Khanty-Mansiysk Autonomous Okrug-Ugra
"Surgut State University"

Approved by
Deputy Rector for Academic Affairs

_____E.V. Konovalova

"11 " June 2026, Record No. 5

Normal Physiology

Syllabus

Department	**Morphology and physiology**
Curriculum	s310501- ЛечДелоИн-25-2.plx Specialty 31.05.01 General Medicine
Qualification	**General Practitioner**
Form of education	**Full time**
Total (in credits)	**7**

Total academic hours	252	Control:
including:		Exam, 4th term
Classes	160	
Self-study	65	
Control hours	27	

Course outline in terms

Academic year (Term)	**3 (2.1)**		**4 (2.2)**		Total	
Weeks	17 2/6		17 2/6			
Types of classes	Cur	Syl	Cur	Syl	Cur	Syl
Lectures	16	16	16	16	32	32
Practical	64	64	64	64	128	128
Classes total	80	80	80	80	160	160
Self-study	28	28	19	19	47	47
Control hours			45	45	45	45
Total	108	108	144	144	252	252

The Syllabus is compiled by:

PhD in Biological Sciences (Biology), Associate Professor, Maltsev V.P.

The Syllabus

Hominal Physiology

Developed in accordance with Federal State Educational Standard:

Federal State Educational Standard of higher education in the specialty 31.05.01 General medicine (Order of the Ministry of Education and Science of the Russian Federation on August, 12, 2020. №988)

Based on the Curriculum:

31.05.01 GENERAL MEDICINE
Specialization: General Medicine

Approved by the Academic Council of Surgut State University, “11” June 2026, Record No. 5

The Syllabus was approved by the department

Morphology and physiology

Head of Department, Doctor of Medicine, Professor Stolyarov V.V.

1. COURSE OBJECTIVES	
1.1	The aim of the course of Normal Physiology is to create the basis for a sufficiently broad theoretical training in the field of medical physiology, allowing students to master their knowledge and form the ideas about functioning of the human body, its systems, organs, tissues and cells, the basic mechanisms, regulations in the human body, the influence of environmental factors. It also develops skills in making a preliminary diagnosis and providing qualified medical care at the prehospital stage and of professional competencies through the systematic approach to get the current knowledge in the field of general and particular physiology.

2. COURSE OVERVIEW	
Course code (in	B1.O.04.10
2.1	**Assumed background:**
	Latin Language
	Foreign Language (English)
	Biology
	Physics, Mathematics
	Chemistry
	Histology, Embryology, Cytology
	Human Anatomy
2.2	**Post-requisite courses and practice:**
	Microbiology, Virology
	Hygiene
	Immunology and Allergology
	Pathophysiology
	Clinical Pathophysiology
	Pharmacology

3. COMPETENCES UPON COMPLETION OF THE COURSE (MODULE)

GPC-5.1: Demonstrates knowledge and understanding in the sections of fundamental medicine - anatomical, histological structures (anatomy of the human body, tissue structure of organs and their microscopic differentiation), physiological processes (human physiology, mechanisms of regulation of homeostasis, functional systems of the body in norm)

By the end of the course students must:

3.1	**Know:**
3.L1.1	principle analysis of social problems in various types of professional and social activities
3.L1.2	the subject and the tasks of the discipline
3.1.3	the role, place and connection of the discipline with other sciences in the system of biological and medical disciplines
3.1.4	the main historical stages of the discipline development
3.1.5	the basic concepts of medical physiology
3.2	**Be able to:**
3.2.1	use the methods of the human study, natural sciences, biomedical and clinical sciences in various types of professional and social activities
3.2.2	use the acquired knowledge in the study of other biomedical and medical disciplines
3.2.3	interpret and apply the basic concepts of medical physiology in the study of biomedical and medical literature and when working with medical specialists

4. STRUCTURE AND CONTENTS OF THE COURSE (MODULE)

Class Code	Topics /Class type	Term / Academic year	Academic hours	Competences	Literature	Interactive	Notes
	Module 1. General properties of excitable						

