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

Agrarian -Technological Institute

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

COURSE SYLLABUS

Biotechnology in Plant Protection
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

2025

1. COURSE GOAL(s)

The purpose of mastering the discipline "Biotechnology in Plant Protection" is the formation of theoretical knowledge and familiarization with the practical problems of implementing biotechnological methods and techniques in the production of healthy planting material of vegetatively propagated agricultural and ornamental crops, in obtaining plant forms with fundamentally new properties and qualities within economically significant species, in the mass production and use of biological products with antibacterial, fungicidal and insecticidal activity.

2. REQUIREMENTS FOR LEARNING OUTCOMES

Mastering the discipline "Biotechnology in Plant Protection" 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	Able to solve the tasks of developing the field of professional activity and (or) organization based on the analysis of scientific and industrial achievements;	OPK-1.1 Demonstrates knowledge of the main methods of analyzing the achievements of science and production in agronomy
		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-4	Able to conduct research, analyse results and prepare reporting documents	OPK-4.2 Uses information resources, scientific, experimental and instrumental base for research in agronomy
OPK-5	Able to carry out feasibility studies of projects in professional activities;	OPK-5.1 Knows the methods of economic analysis and accounting of project indicators in agronomy;
		OPK-5.2 Analyzes the main production and economic indicators of the project in agronomy;
		OPK-5.3 Develops proposals to improve the efficiency of the project in agronomy;
PK-2	He is able to develop experimental techniques and master new research methods.	PK-2.1 Develops methods for conducting experiments;
		PK-2.2 Applies modern types and methods of conducting observations and accounting in field experiments;
PK-3	Able to organize, conduct and analyze the results of experiments (field experiments)	PK-3.2 Organizes field experiments to evaluate the effectiveness of innovative technologies in production conditions;
PK-4	He is able to create models of crop cultivation technologies, plant protection systems, and varieties.	PK-4.2 Able to identify the main and secondary components of models in order to speed up their development;
		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;

Competence code	Competence descriptor	Competence formation indicators (within this course)
PK-6	Able to provide consultations on innovative technologies in agronomy	PK-6.2 Able to argue the need to use crop protection technologies for accelerated development of agricultural enterprises;

3.COURSE IN HIGHER EDUCATION PROGRAMME STRUCTURE

Mastering the discipline "Biotechnology in plant protection" 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

Competence code	Competence descriptor	Previous courses/modules*	Subsequent courses/modules*
OPK-1	Able to solve the tasks of developing the field of professional activity and (or) organization based on the analysis of scientific and industrial achievements;	Bacterial Diseases; Information Technology; Scientific research work / Научно-исследовательская работа;	Biotechnology in Plant Protection; Instrumental methods of research; Mathematical Modeling and Design; Plant Quarantine; Virology; Organization of Integrated Plant Protection Systems; Plant immunity; Scientific research work / Научно-исследовательская работа
OPK-4	Able to conduct research, analyse results and prepare reporting documents	Scientific research work / Научно-исследовательская работа; Bacterial Diseases;	Scientific research work / Научно-исследовательская работа; Undergraduate practice / Преддипломная практика; Instrumental methods of research; Mathematical Modeling and Design; Plant Quarantine; Biotechnology in Plant Protection; Virology; Organization of Integrated Plant Protection Systems; Plant immunity;
OPK-5	Able to carry out feasibility studies of projects in professional activities;		Management and Marketing; Organization of Integrated Plant Protection Systems;

Compet ence code	Competence descriptor	Previous courses/modules*	Subsequent courses/modules*
PK-2	He is able to develop experimental techniques and master new research methods.	Scientific research work / Научно-исследовательская работа; Molecular Methods of Diagnostics;	Plant Quarantine; Biotechnology in Plant Protection; Organization of Integrated Plant Protection Systems; Plant immunity; Instrumental methods of research; Scientific research work / Научно-исследовательская работа;
PK-3	Able to organize, conduct and analyze the results of experiments (field experiments)	Scientific research work / Научно-исследовательская работа;	Scientific research work / Научно-исследовательская работа; Mathematical Modeling and Design; Organization of Integrated Plant Protection Systems;
PK-4	He is able to create models of crop cultivation technologies, plant protection systems, and varieties.	Information Technology;	Organization of Integrated Plant Protection Systems;
PK-6	Able to provide consultations on innovative technologies in agronomy	Pest Risk Analysis; Forecast of Development of Agricultural Pests and Diseases; Nematodes; Bacteriial Diseases;	Virology; Plant immunity; Mathematical Modeling and Design; Organization of Integrated Plant Protection Systems;

* 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 "Biotechnology in plant protection" is 3 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
Contact academic hours	48	48			
including:					
Lectures (LC)	24	24			
Lab work (LW)	24	24			
Seminars (workshops/tutorials) (S)					
Self-studies	52	52			

Type of academic activities		Total academic hours	Semesters/training modules			
			1	2	3	4
Evaluation and assessment (exam/passing/failing grade)		*8*	*8*			
Course workload	academic hours_	**108**	**108**			
	credits	**3**	**3**			

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 history of the development and current state of the biological method of plant protection	Topic 1.1. The main factors of regulation of the number of harmful organisms	LC; LW
	Topic 1.2. The ecological foundations of biometrics. Forms of relationships between organisms in biocenoses.	LC; LW
Module 2: Entomophages	Topic 2.1. Methods of using entomophages.	LC; LW
	Topic 2.2. Trichogramma, gabrobragon, encarsia, syrphides, rhodolia	LC; LW
Module 3: Acariphages	Topic 3.1. Phytoseulus. Ambiguities	LC; LW
Module 4: Phytophages	Topic 4.1. Prospects of use. Phytomise	LC; LW
Module 5: Genetic methods of insect control	Topic 5.1. Sterilization methods. Chemosterilants. Methods and conditions of application	LC; LW
Module 6: Production technology and methods for controlling the effectiveness of biological products	Topic 6.1. Biopesticides; biologically active substances in plant protection. Conditions of use; efficiency; environmental friendliness	LC; LW

* - 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	

Type of academic activities	Classroom equipment	Specialised educational / laboratory equipment, software, and materials for course study (if necessary)
	furniture; a blackboard (screen) and multimedia presentation equipment.	
Computer class	A computer classroom for conducting classes, group and individual consultations, ongoing monitoring and intermediate certification, equipped with personal computers, a blackboard (screen) 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. 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 SBN -9781789851168, 9781789851151, 9781789846980 Publisher -IntechOpen Publisher website -https://www.intechopen.com/ Publication date and place -2020 Imprin-t 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., erased. — 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. Biological protection of plants from stress: a textbook for universities / L. Z. Karimova, V. A. Kolesar, R. I. Safin, G. K. Khuzina. — 3rd ed., erased. — 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

2. Belchenko, S. A. Biological agriculture : a textbook for universities / S. A. Belchenko, O. V. Melnikova, M. P. Naumova. — Saint Petersburg : Lan, 2025. — 100 p. — ISBN 978-5-507-51687-2. — Text : electronic // Lan : electronic library system. — URL: https://e.lanbook.com/book/455588

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/

2.Databases and search engines:
- electronic foundation of legal and normative-technical documentation http://docs.cntd.ru/
- Yandex search engine 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 «Biological Method of Plant Protection»
* 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:

position, department	name and surname

position, department	name and surname

position, department	name and surname

HEAD OF EDUCATIONAL DEPARTMENT:

name of department	name and surname

HEAD
OF HIGHER EDUCATION PROGRAMME:

position, department	name and surname