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**Federal State Autonomous Educational Institution**  
**Higher Education "Peoples' Friendship University of Russia"**  
**Agrarian-Technological Institute**

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

**WORK PROGRAM OF THE DISCIPLINE**

**Forecast of development of pests and diseases in agricultural crops**

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(name of discipline/module)

Recommended by ISSS for the direction of training/specialty:

**35.0 4.04 Agronomy**

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(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 (EP HE):

**Integrated Plant Protection**

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(name (profile/specialization) ep he)



## 1. Goals and objectives of the discipline:

The purpose of mastering the discipline "Forecast of the development of pests and diseases" is the formation of ideas of theoretical knowledge and the acquisition by students of practical skills and abilities on methods for predicting the appearance and development of pests and diseases of agricultural plants.

*The task of studying the discipline* is to study:

- the modern structure of the state service for signaling and forecasting of pests and diseases of crops in the Russian Federation;
- theoretical foundations of the emergence and dynamics of the development and spread of harmful organisms;
- approaches to methods for assessing the phytosanitary state of crops and plantations of agricultural crops;
- principles for the development of long-term forecasts of the appearance and development of plant pests and diseases;
- methods of making short-term forecasts of the appearance of the most dangerous pests and diseases.

; PC-4.5; PC-4.6

### REQUIREMENTS FOR THE RESULTS OF MASTERING THE DISCIPLINE

Mastering the discipline "Forecast of the development of pests and diseases" is aimed at the formation of the following competencies (part of the competencies) among students:

*Table 1 - The list of competencies formed by students during the development of the discipline (the results of mastering the discipline)*

Code	Competence	Competency Achievement Indicators
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-1.1 Performs the search for the necessary information, its critical analysis and summarizes the results of the analysis to solve the task
		UK-1.3 Develops a strategy for achieving the set goal as a sequence of steps, anticipating the result of each of them and assessing their impact on the external environment of the planned activity and on the relationships of the participants in this activity
OPK-1	Able to solve the problems of development of the field of professional activity and (or) organization on the basis of	OPK-1.1 Demonstrates knowledge of the main methods of analyzing the achievements of science and production in agronomy

	analysis of the achievements of science and production	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, 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-1	Able to collect, process, analyze and systematize scientific and technical information, domestic and foreign experience in the field of agronomy	PC-1.1 Performs critical analysis of the information received
PK-4	Able to develop methods of conducting experiments, master new research methods	PC-4.5 Carries out work to protect plants from harmful objects
		PP-4.6 Develops and improves plant protection measures against harmful objects

### 3. THE PLACE OF DISCIPLINE IN THE STRUCTURE OF THE OP VO

The discipline "Forecast of the development of pests and diseases" refers to the part formed by the participants of the educational relations of block B1.B. OP VO.

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 Quarantine".

*Table 2 – List of components of the HE OP that contribute to the achievement of the planned results of the discipline*

Code	Competence	Previous disciplines/modules, practices	Subsequent disciplines/modules, practices
UK-1	Able to carry out search, critical analysis of problem situations on the basis of a systematic approach, to develop	Information Technologies History and method-	Organization of integrated plant protection systems

	an action strategy	ology of scientific agronomy	Work with scientific literature Phytopathological risk analysis Research work Research Practice Pre-diploma practice Biotechnology in plant protection
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	Bacterial diseases Nematode diseases Molecular methods for diagnosing phytopathogens Phytopathological risk analysis	Instrumental research methods Mathematical Modeling and Design Biological method of plant protection Biotechnology in plant protection Plant protection in organic farming Plant immunity Organization of integrated plant protection systems Virology Biology of weedy vegetation Research work Research Practice
OPK-4	Able to conduct research, analyze results and prepare reporting documents	Molecular methods for diagnosing phytopathogens Nematode diseases Phytopathological risk analysis Fundamentals of Scientific Communication	Plant immunity Organization of integrated plant protection systems Biological method of plant protection Virology Bacterial diseases Biotechnology in plant protection Plant quarantine Biology of weedy vegetation Plant protection in organic farming Prognosis of pests and diseases Research work Research Practice Pre-diploma practice
PK-1	Able to collect, process, analyze and systematize scientific and technical information, domestic and foreign	Phytopathological risk analysis	History and methodology of scientific agronomy

	experience in the field of agronomy		Plant immunity Organization of integrated plant protection systems Biotechnology in plant protection Plant quarantine Research work Research Practice Pre-diploma practice
PK-4	Able to develop methods of conducting experiments, master new research methods	Bacterial diseases Phytopathological risk analysis	Plant immunity Biological method of plant protection Virology Biology of weedy vegetation Nematode diseases Research Practice

#### 4. SCOPE OF DISCIPLINE AND TYPES OF EDUCATIONAL WORK

The total labor intensity of the discipline "Prognosis of the development of pests and diseases" is 4 credits for full-time education.

