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**Federal State Autonomous Educational Institution of Higher Education**  
**PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA**  
**RUDN University**

**Institute of Medicine**

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educational division (faculty/institute/academy) as higher education programme developer

**COURSE SYLLABUS**

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**NORMAL PHYSIOLOGY, PHYSIOLOGY OF MAXILLOFACIAL REGION**

(course title)

**Recommended by the Didactic Council for the Education Field of:**

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**31.05.03 DENTISTRY**

(field of studies / speciality code and title)

**The course instruction is implemented within the professional education programme of higher education:**

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**DENTISTRY**

higher education programme profile/specialisation title

**2024 г.**

## 1. COURSE GOAL(s)

The goal of the course is the student's acquisition of knowledge about the development of structures and functions of systems of the body on the basis of modern achievements of physiological science, necessary for the formation of a scientific worldview and practical activities of a dentist

The course "Normal physiology, physiology of maxillofacial region" is included in the higher education programme "Dentistry" in the field of studies 31.05.03 "Dentistry" and it is studied in the 2<sup>nd</sup>, 3<sup>rd</sup> semesters of the 1<sup>st</sup> and 2<sup>nd</sup> year. The course is being implemented by the Department of General Physiology. The course consists of 10 modules and 25 topics and is aimed at studying basic information about the mechanisms and patterns of the physiological processes of the human body.

## 2. REQUIREMENTS FOR LEARNING OUTCOMES

The course "Normal physiology, physiology of maxillofacial region" implementation is aimed at the development of the following competences (competences in part):

*Table 2.1. List of competences that students acquire during the course*

Competence code	Competence descriptor	Competence formation indicators (within this course)
GPC-9	Being able to assess morpho-functional, physiological conditions and pathological processes in the human body to solve professional tasks	GPC-9.1. Being able to use the algorithm of clinical, laboratory and functional diagnosis in dealing with professional tasks.
		GPC-9.2. Evaluating the results of clinical, laboratory and functional diagnosis in dealing with professional tasks.
		GPC-9.3. Determining morpho-functional, physiological states and pathological processes of the human body.

## 3. COURSE IN HIGHER EDUCATION PROGRAMME STRUCTURE

The course refers to the core component of (B1) block of the higher educational programme curriculum.

Within the higher education programme students also master other disciplines (modules) and / or internships that contribute to the achievement of the expected learning outcomes as results of the course.

*Table 3.1. The list of the higher education programme components that contribute to the achievement of the expected learning outcomes as the course results.*

Competence code	Competence descriptor	Previous courses/modules, internships*	Subsequent courses/modules, internships*
GPC-9	Being able to assess morpho-functional, physiological conditions and pathological processes	Biology; Chemistry; Bioorganic chemistry; Anatomy; Histology, Embryology, Cytology;	General Surgery; Obstetrics and Gynecology; Microbiology, Virology; Oncology, Radiation Therapy; Pathophysiology, Clinical Pathophysiology;

Competence code	Competence descriptor	Previous courses/modules, internships*	Subsequent courses/modules, internships*
	in the human body to solve professional tasks		Local anesthesia and anesthesiology in dentistry; Microbiology, virology - Oral microbiology; Orthodontics and Children's Prosthetics; Oral Surgery; Maxillofacial and gnathic surgery; Obstetrics; Biological Chemistry - Oral Biochemistry; Pathophysiology - Head and Neck Pathophysiology; Forensic Medicine; Medical Rehabilitation; X-ray diagnostics; Pathological Anatomy-Head and Neck Pathanatomy; Ophthalmology; Head and Neck Topographic Anatomy and Operative Surgery;

\* - to be filled in according with the competence matrix of the higher education programme.

\*\* - elective courses/practices

#### 4. INTERNSHIP WORKLOAD AND TYPES OF WORK

The total workload of the "Normal physiology" course amounts to 8 credits.

