errors in the table, it is neatly and graphically designed, with sufficient independence of work performance;
- a "satisfactory" grade is given to a student if the table is filled in inaccurately and incompletely, there are errors in the table, it is designed sloppily, the degree of independence of work performance is low;
- "unsatisfactory" grade is given to a student if the table is not filled in if the table is filled in inaccurately, if there are gross errors in the table if the table is inaccurately designed, if the degree of independence of work performance is low.

Presentation assessment criteria:

- A grade "excellent" is assigned to the student if the presentation corresponds to the topic of the independent work, the title slide with the title (topic, goals, plan, etc.) is designed; the formulated topic is clearly stated and structured; graphic images (photos, pictures, etc.) corresponding to the topic are used, the style, color scheme is maintained, animation, sound is used, the work is designed and submitted in due time;



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- A grade of "good" is given to the student if the presentation corresponds to the topic of the independent work, the title slide with the title (topic, objectives, plan, etc.) is designed, the formulated topic is clearly stated and structured, graphic images (photos, pictures, etc.) corresponding to the topic are used, the work is designed and submitted in due time;
- A grade of "satisfactory" is given to the student if the presentation does not fully correspond to the topic of the independent work, the title slide with the title (topic, objectives, plan, etc.) is designed, the formulated topic is not sufficiently outlined and structured, graphic images (photos, pictures, etc.) corresponding to the topic are not used, the work is designed and submitted in due time;
- A grade "unsatisfactory" is given to the student if the presentation does not correspond to the topic of the independent work, the title slide with the title (topic, objectives, plan, etc.) is not designed, the formulated topic is not sufficiently outlined and structured, graphic images (photos, pictures, etc.) corresponding to the topic are not used, the work is not designed or submitted in due time.

Final control in the form of credit is held at the end of the semester, and based on the results of mid-term control.

Form of final control in 1st semester – credit.

The following grading scale is used for students' knowledge assessment:

Scale of correspondence of grades and points				
Maximum score	Intervals			
	«unsatisfactory»	«satisfactory»	«good»	«excellent»
20	0-11	12-15	16-17	18-20
40	0-23	24-30	31-35	36-40
60	0-35	36-45	46-53	54-60
100	0-59	60-75	76-89	90-100

Help: for consultations on the completion of independent works (SIW/SIWT), their submission and defence, as well as for additional information on the material covered and all other arising questions on the course, please contact the teacher MON, WED (08:00-16:00).