

Biology

Syllabus

Assigned to the department	Morphology and Physiology
Curriculum	s310501-ЛечДелоИн-23-1.plx Specialty 31.05.01 General Medicine
Qualification	General Practitioner
Form of education	Full-time
Total (in credits)	5

Total academic hours	180	Control:
including:		Exam, 2nd term
Classes	96	
Self-study	39	
control hours	45	

Course outline in terms

Academic year (Term)	1 (1.1)		2 (1.2)		Total	
	Weeks					
Types of classes	Cur	Syl	Cur	Syl	Cur	Syl
Lectures	16	16	16	16	32	32
Practical	32	32	32	32	64	64
Classes total	48	48	48	48	96	96
Control	48	48	48	48	96	96
Self-study	24	24	15	15	39	39
Control hours			45	45	45	45
Total	72	72	108	108	180	180

The Syllabus is compiled by:

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The Syllabus

Biology

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 12.08. 2020 №988)

Based on the Curriculum:

31.05.01 GENERAL MEDICINE

Specialization: General Medicine

Approved by the Academic Council of Surgut State University, 15.06.2023 Record № 5.

The Syllabus was approved by the department

Morphology and physiology

Head of Department, PhD in Medicine, Professor Stolyarov V.V._____

1. COURSE OBJECTIVES

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|-----|---|
| 1.1 | The purpose of studying the discipline "Biology" is the formation of students' systemic fundamental knowledge, skills and abilities of the greatest interest for practical healthcare, in preparing students for the systematic perception of general medical, social and clinical disciplines and the formation of their natural science worldview and the logic of biological thinking necessary for the subsequent practical activity of a doctor. |
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2. COURSE OVERVIEW

Course code (in curriculum):	B1.O.04
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2.1 Assumed background:

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| 2.1.1 | Biology (school course). Be able to: analyze biological phenomena and patterns of natural processes. |
| 2.1.2 | Have skills of: working with a microscope, models, macro-and micro-preparations of animals; working with literature in Biology, lecture notes and the theoretical part of practical classes. |

2.2 Post-requisite courses and practice:

- | | |
|-------|---|
| 2.2.1 | Histology, Embryology, Cytology |
| 2.2.2 | Biochemistry |
| 2.2.3 | Hominal Physiology |
| 2.2.4 | Microbiology, Virology |
| 2.2.5 | Neurology, Medical Genetics, Neurosurgery |
| 2.2.6 | Internal Diseases Propaedeutics |
| 2.2.7 | Paediatrics, Childhood Infections |
| 2.2.8 | Obstetrics |

3. COMPETENCES UPON COMPLETION OF THE COURSE (MODULE)

GPC-5.2: Knows the structure of the cell, the phases of its division, the theoretical principles of genetics and the biology of insects and helminths, their role in the etiology of human diseases

GPC-5.5: Knows the structure and physiology of microorganisms, their role in the etiology of human diseases

By the end of the course students must

3.1 Know:

- | | |
|-------|--|
| 3.1.1 | Safety regulations and work in biological laboratories with reagents, devices, animals |
| 3.1.2 | General laws of the origin and development of life, the structure of the cell, the phases of its division, human anthropogenesis and ontogenesis; theoretical foundations of genetics, its significance for medicine, the laws of heredity and variability in individual development as the basis for understanding the pathogenesis and etiology of hereditary and multifactorial human diseases; basic concepts and problems of the biosphere and ecology, the phenomenon of parasitism, understanding of the biology of insects and helminths, their role in the etiology of human diseases; features of the organizational and population levels of the organization of life |

3.2 Be able to:

3.2.1	Use educational, scientific, popular science literature, the Internet for professional activities; use biological equipment; work with magnifying equipment (microscopes, optical and simple magnifiers); make calculations based on the results of the experiment, to carry out elementary statistical processing of experimental data; explain the nature of deviations in the course of development that can lead to the formation of variants of anomalies and defects; describe the morphological changes of the studied macroscopic, microscopic preparations and electronograms; diagnose the pathogens of human parasitic diseases on the drug, slide, and photo.
3.3	Have skills of:
3.3.1	Basic information conversion technologies: text, table editors, Internet search; microscopy and analysis of histological preparations and electronic microphotographs.