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.	Semesters	
		1	
<i>Contact work</i>	<b>34</b>	<b>34</b>	
including:			
Lectures (LC)			
Laboratory works (LR)			
Practical/Seminar Classes (FPs)	34	34	
<i>Independent work of students</i>	23	23	
<i>Control (exam/test with grade)</i>	15	15	
Overall labor intensity of the discipline	aca. hrs.	<b>72</b>	<b>72</b>
	Zach. Units.	<b>2</b>	<b>2</b>

Table 4. 2. 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)			
			1	2		
<i>Contact work, ac.ch.</i>		26	26			
Including:						
Lectures (LC)						
Laboratory works (LR)		26	26			
Practical/Seminar Classes (FPs)						
<i>Independent work of students, aca. hrs.</i>		31	31			
<i>Control (exam /test with grade), aca. hrs..</i>		15	15			
<b>Overall labor intensity of the discipline</b>	aca. hrs.	72	72			
	Hrs.ed.	2	2			

Table 4. 3. 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>		10		10		
Including:						
Lectures (LC)						
Laboratory works (LR)		10		10		
Practical/Seminar Classes (FPs)						
<i>Independent work of students, ac.ch.</i>		94		94		
<i>Control (exam /test with grade), ac.ch.</i>		4		4		
<b>Overall labor intensity of the discipline</b>	aca. hrs.	108		108		
	Hrs.ed.	3		3		

## 5. CONTENTS

Table 4 – Content of the discipline (module) by types of educational work

Name of the discipline section	Contents	Type of educational work
Section 1. Introduction. The Scientific Basis for Making Predictions. Types of Predictions.	<b>Topic 1.1.</b> Methods of compilation of short-term forecasting of development of crop pests <b>Topic 1. 2.</b> Forecast by the method of establishing the average long-term date of occurrence of the pest	Ave
Section 2. Phytosanitary monitoring and prognosis of quarantine diseases.	<b>Topic 2.1.</b> Use of the integral indicator of the SCC inthe forecast <b>Topic 2.2.</b> Development of long-term forecasts	Ave
Section 3. Effective heat and its importance in the development and	<b>Topic 3.1.</b> Using the date the temperature has passed through a certain limit	Ave

spread of harmful quarantine facilities.	<p><b>Topic 3.2.</b> Using the sums of effective temperatures in the zone</p> <p><b>Topic 3.3.</b> Forecasting with the help of temperature and phenological nomogram of A.S. Podolsky</p>	
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## 6. MATERIAL AND TECHNICAL SUPPORT OF DISCIPLINE

*Table 5 – Discipline Logistics*

<b>Audience type</b>	<b>Equipping the classroom</b>	<b>Specialized educational/laboratory equipment, software and materials for mastering the discipline</b>
Lab	An auditorium for laboratory work, individual consultations, current control and intermediate certification, equipped with a set of specialized furniture and equipment.	List of specialized laboratory equipment, installations, stands, etc.
Computer Lab	Computer class for classes, group and individual consultations, current control and intermediate certification, equipped with personal computers (in the amount of _____ pieces), a whiteboard (screen) and technical means of multimedia presentations.	List of specialized software installed on computers for mastering the discipline (module)
For independent work of students	An auditorium for independent work of students (can be used for seminars and consultations), equipped with a set of specialized furniture and computers with access to EIOS.	
Audience type	Equipping the classroom	Specialized educational/laboratory equipment, software and materials for mastering the discipline



## 1. EDUCATIONAL, METHODOLOGICAL AND INFORMATION SUPPORT OF THE DISCIPLINE

### (a) Main literature:

1. *Educational and methodical manual on the discipline "Forecast of the development of timers and diseases" [Text] : for laboratory and practical classes / Comp. Sh. A. Gulmagomedova. - Makhachkala : DGSKHA, 2011. - 41 p. - (Ka-phaedra of ecology and plant protection).*

2. *Bondarenko, N. V. Practicum on general entomology [Text] : uchebnoe posobie, dopushch. Min. s.-kh. RF / N. V. Bondarenko. - 3rd ed. - SPb. : "Pro-spect Nauki", 2010. - 344 p. - ISBN 978-5-903090-34-1:*

