Federal State Autonomous Educational Institution for Higher Education
PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA NAMED AFTER PATRICE LUMUMBA
RUDN University
Institute of Medicine

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

COURSE SYLLABUS

BIOLOGY

course title

Recommended by the Didactic Council for the Education Field of:

31.05.03 Dentistry

field of studies / speciality code and title

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

Dentistry

higher education programme profile/specialisation title

2025

1. COURSE GOAL(s)

The goal of the course is to equip students with the knowledge and skills in the field of general biology, parasitology, classical, molecular, and medical genetics, which are necessary for the formation of the scientific worldview and practical activity of the physician.

2. REQUIREMENTS FOR LEARNING OUTCOMES

Mastering the Biology course is aimed at the development of the following competences (competences in part): GPC-8.

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

Competence code	**Competence descriptor**	**Competence formation indicators** (within this course)
GPC-8	Being able to use main physical and chemical, mathematic and scientific notions and methods when dealing with professional tasks	GPC-8.2 Applying basic fundamental physical and chemical knowledge to deal with professional tasks

3. COURSE IN HIGHER EDUCATION PROGRAMME STRUCTURE

The course refers to the core/variable/elective* component of (B1) block of the highere ducational 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***
GPC-8	Being able to use main physical and chemical, mathematic and scientific notions and methods when dealing with professional tasks	Mathematics, Physics	Physiotherapy of dental diseases, Obstetrics

* To be filled in according to the competence matrix of the higher education programme.

3. COURSE WORKLOAD AND ACADEMIC ACTIVITIES

The total workload of the course is 5 credits (180 academic hours).

*Table 4.1. Types of academic activities during the periods of higher education programme mastering (**full-time training**)**

Type of academic activities		Total academic hours	Semesters/training modules	
			2	3
Contact academic hours		105	54	51
including:				
Lectures (LC)		35	18	17
Lab work (LW)		70	36	34
Seminars (workshops/tutorials) (S)		-	-	-
Self-studies		39	36	3
Evaluation and assessment (exam/passing/failing grade)		36	18	18
Course workload	academic hours_	**180**	**108**	**72**
	credits	**5**	**3**	**2**

4. COURSE CONTENTS

Table 5.1. Course contents and academic activities types

Course module title	Course module contents (topics)	Academic activities types
Module 1 Introduction to Biology. The cell as a unit of life	**Topic 1.1.** The cell as a unit of life	**LW**
	Topic 1.2. The structure and functions of the cell membrane.	**LW**
Module 2 Genetic material. Structure and functions of nucleic acids	**Topic 2.1.** Structure and functions of nucleic acids. Genetic code	**LC, LW**
	Topic 2.2. DNA replication	**LC, LW**
	Topic 2.3. Variability of living things. Chromosomal and gene mutations. DNA repair	**LC**
Module 3 Gene expression	**Topic 3.1.** Synthesis of RNA molecules in prokaryotic cells. Control of gene expression in prokaryotes. Operon	**LC, LW**
	Topic 3.2. Synthesis of RNA molecules in eukaryotic cells. Processing of RNA molecules	**LC, LW**
	Topic 3.3. Translation in prokaryotic and eukaryotic cells	**LC, LW**
	Topic 3.4. Genetic material of viruses, prokaryotes and eukaryotes. Chromosomal and extrachromosomal DNA. Mobile genetic elements	**LC**
Module 4 Cell division	**Topic 4.1.** Structure of eukaryotic chromosomes. Karyotype. Genes	**LW**
Course module title	**Course module contents (topics)**	**Academic activities types**

	Topic 4.2. The cell cycle, mitotic cell division. The control of the cell cycle	**LW**
	Topic 4.3. Meiotic cell division	**LW**
Module 5 Concepts of Genetics	**Topic 5.1**. History of Genetics	**LC**
	Topic 5.2. Law of segregation. Interaction of allelic genes	**LW**
	Topic 5.3. Law of independent assortment. Interaction of non-allelic genes	**LW**
	Topic 5.4. Sex-linked inheritance	**LW**
	Topic 5.5. Inheritance of linked genes. Genetic analysis	**LW**
Module 6 Human Genetics	**Topic 6.1.** Human Genetics. Human genome	**LC**
	Topic 6.2. Chromosomal diseases	**LC**
	Topic 6.3. Gene and multifactorial diseases	**LC**
	Topic 6.4. Non-Mendelian diseases	**LC**
	Topic 6.5. Genetic engineering. Gene therapy	**LC**
	Topic 6.6. Methods in Human Genetics. Twin study	**LW**
	Topic 6.7. Pedigree analysis	**LW**
	Topic 6.8. Cytogenetic method	**LW**
	Topic 6.9. Population study	
	Topic 6.10. Methods of Molecular Genetics	**LW**
Module 7 Medical Parasitology	**Topic 7.1.** Basic concepts of medical parasitology	**LC**
	Topic 7.2. Subkingdom Protozoa. Phylum Sarcomastigophora. Class Rhizopoda	**LW**
	Topic 7.3. Class Zoomastigophorea	**LW**
	Topic 7.4. Phylum Apicomplexa, Class Sporozoa. Phylum Ciliophora, Class Ciliata	**LW**
	Topic 7.5. Phylum Platyhelminthes. Class Trematoda	**LW**
	Topic 7.6. Class Cestoda	**LW**
	Topic 7.7. Phylum Nemathelminthes. Class Nematoda**.** Geohelminths	**LW**
	Topic 7.8. Class Nematoda. Biohelminths	**LW**
	Topic 7.9. Phylum Arthropoda. Subphylum Branchiata, class Crustacea. Subphylum Chelicerata, class Arachnida	**LW**
	Topic 7.10. Subphylum Tracheata, Class Insecta, human parasites	**LW**
Module 8 Evolution of the organic world.	**Topic 8.1.** The main points of the modern evolution theory	**LC**
	Topic 8.2. Anthropogenesis	**LC**
Course module title	**Course module contents (topics)**	**Academic activities types**