4. STRUCTURE AND CONTENTS OF THE COURSE (MODULE)						
Class Code	Topics /Class type	Term / Academic	Academic hours	Competences	Literature	Interactive
	Section 1. Introduction. The device of a light microscope and the technique of microscopy. Cellular level of life organization					
1.1	Cell biology. The cellular level of the organization of life / Lec /	1	2	GPS-5.2 GPS-5.5	1.1 1.3 1.4 1.5 2.1 2.3 2.4 E1 E2 E3 E4 E5	
1.2	The structural and functional organization of the hereditary material and its implementation into a trait. The structural organization of the core. Spatial arrangement of chromosomes. The role of nuclear structures in the vital activity of the cell. The mechanism of mutagenesis. Replication. The mechanism of repair / Lec /	1	2	GPS-5.2 GPS-5.5	1.1 1.3 1.4 1.5 2.1 2.3 2.4 E1 E2 E3 E4 E5	
1.3	The device of a light microscope and the technique of microscopy. The cellular level of the organization of biological systems. Structure and functions of organelles /Pr/	1	2	GPS-5.2 GPS-5.5	1.1 1.3 1.4 1.5 2.1 2.3 2.4 E1 E2 E3 E4 E5	
1.4	Cell membranes. Vesicular transport /Pr/	1	2	GPS-5.2 GPS-5.5	1.1 1.3 1.4 1.5 2.1 2.3 2.4 E1 E2 E3 E4 E5	
1.5	Cytoskeleton and structural proteins, intracellular transport, signaling and adhesion. Mitochondria and energy metabolism. Cellular respiration /Pr/	1	2	GPS-5.2 GPS-5.5	1.1 1.3 1.4 1.5 2.1 2.3 2.4 E1 E2 E3 E4 E5	
1.6	Reproduction at the cellular level. Cell cycle, mitosis, apoptosis, the mechanism of cell death. Levels of regulation of gene expression. Transcription. Broadcast /Pr/	1	2	GPS-5.2 GPS-5.5	1.1 1.3 1.4 1.5 2.1 2.3 2.4 E1 E2 E3 E4 E5	
1.7	Colloquium on the topic: "The cellular level of the organization of life" /Pr/	1	2	GPS-5.2 GPS-5.5	1.1 1.3 1.4 1.5 2.1 2.3 2.4 E1 E2 E3 E4 E5	Oral quiz

1.8	Preparation for an oral quiz, tests / Self-study /	1	8	GPS-5.2 GPS-5.5	1.1 1.3 1.4 1.5 2.1 2.3 2.4 E1 E2 E3 E4 E5	
Section 2. Organism (ontogenetic) level of biological system organization						
2.1	Developmental biology. Prenatal ontogenesis / Lec /	1	2	GPS-5.2	1.1 1.3 1.4 1.5 2.1 2.3 2.4 E1 E2 E3 E4 E5	
2.2	Developmental biology. Postnatal ontogenesis / Lec /	1	2	GPS-5.2	1.1 1.3 1.4 1.5 2.1 2.3 2.4 E1 E2 E3 E4 E5	
2.3	Regulation of ontogenesis / Lec /	1	2	GPS-5.2	1.1 1.3 1.4 1.5 2.1 2.3 2.4 E1 E2 E3 E4 E5	
2.4	Homeostasis / Lec /	1	2	GPS-5.2	1.1 1.3 1.4 1.5 2.1 2.3 2.4 E1 E2 E3 E4 E5	
2.5	Ontogenesis. General regularities of progenesis, embryogenesis, postembryonic period of ontogenesis / Pr /	1	2	GPS-5.2	1.1 1.3 1.4 1.5 2.1 2.3 2.4 E1 E2 E3 E4 E5	
2.6	Regulation of ontogenesis / Pr /	1	2	GPS-5.2	1.1 1.3 1.4 1.5 2.1 2.3 2.4 E1 E2 E3 E4 E5	
2.7	Colloquium on the topic: "The main patterns of individual development". "Homeostasis" / Pr /	1	2	GPS-5.2	1.1 1.3 1.4 1.5 2.1 2.3 2.4 E1 E2 E3 E4 E5	
2.8	Preparation for an oral quiz, tests / Self-study /	1	8	GPS-5.2	1.1 1.3 1.4 1.5 2.1 2.3 2.4 E1 E2 E3 E4 E5	
Section 3. Population-specific level of living systems organization. Questions of evolution						