3. *Bey-Bienko, G. Y. Obshchaya entomologiya [Text] : uchebnik, dopushch. Min. s.-kh. RF / G. Y. Bey-Bienko. - Ed. , v. Erased. - SPb : "Prospekt Nauki", 2008. - 486 p. - ISBN 978-5-903090-13-6:*

4. *Minkevich, I. I. Phytopathology. Diseases of tree and shrub species [Text] : textbook, rivers. UMO for education in the field of forestry by direction. "Lesnoe delo" / I. I. Minkevich, T. B. Dorofeeva, V. F. Kovyazin ; under the general editorship of I. I. Minkevich. - SPb. : Izd-vo "Lan", 2016. - 160 p. : (+ gluing, 32p.). - (Textbooks for Universities. Special Literature). - ISBN 978-5-8114-1177-1:*

### b) Additional literature:

1. *Protection of plants from diseases [Text] : textbook, recom. Min. s/kh RF / V. A. Shkalikov, O. O. Beloshapkina, D. D. Bukreev et al.; ed. by V. A. Shkalikov. - 2-e ed., ispr. i dop. - Moscow : "Koloss", 2004. - 225 p. : il. - (Textbooks and ucheb. manuals for stud. higher educational institutions). - ISBN 5-9532-0074-9:*

2. *Educational and methodical manual on the discipline "Forecast of the development of hazards and diseases" [Text] : for laboratory and practical classes / Comp. Sh. A. Gulmagomedov. - Makhachkala : DSAA, 2011. - 41 p. - (Department of Ecology and Plant Protection).*

2. *Educational and methodical manual on the discipline "Agricultural entomology and phytopathology" [Text] : for independent work of students in special. "Agronomy" / Comp.A. A. Rimikhanov, Sh. A. Gulmagomedova. - Makhachkala : DGSKHA, 2009. - 23 p. - (Department of Plant Protection).*

### 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 Jurait <http://www.biblio-online.ru>

– EBS "Student Consultant" [www.studentlibrary.ru](http://www.studentlibrary.ru)

– EBS "Lan" <http://e.lanbook.com/>

– EBS "Trinity Bridge"

2. Databases and search engines:

– electronic fund of legal and normative-technical documentation of the <http://docs.cntd.ru/>

– Yandex <https://www.yandex.ru/> search engine

– Google search engine <https://www.google.ru/>

– abstract database SCOPUS <http://www.elsevierscience.ru/products/scopus/>

– <http://quakes.globalincidentmap.com/>,

- <http://www.globalincidentmap.com/>,
- ScienceDirect: <http://www.sciencedirect.com>
- EBSCO: <http://search.ebscohost.com>
- Sage Publications: <http://online.sagepub.com>
- Springer/Kluwer: <http://www.springerlink.com>
- University Information System RUSSIA: <http://www.cir.ru/index.jsp>

*Educational and methodical materials for independent work of students in the development of the discipline / module:*

1. Educational and methodical manual on the discipline "Prognosis of the development of harm-killers and diseases" [Text] : for laboratory and practical classes / Comp. Sh. A. Gulmagomedova. - Makhachkala : DGSKHA, 2011. - 41 p. - (Department of Ecology and Plant Protection).
2. Bondarenko, N. V. Practicum on general entomology [Text] : uchebnoe posobie, dopushch. Min. s.-kh. RF / N. V. Bondarenko. - 3rd ed. - SPb. : "Pro-spect Nauki", 2010. - 344 p. - ISBN 978-5-903090-34-1:
3. Bey-Bienko, G. Y. Obshchaya entomologiya [Text] : uchebnyk, dopushch. Min. s.-kh. RF / G. Y. Bey-Bienko. - Ed. , v. Erased. - SPb : "Prospekt Nauki", 2008. - 486 p. - ISBN 978-5-903090-13-6:
4. Minkevich, I. I. Phytopathology. Diseases of tree and shrub species [Text] : textbook, rivers. UMO for education in the field of forestry by direction. "Lesnoe delo" / I. I. Minkevich, T. B. Dorofeeva, V. F. Kovyazin ; under the general editorship of I. I. Minkevich. - SPb. : Izd-vo "Lan", 2016. - 160 p. : (+ gluing, 32p.). - (Textbooks for Universities. Special Literature). - ISBN 978-5-8114-1177-1:
5. Educational and methodical manual on the discipline "Agricultural entomology and phytopathology" [Text] : for independent work of students on special. "Agronomy" / Comp. A. A, Rimikhanov, Sh. A. Gulmagomedova. - Makhachkala : DGSKHA, 2009. - 23 p. - (Department of Plant Protection).

