

Документ подписан простой электронной подписью
Информация о владельце:
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Должность: Ректор
Дата подписания: 25.01.2024 18:36:45
Уникальный программный ключ:
ca953a0120d891083f939673078ef1a989dae18a

**Federal State Autonomous Educational Institution of 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

Biotechnology

course title

Recommended by the Didactic Council for the Education Field of:

31.05.01 General Medicine

field of studies / speciality code and title

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

31.05.01 General Medicine

higher education programme profile/specialisation title

2023-2024

1. COURSE GOAL(s)

The goal of the course «**Biotechnology**» is the formation of general ideas, abilities, skills for obtaining medicines by methods of biotechnology, as well as the organization of biotechnological production.

2. REQUIREMENTS FOR LEARNING OUTCOMES

Mastering the course (module) "Biotechnology" is aimed at the development of the following competences /competences in part:**PC-3.2;3.4.**

Competence code	Competence descriptor	Competence formation indicators (within this course)
PC-3	Capable of prescribing treatment and monitoring its efficacy and safety	PC-3.2. Able to prescribe medicines, medical devices and nutritional therapy, taking into account the diagnosis, age and clinical picture of the disease and in accordance with the current procedures for the provision of medical care, clinical guidelines (treatment protocols) on the provision of medical care, taking into account the standards of medical care.
		PC-3.4. Able to evaluate the effectiveness and safety of the use of drugs, medical devices, clinical nutrition and other methods of treatment.

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*
PC-3	Capable of prescribing treatment and monitoring its efficacy and safety	Physics	General surgery, Dermatovenereology, Neurology, medical genetics, neurosurgery, Hospital therapy, Occupational diseases, Polyclinic therapy, Pediatrics

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

4. COURSE WORKLOAD AND ACADEMIC ACTIVITIES

The total workload of the course "Biotechnology" is 2 credits (72 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			
		4			
Contact academic hours	36	36			
including:					
Lectures (LC)					
Lab work (LW)	36	36			
Seminars (workshops/tutorials) (S)					
Self-studies	18	18			
Evaluation and assessment (exam/passing/failing grade)	18	18			
Course workload	academic hours	72	72		
	credits	2	2		

* To be filled in regarding the higher education programme correspondence training mode.

5. COURSE CONTENTS

Table 5.1. Course contents and academic activities types

Course module title	Course module contents (topics)	Academic activities types
Module 1 Fundamentals of the modern biotechnological concept.	Topic 1.1. Introduction to modern biotechnology. Fundamentals of organizing the production of biological products. Biotechnology in solving environmental problems. Biosafety issues.	LW
Module 2 Postgenomic technologies	Topic 2.1. Recombinant proteins and peptides.	LW
	Topic 2.2. Gene therapy	LW
Module 3 Plant and cell producers	Topic 3.1. Plant bioobjects as a source of biologically active substances	LW
	Topic 3.2. Cellular technologies in medicine	LW
	Topic 3.3. Preservation of CP on the example of cell cultures	LW
Module 4 Biotechnology of individual drugs	Topic 4.1. Biotechnology of probiotic preparations.	LW
	Topic 4.2. Medical Enzymes	LW
	Topic 4.3. Modern wound dressings	LW
	Topic 4.4. Biotechnology of antibiotics	LW

* - 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 academic activities	Classroom equipment	Specialised educational / laboratory equipment, software, and materials for course study (if necessary)
Lab work	Audience for laboratory work, individual consultations, current control and intermediate certification equipped with a set of specialized furniture and equipment.	A set of specialized furniture; hardware: Notebook Lenovo ThinkPad E15-IML; multimedia projector Epson EB-X31, there is Internet access. Software: Microsoft products (OS, office suite, including MS Office / Office 365, Teams, Skype) list of specialized equipment, etc.
Lab work	Audience for laboratory work, individual consultations, current control and intermediate certification equipped with a set of specialized furniture and equipment.	A set of specialized furniture; technical means: video projector Epson EMP-S1 sch.1257, laptop Dell Vostro 7500, Internet access. Software: Microsoft products (OS, office suite, including MS Office / Office 365, Teams, Skype) list of specialized equipment, etc.
Self-studies	An auditorium for independent work of students (can be used for seminars and consultations), equipped with a set of specialized furniture and computers with access to the EIOS.	

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

7. RESOURCES RECOMMENDED FOR COURSE STUDY

Main readings:

1. Glick B., Pasternak J. Molecular biotechnology. /under. Yankovsky N.K. edition -M. :: Mir-2022, p.16-23, 533-539.
2. Daan J. A. Pharmaceutical Biotechnology: Fundamentals and Applications/ Daan J. A Crommelin, Robert D. Sindelar, Bernd Meibohm, Springer Science & Business Media,. 2013 - 544 pages.
3. Springer Science & Business Media, 22 окт. 2013 г Dutta R. Fundamentals of Biochemical Engineering/ Springer, 2008. - 306 pages.

Additional readings:

Printed publications:

1. Vijai G. Gupta New and Future Developments in Microbial Biotechnology and Bioengineering: Microbial Cellulase System Properties and Applications/ Elsevier, 2016- 300 pages.
2. Vijai G. Gupta New and Future Developments in Microbial Biotechnology and Bioengineering: Penicillium System Properties and Applications/ Elsevier, 2016- 474 pages.
3. Biotechnology=Biotechnology: Educational and methodical manual on English language./ N.V. Merkushina, I.A. Chernobylskaya. - Electronic text data. - M. : Publishing House of RUDN, 2015. - 39 p.

Resources of the information and telecommunications network "Internet":

1. RUDN ELS and third-party ELS, to which university students have access on the basis of concluded agreements:

- • Electronic libraries with access for RUDN students- RUDN EBS <http://lib.rudn.ru/MegaPro/Web>
- ELS "University Library Online" <http://www.biblioclub.ru>
- EBS Yuray <http://www.biblio-online.ru>
- EBS "Student Advisor" www.studentlibrary.ru
- EBS "Lan" <http://e.lanbook.com/>
- EBS "Trinity Bridge"
- BENTHAMOPEN e-Journal Library <https://benthamscience.com/>

2. Databases and search engines:

- electronic fund of legal and normative-technical documentation <http://docs.cntd.ru/>
- Yandex search engine <https://www.yandex.ru/>
- Google search engine <https://www.google.ru/>
- abstract database SCOPUS <http://www.elsevierscience.ru/products/scopus/>

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

1. The set of lectures on the course “Biotechnology”
2. The laboratory workshop (if any).on the course “Biotechnology”
3. The guidelines for writing a course paper / project (if any) on the course “Biotechnology”.
4.

* 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 (PC-3.2;3.4.) 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:

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