1.1	The structure of biomembranes, their properties and functions. Membrane proteins, their types and role. Receptor functions of cell membranes. Membrane receptors, their properties. Inotropic receptors. Metabotropic receptors, their varieties. Participation in the implementation of effects **/Lecture/**	3	4	(GPC)-5.1	L1.1;L1.2;L1.3 L2.1; L2.2; L2.2; L2.4; L2.5 L3.1; L3.2; E1		
L1.2	Bioelectric signals in excitable tissues **/Practice/**	3	12	(GPC)-5.1	L1.1;L1.2;L1.3 L2.1; L2.2; L2.2; L2.4; L2.5 L3.1; L3.2; E1		
	Module 2. General characteristics of central nervous system						
2.1	General principles of functional regulation. Nervous functional regulation **/Lecture /**	3	4	(GPC)-5.1	L1.1;L1.2;L1.3 L2.1; L2.2; L2.2; L2.4; L2.5 L3.1; L3.2; E1		
2.2	Characteristics of excitable tissues. Bioelectric phenomena in cells and tissues. Irritability and excitability of cells and tissues. Measurement of excitability. Neuron. Properties of neurons. The laws of the excitation in nerve fibers. Properties of synapses. Parabiosis. **/Practice/**	3	8	(GPC)-5.1	L1.1;L1.2;L1.3 L2.1; L2.2; L2.2; L2.4; L2.5 L3.1; L3.2; E1		
2.3	Membrane transport protein. Facilitated transport. Active transport, its types and features **/Self – study/**	3	6	(GPC)-5.1	L1.1;L1.2;L1.3 L2.1; L2.2; L2.2; L2.4; L2.5 L3.1; L3.2; E1		
	Module 3. Private CNS and ANS						
3.1	Private physiology of the central nervous system. Dorsal, midbrain and posterior brain. Cerebellum. Intermediate brain **/Lecture/**	3	2	(GPC)-5.1	L1.1;L1.2;L1.3 L2.1; L2.2; L2.2; L2.4; L2.5 L3.1; L3.2; E1		
3.2	Forebrain. Limbic system. Basal ganglia. Cerebral cortex. Functional brain asymmetry **/Practice/**	3	12	(GPC)-5.1	L1.1;L1.2;L1.3 L2.1; L2.2; L2.2; L2.4; L2.5 L3.1; L3.2; E1		
3.3	Physiology of the spinal cord, medulla oblongata and brain, midbrain, cerebellum, reticular formation, diencephalon, subcortical structures, and the cerebral cortex **/Self – study/**	3	8		L1.1;L1.2;L1.3 L2.1; L2.2; L2.2; L2.4; L2.5 L3.1; L3.2; E1		
	Module 4. Endocrine system						

4.1	Thyroid and parathyroid glands. Pancreas, adrenal glands. Sex glands. Physiology of reproductive function. Endocrine function of non-endocrine organs **/Lecture/**	3	2	(GPC)-5.1	L1.1;L1.2;L1.3 L2.1; L2.2; L2.2; L2.4; L2.5 L3.1; L3.2; E1		
4.2	Humoral and hormonal regulation. Hypothalamic-pituitary system **/Practice/**	3	8	(GPC)-5.1	L1.1;L1.2;L1.3 L2.1; L2.2; L2.2; L2.4; L2.5 L3.1; L3.2; E1		
4.3	Menstrual cycle. Conception, pregnancy, birth. Contraception. Male potency **/Self – study /**	3	8	(GPC)-5.1	L1.1;L1.2;L1.3 L2.1; L2.2; L2.2; L2.4; L2.5 L3.1; L3.2; E1		
	Module 5. Blood						
5.1	General properties of blood. Leukocytes **/Lecture/**	3	2	(GPC)-5.1	L1.1;L1.2;L1.3 L2.1; L2.2; L2.2; L2.4; L2.5 L3.1; L3.2; E1		
5.2	Hemostasis, its types. **/Lecture/**	3	2	(GPC)-5.1	L1.1;L1.2;L1.3 L2.1; L2.2; L2.2; L2.4; L2.5 L3.1; L3.2; E1		
5.3	Erythrocytes. Hemoglobin. Blood groups. System AB0. Rhesus factor. Rules of blood transfusion. Platelet properties. Hemocoagulation. Anticoagulant and fibrinolytic blood systems. **/Practice/**	3	20	(GPC)-5.1	L1.1;L1.2;L1.3 L2.1; L2.2; L2.2; L2.4; L2.5 L3.1; L3.2; E1		
5.4	Anticoagulants. Fibrinolytic blood system. **/ Self – study /**	3	6	(GPC)-5.1	L1.1 L1.2		
5.5	Control work	3	0	(GPC)-5.1	L1.1;L1.2;L1.3 L2.1; L2.2; L2.2; L2.4; L2.5 L3.1; L3.2; E1		
	Module 6. Blood circulation						
6.1	Functional characteristics of the circulatory system. Regulation of the heart. External manifestations of cardiac activity (mechanical, sound). **/Practice/**	3	4	(GPC)-5.1	L1.1;L1.2;L1.3 L2.1; L2.2; L2.2; L2.4; L2.5 L3.1; L3.2; E1		
6.2	Physiological properties of the heart muscles **/Lecture/**	4	4	(GPC)-5.1	L1.1;L1.2;L1.3 L2.1; L2.2; L2.2; L2.4; L2.5 L3.1; L3.2; E1		
6.3	Vascular tone. Systemic hemodynamics. Blood pressure. Microcirculation. Features of blood circulation in various organs. Regulation of systemic hemodynamics. **/Practice/**	4	16	(GPC)-5.1	L1.1;L1.2;L1.3 L2.1; L2.2; L2.2; L2.4; L2.5 L3.1; L3.2; E1		