**1. EVALUATION MATERIALS AND POINT-RATING SYSTEM OF LEVEL ASSESSMENT  
FORMATION OF COMPETENCIES IN THE DISCIPLINE  
Specialty: 35.0 4.04 Agronomy\_1 semester**

Code of a supervised competency or part of it	Controlled discipline section	Controlled theme of discipline	Name of the appraisal tool				Certification		Points Themes	Points Section
			Current control				Maximum	Total		
			Performing Home Job	Execution laboratory assistant Of work	Report, presentation	Tests				
<b>UK-1 OPK-1 OPK-4 PK-1 PK-4</b>	Section 1. Introduction. Scientific basis of forecasting. Types of forecasts.	Methods of compilation of short-term forecasting of development of crop pests	1	4	2	1	10	20	40	
		Forecast by the method of establishing the average long-term date of occurrence of the pest	1	6	2	1				
	Section 2. Phytosanitary monitoring and prognosis of quarantine diseases.	Use of the SCC integral indicator in the forecast	1	4	2	1	10	20	40	
		Development of long-term forecasts	1	6	2	1		20		
	Section 3. Effective heat and its importance in the development and spread of harmful quarantine facilities.	Using sums of effective temperatures in a forecast	1	4	2	1	10	10	20	
		Using temperature dates through a certain limit	1	6	2	1		5		
		Forecasting with the help of temperature and phenological nomogram of A.S. Podolsky	1	4	2	1		5		
			<b>TOTAL</b>	<b>8</b>	<b>34</b>	<b>14</b>	<b>7</b>	<b>10</b>	<b>10</b>	<b>100</b>

## Criteria for the evaluation of controlled types of work

№ p/n	Estimated parameters	Scores	
		Matches Parameters	Does not match the pa- rameters
1	2	3	4
1	<b>Doing homework for lab work</b> - executed completely, carefully -partially executed, carelessly	1 0.5	0 0
2	<b>Perform lab work</b> -made by yourself completely, carefully decorated -made independently, carelessly designed -made partially independently -performed with an error in the result of the work	4 3 2 1	0 0 0 0
3	<b>Report, presentation of the section</b> -Clearly lined up, well illustrated -the report and presentation are well designed, but there are inaccuracies -answers all questions -can't answer most questions -conclusions are entirely derived from the work - conclusions are fuzzy	1 0.5 1 0.5 1 0.5	0 0 0 0 0 0
4	<b>Tests</b> -Correctly answered 95-100% of the questions -Correctly answered 80-94% of questions -Correctly answered 50-79% of questions	2 1 0.5	0 0 0
5	<b>Milestone attestation</b> <i>1) Quality of oral answer to questions</i> (a) Completeness of the response -Replied in full -Answered most of the questions -Didn't answer most of the questions b) Consistency of the answer - The answer is built logically - The answer is built illogically <i>2)Test part</i> -Correctly answered 95-100% of the questions -Correctly answered 80-94% of questions -Correctly answered 50-79% of questions	2.5 1.5 0.5 2.5 0.5 5 4 2	0 0 0 0 0 0 0 0
<b>Total:</b>		10	0
6	<b>Final attestation</b> <i>1) Quality of oral answer to questions</i> (a) Completeness of the response -Replied in full -Answered most of the questions	2.5 1.5	0 0

-Didn't answer most of the questions	0.5	0
b) Consistency of the answer		
- The answer is built logically	2.5	0
- The answer is built illogically	0.5	0
2) <i>Test part</i>		
-Correctly answered 95-100% of the questions	5	0
-Correctly answered 80-94% of questions	4	0
-Correctly answered 50-79% of questions	2	0
<b>Total:</b>	10	0

### **Questions for self-assessment and discussions on topics.**

#### **Topic 1. Introduction. forecast of development and distribution.**

##### **Pests and diseases of agricultural crops**

1. *General concepts of forecasting, tasks of the agricultural sector at the present stage and plant protection services.*
2. *The role of predicting the spread and development of pests.*
3. *History of the development of the forecast service.*
4. *The objectives and content of the forecasting course, and its relationship with other disciplines.*
5. *Planning of the work of the point and laboratory of diagnostics and forecasting.*
6. *Scientific basis of forecasting*

##### **Topic 2: Types and types of forecasts**

1. *Long-term forecasts.*
2. *Long-term prognosis.*
3. *Short-term forecasts.*
4. *Forecasts intended for the organization of preventive plant protection in farms.*

##### **Topic 3: Phytosanitary diagnostics**

1. The content of the required information and the organization of its collections.
  2. Meteorological information.
  3. Agrotechnical information.

