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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**

**Biological chemistry, Biochemistry of oral cavity**

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course title

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

**31.05.03 Dentistry**

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field of studies / speciality code and title

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

**Dentistry**

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higher education programme profile/specialisation title

2022-2023

## 1. COURSE GOAL(s)

The goal of the course "**Biological chemistry – Biochemistry of the oral cavity**" is to equip students with the systematic knowledge of the molecular mechanisms of functioning of biological systems; to ensure the creation of a theoretical basis for further study of biomedical and clinical disciplines.

## 2. REQUIREMENTS FOR LEARNING OUTCOMES

Mastering the course (module) "**Biological chemistry – Biochemistry of the oral cavity**" is aimed at the development of the following competences /competences in part: **(GPC)-9**.

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

Competence code	Competence descriptor	Competence formation indicators (within this course)
GPC-9	Able to assess morphological and functional states and pathological processes in the human body to solve professional issues	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/variable/elective\* component of (B1) block of the higher educational programme curriculum.

\* - Underline whatever applicable.

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

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

Competence code	Competence descriptor	Previous courses/modules*	Subsequent courses/modules*
General Professional Competences-9 (GPC-9)	Able to assess morphological and functional states and pathological processes in the human body to solve professional issues	Human Anatomy - Anatomy of the head and neck Biology Histology, embryology, cytology - Oral Histology Normal physiology, physiology of the maxillofacial region Chemistry	Pathological anatomy - Pathanatomy of the head and neck Pathophysiology - Pathophysiology of the head and neck Forensic medicine

#### 4. COURSE WORKLOAD AND ACADEMIC ACTIVITIES

The total workload of the course “Biological chemistry, biochemistry of oral cavity” is 6 credits (216 academic hours).

Table 4.1. Types of academic activities during the periods of higher education programme mastering

Type of academic activities		Total academic hours	Semesters/training modules	
			3	4
Classroom learning, <i>ac.h.</i>		<b>140</b>	<b>68</b>	<b>72</b>
including:				
Lectures ( <b>Lec</b> )		35	17	18
Lab work ( <b>Lab</b> )		105	51	54
Practical/seminar classes				
Self-studies, academic hours		31	22	9
Evaluation and assessment (exam or pass/fail grading)		45	18	27
<b>Total workload of the discipline</b>	Academic hours	<b>216</b>	<b>108</b>	<b>108</b>
	credits	<b>6</b>	<b>3</b>	<b>3</b>

#### 5. COURSE CONTENTS

Table 5.1. Course contents and academic activities types

Course module title	Course module contents (topics)	Academic activities types
<b>Course 1.</b> Basic molecules - components of living systems	<b>Topic 1.1.</b> Introduction to biochemistry. Proteins: structure, properties, functions	<b>Lec, Lab</b>
	<b>Topic 1.2.</b> Complex proteins, nucleic acids, lipids	<b>Lec, Lab</b>
	<b>Topic 1.3.</b> Enzymes	<b>Lec, Lab</b>
	<b>Topic 1.4.</b> Vitamins	<b>Lec, Lab</b>
	<b>Topic 1.5.</b> Hormones	<b>Lec, Lab</b>
<b>Course 2</b> Metabolism and energy	<b>Topic 2.1.</b> Introduction to metabolism. Biological oxidation	<b>Lec</b>
	<b>Topic 2.2.</b> Metabolism of carbohydrates	<b>Lec, Lab</b>
	<b>Topic 2.3.</b> Lipid metabolism	<b>Lec, Lab</b>
	<b>Topic 2.4.</b> Metabolism of amino acids and proteins. Complex protein metabolism.	<b>Lec, Lab</b>
<b>Course 3</b> Biochemistry of body fluids	<b>Topic 3.1.</b> Biochemistry of blood and urine	<b>Lec, Lab</b>
	<b>Topic 3.2.</b> Biochemistry of oral fluids	<b>Lec, Lab</b>
	<b>Topic 3.3.</b> Biochemistry of inflammation	<b>Lec</b>
	<b>Topic 3.4.</b> Biochemistry of digestion	<b>Lec, Lab</b>
<b>Course 4</b> Biochemistry of connective tissue	<b>Topic 4.1.</b> Biochemistry of the main proteins of connective tissue	<b>Lec, Lab</b>
	<b>Topic 4.2.</b> Biochemistry of the main non-	<b>Lec</b>

	protein components of the connective	
	<b>Topic 4.3.</b> Biochemistry of mineralized tissues	<b>Lec, Lab</b>

## 6. CLASSROOM EQUIPMENT AND TECHNOLOGY SUPPORT REQUIREMENTS

*Table 6.1. Classroom equipment and technology support requirements*

<b>Type of academic activities</b>	<b>Classroom equipment</b>	<b>Specialised educational / laboratory equipment, software, and materials for course study (if necessary)</b>
Lab work	A classroom for laboratory work, individual consultations, routine monitoring and interim certification, equipped with a set of specialized furniture and equipment. (The classroom 334)	Classrooms with a set of specialized furniture, equipped with multimedia projectors and motorized screens NEC V 260X Projector, Motorized Screen for Master Control Projector 203X203. laboratory equipment: Fume hood, CENTRIFUGE OPIH-8, KFK-3-01 photoelectrocolorimeter, Electric drying cabinet SNOL 67/350, Thermoblock ПЭ-4030 36 ГН. d-23*45mm, Spectrophotometer Specord M -40, Electrophoretic chamber, 1mm, Analytical balance EP214C, Laboratory washing table 985*610*900. Corporate Licensing Program (Microsoft Subscription) Enrollment for Education Solutions 90-07-001-00599-8 Non-exclusive Right (2016) Registration Key (2016) *Windows 10 Education Desktop Education ALNG LicSAPk MVL A Faculty EES •Win Pro SP1 x64 7, License № 1620000996000270, issue date 3.5.2014. CFX Manager Software Office Pro Plus 2016 Desktop Education ALNG LicSAPk MVL A Faculty EES 90-07-012-00604-5 Registration Key (2016) Non-exclusive right (2016) MyTestXPro 11.0 is a software system for creating and conducting computer testing of knowledge, collecting and analyzing results. Electronic license/ key (for higher education – university). Symantec Endpoint Protection 11.0 BNDL STD LIC ACAD BAND A BASIC 12 MO 90-07-010-00211-7 Non-exclusive right (2008, IOP No.1.1.16.3/39)
Computer Lab	Laboratory of Molecular	Set of specialized furniture, laboratory medical centrifuge ProfMT, Refrigerator ATLANT XM 6026-

