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

Agrarian-Technological Institute

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

COURSE SYLLABUS

Virology

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. THE PURPOSE OF MASTERING THE DISCIPLINE

The purpose of mastering the discipline "Virology" is to obtain basic knowledge about the ways and means of spreading a viral infection, measures to prevent infection of plants and methods of localization of lesions, familiarization with modern methods of identification and diagnosis of viruses.

2. REQUIREMENTS FOR THE RESULTS OF MASTERING THE DISCIPLINE

Mastering the discipline "Virology" is aimed at the formation of the following competencies among students: OPK-1.2; OPK-4.2; OPK-4.3; PC-4.5; PC-4.6; PC-7.1; PC-7.2

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)
OPK – 1.2	Uses methods of solving problems in the development of agronomy based on the search and analysis of modern achievements of science and production	OPK-1.2.1 Uses in professional activities the representation of the biological characteristics of viruses, diagnostic methods OPK-1.2.2 Applies in professional activities knowledge about measures to combat viruses, their localization and elimination of epiphytotics
OPK – 4.2	Uses information resources, scientific, experimental and instrumental base for research in agronomy	OPK-4.2.1 Uses modern equipment in the laboratory OPK-4.2.2 Uses skills in sampling plant material to search for pathogens
OPK – 4.3	Formulates the results obtained in the course of solving research problems	OPK-4.3.1 Able to interpret the results of modern molecular genetic diagnostic methods for the detection of viruses
PC – 4.5	Carries out work on the protection of plants from harmful objects	PC – 4.5.1 Able to apply in practice knowledge about measures to combat viruses, viroids and phytoplasmas
PC – 4.6	Develops and improves measures to protect plants from harmful objects	PC – 4.6.1 Participates in the development of regulatory documents for the diagnosis of viruses, viroids and phytoplasmas PC – 4.6.2 Participates in the formation of rules to limit the spread of viral infections
PC – 7.1	Recognizes quarantine objects and identifies quarantine pests and pathogens	PC – 7.1.1 Owns methods of species identification and viruses, viroids and phytoplasmas PC – 7.1.2 Has knowledge of the symptoms, developmental responsibilities, spread of quarantine types of viruses that it uses in practice
PC – 7.2	Conducts examination of crops and crop	PC – 7.2.1 Owns methods and techniques

	products for the presence of quarantine facilities	for conducting phytosanitary research of plant material to search for quarantine species of viruses, viroids and phytoplasmas in it
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3. MESTO DISCIPLINE IN THE STRUCTURE OF THE OP VO

The discipline "**Virology**" refers to *the variable* part of the block B1.O.02.06. OP VO.

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

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

Code	Competence	Previous disciplines/modules, practices*	Subsequent disciplines/modules, practices*
OPK – 1.2	Uses methods of solving problems in the development of agronomy based on the search and analysis of modern achievements of science and production	Phytopathology Biological method of plant protection Work with scientific literature Fundamentals of Scientific Communication Plant protection in organic farming Molecular methods for diagnosing phytopathogens Prognosis of pests and diseases Phytosanitary risk analysis	Instrumental research methods Instrumental research methods Plant quarantine Biotechnology in plant protection
OPK – 4.2	Uses information resources, scientific, experimental and instrumental base for research in agronomy	Phytopathology Biological method of plant protection Work with scientific literature Fundamentals of Scientific Communication Plant protection in organic farming Molecular methods for diagnosing phytopathogens Prognosis of pests and diseases Phytosanitary risk analysis	Instrumental research methods Instrumental research methods Plant quarantine Biotechnology in plant protection
OPK – 4.3	Formulates the results obtained in the course of solving research problems	Phytopathology Biological method of plant protection Work with scientific	Instrumental research methods Instrumental research methods

