NATIONAL UNIVERSITY OF LIFE AND ENVIRONMENTAL SCIENCES OF UKRAINE
V.F. Peresypkin Department of Phytopathology

APPROVED
by the Dean of the Faculty Plant Protection,
Biotechnologies and Ecology
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WORK PROGRAM OF THE ACADEMIC DISCIPLINE "AGRICULTURAL PLANT PATHOLOGY"

Field of knowledge 20 Agricultural sciences and food
Specialty 202 Plant Protection and Quarantine
Academic programme Plant Protection and Quarantine
Faculty Plant Protection, Biotechnologies and Ecology
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Description of the discipline “Agricultural Plant Pathology”

The discipline is studied in the final course of training for applicants of the first (bachelor's) level of higher education in the specialty 202 Plant Protection and Quarantine. Its program provides for the study of diseases of agricultural crops, the species composition of pathogens and areas of their distribution, diagnostic signs of disease manifestations on various plant organs, the influence of biotic and abiotic environmental factors on the development of pathologies, sources and places of infection reservation, protective measures against individual diseases and systems of measures against diseases of a specific crop. As a result of studying the academic discipline, the student must: know the tasks, goals and objects of agricultural phytopathology; areas of diseases and the size of crop losses of agricultural plants; diagnostic signs of pathologies on agricultural crops; morphological, biological and ecological features of pathogens; places of reservation and storage of infection; justification of protective measures against diseases on each agricultural crop; be able to independently determine the most common and harmful diseases of various etiologies in agricultural crops by diagnostic signs; identify disease pathogens by morphological signs: predict the development of diseases depending on weather conditions; plan and carry out agrotechnical, seed selection, chemical and biological plant protection measures; justify the feasibility of using plant protection products against diseases depending on the phytosanitary condition of crops; select and introduce disease-resistant varieties and hybrids of agricultural crops for the conditions of a specific farm.

Academic degree, specialty, academic programme		
Academic degree	bachelor’s	
Specialty	202 Plant Protection and Quarantine	
Academic programme	Plant Protection and Quarantine	
Characteristics of the discipline		
Type	compulsory	
Total number of hours	240	
Number of ECTS credits	8	
Number of modules	4	
Course project (work) (if any)	CW	
Form of assessment	exam / credit	
Indicators of the discipline for full-time and part-time forms of university study		
	Full-time	Part-time
Year of study	4	5
Semester	7,8	8,9
Lectures	60 h.	4 h.
Practical classes and seminars	-	-
Laboratory classes	90 h.	-
Self-study	90 h.	236 h.
Number of hours per week for full-time students	6 h.	

1. Aim, objectives, competences and expected learning outcomes of the discipline

The purpose of the discipline "Agricultural Plant Pathology" is to study diseases of agricultural crops, the species composition of pathogens and areas of their harmfulness, diagnostic signs of the manifestation of diseases on various plant organs, the influence of biotic and abiotic factors of the environment on the development of pathologies, sources and places of reservation of infection, measures to protect against certain diseases and systems of measures against diseases of a specific culture.

Task: studying the spread, symptoms, and harmfulness of diseases of the following groups of crops: grain cereals, grain legumes, annual and perennial leguminous grasses, sorghum, oilseeds, root crops, tubers, vegetables, fruits, berries, and grapes;

Study of the species composition of pathogens of various agricultural crops, their morphological and biological features;

Study of the influence of biotic and abiotic environmental factors on the development of plant diseases;

Clarification of sources and places of reservation of infectious material of pathogens;

Development and substantiation of preventive and therapeutic measures at a high professional level.

As a result of studying the academic discipline, the student should:

to know: tasks, goals and objects of agricultural phytopathology; diagnostic signs of diseases on agricultural crops; morphological, biological and ecological features of pathogens; places of reservation and storage of infection; areas of spread of diseases and the extent of crop losses of agricultural plants; substantiation of protective measures against diseases on each agricultural crop;

to be able to: independently determine the most common and harmful diseases of various etiologies on agricultural crops by diagnostic signs; to identify the causative agents of diseases by morphological signs: to predict the development of diseases depending on weather conditions; plan and carry out agrotechnical, seed selection, chemical and biological plant protection measures; justify the expediency of using chemical and biological means of plant protection against diseases depending on the phytosanitary state of crops; to select and introduce regional disease-resistant varieties and hybrids of agricultural crops for the conditions of a specific farm.

