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

Approved by  
Deputy Rector for Academic Affairs  
\_\_\_\_\_  
E. V. Konovalova

13 June 2024, Record №5

# Physiological basis of human adaptation in the North

## Syllabus

Department	Morphology and physiology
Curriculum	s310501- ЛечДелоИн-24-2. plx Specialty 31.05.01 General Medicine
Qualification	General Practitioner
Form of education	Full-time
Total (incredits)	2
Total academic hours	72
including:	
Classes	40
Self-study	32

Control:  
Credit, 4<sup>th</sup> term

Course outline in terms

Academic year (Term)	4 (2.4)		Total	
Weeks	17 2/6			
Type of classes	Cur	Syl	Cur	Syl
Lectures	8	8	8	8
Practical	32	32	32	32
Total classes	40	40	40	40
Contact work	40	40	40	40
Self-study	32	32	32	32
Total	72	72	72	72

The Syllabus is compiled by:

PhD in Biology, Associate Professor, Maltsev V.P. \_\_\_\_\_

The Syllabus

**Physiological basis of human adaptation in the North**

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, 13 June 2024, Record №5.

The Syllabus was approved by the department

**Morphology and physiology**

Head of Department, Doctor of Medical Sciences, Professor, Stolyarov V.V.

<b>1. COURSE OBJECTIVES</b>
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1.1	The physiological basis of human adaptation in the North is a branch of physiology that studies the dependence of body functions on living conditions and activities. It is the basis for understanding the ecological interactions of biological processes on the one hand and non-biological processes on the other, affecting the state of the human body at different levels of its organization. It is a branch of physiology that studies the dependence of human functions on living conditions and activities in unfavorable physical and geographical conditions of the North, in different periods of the year, day; reveals the physiological basis of adaptation (physiological adaptation) to natural factors.
1.2	The purpose of studying the discipline is: to consider the dependence of the body's functions on the conditions of existence, to reveal the physiological foundations and mechanisms of adaptation of the body to constantly changing environmental conditions.

2. COURSE OVERVIEW	
Course code (in curriculum):	FTD
<b>2.1</b>	<b>Assumed background:</b>
2.1.1	Adaptive and Age-related Physiology
2.1.2	Hominal Physiology
2.1.3	Human Anatomy
2.1.4	Biology
2.1.5	Adaptive and Age-related Physiology
2.1.6	Human Anatomy
2.1.7	Hominal Physiology
<b>2.2</b>	<b>Post-requisite courses and practice:</b>
2.2.1	Immunology and Allergology
2.2.2	Obstetrics
2.2.3	Paediatrics
2.2.4	Hygiene
2.2.5	Pathophysiology
2.2.6	Immunology and Allergology
2.2.7	Paediatrics
2.2.8	Internal Diseases Propaedeutics
2.2.9	Obstetrics
2.2.10	Clinical pathological physiology

3. COMPETENCES UPON COMPLETION OF THE COURSE (MODULE)
PC-7.5 Teaches patients and their relatives basic hygienic measures of health-improving nature, skills of self-monitoring of basic physiological indicators, contributing to the preservation and promotion of health, prevention of diseases, hygiene education of the population and formation of a healthy lifestyle, he is capable of forming healthy lifestyle programs, including programs to reduce alcohol and tobacco consumption, prevent and combat non-medical consumption of narcotic drugs and psychotropic substances and he is able to evaluate the effectiveness of preventive work with patients.
PC-9.1 Analyzes medical information

**By the end of the course students must:**

<b>3.1</b>	<b>Know:</b>
3.1.1	The main physiological patterns of the functioning of the body in the sections of fundamental medicine - anatomical, histological structures. Physiological processes of function and mechanisms (human physiology, mechanisms of regulation of homeostasis, functional systems and the body are normal). Theoretical foundations of immunology, understanding of immune defense mechanisms, types of immunological reactions and their role in human pathogenesis. The main patterns of ontogenesis of the human body and the features of physical, mental and intellectual capabilities in each period. Methodological foundations of the organization of research activities, patterns of functioning of individual organs and systems; criteria for assessing the functional state of the body of an adult and adolescents. The main malformations, diseases and traumatic injuries associated with living in unfavorable conditions

