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

Nematodes
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 "Nematodes" is to familiarize with the features of the structure, physiology and genetics of bacteria, the principles of their classification, the symptoms of plant lesions. Mastering methods for isolating pathogens from plant tissue into pure culture, calculating their harmfulness and the amount of economic damage. Evaluation of integrated control techniques used in the fight against nematodes.

2. REQUIREMENTS FOR LEARNING OUTCOMES

Mastering the discipline "Nematodes" 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)
PK-4	Able to create models of crop cultivation technologies, plant protection systems, and varieties.	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	It is capable of carrying 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 facilities 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 "Nematodes" 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***
PK-4	Able to create models of crop cultivation technologies, plant		Research Practice; Mathematical Modeling and Design;

Competence code	Competence descriptor	Previous courses/modules*	Subsequent courses/modules*
	protection systems, and varieties.		Biological Method of Plant Protection; Organization of Integrated Plant Protection Systems; Plant immunity; Plant Protection in Organic Farming; Weed biology and management; Virology;
PK-7	It is capable of carrying 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.		Plant Quarantine; Virology;

* 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 "Nematodes" is 2 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		*34*	*34*			
including:						
Lectures (LC)						
Lab work (LW)		34	34			
Seminars (workshops/tutorials) (S)						
Self-studies		*23*	*23*			
Evaluation and assessment (exam/passing/failing grade)		*15*	*15*			
Course workload	academic hours_	**72**	**72**			
	credits	**2**	**2**			

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 main stages of the development of phytonematology	Topic 1.1. The history of the development and formation of science	LW
	Topic 1.2. Taxonomy of nematodes by lifestyle,morphological and genetic characteristics.Methods of penetration of nematodes into plants and damage to plants, symptoms of damage	LW
	Topic 1.3. Plant resistance to nematodes and the factors determining it	LW
	Topic 1.4. The relationship between nematodes and plant pathogens.	LW
	Topic 1.5. The economic importance of nematode diseases: the economic consequences of damage to crops, a decrease in the quantity and quality of crops	LW
Module 2: The origin and evolution of nematodes, systematics of phytoparasitic nematodes	Topic 2.1. Niches of habitat of various groups bacteria	LW
	Topic 2.2. Morphological and anatomical features of the structure of phytonematodes	LW
	Topic 2.3. Nematode taxonomy based on morphological features and DNA analysis	LW
Module 3: Harmfulness and economic importance	Topic 3.1. The spread of nematodes	LW
	Topic 3.2 Economic harmfulness of nematodes	LW
Module 4: Biology and Ecology of phytonematodes	Topic 4.1. Reproduction cycles of the main nematode groups	LW
	Topic 4.2. The influence of climatic factors, physical and chemical soil factors on the spread of nematodes	LW
	Topic 4.3. The influence of antagonistic microflora and microfauna: predatory fungi and pathogenic nematodes	LW
Module 5. Features of the interaction of nematodes and plants	Topic 5.1. Interaction of nematodes with the host plant: free-living and parasitic species	LW
	Topic 5.2. Nematode survival in soil,spreading with seeds	LW
Module 6. Characteristic the main families of phytoparasitic nematodes.	Topic 6.1. The families Aphelenchidae and Aphelenchoididae	LW
	Topic 6.2. The family Ditylenchidae	LW
	Topic 6.3. Family Anguinidae	LW
	Topic 6.4. Nematodes are parasites of the root system of plants:Family Hoplolaimidae; Telotylenchidae; Pratylenchidae;Nacobbidae; Tylenchulidae; Heteroderidae; Meloidogynidae;Genus Globodera; Genus Heterodera	LW

Course module title	Course module contents (topics)	Academic activities types
	Topic 6.5. Nematodes are carriers of viruses and bacteria	LW
	Topic 6.6. Quarantine phytoparasitic nematodes	LW
Module 7. Methods of control of phytoparasitic nematodes	Topic 7.1. Examination of soil, plants, seeds and planting material for contamination.	LW
	Topic 7.2. Methods of nematode isolation	LW
	Topic 7.3. Practical diagnostics based on phenotypic traits and DNA	LW
	Topic 7.4. Preventive, quarantine,phytosanitary, agrotechnical and extermination (biological, physical and chemical methods) measures.	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)
Scientific Laboratory	An auditorium for laboratory work, individual consultations, routine monitoring and intermediate certification, equipped with a set of specialized furniture and 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. Nematodes Publisher-IntechOpen Publisher website-https://www.intechopen.com/ Publication date and place-2024 Imprint-IntechOpen Classification-Medical parasitology Pages-136

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. Diseases, pests and weeds of potato plants. Diagnostic and accounting methods : A textbook for universities / V. N. Zeiruk, G. L. Belov, I. N. Gasparyan [et al.]. — St. Petersburg : Lan, 2022. - 256 p. — ISBN 978-5-8114-8281-8. — Text : electronic // Lan : electronic library system. — URL: https://e.lanbook.com/book/187510

2. Integrated plant protection / T. V. Dolzhenko, L. E. Kolesnikov, A. G. Semenova [et al.]. — 3rd ed., ster. — St. Petersburg : Lan, 2024. — 120 p. — ISBN 978-5-507-47304-5. — Text : electronic // Lan : electronic library system. — URL: https://e.lanbook.com/book/359825

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 «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:

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