6.4	Methods for the study of blood vessels, blood pressure measurement. Organ circulation, methods of its examination **/Self – study/**	4	4	(GPC)-5.1	L1.1;L1.2;L1.3 L2.1; L2.2; L2.2; L2.4; L2.5 L3.1; L3.2; E1		
	Module 7. Breathing and Excretion						
7.1	External breathing. Biomechanics of respiration. Water-salt metabolism. Physiology of secretion. Renal Physiology **/Lecture /**	4	4	(GPC)-5.1	L1.1;L1.2;L1.3 L2.1; L2.2; L2.2; L2.4; L2.5 L3.1; L3.2; E1		
7.2	Gaseous exchange. Respiration **/Practice/**	4	16	(GPC)-5.1	L1.1 L1.2		
7.3	Water balance, factors to maintain balance, and water regulation. Water spaces, their characteristic. **/Self – study/**	4	2		L1.1 L1.2		
	Module 8. Digestion and metabolism						
8.1	The physiology of digestion. Methods for studying the functions of the digestive tract. Functions of the digestive tract. Secretory function of the gastrointestinal tract. **/Lecture/**	4	2	(GPC)-5.1	L1.1;L1.2;L1.3 L2.1; L2.2; L2.2; L2.4; L2.5 L3.1; L3.2; E1		
8.2	Motor, absorption and excretory functions of the gastrointestinal tract. Regulation of digestion. Metabolism. Heat exchange. Thermoregulation. Energy exchange. Methods for estimating energy consumption **/Practice/**	4	16	(GPC)-5.1	L1.1;L1.2;L1.3 L2.1; L2.2; L2.2; L2.4; L2.5 L3.1; L3.2; E1		
8.3	The secretory function of the gastrointestinal tract **/Self – study/**	4	4	(GPC)-5.1	L1.1 L1.2		
	Module 9. Analyzers						
9.1	General properties of analyzers **/Lecture/**	4	2	(GPC)-5.1	L1.1 L1.2		
9.2	Private physiology of analyzers (auditory, vestibular, tactile, taste and temperature analyzers) **/Practice/**	4	8	(GPC)-5.1	L1.1 L1.2		
9.3	Physiology of pain perception. Nociception and anti-nociception. **/Self – study/**	4	2	(GPC)-5.1	L1.1 L1.2		
	Module 10. Higher nervous activity						
10.1	Congenital and acquired behaviors. Unconditioned	4	4	(GPC)-5.1	L1.1;L1.2;L1.3 L2.1; L2.2;		