Table 4.1. Type of educational work for full-time education

Type of educational work	TOTAL, academic hours	Semesters / module		
		2	3	
<i>Classroom lessons, academic hours</i>	<b>122</b>	<b>54</b>	<b>68</b>	
<b>Including:</b>				
Lectures (LCT)	17	0	17	
Lab work (LW)	105	54	51	
Practical classes / seminars (PC/S)	0	0	0	
<i>Independent work, academic hours</i>	37	15	22	
<i>Examination/test, academic hours</i>	21	3	18	
<b>Total labor intensity</b>	acad.hours	<b>180</b>	<b>72</b>	<b>108</b>
	credits	<b>5</b>	<b>2</b>	<b>3</b>

## 5. COURSE CONTENTS

Table 5.1. Course contents\*

<b>Module N</b>	<b>The name of the module</b>	<b>Contents (topics, types of practical activities)</b>		<b>Workload, academic hours</b>
Module 1	Physiology of excitable cells.	1.1	Introduction to physiology. General physiology and cell physiology. Cell membranes, cell membrane transport. "Safety techniques and rules of conduct in the physiological laboratory". Analyzing and solving problems on the topic of the class.	LW
		1.2	Excitability and its assessment. Membrane potential. Action potential. Analyzing and solving problems on the topic of the class.	LW
		1.3	Physiology of the synapse. The physiology of the nerve and the nerve fiber. Analyzing and solving problems on the topic of the class.	LW
		1.4	Physiology of muscle contraction. "Dynamometry. Maximum arbitrary force and strength endurance tests". Analyzing and solving problems on the topic of the class.	LW
Module 2	Nervous and humoral regulation of body functions.	2.1	Nervous regulation of physiological functions. Reflex and its characteristics. The main properties of nerve centers. "Unconditional human reflexes".	LW
		2.2	Sympathetic, parasympathetic, metasympathetic nervous system. The role of the autonomic nervous system in the forming of adaptive reactions. "The tentative estimate of vegetative tone by questioning", "Assessment of vegetative tone according to the Kerdo index".	LW
		2.3	Humoral regulation of physiological functions. Physiology of endocrine glands. General hormone properties. Endocrine glands hierarchy. "Determination of glucose concentration in human blood", "Assessment of the glycemic curve when eating foods with different glycemic index"	LW
Module 3	Physiology of higher nervous activity	3.1	Physiology of HNA. Conditional reflexes. Types of HNA and the temperament. "Determination of the type of HNA". "Determination of psychological characteristics of a person using the EPI personality questionnaire (G. Eysenck's methodology)".	LW
		3.2	Memory. Sleep. "Attention switching research". "The dependence of the amount of memory on the degree of meaningfulness of the material." «Electroencephalography». Analyzing and solving problems on the topic of the class.	LW
Module 4	Physiology of sensory systems	4.1	General physiology of sensory systems. Skin sensitivity. "Determination of the spatial threshold of tactile sensitivity".	LW