Competence acquisition:

Integral competence:

The ability to solve complex specialized tasks and practical problems of professional activity in plant protection and quarantine and applied theoretical knowledge and methods of phytosanitary monitoring, inspection, analysis, expertise, characterized by complexity and uncertainty of conditions.

-General competences (GC):

GC 2. Ability to apply knowledge in practical situations.

GC 3. Knowledge and understanding of the subject area and understanding of professional activity.

GC 9. Ability to make informed decisions.

-Special (professional, subject) competencies (SC):

SC 1. Ability to conduct phytosanitary diagnostics of plant diseases, insects, mites, nematodes, rodents and weeds using the latest principles and methods.

SC 4. Ability to detect, localize and eliminate regulated harmful organisms based on the results of inspection and phytosanitary examination.

SC 5. Ability to develop and apply plant protection technologies at agricultural and other facilities.

SC 7. Ability to coordinate phytosanitary monitoring to detect, identify and determine the features of the biology and ecology of harmful organisms in Ukraine and in accordance with the WTO SPS Agreement and the provisions of the legislation of the European Union.

SC 8. Ability to comprehensively apply methods for long-term regulation, development and spread of harmful organisms to an economically insignificant level based on the forecast, economic thresholds of harmfulness, effectiveness of beneficial organisms, energy-saving and environmental technologies that ensure reliable plant protection and environmental safety in accordance with the WTO SPS agreement and the provisions of the legislation of the European Union.

SC 9. Ability to organize measures for plant protection and quarantine by enterprises, institutions, organizations of all forms of ownership and citizens whose activities are related to the use of land, water bodies, cultivation of plants for agricultural and other purposes, their sale, processing, storage and use in accordance with the WTO, SPS agreements, and European requirements.

-Program learning outcomes (PLO):

PLO 6. Correctly use appropriate methods of observation, description, identification, classification, cultivation of agrobiocenosis objects and maintaining their stability to preserve natural diversity.

PLO 7. Draw up technological maps for organizing plant protection measures.

PLO 10. Train, monitor and evaluate the professional skills of employees involved in the implementation of plant protection and quarantine measures.

PLO 11. Comply with the requirements of legislation in the field of plant protection and quarantine and promptly respond to changes in legislation.

2. The program and structure of the academic discipline for:

– full-time full-time (correspondence) form of education;– reduced period of full-time (correspondence) education.

Titles of modules and themes	Amount of hours											
	Full time					External						
	total	including				total		including				
		l	p	l	i	In		l	p	l	i	Ind
1	2	3	4	5	6	7	8	9	10	11	12	13
Module 1. Diseases of grain and leguminous crops												
Topic 1. Wheat protection system against diseases.	8	3		4	-	1		2				
Topic 2. Barley protection system against diseases.	5	2		2		1						
Topic 3. Rye diseases and the system of measures for their control	4	-	-	1		3						
Topic 4. Oat diseases and the system of measures to control them	4	-	-	1	-	3						
Topic 5. Corn protection system against diseases.	5	2		2		1						
Topic 6. Rice diseases and the system of their control measures	4	-	-	1	-	3						
Topic 7. Millet diseases and the system of measures to control them	4					4						
Topic 8. Buckwheat diseases and the system of measures to control them	2					2						
Topic 9. Diseases of sorghum, sudanka and cereal grasses. System of their control measures.	3	1				2						
Topic 10. Pea diseases and the system of measures to control them	7	2		2		3						
Topic 11. Soybean diseases and the system of measures to control them	5	2		2		2						
Topic 12. Diseases of beans, fodder beans, lupine and vetch. System of their control measures	4	1		1		2						
Topic 13. Diseases of perennial legumes	3					3						
Together according to the content module 1	**60**	**16**		**15**		**30**						
Module 2. Diseases of industrial crops												
Topic 1. Sunflower diseases and the system of measures to control their development.	8	2		3		3						
Topic 2. Hemp diseases and measures to limit their development	6	1		1		5						
Topic 3. Flax diseases and measures to limit their development	7	1		1		6						
Topic 4. Diseases of castor beans and measures to limit their development	4	1				4						
Topic 5. Rapeseed diseases and measures to limit their development	8	2		2		4						
Topic 6. Tobacco and shaggy diseases. A system of measures to limit their development	7	2		2		5						