	reflexes, instincts. Conditioned reflexes. Dynamic stereotype **/Lecture/**				L2.2; L2.4; L2.5 L3.1; L3.2; E1		
10.2	Congenital and acquired behaviors. Conditioned reflexes. Types of higher nervous activity. Methods for evaluating behavioral responses. Emotions. Motivations. Memory. Architectonics of a focused behavioral act. Methods of memory evaluating **/Practice/**	4	8	(GPC)-5.1	L1.1;L1.2;L1.3 L2.1; L2.2; L2.2; L2.4; L2.5 L3.1; L3.2; E1		
10.3	Stress and adaptation. Mechanisms of urgent and long-term adaptation. **/Self – study/**	4	7	(GPC)-5.1	L1.1;L1.2;L1.3 L2.1; L2.2; L2.2; L2.4; L2.5 L3.1; L3.2; E1		
10.4	Control work	4	0	(GPC)-5.1	L1.1;L1.2;L1.3 L2.1; L2.2; L2.2; L2.4; L2.5 L3.1; L3.2; E1		
10.5	Exam	4	45	(GPC)-5.1	L1.1;L1.2;L1.3 L2.1; L2.2; L2.2; L2.4; L2.5 L3.1; L3.2; E1		

5. ASSESSMENT TOOLS

5.1. Tests and tasks

Presented by a single document

5.2. Topics for written papers

Presented by a single document

6. COURSE (MODULE) RESOURCES

6.1. Recommended Literature

6.1.1. Core

	Authors	Title	Publish, year	Quantity
L1.1	Hall, John E.	Guyton and Hall Textbook of Medical Physiology	Philadelphia: Elsevier, cop.2019	31
L1.2	Lapkin M.M., Trutneva E.A.	Selected Lectures on Normal [Electronic resource]: study guide in Russian and English	M.: GEOTAR- Media. 2019, Electronic resource	1
L1.3	Sudakov K.V., V. Andrianov.V., Vagin Yu.E.,	Human Physiology: Atlas of dynamic circuits: educational visual aid	Moscow: GEOTAR - Media, 2015, electronic resource	1

6.1.2. Supplementary

	Authors	Title	Publish., year	Quantity
L2.1	Belchenko L. A., Lavrinenko V. A.	Human physiology. The organism as a whole: Educational and Methodical complex	Novosibirsk: Siberian University Publishing House, 2017, electronic	10
L2.2	Brin V. B.	Human physiology in diagrams and tables	Moscow: Lan, 2017, electronic resource	1
L2.3	Kapilevich L. V.	Human physiology. Sport: Textbook	Moscow: building Yurayt, 2019, electronic resource	1
L2.4	Degtyarev V.P., Sorokina N.D.	Normal physiology: textbook	Moscow: GEOTAR - Media, 2016, electronic resource	2

L2.5	Gribanova O. V., Novikova E. I., Shcherbakova T. G.	Anatomy and physiology of the cardiovascular system: Textbook	Volgograd: Volgograd State Socio-Pedagogical University, 2016, electronic resource	1

6.1.3. Methodological developments

	Authors	Title	Publish., year	Quantity
L3.1	Sai Yu. V.	Workbook on the academic discipline "Human anatomy and physiology"	Moscow: Lan, 2017, electronic resource	1
L3.2	Yurina M. A., Lopatskaya Zh. N.	Normal physiology: guidelines for performing laboratory work	Surgut: Publishing Center of SurGU, 2020, electronic resource	1

6.2. Internet resources

E1	FreeMedicalJournals, http://www.freemedicaljournals.com

6.3.1 Software

6.3.1.1	Operational system Microsoft, applied programs pack Microsoft Office

6.3.2 Information Referral systems

6.3.2.1	"Garant", http:// www .garant.ru
6.3.2.2	"Consultant-plus", http://www.consultant.ru

7. MATERIAL AND TECHNICAL SUPPORT OF DISCIPLINE (MODULE)

Classroom for conducting classes lectures, seminars (laboratory classes), group and individual consultations, current control and interim certification. individual consultations, current control and interim certification equipped with: a set of specialised teaching furniture, marker (chalk) board, a set of portable multimedia equipment. blackboard, a set of portable multimedia equipment - computer, projector, projector, projection screen, computers with Internet access and access to the electronic information and educational environment. electronic information and educational environment. Access to the Internet and the electronic information environment of the organisation is provided. Internet and electronic information environment of the organisation. Information about information about the equipment of classrooms is located on the university website at the following address: Information about the educational organisation - Material and technical support of the organisation. Educational organisation - Material and technical support and equipment of the educational process. equipment of the educational process.