Type of academic activities	Classroom equipment	Specialised educational / laboratory equipment, software, and materials for course study (if necessary)
	Biological Research Methods (Room 201)	031, Freezer Minsk-17, Electronic scales AR0640 Ohaus Europe, Spectrophotometer Hitachi F-2700, Distiller GTL-200, Thermostat, Thermoblock PE-4030 36 gn. d-23*45mm, Bi-beam Spectrophotometer U-2900, Centrifuge L7-55. HP 280 G2 MT V7 Q81E Intel Pentium Dual-Core G4400 Computer There is an Internet connection Corporate Licensing Program (Microsoft Subscription) Enrollment for Education Solutions 90-07-001-00599-8 Non-exclusive right (2016) Registration Key (2016) *Windows 10 Education Desktop Education ALNG LicSAPk MVL A Faculty EES •Win Pro SP1 x64 7, License No. 1620000996000270, issue date 3.5.2014. CFX Manager Software Office Pro Plus 2016 Desktop Education ALNG LicSAPk MVL A Faculty EES 90-07-012-00604-5 Registration Key (2016) Non-Exclusive Right (2016) Symantec Endpoint Protection 11.0 BNDL STD LIC ACAD BAND A BASIC 12 MO 90-07-010-00211-7 Non-exclusive right (2008, IOP No.1.1.16.3/39)
Self-studies	A classroom for independent work of students (can be used for laboratory classes and consultations), equipped with a set of specialized furniture (The room203)	A set of specialized furniture, HP 15-AC070UR 15.6" Intel Pentium 5 Computers, Refrigerator Biryusa-6, Freezer Minsk-17, Drying Electric Cabinet SNOL 67/350, Thermoblock PE-4030 36 gn. d-23*45 mm, Spectrophotometer Specord M - 40, Electrophoretic chamber, 1mm, Analytical scales EP214C. Products: Microsoft products (OS, office suite, including MS Office/ Office 365, Teams)

## 7. RESOURCES RECOMMENDED FOR COURSE STUDY

*Main readings:*

### **Printed publications:**

1. Berezov T.T. Biochemistry / T.T. Berezov, B.F. Korovkin ; Transl. from the Russian by B.V.Rassadin. – Book on English Language. - Moscow: Mir, 1992. - 515 p.
2. Biochemistry. - 3rd edition. - Philadelphia: Harwal Publishing, 1993. - 584 p. : ill. - (The National Medical Series for Independent Study).

3. Marshall William J. Clinical chemistry / W. J. Marshall. - eighth edition - London: Elsevier, 2017. - 413 p.
4. Meisenberg Gerhard. Principles of Medical Biochemistry / G. Meisenberg, W.H. Simmons. - Fourth Edition. - London: Elsevier, 2017. - 617 p.
5. Baynes John W. Medical Biochemistry / J.W. Baynes, M.H. Dominiczac. - Fifth Edition. - London: Elsevier, 2019. - 682 p.
6. Lehninger Principles of Biochemistry, 5th Ed, David L. Nelson and Michael M. Cox, WH Freeman and Company.
7. Harper`s illustrated biochemistry, 26th edition, Murray R, Granner D, Mayes P, Rodwell V, Lange medical books/McGrow-Hill

***Electronic and printed full-text materials:***

1. Biochemistry with exercises and tasks: textbook / editors by A. I. Glukhov, V. V. Garin. - Moscow: GEOTAR-Media, 2020. - 296 p.: [http://lib.rudn.ru/MegaPro/UserEntry?Action=Rudn\\_FindDoc&id=497894&idb=0](http://lib.rudn.ru/MegaPro/UserEntry?Action=Rudn_FindDoc&id=497894&idb=0)

***Additional readings:***

1. Clinical Biochemistry, 2<sup>nd</sup> edition. Allan Gaw et. al.
2. Marks' Basic Medical Biochemistry: A Clinical Approach, 2nd Edition; Colleen M. Smith, Allan D. Marks, Michael A. Lieberman
3. Topics in dental biochemistry, Levine M. – Springer Science & Business Media, 2010.

***Training toolkit for self- studies to master the course \*:***

The set of lectures on the course “Biological chemistry, biochemistry of oral cavity”

\* The training toolkit for self- studies to master the course is 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 competences formation level (GPC-9) upon the course study completion 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:**

**Associate Professor** of the  
T.T. Berezov Department of  
Biochemistry:

D.D. Zhdanov

position, department

signature

name and surname

**HEAD OF EDUCATIONAL  
DEPARTMENT:**  
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V.S. Pokrovsky

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**HEAD of the Higher Education Program:**

First Deputy Director of MI for  
Academic Affairs

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S.N. Razumova

name and surname