		<p>literature</p> <p>Fundamentals of Scientific Communication</p> <p>Plant protection in organic farming</p> <p>Molecular methods for diagnosing phytopathogens</p> <p>Prognosis of pests and diseases</p> <p>Phytosanitary risk analysis</p>	<p>Plant quarantine</p> <p>Biotechnology in plant protection</p>
PC – 4.5	Carries out work on the protection of plants from harmful objects	<p>Phytopathology</p> <p>Biological method of plant protection</p> <p>Work with scientific literature</p> <p>Fundamentals of Scientific Communication</p> <p>Plant protection in organic farming</p> <p>Molecular methods for diagnosing phytopathogens</p> <p>Prognosis of pests and diseases</p> <p>Phytosanitary risk analysis</p>	<p>Instrumental research methods</p> <p>Instrumental research methods</p> <p>Plant quarantine</p> <p>Biotechnology in plant protection</p>
PC – 4.6	Develops and improves measures to protect plants from harmful objects	<p>Phytopathology</p> <p>Biological method of plant protection</p> <p>Work with scientific literature</p> <p>Fundamentals of Scientific Communication</p> <p>Plant protection in organic farming</p> <p>Molecular methods for diagnosing phytopathogens</p> <p>Prognosis of pests and diseases</p> <p>Phytosanitary risk analysis</p>	<p>Instrumental research methods</p> <p>Instrumental research methods</p> <p>Plant quarantine</p> <p>Biotechnology in plant protection</p>
PC – 7.1	Recognizes quarantine objects and identifies quarantine pests and pathogens	<p>Phytopathology</p> <p>Biological method of plant protection</p> <p>Work with scientific literature</p> <p>Fundamentals of Scientific Communication</p> <p>Plant protection in organic farming</p> <p>Molecular methods for diagnosing phytopathogens</p>	<p>Instrumental research methods</p> <p>Instrumental research methods</p> <p>Plant quarantine</p> <p>Biotechnology in plant protection</p>

		Prognosis of pests and diseases Phytosanitary risk analysis	
PC – 7.2	Conducts examination of crops and crop products for the presence of quarantine facilities	Phytopathology Biological method of plant protection Work with scientific literature Fundamentals of Scientific Communication Plant protection in organic farming Molecular methods for diagnosing phytopathogens Prognosis of pests and diseases Phytosanitary risk analysis	Instrumental research methods Instrumental research methods Plant quarantine Biotechnology in plant protection

* - 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 "**Virology**" is **4** credit units.

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

Type of educational work		TOTAL, aca.hrs.	Semester(s)			
			4	5		
<i>Contact work, ac.ch.</i>		68	34	34		
Including:						
Lectures (LC)		34	16	18		
Laboratory works (LR)						
Practical/Seminar Classes (FPs)		34	14	20		
<i>Independent work of students, ac.ch.</i>		52	30	22		
<i>Control (exam /test with grade), ac.ch.</i>		24	10	14		
Overall labor intensity of the discipline	aca.hrs.	144	70	74		
	Hrs.ed.	4	2	2		

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 Introduction to Virology	Topic 1.1. Subject and history of virology	LC, NW
Section 2 Morphological and	Topic 2. 1. Classification of viruses, viroids and phytoplasmas	LC, NW

