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**Federal State Autonomous Educational Institution
Higher Education "Peoples' Friendship University of Russia"**

Agrarian-Technological Institute

(name of the main training unit (PMO)-developer of the EP HE)

WORK PROGRAM OF THE DISCIPLINE

PLANT IMMUNITY

(name of discipline/module)

Recommended by ISSS for the direction of training/specialty:

35.04.04. Agronomy

(code and name of the direction of training/specialty)

The development of the discipline is carried out within the framework of the implementation of the main professional educational program of higher education (OP HE):

Integrated Plant Protection

(name (profile/specialization) op vo)

1. THE PURPOSE OF MASTERING THE DISCIPLINE

The purpose of mastering the discipline "Plant Immunity" is to train qualified specialists who are able to collect and analyze information on breeding and seed production to create highly productive varieties and hybrids resistant to harmful organisms, as well as to clarify plant protection systems against diseases and pests. .

2. REQUIREMENTS FOR THE RESULTS OF MASTERING THE DISCIPLINE

Mastering the discipline "Plant Immunity" is aimed at the formation of the following competencies in students:

Table 2.1. List of competencies formed in students during the development of the discipline (results of mastering the discipline)

Code	Competence	Competency Achievement Indicators (within the framework of this discipline)
UK-1	Able to carry out search, critical analysis of problem situations on the basis of a systematic approach, to develop an action strategy	UK-1.2 Uses a systematic approach to solve the tasks
OPK-1	Able to solve the problems of development of the field of professional activity and (or) organization on the basis of analysis of the achievements of science and production	OPK-1.2. Uses methods of solving problems of agronomy development based on the search and analysis of modern achievements of science and production
OPK-4	Able to conduct research, analyze results and prepare reporting documents	OPK-4. 2. Uses information resources, scientific, experimental and instrumental base for research in agronomy
PK-1	Able to collect, process, analyze and systematize scientific and technical information, domestic and foreign experience in the field of agronomy	PC-1.1. Carries out a critical analysis of the information received
PK-2	Able to develop methods of conducting experiments, master new research methods	PC-2.1. Develops methods of conducting experiments
PK-4	Able to create models of crop cultivation technologies, plant protection systems, varieties	PC-4.2. Able to highlight the main and secondary components of models in order to accelerate their development PC-4.5. Carries out work on the protection of plants from harmful objects PC-4.6. Develops and improves measures to protect plants from harmful objects

3. PLACE OF THE DISCIPLINE IN THE STRUCTURE OF THE EP HE

The discipline "**Plant immunity**" refers to *theoretical* part of block B1 OP VO (B1.O.02.01)

Within the framework of the OP HE, students also master other disciplines and / or practices that contribute to the achievement of the planned results of the development of the discipline "**Plant Immunity**".

Table 3.1. List of components of the OP HE that contribute to the achievement of the planned results of the discipline

Code	Competence	Other disciplines/modules*	Subsequent disciplines/modules*
UK-1	Able to carry out search, critical analysis of problem situations on the basis of a systematic approach, to develop an action strategy	History and methodology of scientific agronomy Information Technologies Instrumental research methods Organization of integrated plant protection systems Work with scientific literature Prognosis of pests and diseases Phytosanitary risk analysis	Biotechnology in plant protection Research work Pre-diploma practice
OPK-1	Able to solve the problems of development of the field of professional activity and (or) organization on the basis of analysis of the achievements of science and production	Information Technologies Instrumental research methods Mathematical Modeling and Design Organization of integrated plant protection systems Biological method of plant protection Virology Bacterial diseases Biology of weedy vegetation Plant protection in organic farming Molecular methods for diagnosing phytopathogens Nematode diseases Prognosis of pests and diseases Phytosanitary risk analysis	Biotechnology in plant protection Plant quarantine Research work Pre-diploma practice
OPK-4	Able to conduct research, analyze results and prepare reporting documents	Instrumental research methods Mathematical Modeling and Design Organization of integrated plant protection systems Biological method of plant protection	Biotechnology in plant protection Plant quarantine Research work