##### **Topic 4: Methods for accounting for the density (abundance) of pest populations**

1. Accounting for soil pests.
2. Accounting for pests moving on the soil surface.
3. Accounting for pests living on plants
4. Accounting for pests living inside plants.

## Test tasks

1. Method for identifying soil pests:

- 1) the method of soil excavation;
- 2) bait method;
- 3) by means of earthen traps;
- 4) by shaking the plants.

2. The essence of the method of soil excavation:

- 1) take a soil sample (fine, ordinary, deep) to a depth of 7 to 65 cm;
- 2) mowing with an entomological net (10 times for 10 strokes);
- 3) install trapping grooves;
- 4) install pheromone traps (sex traps).

3. Phenological timing and method of detection of harmful turtle:

- 1) pre-sowing period, method of soil excavation;
- 2) regrowth period - the beginning of the exit into the tube, the method of mowing with a net;
- 3) the phase of winter seedlings, the method of mowing with a net;
- 4) the phase of earing - flowering, the method of trial sites.

4. Method of detecting bread beetle:

- 1) trial site method;
- 2) the method of visual inspection;
- 3) net mowing method;
- 4) Bait method.

5. How is the method of soil excavation practically carried out?

- 1) manual selection of pests;
- 2) sifting the soil sample;
- 3) washing of the soil sample;
- 4) with the help of a Petluk box.

6. The basis for the development of protective measures against pests and diseases:

- 1) the economic threshold of the density of harmful organisms;
- 2) phytosanitary assessment of crops, plantings;
- 3) environmental factors;
- 4) phenological timing of plant development.

7. What is phytosanitary assessment of crops, plantings? 1) the number of pests;

- 2) the number of diseases;
- 3) determination of the species composition of harmful and beneficial organisms;
- 4) species composition of beneficial insects.

8. Bait method:

- 1) the use of various baits and traps;
- 2) use of petlyuk box;
- 3) shaking plants;
- 4) use of square areas.

9. Pests living inside plants:

- 1) harmful turtle, bread beetles, cabbage white, Colorado beetle, bread bug;
- 2) bread sawfly, cabbage secretive proboscis, woodcutters, onion fly, melon fly;
- 3) apple moth, apple moth, cherry slimy sawfly, ringed silkworm;
- 4) Bear, wireworms, false wireworms, locusts.

10. Phenological terms of phytosanitary evaluation of beet crops:

- 1) before planting seedlings, seedling period, period of survival of seedlings, phase of leaf rosette;
- 2) pre-sowing period, the phase of seedlings, on the testes;
- 3) pre-sowing, regrowth period, tubing phase, earing, grain filling, a week before sowing winter crops, seedling phase;
- 4) pre-sowing period, seedling phase, budding, post-harvest period, storage period.

11. Method of accounting for the number of pests leading a hidden lifestyle:

- 1) the method of soil excavation;
- 2) bait method;
- 3) the method of opening plants;
- 4) the method of earth traps.

12. Accounting for the number of pests moving on the soil:

- 1) with the help of a Petlyuk box;
- (2) by means of earthen traps;
- 3) with the help of trapping grooves;
- 4) sifting the soil sample.

13. Phenological terms of phytosanitary evaluation of vineyards:

- 1) before the buds dissolve;

2) during the period of swelling of the buds, during the formation of 2-3 leaves, during the isolation of buds, tying - the growth of berries, the beginning of ripening of berries;

3) pre-sowing, regrowth period, tubing phase, earing, grain filling, a week before sowing winter crops, seedling phase;

4) pre-sowing period, seedling phase, budding phase, post-harvest period, storage period.

14. Accounting for the number of bread saws:

1) by the method of opening the stems;

2) with the help of a Petluk box;

3) sifting of the soil sample;

4) washing the soil sample.

15. Extraction of insects from the soil sample;

1) manual sampling of insects;

2) washing of the soil sample;

3) shaking plants;

4) opening of damaged plant stems.

16. Integrated plant protection system:

1) the use of chemical plant protection products;

2) a rational dynamic system of plant protection against pests and diseases, combining the use of natural environmental factors with differentiated application, based on the economic threshold of the density of pests, a set of effective methods that meet environmental requirements;

3) the use of biological means of protection;

4) carrying out agrotechnical measures against harmful organisms.