Topic 7. Hop diseases and measures to limit their development	6	1		2		4						
Topic 8. Beet diseases and measures to limit their development	10	3		4		4						
Together according to the content module II	61	**13**		**15**		**35**						
Course work												
Credit												
Module 3. Diseases of potatoes and vegetable crops												
Topic 1. Potato diseases and the system of their control measures	11	3		4		5						
Topic 2. Diseases of tomatoes and the system of their control measures	9	3		2		4						
Topic 3. Diseases of cabbage vegetable crops and the system of measures for their control	8	2		2		4						
Topic 4. Onion and garlic diseases and the system of measures to control them	7	2		2		3						
Topic 5. Carrot diseases and the system of their control measures	7	2		2		3						
Topic 6. Diseases of pumpkin crops and the system of measures to control them	8	2		2		4						
Topic 7. Diseases of greens and the system of measures to control them	8	2		1		4						
Together according to the content module III	**58**	**16**		**15**		**27**						
Module 4. Diseases of fruit and berry crops and grapes												
Topic 1. Diseases of seed fruit crops and the system of measures for their control	10	3		3		4						
Topic 2. Diseases of stone fruit crops and the system of their control measures	9	2		3		4						
Topic 3. Strawberry diseases and the system of measures to control them	8	2		3		4						
Topic 4. Currant and Gooseberry diseases and the system of measures for their control	7	2		1		4						
Topic 5. Raspberry and blueberry diseases and the system of their control measures	8	2		2		4						
Topic 6. Diseases of grapes and the system of their control measures	9	2		3		4						
Topic 7. Diseases of nuts and the system of their control measures	7	2		1		4						
Together according to the content module IV	**58**	**15**		**15**		**28**						
Total hours	**240**	**60**		**60**		**120**						
Course work	15											

3. Topics of laboratory classes

№	**Topic name**	Hours
1.	Powdery mildew diseases of wheat	2
2.	Rusty diseases and root rot of wheat	2
3.	Other diseases of wheat	2
4.	Diseases of barley	2
5.	Rye and oat diseases	2
6.	Diseases of soybeans	2
7.	Diseases of peas	2
8.	Diseases of clover and alfalfa	2
9.	Sunflower diseases	2
10.	Flax diseases	2
11.	Rapeseed diseases	2
12.	Tobacco and pure tobacco diseases	2
13.	Diseases of hops	2
14.	Diseases of sugar beets	2
15.	Diseases of sugar beet roots	2
16.	Potato diseases	2
17.	Diseases of tomatoes	2
18.	Diseases of cabbage	2
19.	Diseases of onions and garlic	3
20.	Carrot diseases	2
21.	Cucumber diseases	2
22.	Diseases of green vegetables	2
23.	Diseases of seed fruit crops	3
24.	Diseases of stone fruit crops	2
25.	Strawberry diseases	2
26.	Currant diseases	2
27.	Raspberry diseases	2
28.	Blueberry diseases	2
29.	Diseases of grapes	3
30.	Diseases of walnut and hazelnut	2