	of the North, in various age groups, their classifications. The main symptoms of malformations, diseases and traumatic injuries in various age groups, the formulation of the main pathological conditions, symptoms, disease syndromes, nosological forms in accordance with the International Statistical Classification of Diseases and Health-related Problems - X revision.
<b>3.2</b>	<b>Be able to:</b>
3.2.1	Use basic knowledge in the field of biomedical and other natural science disciplines in mastering the profession in the sections of fundamental medicine - anatomical, histological structures, physiological processes, fundamentals of immunology, immune defense mechanisms, types of immunological reactions and their role in human pathogenesis; plan goals and set priorities when choosing decision-making methods taking into account the conditions, means, personal capabilities and time prospects of achievement; implementation of activities. Analyze the patterns of functioning of individual organs and systems; use the knowledge of anatomical and physiological bases to assess the functional state of the human body at rest and in the process of adaptation to environmental stresses in various conditions. Carry out scientific analysis, generalization, design and presentation of the results of educational research activities and scientific research; formulate a conclusion on the obtained result in relation to the goals and objectives of the study based on the symptoms, identify the main pathological conditions, symptoms and syndromes of malformations, diseases and traumatic injuries associated with living in unpleasant conditions of the North; formulate a diagnosis of the main pathological conditions, symptoms, disease syndromes, nosological forms in accordance with the International Statistical Classification of Diseases and Health-related Problems - X revision adopted by the 43rd By the World Health Assembly; use the International Statistical Classification of Diseases and Health-Related Problems - X revision adopted by the 43rd World Health Assembly

4. STRUCTURE AND CONTENTS OF THE COURSE (MODULE)						
Class Code	Topics /Class type	Term / Academic	Academic hours	Competences	Literature	Interactice
	<b>Chapter 1. Physiological bases of adaptation.</b>					
1.1	Physiological functions of the body /Lec/	4	2	PC-7.5 PC-9.1	1.1 1.2 1.3 1.5 1.4 2.2 2.1 E1 E2 E3 E4 E5	
1.2	Physiological functions of the body. General mechanisms of physiological adaptation. /Pr/	4	4	PC-7.5 PC-9.1	1.1 1.2 1.3 1.5 1.4 2.2 2.1 E1 E2 E3 E4 E5	
1.3	Types and mechanisms of adaptation /Pr/	4	2	PC-7.5 PC-9.1	1.1 1.2 1.3 1.5 1.4 2.2 2.1 E1 E2 E3 E4 E5	
1.4	Physiological bases of adaptation. / Self-study/	4	8	PC-7.5 PC-9.1	1.1 1.2 1.3 1.5 1.4 2.2 2.1 E1 E2 E3 E4 E5	
	<b>Chapter 2. Individual features of adaptation to extreme environmental factors.</b>					
2.1	Individual features of adaptation to extreme environmental factors. /Lec/	4	2	PC-7.5 PC-9.1	1.1 1.2 1.3 1.5 1.4 2.2 2.1 E1 E2 E3 E4 E5	
2.2	Physical development / Pr/	4	2	PC-7.5 PC-9.1	1.1 1.2 1.3 1.5 1.4 2.2 2.1 E1 E2 E3 E4 E5	
2.3	Typology of human behavioral reactions /Pr/	4	4	PC-7.5 PC-9.1	1.1 1.2 1.3 1.5 1.6 1.4 2.2 2.1 E1 E2 E3 E4 E5	

2.4	Individual features of adaptation to extreme environmental factors. / Self-study /	4	8	PC-7.5 PC-9.1	1.1 1.2 1.3 1.5 1.4 2.2 2.1 E1 E2 E3 E4 E5	
	<b>Chapter 3. Adaptation of regulatory systems</b>					
3.1	Adaptation of regulatory systems /Lec/	4	2	PC-7.5 PC-9.1	1.1 1.2 1.3 1.5 1.4 2.2 2.1 E1 E2 E3 E4 E5	
3.2	Ecological aspects of chronobiology. /Pr/	4	4	PC-7.5 PC-9.1	1.1 1.2 1.3 1.5 1.4 2.2 2.1 E1 E2 E3 E4 E5	
3.3	Stress and adaptation Psychosomatic disorders /Pr/	4	4	PC-7.5 PC-9.1	1.1 1.2 1.3 1.5 1.4 2.2 2.1 E1 E2 E3 E4 E5	
3.4	Adaptation of regulatory systems / Self-study/	4	6	PC-7.5 PC-9.1	1.1 1.2 1.3 1.5 1.4 2.2 2.1 E1 E2 E3 E4 E5	
	<b>Chapter 4. Adaptation of vegetative systems</b>					
4.1	Adaptation of vegetative systems /Lec/	4	2	PC-7.5 PC-9.1	1.1 1.2 1.3 1.5 1.4 2.2 2.1 E1 E2 E3 E4 E5	
4.2	Internal environment. Adaptation of the blood system /Pr/	4	2	PC-7.5 PC-9.1	1.1 1.2 1.3 1.5 1.4 2.2 2.1 E1 E2 E3 E4 E5	
4.3	Adaptation of the circulatory system /Pr/	4	4	PC-7.5 PC-9.1	1.1 1.2 1.3 1.5 1.4 2.2 2.1 E1 E2 E3 E4 E5	
4.4	Adaptation of the respiratory system /Pr/	4	2	PC-7.5 PC-9.1	1.1 1.2 1.3 1.5 1.4 2.2 2.1 E1 E2 E3 E4 E5	
4.5	Cardio-respiratory system / Pr/	4	2	PC-7.5 PC-9.1	1.1 1.2 1.3 1.5 1.4 2.2 2.1 E1 E2 E3 E4 E5	
4.6	Temperature regime. Adaptation of the thermoregulation system /Pr/	54	2	PC-7.5 PC-9.1	1.1 1.2 1.3 1.5 1.6 1.4 2.2 2.1 E1 E2 E3 E4 E5	
4.7	Adaptation of vegetative systems / Self-study/	4	10	PC-7.5 PC-9.1	1. 3 1. 1 1. 2 1. 5 1. 6 1. 4 2. 2 2. 1 E1 E2 E3 E4 E5	

