

Документ подписан простой электронной подписью
Информация о владельце:
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Должность: Ректор
Дата подписания: 26.05.2026 15:53:07
Уникальный программный ключ:
ca953a0120d891083f939673078ef1a989dae18a

**Federal State Autonomous Educational Institution of Higher Education
Peoples' Friendship University of Russia named after Patrice Lumumba
RUDN University**

Agrarian and Technological Institute

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

COURSE SYLLABUS

BACTERIAL DISEASES

course title

Recommended by the Didactic Council for the Education Field of:

35.04.04 AGRONOMY

field of studies / speciality code and title

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

INTEGRATED PLANT PROTECTION

higher education programme profile/specialisation title

1. COURSE GOAL(s)

The discipline "Bacterial Diseases" is part of the Master's program "Integrated Plant Protection" under the field of study 35.04.04 "Agronomy" and is studied in the 1st semester of the 1st year. The discipline is delivered by the Agrobiotechnology Department.

The discipline consists of 6 sections and 17 topics and is aimed at studying bacteria, their morphology, classification, symptoms of plant damage.

The purpose of mastering the discipline is: familiarization with the features of the structure, physiology and genetics of bacteria, the principles of their classification, and the symptoms of plant lesions. Mastering the methods of isolating pathogens from plant tissue into pure culture, calculating their harmfulness and the amount of economic damage. Evaluation of integrated control techniques used in the fight against phyto bacteriosis.

2. REQUIREMENTS FOR LEARNING OUTCOMES

Mastering the discipline "Bacterial Diseases" is aimed at developing the following competencies (parts of competencies) in students:

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

Competence code	Competence descriptor	Competence formation indicators (within this course)
GPC-1	Able to solve problems of development of the field of professional activity and/or organization based on the analysis of scientific and production achievements	GPC-1.2 Uses methods for solving problems of agronomy development based on search and analysis of modern scientific and production achievements;
GPC-4	Able to conduct scientific research, analyze results and prepare reporting documents	GPC-4.2 Uses information resources, scientific, experimental and instrumental base for conducting research in agronomy;
PC-4	Able to create models of crop cultivation technologies, plant protection systems, and varieties	PC-4.5 Carries out plant protection activities against harmful organisms; PC-4.6 Develops and improves measures for plant protection against harmful organisms;
PC-7	Able to carry out phytosanitary control at the state border to protect the territory of the Russian Federation from the penetration of quarantine and other dangerous pathogens of plant diseases and pests, and weeds	PC-7.1 Recognizes quarantine objects and identifies quarantine pests and pathogens; PC-7.2 Conducts examination of crops and plant products for the presence of quarantine objects;

3. COURSE IN HIGHER EDUCATION PROGRAMME STRUCTURE

The discipline "Bacterial Diseases" belongs to the mandatory part of Block 1 "Disciplines (modules)" of the higher education program.

Within the framework of the higher education program, students also master other disciplines and/or practices that contribute to achieving the planned learning outcomes of the discipline "Bacterial Diseases".

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-1	Able to solve problems of development of the field of professional activity and/or organization based on the analysis of scientific and production achievements		Scientific research work; Scientific and Research Practice; Biotechnology in Plant Protection; Biological Method of Plant Protection; Instrumental methods of research; Mathematical Modeling and Design; Plant Quarantine; Virology; Organization of Integrated Plant Protection Systems; Plant immunity;
GPC-4	Able to conduct scientific research, analyze results and prepare reporting documents		Scientific research work; Scientific and Research Practice; Undergraduate practice/Pre-diploma practice; Instrumental methods of research; Mathematical Modeling and Design; Plant Quarantine; Biotechnology in Plant Protection; Virology; Biological Method of Plant Protection; Organization of Integrated Plant Protection Systems; Plant immunity;
PC-4	Able to create models of crop cultivation technologies, plant protection systems, and varieties		Scientific and Research Practice; Mathematical Modeling and Design; Biological Method of Plant Protection; Organization of Integrated Plant Protection Systems; Plant immunity; Plant Protection in Organic Farming**; Weed biology and management**; Virology;
PC-7	Able to carry out phytosanitary control at the state border to protect the territory of the Russian Federation from the penetration of quarantine and other dangerous pathogens of plant diseases and pests, and weeds		Plant Quarantine; Virology;

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

** – Elective disciplines/practices

4. COURSE WORKLOAD AND ACADEMIC ACTIVITIES

The total labor intensity of the discipline "Bacterial Diseases" is 3 credit units.