		<p>Virology Bacterial diseases Work with scientific literature Fundamentals of Scientific Communication Biology of weedy vegetation Plant protection in organic farming Molecular methods for diagnosing phytopathogens Nematode diseases Prognosis of pests and diseases Phytosanitary risk analysis</p>	
PK-1	Able to collect, process, analyze and systematize scientific and technical information, domestic and foreign experience in the field of agronomy	<p>Information Technologies History and methodology of scientific agronomy Organization of integrated plant protection systems Prognosis of pests and diseases Phytosanitary risk analysis</p>	<p>Biotechnology in plant protection Plant quarantine Research work Pre-diploma practice</p>
PK-2	Able to develop methods of conducting experiments, master new research methods	<p>Instrumental research methods Organization of integrated plant protection systems Biological method of plant protection Plant protection in organic farming Organization of integrated plant protection systems Biological method of plant protection Molecular methods for diagnosing phytopathogens</p>	<p>Biotechnology in plant protection Plant quarantine Research work</p>
PK-4	Able to create models of crop cultivation technologies, plant protection systems, varieties	<p>Mathematical Modeling and Design Organization of integrated plant protection systems Biological method of plant protection Plant protection in organic farming</p>	<p>Research work</p>

* - is filled in accordance with the competence matrix and the SPMS OP VO

4. SCOPE OF DISCIPLINE AND TYPES OF EDUCATIONAL WORK

The total labor intensity of the discipline "**Higher Plants**" is **3** credits.

Table 4.1. Types of educational work by periods of mastering the OP HE for full-time education

Type of educational work		TOTAL, aca.hrs.	Semester(s)			
						4
<i>Contact work, ac.ch.</i>		60				60
Including:						
Lectures (LC)		18				18
Laboratory works (LR)						
Practical/seminar sessions (PW)		18				18
<i>Independent work of students, ac.ch.</i>		64				64
<i>Control (exam /test with grade), ac.ch.</i>		8				8
Overall labor intensity of the discipline	aca.hrs..	108				108
	Hrs.ed.	3				3

Table 4.1. Types of educational work by periods of mastering the OP HE for **full-time and part-time** education

Type of educational work		TOTAL, aca.hrs.	Semester(s)			
			5	6		
<i>Contact work, ac.ch.</i>		45	45			
Including:						
Lectures (LC)		18	18			
Laboratory works (LR)						
Practical/Seminar Classes (PE)		27	27			
<i>Independent work of students, ac.ch.</i>		27	27			
<i>Control (exam /test with grade), ac.ch.</i>		36	36			
Overall labor intensity of the discipline	aca.hrs..	108	108			
	Hrs.ed.	3	3			

Table 4.1. Types of educational work by periods of mastering the OP HE for **part-time** education

Type of educational work		TOTAL, aca.hrs.	Semester(s)			
			Winters.	Years.		
<i>Contact work, ac.ch.</i>		20		20		
Including:						
Lectures (LC)		10		10		
Laboratory works (LR)						
Practical/Seminar Classes (PE)		10		10		
<i>Independent work of students, ac.ch.</i>		79		79		
<i>Control (exam /test with grade), ac.ch.</i>		9		9		
Overall labor intensity of the discipline	aca.hrs..	108		108		
	Hrs.ed.	3		3		

5. CONTENT OF THE DISCIPLINE

Table 5.1. The content of the discipline (module) by types of educational work

Name of the discipline section	Contents	Type of educational work*
Section 1 The subject, tasks and goals of plant immunity	The history of the development and formation of phytobacteriology. Systematics of bacteria. Features of metabolism and genetics of bacteria. Methods of penetration into the plant, symptoms of damage. Plant resistance to bacteriosis	LC, PE

Section 2 Structural features of phytopathogenic bacteria	Morphology, physiology and genetics of bacteria. Features of respiration and enzymatic processes in various groups of bacteria. DNA analysis, characteristics of the most pathogenic groups	LC, PE
Section 3 Biology phytopathogenic bacteria	Interaction with the host plant. Genes responsible for the pathogenicity of bacteria, horizontal gene transfer in bacteria	LC, PE
Section 4 Ecology of phytopathogenic bacteria	Influence of climatic and other factors, antagonistic microflora. Bacteriophages, antibiotic producers and competitors	LC, PE
Section 5 The main methods of combating phyto-bacteriosis	Quarantine measures; phytosanitary and agrotechnical measures. Extermination measures	LC, PE
Section 5 Laboratory research methods	Study of soil and plant material samples for infestation with phyto-bacteria. Methods of isolation into pure culture, preservation in pure culture. Plant inoculation methods to test the pathogenicity of bacteria	LC, PE

* - is filled in only on **full-time** forms of training: *LC* - lectures; *PE* – practical exercises.