Module 9 Man and the Biosphere	**Topic 9.1.** Man and the Biosphere	**LC**

* - to be filled in only for **full** -time training: *LC - lectures; LW - lab work; S - seminars.*

6. CLASSROOM EQUIPMENT AND TECHNOLOGY SUPPORT REQUIREMENTS

Table 6.1. Classroom equipment and technology support requirements

Type of classrooms	**Classroom equipment**	**Specialised educational / laboratory equipment, software, and materials for course study** (if necessary)
Lab-work	A classroom for laboratory work, individual consultations, current and mid-term assessment; equipped with a set of specialised furniture and machinery (328, 329, 330, 331, 342, 343)	A set of specialized furniture; whiteboard; technical means of multimedia presentations. Microscopes. Software: Microsoft Windows, MS Office / Office 365, MS Teams.
Computer lab	Laboratory of Molecular Genetics (332, 332A)	PCR laboratory equipment
Self-studies	A classroom for independent work of students (can be used for seminars and consultations), equipped with a set of specialised furniture (342)	A set of specialized furniture; whiteboard; technical means of multimedia presentations.

* The premises for students' self-studies are subject to **MANDATORY** mention

7. RESOURCES RECOMMENDED FOR COURSE STUDY

Main readings:

1. Essential medical biology. V. 1 : Cell biology / N. V. Chebyhev, I.A. Berechikidze, S.M. Kuzin [и др.] ; Ed. by N.V. Chebyshev. - Книга на английском языке. - Moscow : Medical Informational Agency, 2020. - 113 p.
2. Essential medical biology. V.2 : Genetics / N. V. Chebyhev, S.H. Larina, E.S. Gorozhanina [и др.] ; Ed. by N.V. Chebyshev. - Книга на английском языке. - Moscow : Medical Informational Agency, 2020. - 112 p.

3. Essential medical biology. V. 3 : Human parasitology / N. V. Chebyhev, I.A. Berechikidze, G.G. Grineva [и др.] ; Ed. by N.V. Chebyshev. - Книга на английском языке. - Moscow : Medical Informational Agency, 2020. - 264 p.
4. Myandina G.I. Medical parasitology. – M.: PFU. – 2014. https://lib.rudn.ru:443/MegaPro/UserEntry?Action=Link_FindDoc&id=444651&idb=0

Additional readings:

1. Общая генетика [Текст/электронный ресурс] = General Genetics. Manual for Graduate Students : Учебное пособие / Е.В. Романова, П. Кезимана. - Книга на английском языке; Электронные текстовые данные. - М. : Изд-во РУДН, 2018. - 104 с.
2. Fletcher H., Hickey I. Genetics. – Garland Science. – 2013.
3. Klug W.S., Cummings M.R., Spencer C.A., Palladio M.A. Concepts of genetics. – Pearson Education International. – 2014.
4. Lewin B. Genes. – Oxford University Press. – 2012.
5. Color Atlas of Genetics / Passarge Eberhard. - 4th edition, revised and update. - Stuttgard ; New York : Thieme, 2013.
6. Vogel and Motulsky's Human Genetics: Problems and Approaches / M. Speicher, Antonarakis S.E., Motulsky A.G. – Springer. – 2010.

Internet sources:

1. Electronic libraries with access for RUDN students:

- RUDN online library http://lib.rudn.ru/MegaPro/Web
- Scientific electronic library: - http://elibrary.ru
- Nature - http://www.nature.com/siteindex/index.html
- EL "University Library Online" http://www.biblioclub.ru
- http://www.biblio-online.ru
- EL "Student Consultant" www.studentlibrary.ru
- EL "Lan" http://e.lanbook.com/
- EL "Yurayt" http://www.biblio-online.ru

1. Databases and search engines:

- National Center for Biotechnology Information (NCBI) - www.ncbi.nlm.nih.gov
- ScienceDirect - http://www.sciencedirect.com
- Google Academy - http://scholar.google.ru/
- SCOPUS http://www.scopus.com/

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

1. Biology workbook
2. Methodological recommendations on discipline study

* 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 EVALUATIONOF STUDENTS' COMPETENCES LEVEL UPON COURSE COMPLETION

Evaluation materials and point-rating system* for assessing the level of competence formation (GPC-8) based on the results of mastering the discipline «Biology» are presented in the Appendix to this Work Program of the discipline.

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

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