	<b>Chapter 5. Physiological mechanisms of human adaptation in the North</b>					
5.1	Control work	4	0	PC-7.5 PC-9.1	1.1 1.2 1.3 1.5 1.4 2.2 2.1 E1 E2 E3 E4 E5	
5.2	/Credit/	4	0	PC-7.5 PC-9.1	1.1 1.2 1.3 1.5 1.4 2.2 2.1 E1 E2 E3 E4 E5	

<b>5. ASSESSMENT TOOLS</b>						
<b>5.1. Assessment tools for midterm assessment</b>						
Presented by a single document						
<b>5.2. Assessment tools for diagnostic testing</b>						
Presented by a single document						

<b>6. COURSE (MODULE) RESOURCES</b>				
<b>6.1. Recommended Literature</b>				
<b>6.1.1. Core</b>				
	Authors	Title	Publish., year	Quantity
1. 1	Lapkin M. M., Trutneva E. A.	Selected Lectures on Hominal Physiology = Selected Lectures on Hominal Physiology: study guide	Moscow: GEOTAR-Media, 2019, electronic resource	2
1. 2	Lapkin M. M., Trutneva E. A.	Selected Lectures on Hominal Physiology = Selected Lectures on Hominal Physiology: study guide	Moscow: GEOTAR-Media, 2021, electronic resource	1
1. 3	Osikov M. V., Ageeva A. A., Savchuk K. S., Vorgova L. V.	Practice guide on general pathophysiology for students of medical department: learning guide	Chelyabinsk: YUGMU, 2021, electronic resource	1
1. 4	Deryugina A. V., Shabalin M. A., Zolotova M. V.	Electrophysiology. Physiology of excitable tissues: educational and methodical manual	Nizhny Novgorod: Lobachevsky National Research University, 2020, electronic resource	1
1. 5		Hominal physiology: textbook	Moscow: GEOTAR-Media, 2022, electronic resource	2
<b>6.1.2. Supplementary</b>				
	Authors	Title	Publish., year	Quantity
2. 1	Hole J. W.	Human Anatomy & Physiology	Dubuque: WCB, 1993	5
2. 2	Smyth J. D., Halton D. W.	The Physiology of Trematodes	Cambridge: Cambridge University Press, 1983	1

6.2. Internet resources	
E1	<a href="http://e.lanbook.com/">http://e.lanbook.com/</a>
E2	<a href="https://znanium.com/">https://znanium.com/</a>
E3	<a href="http://iprbookshop.ru">http://iprbookshop.ru</a>
E4	<a href="http://www.studentlibrary.ru">http://www.studentlibrary.ru</a>
E5	<a href="http://www.elibrary.ru/">http://www.elibrary.ru/</a>
6.3.1 Software	
6.3.1.1	Text Editor Microsoft Office
6.3.1.2	Spreadsheets Microsoft Excel
6.3.1.3	A program for creating presentations Microsoft Power Pjint
6.3.2 Information Referral systems	
6.3.2.1	<a href="http://www.garant.ru">http://www.garant.ru</a>
6.3.2.2	<a href="http://www.consultant.ru/">http://www.consultant.ru/</a>

7. MATERIAL AND TECHNICAL SUPPORT OF DISCIPLINE (MODULE)	
7.1	Classrooms for lecture-type classes, seminar-type classes (practical classes), group and individual classes, ongoing monitoring and intermediate certification are equipped with: standard educational furniture, technical training tools that serve to present educational information
7.2	The lecture hall is equipped with a multimedia projector, a screen, a laptop, a stationary chalk board, standard educational furniture: desks, chairs
7.3	The classroom for practical classes is equipped with:
7.4	personal projector, laptop, computers, videos, tables, electro-cardiographs, spirometer and "Micro LAB" included.
7.5	Tools and consumables in an amount that allows students to master the skills and abilities provided by professional activities.