17. The main purpose of identifying pests:

1) carrying out fighter measures;

2) establishing the likely threat from pests;

3) carrying out agrotechnical measures;

4) the use of biological plant protection products.

18. Locust Observation System:

1) spring examination for the detection of larvae, summer - before inspiration, autumn - for cubes, spring (control) - for cubes;

2) spring, autumn, summer surveys;

3) autumn, spring (control) examinations;

4) spring survey.

19. A disease is....:



- 1) deviation of the normal state of the body;
- 2) plant eater;
- 3) insect eater;
- 4) plant pollen eater.

20. Technical effectiveness of protective measures:

- 1) the percentage of death of harmful organisms from protective agents;
- 2) the amount of additional yield;
- 3) the amount of harvest saved;
- 4) the amount of costs.

21. The main indicators of the use of pesticides in agriculture:

- 1) technical efficiency (toxicity of drugs);
- 2) economic efficiency;
- 3) the amount of additional yield;
- 4) technical, economic and environmental efficiency.

22. Cost-effectiveness:

- 1) increase in yield;
- 2) the amount of harvest saved;
- 3) the percentage of death of harmful organisms;
- 4) return on the money spent.

23. Indicators characterizing economic efficiency:

- 1) the amount of additional harvest in physical and monetary terms, the amount of costs for the preserved harvest, conditionally net income and the rate of profitability of the use of protective equipment;
- 2) crop yield;
- 3) harvesting area;
- 4) gross harvest.

24. A pest is...:

- 1) plant eater;
- 2) insect eater;
- 3) an insect living at the expense of another insect;
- 4) insect, devouring both insects and plants.

25. Give an example of a disease manifested in the form of "pustules":

1. Rust of cereals
2. Powdery mildew oak
3. Cucumber bacteriosis

4. Cherry pockets
5. Potato late blight

26. Give examples of diseases whose causative agents form sclerotia:

1. Cherry pockets, potato cancer
2. Ergot cereals, cucumber bacteriosis
3. White sunflower rot, beet cancer
4. Ergot cereals, white sunflower rot
5. White sunflower rot, oat smut

27. What is the basis for the division of fungi into lower and higher?

1. Structure of the sexual spore
2. Structure of the asexual spore
3. Structure of mycelium
4. Mycelium color
5. Color of spore bearing

28. What is the vegetative body of fungi of the class Plasmodiophoromycetes:

1. Zoospores
2. Inarticulate mycelium
3. Plasmodium
4. Multicellular mycelium
5. Rhizomorphs

29. What is the vegetative body of Chytridiomycetes fungals?

1. Unicellular mycelium
2. Multicellular mycelium
3. Rhizomorphs
4. Plasmodium
5. Zoospores

30. Name asexual spores of fungi belonging to the class Ascomycetes:

1. Zoospores
2. Sporangiospores
3. Conidia
4. Sumcospores
5. Basidiospores

31. Name the vegetative body of fungi belonging to the genus Phytophthora:

1. Multicellular mycelium
2. Unicellular mycelium
3. Rhizomorphs
4. Amoeboid
5. Cysta

32. What modifications of mycelium are formed in cephalic fungi?

1. Sclerotia
2. Rhizomorphs and sclerotia
3. Head spores and sclerotia
4. Head spores and gems
5. Gemmas of the rhizomorphs

33. Which plant organs are infected with bubble corn smut?

1. Roots
2. Stem
3. Cobs
4. Panicles
5. All above ground

34. What spores re-infect plants with fungi related to the order Rust?

1. Sporangiospores
2. Conidia
3. Urediniospores
4. Teliospores
5. Basidiospores

35. Why does the class Imperfect Fungi have such a name?

1. Often missing mycelium
2. As a rule, there is no conidial spore bearing
3. As a rule, there are no sclerotia
4. As a rule, there are no sexual spores
5. No modifications of mycelium

36. What is the conservation of fungi belonging to the class Deuteromycetes of the order Pycnidial (spheropsidal)?

1. Sclerotia
2. Rhizomorphs
3. Mycelium and sclerotia
4. Mycelium and pycnidia
5. Conidia and mycelium

37. Dusty wheat smut manifests itself:

1. In the form of spots on spiked scales;
2. In the form of pustules on the leaves and leafy vegetables;
3. Sclerotia in the spike;
4. In the form of a dark coating on the spiked scales;
5. In the form of a black soot mass, which is formed as a result of the destruction of all organs of the ear (with the exception of the root).

