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**Federal State Autonomous Educational Institution of Higher Education  
PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA  
RUDN University**

**Agrarian -Technological Institute**

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

**COURSE SYLLABUS**

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**Virology**

course title

**Recommended by the Didactic Council for the Education Field of:**

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**35.04.04 Agronomy**

field of studies / speciality code and title

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

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**Integrated Plant Protection**

higher education programme profile/specialisation title

## 1. COURSE GOAL(s)

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 LEARNING OUTCOMES

Mastering the discipline "Virology" is aimed at the formation of the following competencies (part of the competencies) among students:

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

Competence code	Competence descriptor	Competence formation indicators (within this course)
OPK-1	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. Uses in professional activities the representation of the biological characteristics of viruses, diagnostic methods
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
		OPK-4.3. Formulates the results obtained in the course of solving research problems
PK-4	Able to conduct research, analyze results and prepare reporting documents	PK-4.5. Carries out work to protect plants from harmful objects;
		PK-4.6. Develops and improves measures to protect plants from harmful objects;
PK-7	Able to carry out phytosanitary control at the state border in order to protect the territory of the Russian Federation from the penetration of quarantine and other dangerous pathogens and plant pests, weeds	PK-7.1. Recognizes quarantine objects and identifies quarantine pests and pathogens
		PK-7.2. Conducts an examination of crops and crop production for the presence of quarantine facilities

## 3. COURSE IN HIGHER EDUCATION PROGRAMME STRUCTURE

Mastering the discipline "Virology" is aimed at forming the following competencies (part of the competencies) among students:

*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*

<b>Competence code</b>	<b>Competence descriptor</b>	<b>Previous courses/modules*</b>	<b>Subsequent courses/modules*</b>
OPK-1	Uses methods of solving problems in the development of agronomy based on the search and analysis of modern achievements of science and production	Biological Method of Plant Protection; Instrumental methods of research; Bacterial Diseases; Information Technology; Scientific research work / Научно-исследовательская работа; Research Practice;	Scientific research work / Научно-исследовательская работа; Biotechnology in Plant Protection; Plant Quarantine; Plant immunity;
OPK-4	Able to conduct research, analyze results and prepare reporting documents	Scientific research work / Научно-исследовательская работа; Research Practice; Instrumental methods of research; Bacterial Diseases; Biological Method of Plant Protection;	Scientific research work / Научно-исследовательская работа; Undergraduate practice / Преддипломная практика; Biotechnology in Plant Protection; Plant Quarantine; Plant immunity;
PK-4	Able to conduct research, analyze results and prepare reporting documents	Research Practice; Biological Method of Plant Protection; Plant Protection in Organic Farming; Pest Risk Analysis; Forecast of Development of Agricultural Pests and Diseases; Nematodes; Weed biology and management; Bacterial Diseases;	Plant immunity;
PK-7	Able to carry out phytosanitary control at the state border in order to protect the territory of the Russian Federation from the penetration of quarantine and other	Nematodes; Molecular Methods of Diagnostics; Bacterial Diseases;	Plant Quarantine;

Competence code	Competence descriptor	Previous courses/modules*	Subsequent courses/modules*
	dangerous pathogens and plant pests, weeds		

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

#### 4. COURSE WORKLOAD AND ACADEMIC ACTIVITIES

##### Possible wording

The total labor intensity of the discipline "Virology" is 4 credits for full-time education.

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

Type of academic activities		Total academic hours	Semesters/training modules			
			1	2	3	4
<i>Contact academic hours</i>		<b>68</b>			<b>68</b>	
including:						
Lectures (LC)		<b>34</b>			<b>34</b>	
Lab work (LW)						
Seminars (workshops/tutorials) (S)		<b>34</b>			<b>34</b>	
<i>Self-studies</i>		<b>48</b>			<b>48</b>	
<i>Evaluation and assessment (exam/passing/failing grade)</i>		<b>28</b>			<b>28</b>	
<b>Course workload</b>	academic hours	<b>144</b>			<b>144</b>	
	credits	<b>4</b>			<b>4</b>	