3.1	The evolutionary doctrine / Lec /	1	2	GPS-5.2	1.1 1.3 1.4 1.5 2.1 2.3 2.4 E1 E2 E3 E4 E5	
3.2	Evolution of Organ Systems / Lec /	1	2	GPS-5.2	1.1 1.3 1.4 1.5 2.1 2.3 2.4 E1 E2 E3 E4 E5	
3.3	The evolutionary doctrine. Man as an object of the action of evolutionary factors. The evolution of the musculoskeletal system. Phylogenetically determined defects of the musculoskeletal system / Pr /	1	2	GPS-5.2	1.1 1.3 1.4 1.5 2.1 2.3 2.4 E1 E2 E3 E4 E5	
3.4	The evolution of the digestive system. Phylogenetically determined defects of the digestive system / Pr /	1	2	GPS-5.2	1.1 1.3 1.4 1.5 2.1 2.3 2.4 E1 E2 E3 E4 E5	
3.5	The evolution of the respiratory system. Phylogenetically determined defects of the respiratory system / Pr /	1	2	GPS-5.2	1.1 1.3 1.4 1.5 2.1 2.3 2.4 E1 E2 E3 E4 E5	
3.6	The evolution of the circulatory system. Phylogenetically determined heart and vascular defects / Pr /	1	2	GPS-5.2	1.1 1.3 1.4 1.5 2.1 2.3 2.4 E1 E2 E3 E4 E5	
3.7	Evolution of the excretory system. Phylogenetically determined defects of the excretory system / Pr /	1	2	GPS-5.2	1.1 1.3 1.4 1.5 2.1 2.3 2.4 E1 E2 E3 E4 E5	
3.8	The evolution of integration systems: nervous, endocrine. Phylogenetically determined defects of integration systems / Pr /	1	2	GPS-5.2	1.1 1.3 1.4 1.5 2.1 2.3 2.4 E1 E2 E3 E4 E5	
3.9	Colloquium on the topic: "Evolution of organ systems" / Pr /	1	2	GPS-5.2	1.1 1.3 1.4 1.5 2.1 2.3 2.4 E1 E2 E3 E4 E5	
3.10	Final lesson / Pr /	1	2	GPS-5.2	1.1 1.3 1.4 1.5 2.1 2.3 2.4 E1 E2 E3 E4 E5	

3.11	Control work / Control	1	0	GPS-5.2	1.1 1.2 1.3 1.4 1.5 2.1 2.2 2.3 2.4 3.1 E1 E2 E3 E4 E5	presentation of Essays
3.12	Preparation for an oral quiz, tests. Writing Essays / Self-study /	1	8	GPS-5.2	1.1 1.2 1.3 1.4 1.5 2.3 2.4 3.1 E1 E2 E3 E4 E5	
Section 4. Human genetics and anthropogenesis						
4.1	Human genetics and anthropogenesis / Lec /	2	2	GPS-5.2	1.1 1.3 1.4 1.5 2.3 2.4 E1 E2 E3 E4 E5	
4.2	Human genetics. The role of genetic factors and the environment in the formation of the phenotype. Genotype - an evolutionarily developed system of genes / Pr /	2	2	GPS-5.2	1.1 1.3 1.4 1.5 2.3 2.4 E1 E2 E3 E4 E5	
4.3	Concatenated inheritance. Genetics of sex. Gender-linked inheritance / Pr /	2	2	GPS-5.2	1.1 1.3 1.4 1.5 2.3 2.4 E1 E2 E3 E4 E5	
4.4	Variability and its forms / Pr /	2	2	GPS-5.2	1.1 1.3 1.4 1.5 2.3 2.4 E1 E2 E3 E4 E5	
4.5	Anthropogenesis / Pr /	2	2	GPS-5.2	1.1 1.3 1.4 1.5 2.3 2.4 E1 E2 E3 E4 E5	
Section 5. Biogeocenotic and biospheric levels of biological systems organization						
5.1	Ecology. General ecology. The main sections. General characteristics of the ecological system. Environmental factors. Endo -, out -, dem -, synecology/ Human Ecology. The doctrine of the biosphere / Lec /	2	4	GPS-5.2	1.1 1.3 1.4 1.5 2.3 2.4 E1 E2 E3 E4 E5	
5.2	General ecology, human ecology, medical ecology / Pr /	2	2	GPS-5.2	1.1 1.3 1.4 1.5 2.3 2.4 E1 E2 E3 E4 E5	
5.3	Colloquium on the topic: "Human genetics. Anthropogenesis. Ecology" / Pr /	2	2	GPS-5.2	1.1 1.3 1.4 1.5 2.3 2.4 E1 E2 E3 E4 E5	