6. MATERIAL AND TECHNICAL SUPPORT OF DISCIPLINE

Table 6.1. Logistics of discipline

Audience type	Equipping the classroom	Specialized educational/laboratory equipment, software and materials for mastering the discipline (if necessary)
Lab	And I'm an instructor for laboratory and practical classes during the semesters.	- <i>Laboratory utensils and tools</i> - <i>Laboratory equipment</i> - <i>Reagents</i>
Auditorium for independent work of students	An auditorium for independent work of students, equipped with a complex of specialized furniture and technical means of multimedia presentations.	- <i>Specialized furniture</i> - <i>Multimedia \projector</i>

7. EDUCATIONAL, METHODOLOGICAL AND INFORMATION SUPPORT OF THE DISCIPLINE

Main literature:

1. Girich V. S. Microflora of plants and phytoimmunitet : educational-methodical manual / V.S. Girich. - Electronic text data. - M. : RUDN, 2018. - 37 s

2. Svirkova, S. V. Immunity of plants : uchebnoe posobie / S. V. Svirkova, A. V. Zaushintsena. — Kemerovo : KemGU, 2014. — 207 p. — ISBN 978-5-8353-1722-6. — Text : electronic // Lan : e-bibliotechnaya sistema. — URL: <https://e.lanbook.com/book/69997>

Further reading:

1. Svirkova, S. V. Immunity of plants: electronic training manual / S. V. Svirkova, A. V. Zaushintsena ; Kemerovo State University, Department of Botany. — Kemerovo : Kemerovo State University, 2014. — 207 p. : tabl., ill. — Access mode: by subscription. — URL: <https://biblioclub.ru/index.php?page=book&id=437491>

Resources of the information and telecommunication network "Internet":

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

- Electronic library system RUDN University – EBS RUDN university <http://lib.rudn.ru/MegaPro/Web>
- EBS "University Library Online" <http://www.biblioclub.ru>
- EBS Yurayt <http://www.biblio-online.ru>
- EBS "Student Consultant" www.studentlibrary.ru
- EBS "Lan" <http://e.lanbook.com/>

2. Databases and search engines:

- NCBI: <https://p.360pubmed.com/pubmed/>
- RUDN University Bulletin: access mode from the territory of RUDN University and remotely <http://journals.rudn.ru/>
- Scientific Library Elibrary.ru: access by IP-addresses of RUDN University at the address: <http://www.elibrary.ru/defaultx.asp>
- ScienceDirect (ESD), FreedomCollection, Cell Press And Elsevier. There is remote access to the database, access by IP-addresses of RUDN University (or remotely by individual login and password).
- Google Scholar is a free search engine for full texts of scientific publications of all formats and disciplines. Indexes the full texts of scientific publications. Access mode: <https://scholar.google.ru/>
- Scopus is a scientometric database of the publishing house "Elsevier". Access to the platform is carried out by IP-addresses of RUDN University or remotely. <http://www.scopus.com/>
- Database of Botanical and Biological Publications:

Educational and methodical materials for independent work of students when mastering the discipline / module:*

1. Methodical instructions for students on the development of the discipline "**Plant Immunity**"
2. Lecture notes
3. Methodical recommendations on all topics of laboratory work
4. Tasks to perform as part of independent work

* - all educational and methodological materials for independent work of students are placed in accordance with the current procedure on the page of **the discipline in TUIS!**

8. EVALUATION MATERIALS AND POINT-RATING SYSTEM FOR ASSESSING THE LEVEL OF FORMATION OF COMPETENCIES IN THE DISCIPLINE

Evaluation materials and a point-rating system* for assessing the level of formation of competencies (parts of competencies) based on the results of mastering the discipline "**Plant Immunity**" are presented in the Appendix to this Work Program of the discipline.

* - OM and BRS are formed on the basis of the requirements of the relevant local regulatory act of RUDN University.

DEVELOPERS:

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