4. Topics of independent work

№	**Topic name**	Hours
1.	Oat protection system against diseases	2
2.	Rye protection system against diseases	2
3.	Rice diseases and the system of cultural protection measures	4
4.	Diseases of millet and the system of cultural protection measures	2
5.	Buckwheat diseases and the system of cultural protection measures	4
6.	Cereal grass diseases. Systems of protection measures	4
7.	Chickpea diseases. System of protection measures	2
8.	Diseases of beans. System of protection measures	4
9.	Diseases of fodder beans. Systems of protection measures	2
10.	Lupine diseases. System of protection measures	2
11.	Diseases of lentils and vetches. System of protection measures	2
12.	Systems of measures to protect clover and alfalfa from diseases	2
13.	Diseases of sainfoin. System of protection measures	2
14.	Flax protection system against diseases	9
15.	Disease protection system for tobacco and shag	9
16.	System of protection of hops from diseases	8
17.	Hemp diseases and protection system	9
18.	System of measures to protect cabbage vegetable crops from diseases	3
19.	A system of measures to protect onions and garlic from diseases	3
20.	System of measures to protect district crops from diseases	3
21.	System of measures to protect pumpkin crops from diseases	3
22.	System of measures to protect green vegetable crops from diseases	4
23.	System of strawberry disease control measures	3
24.	Currant disease control measures system	2
25.	Gooseberry diseases and the system of protection measures	2
26.	System of raspberry disease control measures	3
27.	A system of measures to protect walnuts from diseases	3
28.	A system of measures to protect hazelnuts from diseases	3

5. Tools for assessing expected learning outcomes: *(select necessary or add)*

- exam;
- credit;
- module tests;
- abstracts;
- presentation of laboratory and practical works;
- other types.

6. Teaching methods:

- verbal method (lecture, discussion);
- practical method (laboratory, practical classes);
- visual method (illustration, demonstration);
- processing learning resources (note-taking, summarising, reviewing, writing an abstract);
- video method (remote, multimedia, web-based, etc.);
- self-study (completing assignments);
- individual research work;
- other types.

7. Assessment methods: *(select necessary or add)*

- exam;
- credit;
- oral or written assessment;
- module tests;
- team projects;
- presentation of laboratory and practical works;
- presentations at academic events
- other types.

8. Results assessment.

The student's knowledge is assessed by means of a 100-point scale converted into the national grades according to the "Exam and Credit Regulations at NULES of Ukraine" in force.

8.1. Distribution of points by types of educational activities

Educational activity	Results	Assessment
Module 1. Diseases of grain and leguminous crops		
Laboratory work 1	PLO 6. Correctly use appropriate methods of observation, description, identification, classification, cultivation of agrobiocenosis objects and maintaining their stability to preserve natural diversity. PLO 7. Draw up technological maps for organizing plant protection measures. PLO 10. Train, monitor and evaluate the professional skills of employees involved in the implementation of plant protection and quarantine measures. PLO 11. Comply with the requirements of legislation in the field of plant protection and quarantine and promptly respond to changes in legislation.	7
Laboratory work 2		7
Laboratory work 3		7
Laboratory work 4		7
Self-study 1		7
Laboratory work 5		7
Laboratory work 6		7
Laboratory work 7		7
Laboratory work 8		7
Self-study 2		7