	Section 6. General and medical parasitology					
6.1	Parasitism as an ecological phenomenon. Human parasitic diseases / Lec /	2	2	GPS-5.2	1.1 1.3 1.4 1.5 1.6 2.3 2.4 E1 E2 E3 E4 E5	
6.2	General and Medical protozoology / Lec /	2	2	GPS-5.2	1.1 1.3 1.4 1.5 1.6 2.3 2.4 E1 E2 E3 E4 E5	
6.3	Fundamentals of medical protozoology. The Sarcodes class. Flagellate class / Pr /	2	2	GPS-5.2	1.1 1.3 1.4 1.5 1.6 2.3 2.4 E1 E2 E3 E4 E5	
6.4	The Sporoviki class. Infusoria Class / Pr /	2	2	GPS-5.2	1.1 1.3 1.4 1.5 1.6 2.3 2.4 E1 E2 E3 E4 E5	
	Section 7. General and Medical Helminthology					
7.1	General and medical helminthology / Lec /	2	4	GPS-5.2	1.1 1.3 1.4 1.5 1.6 2.3 2.4 E1 E2 E3 E4 E5	
7.2	Basic concepts of helminthology. Species Flatworms. Class Flukes. System organization and morphology. Life cycle / Pr /	2	2	GPS-5.2	1.1 1.3 1.4 1.5 1.6 2.3 2.4 E1 E2 E3 E4 E5	
7.3	Basic concepts of helminthology. Species Flatworms. Class Tapeworms. System organization and morphology. Life cycle / Pr /	2	2	GPS-5.2	1.1 1.3 1.4 1.5 1.6 2.3 2.4 E1 E2 E3 E4 E5	
7.4	Roundworms. Class Actually round. System organization and morphology / Pr /	2	2	GPS-5.2	1.1 1.3 1.4 1.5 1.6 2.3 2.4 E1 E2 E3 E4 E5	
7.5	Species Ringed Worms. Class Leech / Pr /	2	2	GPS-5.2	1.1 1.3 1.4 1.5 1.6 2.3 2.4 E1 E2 E3 E4 E5	
	Section 8. General and medical arachnoentomology					

8.1	General and medical arachno- entomology / Lec /	2	2	GPS-5.2	1.1 1.3 1.4 1.5 1.6 2.3 2.4 E1 E2 E3 E4 E5
8.2	Type Arthropods. Subtype Toad. Class Crustaceans / Pr /	2	2	GPS-5.2	1.1 1.3 1.4 1.5 1.6 2.3 2.4 E1 E2 E3 E4 E5
8.3	Type Arthropods. Subtype Helicer. Spider-like class / Pr /	2	2	GPS-5.2	1.1 1.3 1.4 1.5 1.6 2.3 2.4 E1 E2 E3 E4 E5
8.4	Type Arthropods. Subtype Tracheus. Insect Class / Pr /	2	2	GPS-5.2	1.1 1.3 1.4 1.5 1.6 2.3 2.4 E1 E2 E3 E4 E5
8.5	Colloquium on the topic: " Fundamentals of medical parasitology" / Pr /	2	2	GPS-5.2	1.1 1.3 1.4 1.5 1.6 2.3 2.4 E1 E2 E3 E4 E5
8.6	Preparation for an oral quiz, tests. Solving situational problems. Writing Essays / Self-study /	2	15	GPS-5.2	1.1 1.3 1.4 1.5 1.6 2.3 2.4 E1 E2 E3 E4 E5
8.7	Control work / Control /	2	0	GPS-5.2	
8.8	Exam / Exam /	2	45	GPS-5.2 GPS-5.5	1.1 1.2 1.3 1.4 1.5 1.6 1.7 2.1 2.2 2.3 2.4 3.1 E1 E2 E3 E4 E5