<b>Module N</b>	<b>The name of the module</b>	<b>Contents (topics, types of practical activities)</b>		<b>Workload, academic hours</b>
		4.2	Physiology of vision. "Definition of visual acuity", "Definition of the field of vision".	LW
		4.3	Physiology of hearing and vestibular apparatus. "Comparison of air and bone conduction (Rinne test)"	LW
		4.4	Physiology of taste and smell. "Determination of taste sensitivity thresholds". "Determining the role of the sense of smell in the occurrence of taste sensations".	LW
Module 5	Blood physiology.	5.1	Function and composition of blood. Blood plasma. Blood elements. White blood cells. Functions of red blood cells and hemoglobin. Blood types. Rh factor. "Blood typing".	LCT, LW
		5.2	Blood buffer systems. A system for regulating the aggregate state of blood. "Determining the bleeding time". "Determining the clotting time"	LCT, LW
Module 6	Respiratory physiology.	6.1	Physiology of respiration. External breathing. The role of respiratory muscles. Air volumes that characterize respiration. "Spirometry".	LCT, LW
		6.2	Biophysics of gas exchange. Transfer of gases by blood. Regulation of respiration. "Hypoxemic tests for Stange and Hensch".	LCT, LW
Module 7	Physiology of the cardiovascular system.	7.1	Physiology of the cardiovascular system. Heart cycle. Propagation of excitation through the myocardium. Conductive system of the heart. Properties of the heart muscle. Nervous and humoral regulation of the heart. "Registration of an electrocardiogram. Interpretation of a normal electrocardiogram".	LCT, LW
		7.2	Hemodynamics. Basic laws. Microcirculation and lymph flow. Coronary blood flow. Methods of blood circulation research. "Measurement of blood pressure". "Assessment of parameters of the cardiovascular system at rest and during exercise".	LCT, LW
Module 8	Excretion. Physiology of kidneys.	8.1	The system of excretory organs. Formation of urine in the kidneys. Kidneys as an organ of homeostasis. "Study of some components of urine using diagnostic strips".	LCT, LW
		8.2	Non-urinary functions of the kidneys. The role of the kidneys in the development of adaptive responses of the body. Analysis of the RAAS scheme. Analyzing and solving problems on the topic of the class.	LCT, LW
Module 9	Physiology of digestion.	9.1	Functions of the digestive tract. Motility of the digestive tract. Secretory function and digestion in the oral cavity. "Digestion of starch by human saliva	LCT, LW

<b>Module N</b>	<b>The name of the module</b>	<b>Contents (topics, types of practical activities)</b>		<b>Workload, academic hours</b>
			enzymes", "Determination of active saliva response (pH) using universal indicator paper".	
		9.2	Secretory function and digestion in the stomach, small and large intestine. The role of the liver in digestion. Absorption of nutrients in the gastrointestinal tract. "Study of the enzymatic properties of gastric juice". "The effect of bile on fats".	LCT, LW
Module 10	Metabolism and energy. Thermoregulation.	10.1	Metabolism. Energy exchange. Determination of the metabolic rate. Basic metabolic rate, total metabolic rate, working metabolism, daily energy consumption. Intake and consumption of substances in the body. Metabolism of proteins, fats, carbohydrates and trace elements. "Determining the value of the proper basic metabolic rate in various ways." "Calculation of proper total metabolic rate"	LCT, LW
		10.2	Neurohumoral regulation of metabolism in the body. Physiological basis of nutrition. Basic principles of compiling food rations. Thermoregulation. Body temperature and thermoreception. "Assessment of the state of human metabolism based on the analysis of body weight (calculations of body mass index and ideal body weight)". «Study of temperature sensitivity (thermoesthesiometry)».	LCT, LW

\* To be filled for full-time education **only**: LCT – lectures; LW – lab works

## 6. CLASSROOM EQUIPMENT AND TECHNOLOGY SUPPORT REQUIREMENTS

*Table 6.1. Course equipment*

<b>Auditorium for Academic Activity Type</b>	<b>Auditorium equipment</b>	<b>Technical supply</b>
Lecture	An auditorium for lecture-type classes is equipped with specialized furniture, a board (screen) and multimedia devices.	
Laboratory	An auditorium for laboratory work, individual consultations, current control tests and interim assessment tests is fitted with a set of specialized furniture and equipment.	A set of specialized furniture; technical equipment; multimedia projectors «Optoma», «View Sonic»; speakers «Genius», «Dialog», nettops Lenovo, personal computer «CM», motorized wall screens Digis. Computer training programs for lab works: the program for testing «Mytest».