38. Hard wheat smut manifests itself:

1. In the form of dark spots on the leaves, stems and spikelet;
2. In the form of dark pustules on the leaves, stems and spikelet;
3. Darkening of roots and root hairs;
4. In the form of a black soot mass, which is formed as a result of grain destruction (except for the shell);
5. In the form of dark spots on the surface of the grain

39. What and where is the causative agent of durum wheat smut preserved:

1. Mycelium in crop residues;
2. Teliospores on seed and in soil;
3. Basidiospores in the soil and on seeds;
4. Teliospores in seed;
5. Mycelium in seeds.

40. What and where is the causative agent of wheat dust smut preserved:

1. Sclerotia in the soil;
2. Mycelium in seeds;
3. Teliospores on seed material;
4. Sclerotia on the seed material;
5. Mycelium in plant residues.

41. What and where is the causative agent of hard barley smut preserved:

1. Mycelium in seeds;
2. Mycelium in seeds and crop residues;
3. Mycelium in seeds, crop residues and in the soil;
4. Teliospores on seeds;
5. Teliospores in seeds.

42. What and where is the causative agent of stye dust smut preserved:

1. Teliospores on seeds;
2. Teliospores in seeds;
3. Mycelium on seeds;
4. Mycelium in seeds;
5. Sclerotia on seeds.

43. What and where is the causative agent of hard (covered) oat smut preserved:

1. Gems in the soil;
2. Gems and teliospores under the film of grain and on grain;
3. Teliospores in plant residues;
4. Sclerotia on seeds and plant residues;
5. Mycelium in plant residues.

44. What and where is the causative agent of dusty oat smut preserved:

1. Sclerotia on seeds and in the soil;
2. Teliospores in seeds and soil;
3. Basidiospores on seeds, in soil and on plant residues;
4. Gems under the grain film and in the pericarp;
5. Teliospores on grain and gems under its film.

45. External signs of millet smut:

1. Dark coating on the grain;
2. Dark plaque on all parts of the panicle;
3. All parts of the panicle turn into a dark dusty mass consisting of teliospores;
4. The panicle turns into a jelly covered with a thin film, inside it is a black mass of teliospores;
5. The panicle turns into a dark-colored sclerotium.

46. Linear rust of cereals is manifested by:

1. Spots on the entire above-ground part of the plants;
2. Spots on the leaves and leaf sheaths;
3. Darkening of the base of the stem;
4. Pustules on the stems and vaginas of leaves;
5. Pustules on the leaf vagina.

47. How and where is the causative agent of linear rust of cereals preserved?

1. Oospores in plant residues;
2. Sclerotia on seeds and plant residues;
3. Teliospores on seeds and plant residues;
4. Ectiospores on seeds and plant residues;
5. Teliospores on plant residues.

48. Secondary contamination of cereals by the causative agent of linear rust of cereals is carried out by:

1. Teliospores;
2. Urediniospores;
3. Basidiospores;
4. Spermospores;
5. Eziospores.

49. External signs of brown wheat rust:

1. Leaves, leafy vegetables and stems are covered with uredovustulas, and then teliopustules;
2. Leaves, leafy vegetables and stems are covered with yellow spots that gradually darken;
3. Leaves and leafy vegetables are covered with uredovustulas, and then teliopustules;

4. Leaves and leafy vegetables are covered with yellow spots that gradually darken;
5. Leaves and leafy vegetables are covered with a coating of gray color.

50. External signs of crown rust of oats:

1. Leaves, leafy vegetables and stems are covered with uredovustulas, and then teliopustules;
2. Leaves, leafy vegetables and stems are covered with yellow spots that gradually darken;
3. Leaves and leafy vegetables are covered with uredovustulas, and then teliopustules;
4. Leaves and leafy vegetables are covered with yellow spots that gradually darken;
5. Leaves and leafy vegetables are covered with a coating of gray color.

51. External signs of ergot cereals:

1. All above-ground organs of plants are covered with a dark coating;
2. Spiked scales and grain are covered with a dark coating;
3. Instead of grain, sclerotia develops - the formation of a dark color;
4. Leaves and leaf vaginas are covered with teliopustules;
5. All above-ground organs of plants are covered with uradopustules, and then teliopustules.

52. External signs of "drunken bread":

1. The entire above-ground part of the plants is covered with a coating of pink color;
2. The leaves and stem of plants are covered with a coating of pink color with black dots;
3. The spike and grain are covered with a coating of pink color sometimes with black dots;
4. The ear and grain are covered with a dark coating;
5. The entire above-ground part of the plants is covered with a dark coating.