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
		1
Contact academic hours	34	34
including:		
Lectures (LC)	17	17
Lab work (LW)	17	17
Seminars (workshops/tutorials) (S)	0	0
Self-studies	48	48
Evaluation and assessment (exam/passing/failing grade)	26	26
Course workload	academic hours	108
	credits	3

* 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: The subject and objectives of phytobacteriology	Topic 1.1. The history of the development and formation of science.	LC, LW
	Topic 1.2. Features of metabolism and genetics of bacteria.	
	Topic 1.3. The interaction between the parasite bacterium and the host plant.	
	Topic 1.4. The relationship between bacteria and other pests and plant pathogens.	
	Topic 1.5. The economic significance of phytobacterioses	
Module 2: Morphology, physiology and genetics of bacteria	Topic 2.1. Features of respiration, enzymatic processes in various groups of bacteria.	
	Topic 2.2. Bacterial systematics based on physiological characteristics and DNA analysis, characteristics of the most pathogenic groups of bacteria	
Module 3: Features of biology	Topic 3.1. Interaction with the host plant	
	Topic 3.2. Genes responsible for bacterial pathogenicity and horizontal gene transfer in bacteria.	
Module 4: Ecology of phytobacteria	Topic 4.1. The influence of climatic factors, physical and chemical soil factors	
	Topic 4.2. The influence of antagonistic microflora	

Course module title	Course module contents (topics)	Academic activities types
	and microfauna	
Module 5: The main methods of combating bacteriosis	Topic 5.1. Preventive, quarantine, phytosanitary, agrotechnical and extermination (biological, physical and chemical methods) measures.	
Module 6: Bacteria as objects of research	Topic 6.1. Examination of plants, seeds and planting material for infection with phyto-bacteria	
	Topic 6.2. Selection of plant samples	
	Topic 6.3. Diagnosis of bacteria based on phenotypic traits and DNA	
	Topic 6.4. Preservation of bacteria in a pure culture	
	Topic 6.5. Methods of plant inoculation to test the pathogenicity of bacteria and plant resistance	

* - 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)
Lecture	A lecture hall for lecture-type classes, equipped with a set of specialized furniture; board (screen) and technical means of multimedia presentations.	Set of specialized furniture, MIKMED-5 binocular medical microscope, microscopic preparations, Technical means: interactive whiteboard
Laboratory	A classroom for laboratory work, individual consultations, current and mid-term assessment; equipped with a set of specialized furniture and equipment.	Set of specialized furniture, MIKMED-5 binocular medical microscope, microscopic preparations, Technical means: interactive whiteboard
Self-studies	A classroom for independent work of students (can be used for seminars and consultations), equipped with a set of specialised furniture and computers with access to the electronic information and educational environment.	

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

7. RESOURCES RECOMMENDED FOR COURSE STUDY

Main readings:

1. Plant pathology & diseases. URI: <https://directory.doabooks.org/handle/20.500.12854/67434> DOI: 10.5772/intechopen.80762 Webshop link: <https://www.intechopen.com/books> ISBN: 9781789851168, 9781789851151, 9781789846980 Publisher: IntechOpen. Publisher

website: <https://www.intechopen.com/>. Publication date and place: 2020. Imprint: IntechOpen. Classification: Plant reproduction & propagation. Pages: 240.

2. Sternshis, M.V. Biological protection of plants: a textbook for universities / M.V. Sternshis, I.V. Andreeva, O.G. Tomilova. — 7th ed., revised. — St. Petersburg: Lan, 2024. — 332 p. — ISBN 978-5-507-49266-4. — Text: electronic // Lan: electronic library system. — URL: <https://e.lanbook.com/book/384752>

Additional readings:

1. Belousova, A.R. *English for students of agricultural universities: a textbook for universities* / A.R. Belousova, O.P. Melchina. — 9th ed., revised. — Saint Petersburg: Lan, 2024. — 352 p. — ISBN 978-5-507-51965-1. — Text: electronic // Lan: electronic library system. — URL: <https://e.lanbook.com/book/434129>
2. Vyugina, G.V. *Floriculture of the open ground: a textbook for universities* / G.V. Vyugina, S.M. Vyugin. — 7th ed., revised. — St. Petersburg: Lan Publ., 2024. — 256 p. — ISBN 978-5-507-50379-7. — Text: electronic // Lan: electronic library system. — URL: <https://e.lanbook.com/book/424346>

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
- EL "Lan" <http://e.lanbook.com/>
- EL "Znaniy": <https://znaniy.ru/>

2. Databases and search engines:

- Sage: <https://journals.sagepub.com/>
- Springer Nature Link: <https://link.springer.com/>
- Wiley Journal Database: <https://onlinelibrary.wiley.com/>
- Scientometric database Lens.org: <https://www.lens.org>

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

- Lecture course on the discipline "Bacterial Diseases".

* 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.

DEVELOPERS:

Professor of the Agrobiotechnology Department

Ignatov A.N.

position, department

name and surname

HEAD OF EDUCATIONAL DEPARTMENT:

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