#### 5. COURSE CONTENTS

*Table 5.1. Course contents and academic activities types*

Course module title	Course module contents (topics)	Academic activities types
Module 1: Introduction to Virology	Topic 1.1. The subject and history of virology	LC; S
Module 2: Morphological and biological features	Topic 2.1. Classification of viruses, viroids and phytoplasmas	LC; S
	Topic 2.2. Morphological features of viruses	LC; S
	Topic 2.3. Morphological features of viroids	LC; S
	Topic 2.4. Morphological features of phytoplasmas	LC; S
	Topic 2.5. Biological features of viruses, viroids and phytoplasmas. Replication methods	LC; S
Module 3: Diagnostic methods for viruses, viroids and phytoplasmas	Topic 3.1. Classical methods of detecting viral infections	LC; S
	Topic 3.2 Enzyme immunoassay	LC; S
	Topic 3.3 Molecular genetic diagnostic methods	LC; S
Module 4: Viruses, viroids and phytoplasmas are	Topic 4.1. Especially dangerous pathogens of tomato diseases	LC; S

Course module title	Course module contents (topics)	Academic activities types
pathogens of nightshade crops. Diagnostics and control measures	Topic 4.2. Especially dangerous pathogens of potato diseases	LC; S
Module 5. Viruses, viroids and phytoplasmas are pathogens of cereal crops. Diagnostics and control measures	Topic 5.1. Especially dangerous pathogens of wheat diseases	LC; S
	Topic 5.2. Especially dangerous pathogens of rice diseases	LC; S
	Topic 5.3. Especially dangerous pathogens of corn diseases	LC; S
Module 6. Viruses, viroids and phytoplasmas are pathogens of fruit and berry crops. Diagnostics and control measures	Topic 6.1. Especially dangerous pathogens of stone crops	LC; S
	Topic 6.2. Especially dangerous pathogens of seed crops	LC; S
	Topic 6.3. Especially dangerous pathogens of strawberry diseases	LC; S
	Topic 6.4. Especially dangerous pathogens of raspberries and other berry crops	LC; S
	Topic 6.5. Especially dangerous pathogens of grape diseases	LC; S
	Topic 6.6. Certification of planting material. International experience and rules	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)
Lecture hall	An auditorium for conducting lecture-type classes, equipped with a set of specialized furniture; a blackboard (screen) and multimedia presentation equipment.	
Seminary	An auditorium for seminar-type classes, group and individual consultations, ongoing monitoring and intermediate certification, equipped with a set of specialized furniture and multimedia presentation equipment.	
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. Fields Virology: Emerging Viruses Peter M. Howley-David M. Knipe. Wolters Kluwer Health, 2020.

2. Virology. Practicum / Year. V. Tretyakova, M. S. Kalmykova, Family. Year. Yarygin, V. M. Kalmykov. — The 4th is decreasing., erased. — Traveled to St. Petersburg : Lanya, 2023. — P. 132. — ISBN 978-5-507-47971-9. — Text : electronic // Lanya : electronic library system. — URL: <https://e.lanbook.com/book/335198>

*Additional readings:*

1. Sashenkov, S. A. Virology: a practical guide / S. A. Sashenkov, G. V. Ilyin, D. Spell. Ilyin. Penza : PGAU, 2022. — p. 157. — Text : electronic // Lanya : electronic library system. — URL: <https://e.lanbook.com/book/332963>

2. Virology. Practicum / Year. V. Tretyakova, M. S. Kalmykova, Family. Year. Yarygin, V. M. Kalmykov. — The 4th is decreasing., erased. — Traveled to St. Petersburg : Lanya, 2023. — P. 132. — ISBN 978-5-507-47971-9. — Text : electronic // Lanya : electronic library system. — URL: <https://e.lanbook.com/book/335198>

*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](http://www.studentlibrary.ru)
- EL "Lan" <http://e.lanbook.com/>

2. Databases and search engines:

- electronic foundation of legal and normative-technical documentation <http://docs.cntd.ru/>
- Yandex search engine [https:// www .yandex.ru/](https://www.yandex.ru/)
- Google search engine <https://www.google.ru/>
- Scopus abstract database <http://www.elsevierscience.ru/products/scopus/>

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

The set of lectures on the course «Virology»

\* 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:**

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position, department

name and surname

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position, department	name and surname
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position, department	name and surname
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**HEAD OF EDUCATIONAL DEPARTMENT:**

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name of department	name and surname
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**HEAD  
OF HIGHER EDUCATION PROGRAMME:**

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position, department	name and surname
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