53. External signs of powdery mildew of cereals:

1. All above-ground organs of plants (except grain) are covered with a white, later browning coating;
2. All above-ground organs of plants (except grain) are covered with spots of white, with a later browning coating;
3. All above-ground organs of plants are covered with pustules at the beginning of yellow, then dark color;
4. All above-ground organs of plants are covered with pustules of brown color;
5. All above-ground organs of plants (except grain) are covered with brown pustules.

54. What and where is the causative agent of powdery mildew of cereals preserved:

1. Mycelium in seeds;
2. Oospores on plant residues and seed material;
3. Mycelium on winter crops and cleistothecia on plant residues;

4. Teliospores on plant residues and seed material;
5. Oospores on plant residues and in the soil.

55. External signs of septoriosiis of cereals:

1. All above-ground organs of plants are covered with a brown coating;
2. All above-ground organs of plants are covered with brown spots;
3. All above-ground organs of plants are covered with a coating of gray color;
4. All above-ground organs of plants are covered with light brown spots with a rim and black small pycnids;
5. All above-ground organs of plants are covered with dark brown spots with a black coating.

56. How and where is the causative agent of pea rust preserved?

1. Oospores in plant residues and soil;
2. Teliospores in plant residues of peas and mycelium in the intermediate host;
3. Urediomycelium in the intermediate host;
4. Zygosporos in plant residues and soil;
5. Microsclerotia on plant residues.

57. What and where are the causative agents of brown spot of alfalfa and clover preserved:

1. Apothecia on plant residues;
2. Teliospores on plant residues;
3. Mycelium in seed;
4. Mycelium and conidia in plant residues and seed material;
5. Bacteria in plant residues and seeds.

58. External signs of beet cercosporosis:

1. All above-ground organs of beet plants of the first and second year of life are covered with a dark brown coating;
2. The leaves of beet plants of the first and second year of life are covered with rounded light brown spots with a red-brown border with a grayish coating, the leaves die off;
3. The leaves of plants of the first and second year of life of beets darken and are covered with a coating of brown color;
4. The leaves of plants of the first and second year of life of beets dry out and die;
5. Stems and glomeruli darken, stems break.

59. External signs of beet peronosporosis:

1. Spotting;
2. Spotting and plaque;
3. Rot and spotting;
4. Growth and plaque;

5. Growth and rot.

60. How is the causative agent of beet peronosporosis preserved:

1. Mycelium in the tissues of the heads of root crops and oospores in plant residues and seeds;
2. Zoospores in the leaves;
3. Zygosporangia in living tissues of root crop heads;
4. Ascospores and mycelium in the leaves;
5. Cysts and zoospores in the leaves and heads of root crops.

**Evaluation criteria:**

*(in accordance with the current regulatory framework)*

Compiled by \_\_\_

Director of department \_\_\_

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**Evaluation criteria:**

*(in accordance with the current regulatory framework)*

Compliance of grading systems (previously used grades of final academic performance, ECTS grades and the point-rating system (BRS) of assessments of current academic performance).

<b>BRS Scores</b>	<b>Traditional Assessments of the Russian</b>	<b>Evaluation ECTS</b>
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	<b>Federation</b>	
95 - 100	5	A
86 - 94		B
69 - 85	4	C
61 - 68	3	D
51 - 60		E
31 - 50	2	FX
0 - 30		F
51-100	Credit	Passed

Compiled by \_\_\_

Director of department \_\_\_

" \_\_\_ " \_\_\_

### **List of questions of the final certification for the course**

1. What is a forecast and name the purpose of the forecast of harmful objects.
2. Characterize the phytosanitary survey and its importance in protection Plants.

3. Name the scientific basis for the development of forecasts.
4. Types of forecasts and their characteristics.
5. What are the methods for counting insects?
6. Name the insects that live inside the plants and how to count them.
7. Name the soil-dwelling insects and how to account for them.
8. Name the insects that move on the surface of the soil and the methods of their accounting.
9. Name the insects that live on plants and how to count them.
10. Mass reproduction of the pest and what is it called differently?
11. Economic threshold of harmfulness of pests (EPP) and its importance in plant protection?
12. What is the effectiveness of protective measures and what does it depend on?
13. What is bioavailability?
14. What is the cost-effectiveness of protective measures?
15. Characterize the state of depression of insects.
16. The role of phytosanitary monitoring in the protection of plants from harmful objects.
17. Phenological terms of phytosanitary evaluation of crops (plantings).
18. Integrated plant protection system and the place of prognosis in it.

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 "Agrochemistry" are presented in the Appendix to this Work Program of the discipline.

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