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**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

PLANT IMMUNITY

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 "Plant Immunity" is part of the Master's program "Integrated Plant Protection" under the field of study 35.04.04 "Agronomy" and is studied in the 4th semester of the 2nd year. The discipline is delivered by the Agrobiotechnology Department.

The discipline consists of 6 sections and 6 topics and is aimed at studying plant protection systems against diseases and pests.

The purpose of mastering the discipline is: training of qualified specialists capable of collecting and analyzing information on breeding and seed production to create highly productive varieties and hybrids resistant to harmful organisms, as well as clarifying plant protection systems against diseases and pests.

2. REQUIREMENTS FOR LEARNING OUTCOMES

Mastering the discipline "Plant Immunity" 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)
GC-1	Able to carry out critical analysis of problem situations based on a systematic approach, develop an action strategy	GC-1.2 Uses a systematic approach to solve assigned tasks;
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-1	Able to collect, process, analyze and systematize scientific and technical information, domestic and foreign experience in the field of agronomy	PC-1.1 Performs critical analysis of the information received;
PC-2	Able to develop methodologies for conducting experiments, master new research methods	PC-2.1 Develops methodologies for conducting experiments;
PC-4	Able to create models of crop cultivation technologies, plant protection systems, and varieties	PC-4.2 Able to identify primary and secondary components of models to accelerate their development; PC-4.5 Carries out plant protection activities against harmful organisms;

Competence code	Competence descriptor	Competence formation indicators (within this course)
		PC-4.6 Develops and improves measures for plant protection against harmful organisms;

3.COURSE IN HIGHER EDUCATION PROGRAMME STRUCTURE

The discipline "Plant Immunity" 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 "Plant Immunity".

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*
GC-1	Able to carry out critical analysis of problem situations based on a systematic approach, develop an action strategy	Scientific and Research Practice; Manuscript Design**; Organization of Integrated Plant Protection Systems; Information Technology; Pest Risk Analysis**; Forecast of Development of Agricultural Pests and Diseases**; Instrumental methods of research; History and methodology of scientific Agronomy; Scientific research work;	
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 and Research Practice; Scientific research work; Biological Method of Plant Protection; Instrumental methods of research; Mathematical Modeling and Design; Bacterial Diseases; Virology; Organization of Integrated Plant Protection Systems; Information Technology;	
GPC-4	Able to conduct scientific research, analyze results and prepare reporting documents	Instrumental methods of research; Mathematical Modeling and Design; Bacterial Diseases; Virology; Biological Method of Plant Protection; Organization of Integrated Plant Protection	

Competence code	Competence descriptor	Previous courses/modules*	Subsequent courses/modules*
		Systems; Scientific research work; Scientific and Research Practice;	
PC-1	Able to collect, process, analyze and systematize scientific and technical information, domestic and foreign experience in the field of agronomy	Pest Risk Analysis**; Forecast of Development of Agricultural Pests and Diseases**; Organization of Integrated Plant Protection Systems; History and methodology of scientific Agronomy; Information Technology; Scientific and Research Practice; Scientific research work;	
PC-2	Able to develop methodologies for conducting experiments, master new research methods	Scientific and Research Practice; Scientific research work; Molecular Methods of Diagnostics**; Biological Method of Plant Protection; Organization of Integrated Plant Protection Systems; Plant Protection in Organic Farming**; Instrumental methods of research;	
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 Protection in Organic Farming**; Pest Risk Analysis**; Forecast of Development of Agricultural Pests and Diseases**; Nematodes**; Weed biology and management**; Bacterial Diseases; 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 "Plant Immunity" is 4 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
		4
<i>Contact academic hours</i>	30	30
including:		
Lectures (LC)	10	10
Lab work (LW)	0	0
Seminars (workshops/tutorials) (S)	0	0
<i>Self-studies</i>	20	20
<i>Evaluation and assessment (exam/passing/failing grade)</i>	96	96
Course workload	academic hours	144
	credits	4

* 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, objectives and goals of plant immunity	Topic 1.1. The history of the development and formation of phytobacteriology.	LC, S
Module 2: Structural features of phytopathogenic bacteria	Topic 2.1. Morphology, physiology and genetics of bacteria. Features of respiration and enzymatic processes in various groups of bacteria.	LC, S
Module 3: Features of the biology of phytopathogenic bacteria	Topic 3.1. Interaction with the host plant.	LC, S
Module 4: The influence of climatic and other factors, antagonistic microflora. Bacteriophages, antibiotic producers and competitors	Topic 4.1. The influence of climatic and other factors, antagonistic microflora.	LC, S
Module 5: The main methods of combating phytobacteriosis	Topic 5.1. Quarantine measures; phytosanitary and agrotechnical measures. Extermination measures	LC, S
Module 6: Laboratory research methods	Topic 6.1. Examination of soil and plant material samples for infection with phytobacteria.	LC, S

* - 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)

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; technical means: interactive whiteboard
Seminar	A classroom for conducting seminars, group and individual consultations, current and mid-term assessment; equipped with a set of specialized furniture and technical means for multimedia presentations.	Set of specialized furniture, binocular medical microscope MIKMED-5, 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 immunity against viruses. Publisher: Frontiers Media SA. Publisher website: www.frontiersin.org. Publication date and place: 2017. Series: Frontiers Research Topics. Classification: Microbiology (non-medical). Pages: 163.
2. Integrated plant protection in agrophytocenoses: a textbook for universities / V.E. Torikov, O.V. Melnikova, I.V. Sycheva [et al.]; edited by V.E. Torikov. — St. Petersburg: Lan, 2024. — 180 p. — ISBN 978-5-507-48892-6. — Text: electronic // Lan: electronic library system. — URL: <https://e.lanbook.com/book/401012>

Additional readings:

1. Zykin, A.V. *English for agricultural universities. Gardening* / A.V. Zykin, N.G. Kovalenko. — Saint Petersburg: Lan Publ., 2024. — 124 p. — ISBN 978-5-507-48308-2. — Text: electronic // Lan: electronic library system. — URL: <https://e.lanbook.com/book/367355>
2. *Biological protection of plants from stress: a textbook for universities* / L.Z. Karimova, V.A. Kolesar, R.I. Safin, G.K. Khuzina. — 3rd ed., revised. — Saint Petersburg: Lan, 2024. — 100 p. — ISBN 978-5-507-49137-7. — Text: electronic // Lan: electronic library system. — URL: <https://e.lanbook.com/book/379346>

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 "Znaniium": <https://znaniium.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 " Nematodes".

* 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

Gins M.S.

position, department

name and surname

HEAD OF EDUCATIONAL DEPARTMENT:

Director of the Agrobiotechnology Department

Pakina E. N.

name of department

name and surname

**HEAD
OF HIGHER EDUCATION PROGRAMME:**

Director of the Agrobiotechnology Department

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