Auditorium for Academic Activity Type	Auditorium equipment	Technical supply
		Equipment: laboratory complex (БИОЖЕЗЛ), training films, multi-purpose supports, a set of tables, universal indicator papers (рН), urine test strips, a reflex hammer, an outside caliper, a centimeter tape, Weber's esthesiometer, rulers, a kit of tuning forks, a hand dynamometer, reagents anti-A, anti-B, anti-AB, anti-D for blood typing, microscopes «Микромед», electrocardiographs ЭКГТ-07 и Axion, sphygmomanometers, phonendoscopes, spirometers, timers, Foerster's perimeter, Sivtsev table, a portable glucometer, an electroencephalograph, thermoesthesiometers, stencils for thermoesthesiometry, laboratory kits.
For self-work of students	An auditorium for for self-work of students (can be used for seminars and consultations) is equipped with specialized furniture and multimedia devices with access to E-system	A set of specialized furniture; technical equipment; multimedia projectors «Optoma», speakers «Genius», nettop Lenovo, motorized wall screen.

\* - the audience for self-work of students is MANDATORY!

## 7. RESOURCES RECOMMENDED FOR COURSE STUDY

### *Basic references:*

1. Koeppen Bruce M. Berne and Levy Physiology / В.М. Коеппен. - Seventh Edition ; Книга на английском языке. - Philadelphia : Elsevier, 2018. - 867 p. : il.

### *Additional references:*

1. Human Physiology. Vol. 1 / E. Babsry, B. Khodorov, G. Kositsky, A. Zubkov ; Edited by E.B.Babsky; Transl. from the Russian by L.Aksenova. - Книга на английском языке. - Moscow : Mir, 1989. - 411 p. : ill.

2. Human Physiology. Vol. 2 / E. Babsry, B. Khodorov, G. Kositsky, A. Zubkov ; Edited by E.B.Babsky; Transl. from the Russian by L.Aksenova. - Книга на английском языке. - Moscow : Mir, 1989. - 416 p. : il.

### *Internet sources*

1. Electronic libraries (EL) of RUDN University and other institutions, to which university students have access on the basis of concluded agreements:

- RUDN Electronic Library System (RUDN ELS) <http://lib.rudn.ru/MegaPro/Web>
- EL "University Library Online" <http://www.biblioclub.ru>
- EL "Yurayt" <http://www.biblio-online.ru>
- EL "Student Consultant" [www.studentlibrary.ru](http://www.studentlibrary.ru)

- EL "Trinity Bridge"

2. *Databases and search engines:*

- electronic foundation of legal and normative-technical documentation  
<http://docs.cntd.ru/>

- Yandex search engine [https:// www .yandex.ru/](https://www.yandex.ru/)

- Google search engine <https://www.google.ru/>

- Scopus abstract database <http://www.elsevierscience.ru/products/scopus/>

*The training toolkit and guidelines for students' self-work mastering the course/module*

1. Lecture course « Normal physiology, physiology of maxillofacial region».

\*The training toolkit and guidelines for the course are placed on the course page in the **university telecommunication training and information system** under the set procedure

## **8. ASSESSMENT TOOLKIT AND GRADING SYSTEM\* FOR EVALUATION OF STUDENTS' COMPETENCES LEVEL UPON COURSE COMPLETION**

The assessment toolkit and the grading system\* to evaluate the level of competences (competences in part) formation as the course results are specified in the Appendix to the course syllabus.

\* The assessment toolkit and the grading system are formed on the basis of the requirements of the relevant local normative act of RUDN University (regulations / order).

### **DEVELOPERS:**

Professor of the Department of  
General Physiology

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position, educational department

Torshin Vladimir

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signature

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name and surname

Associate Professor of the  
Department of  
General Physiology

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position, educational department

Sveshnikov Dmitri

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name and surname

Associate Professor of the  
Department of  
General Physiology

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position, educational department

Yakunina Elena

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signature

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name and surname

### **HEAD OF EDUCATIONAL DEPARTMENT:**



Head of the Department of  
General Physiology

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position, educational department

Torshin Vladimir

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signature

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name and surname

**HEAD OF  
HIGHER EDUCATION PROGRAMME:**

Head of the Department of  
Propaedeutics of Dental Diseases

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position, educational department

Razumova Svetlana

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name and surname