biological features	Topic 2. 2. Morphological features of viruses	LC, NW
	Topic 2. 3. Morphological features of viroids	LC, NW
	Topic 2. 4. Morphological features of phytoplasmas	LC, NW
	Topic 2. 5. Biological features of viruses, viroids and phytoplasmas. Methods of replication	LC, NW
Section 3 Methods of diagnosis of viruses, viroids and phytoplasmas.	Topic 3. 1. Classical methods for detecting viral infections	LC, NW
	Topic 3. 2. Enzyme-linked immunosorbent assay	LC, NW
	Topic 3. 3. Molecular genetic diagnostic methods	LC, NW
Section 4 Viruses, viroids and phytoplasmas are the causative agents of diseases of nightshade crops. Diagnostics and control measures	Topic 4. 1. Especially dangerous in the stimuli of tomato diseases	LC, NW
	Topic 4. 2. Especially dangerous pathogens of potato diseases	LC, NW
Section 5 Viruses, viroids and phytoplasmas are the causative agents of diseases of cereals. Diagnostics and control measures	Topic 5.1. Especially dangerous pathogens of wheat diseases	LC, NW
	Topic 5.2. Especially dangerous pathogens of rice diseases	LC, NW
	Topic 5.3. Especially dangerous causative agents of corn diseases	LC, NW
Section 6 Viruses, viroids and phytoplasmas are the causative agents of diseases of fruit and berry crops. Diagnostics and control measures	Topic 6. 1. Especially dangerous pathogens of diseases of stone crops	LC, NW
	Topic 6. 2. Especially dangerous pathogens of diseases of pome crops	LC, NW
	Topic 6. 3. Especially dangerous pathogens of strawberry diseases	LC, NW
	Topic 6. 4. Especially dangerous pathogens of diseases of raspberries and other berry crops	LC, NW
	Topic 6. 5. Especially dangerous pathogens of grape diseases	LC, NW
	Topic 6. 6. Certification of planting material. International experience and rules	LC, NW
Section 7 Viruses, viroids and	Topic 7. 1. Especially dangerous pathogens of diseases of leguminous crops	LC, NW

phytoplasmas are causative agents of diseases of economically significant crops. Control measures and diagnostics	Topic 7. 2. Especially dangerous pathogens of diseases of pumpkin and root crops of x crops	LC, NW
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* - is filled only in **full-time** forms of training: *LC* - lectures; *LR* - laboratory work; *SZ* - seminar classes.

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)
Specialized audience	An auditorium for practical work, individual consultations, current control and intermediate certification, equipped with a set of specialized furniture and equipment. (audiences 310, 238)	Comof specialized furniture Mobile Projector
Educational and Scientific Laboratory	Laboratory of Molecular Genetic Diagnostic Methods (235, 439)	Amplifier for classical PCR Set of dispensers Solid-state thermostat Vortex Centrifuge
For independent work of students	Auditorium for independent work of students (can be used for lectures and consultations), equipped with a set of specialized furniture (room 310)	Set of specialized furniture Mobile Projector

* - the audience for independent work of students is indicated **NECESSARILY!**

7. EDUCATIONAL, METHODOLOGICAL AND INFORMATION SUPPORT OF THE DISCIPLINE

Main literature:

Publications:

1. A. V. Pinevich A. K. Sirotkin O. V. Gavrilova A. A. Potekhin «Virologiya». Izd-vo S.-Peterb. un-ta, 2012. — 432 s.
2. Luria S., Darnell J. "General Virology". Ed. "Mir", 1981.
3. Matthews, R. «Plant Viruses». Ed. "The World". 1973.
4. Agol V.I., Atabekov I.G., Krylov V.N., Tikhonenko T.I. "Molecular biology of viruses". Ed. Nauka, 1971.
5. Virology. Ed. Mir, 1989.

Electronic and printed full-text materials:

Further reading:

Electronic and printed full-text materials:

1. "Molecular Biology (Structure and Biosynthesis of Nucleic Acids)", "Graduate School", 1990.
2. Lewin B. "Genes", Publishing House "The World", 1987
3. Mamontov S.G., Zakharov V.B. Obshchaya biologiya. M.; Ed. "Higher School", 1996
4. Zhdanova V. M., Gaydamovich S. Ya. General and private virology, M.; Ed. - The Young Guard (1982)

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>

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>
 - Electronic resource: EPPO global database URL <https://gd.eppo.int/>
 - Electronic resource: Crop Protection Compendium URL <https://www.cabi.org/cpc>
 - Electronic resource: PlantwisePlus URL <https://www.plantwise.org/>

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 (part of competencies) based on the results of mastering the discipline "**Virology**" 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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Position, BCD

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