5. ASSESSMENT TOOLS

5.1. Assessment tools

Presented by a single document

5.2. Assessment tools for diagnostic testing

Presented by a single document

6. COURSE (MODULE) RESOURCES

6.1. Recommended Literature

6.1.1. Core				
	Authors	Title	Publish., year	Quantity
1.1	Khandogina E.K., Terekhova I.D., Zhilina S.S., Mayorova M.E., Shakhtarin V.V., Khandogina A.V.	Human genetics with the basics of medical genetics: Student's book	Moscow: GEOTAR-Media, 2019,electronic resources	2
1.2	Karpenko, R. V.	Evolutionary doctrine: teaching aid	Volgograd: Volgograd State Socio-Pedagogical University, "Change", 2020,electronic resources	1
1.3	Yarygin V. N., Sinelschikova V. V., Chernykh G. V., Bulchuk O. V., Volkov I. N.	Biology in 2 parts. The second part: Student's book for universities	Moscow: Yurayt, 2022, electronic resources	1
1.4	Yarygin V. N., Vasilyeva V. I., Volkov I. N., Kozlova I. I., Sinelschikova V. V.	Biology. Student's book and teaching aid for universities	Moscow: Yurayt, 2022, electronic resources	1
1.5	Yarygin V. N., Sinelschikova V. V., Chernykh G. V., Bulchuk O. V., Volkov I. N.	Biology in 2 parts. Student's book for universities	Moscow: Yurayt, 2022, electronic resources	1
1.6	M. M. Azova	Medical parasitology: teaching aid: Recommended by FIED «Federal Institute of Education Development» as teaching aid for using in teaching process of educational institutions which implemented programs of high educations by specialties 31.05.01 "General medicine", 31.05.03 "Dentistry", 33.05.01 "Pharmacy"	Moscow: Publishing group "GEOTAR-Media", 2017electronic resources	57
1.7	Nesmelova N. N.	Human ecology: Student's book and teaching aid for universities	Moscow: Yurayt, 2022,electronic resources	0
6.1.2. Supplementary				
	Authors	Title	Publish., year	Quantity
2.1	Polyakova T. I., Sukhov I. B.	Cell Biology: Study Guide	St. Petersburg: St. Petersburg Medical and Social Institute, 2015, electronic resources	1

	Authors	Title	Publish., year	Quantity
2.2	Dondua A.K.	Developmental Biology: Textbook	St. Petersburg: St. Petersburg State University Publishing House, 2018, electronic resource	1
2.3	V. N. Yarygin in et al.]; ed. V. N. Yarygina	Biology. T.1: textbook: recommended by the State Educational Institution of Higher Professional Education "I.M. Sechenov First Moscow State Medical University" as a textbook for students of institutions of higher professional education studying in the specialties 060101.65 "General Medicine" and 060103.65 "Pediatrics" in the discipline "Biology" : in 2 volumes	Moscow: Publishing group "GEOTAR-Media", 2013 electronic resource	15
2.4	V. N. Yarygin in et al.]; ed. V. N. Yarygina	Biology. T. 2: textbook: recommended by the State Educational Institution of Higher Professional Education "I.M. Sechenov First Moscow State Medical University" as a textbook for students of institutions of higher professional education studying in the specialties 060101.65 "General Medicine" and 060103.65 "Pediatrics" in the discipline "Biology" : in 2 volumes	Moscow: Publishing group "GEOTAR-Media", 2013 electronic resource	15

6.1.3. Methodical development

	Authors	Title	Publish., year	Quantity
3.1	Soltys T. V.	Regulation of ontogeny: textbook	Surgut: Publishing Center of SurSU, 2014, electronic resource	123

6.2. Internet resources

E1	Central Scientific Medical Library (CSML). [Electronic resource] - Access mode: http://www.scsml.rssi.ru			
E2	Scientific and Medical Library of the Siberian State Medical University. [Electronic resource] - Access mode: http://medlib.tomsk.ru			
E3	FreeMedicalJournals. [Electronic resource] - Access mode: http://www.freemedicaljournals.com			
E4	BMN. [Electronic resource] - Access mode: http://www.bmn.com			
E5	The largest abstract and citation database of peer-reviewed literature. [Electronic resource] - Access mode: http://www.scopus.com/			

6.3.1 Software

6.3.1.1	Operational systems "Microsoft", Software package Microsoft Office			
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6.3.2 Information Referral systems

6.3.2.1	http://www.garant.ru			
6.3.2.2	http://www.consultant.ru			

7. MATERIAL AND TECHNICAL SUPPORT OF DISCIPLINE (MODULE)

7.1	Classrooms for practical classes, group and individual consultations, current and intermediate control, for individual work are equipped with a blackboard, a portable projector, a computer, an interactive whiteboard, microscopes, racks with visual aids, standard furniture for the teacher (table, chair), standard furniture for students (educational tables and chairs for 18 seats), visual aids, micro-preparations.			
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