Module control work 1		30
Total for module 1		100
Module 2. Diseases of industrial crops		
Laboratory work 9	PLO 6. Correctly use appropriate methods of observation, description, identification, classification, cultivation of agrobiocenosis objects and maintaining their stability to preserve natural diversity. PLO 7. Draw up technological maps for organizing plant protection measures. PLO 10. Train, monitor and evaluate the professional skills of employees involved in the implementation of plant protection and quarantine measures. PLO 11. Comply with the requirements of legislation in the field of plant protection and quarantine and promptly respond to changes in legislation.	10
Laboratory work 10		7
Laboratory work 11		7
Laboratory work 12		7
Self-study 3		7
Laboratory work 13		8
Laboratory work 14		8
Laboratory work 15		8
Self-study 4		8
Module control work 2.		30
Total for module 2		100
Academic work	**(M1 + M2)/2*0.7 ≤ 70**	
Exam	**30**	
Course project/work (if available)		100
Module 3. Diseases of potatoes and vegetable crops		
Laboratory work 1	PLO 6. Correctly use appropriate methods of observation, description, identification, classification, cultivation of agrobiocenosis objects and maintaining their stability to preserve natural diversity. PLO 7. Draw up technological maps for organizing plant protection measures. PLO 11. Comply with the requirements of legislation in the field of plant protection and quarantine and promptly respond to changes in legislation.	7
Laboratory work 2		8
Laboratory work 3		7
Laboratory work 4		8
Self-study 1		5
Laboratory work 5		8
Laboratory work 6		7
Laboratory work 7		8
Laboratory work 8		5
Self-study 2		7
Module control work 3		30
Total for module 3		100
Module 4. Diseases of fruit and berry crops and grapes		
Laboratory work 9	PLO 6. Correctly use appropriate methods of observation, description, identification, classification, cultivation of agrobiocenosis objects and maintaining their stability to preserve natural diversity. PLO 7. Draw up technological maps for organizing plant protection measures. PLO 10. Train, monitor and evaluate the professional skills of employees involved in the implementation of plant protection and quarantine measures.	7
Laboratory work 10		7
Laboratory work 11		9
Self-study 3		7
Laboratory work 12		8
Laboratory work 13		7
Laboratory work 14		9
Laboratory work 15		7
Self-study 4		9
Module control work 4		30
Total for module 4		100
Academic work	**(M1 + M2)/2*0,7 ≤ 70**	
Exam/credit	**30**	
Total for year	**(Class work + exam) ≤ 100**	

8.2. Scale for assessing student's knowledge

Student's rating, points	National grading of exams and credits
	exams
90-100	excellent
74-89	good
60-73	satisfactorily
0-59	unsatisfactorily

8.3. Assessment policy

Deadlines and exam retaking rules	Works that are submitted late without valid reasons will be assessed with a lower grade. Module tests may be retaken with the permission of the lecturer if there are valid reasons
Academic integrity rules	Cheating during tests and exams is prohibited (including using mobile devices). Term papers and essays must have correct references to the literature used
Attendance rules	Attendance is compulsory. For good reasons (e.g. illness, international internship), training can take place individually (online by the faculty dean's consent)

9. Teaching and learning aids

- e-learning course of the discipline (*https://elearn.nubip.edu.ua/course/view.php?id=3039*);
- lectures and presentations (in electronic form);
- textbooks, manuals, tutorials;
- guidelines for studying a discipline by full-time and part-time students;
- internship programmes of the discipline (if included in the curriculum).

10. Educational and methodological support

Electronic educational course Agricultural phytopathology / Pikovsky M.Y., website: URL: https://elearn.nubip.edu.ua/course/view.php?id=3049

1. Workbook for conducting laboratory work on the discipline "Agricultural Phytopathology" for students of the specialty 202-protection and quarantine of plants. Part 1. Diseased legumes, legumes and industrial crops / editor: M.Y. Pikovsky, M.M. Kirik Kyiv: Editorial and Publishing Department of NUBiP of Ukraine, 2018. 183 p. http://dspace.nubip.edu.ua:8080/jspui/handle/123456789/6069

2. Workbook for conducting laboratory work of the discipline "Agricultural Phytopathology" for students of the specialty 202-plant protection and quarantine. Part 2. Diseases of vegetable, fruit and berry crops and grapes / comp. M.Y. Pikovsky. Kyiv: Editorial and Publishing Department of NUBiP of Ukraine, 2019. 124 p. http://dspace.nubip.edu.ua:8080/jspui/handle/123456789/6395

3. Agricultural phytopathology. Methodical instructions for course work by students of the BA "Bachelor" specialty 202 "Protection and quarantine of plants" / comp.: M.Y. Pikovsky, D.T. Gentosh, N.M. Voloshchuk Kyiv: "CP KOMPRINT", 2022. 45 p.

4. Methodical recommendations for independent work on the discipline "Agricultural phytopathology" for first (bachelor's) students level of higher education, specialty 202 Protection and quarantine of plants / comp.: M.Y. Pikovsky. Kyiv: Editorial and publishing department of NUBiP of Ukraine, 2023. 96 p.

5.Kolodiychuk V. D., Kryvenko A. I., Shushkivska N. I. Workshop on agricultural phytopathology: study guide. Kyiv: Center for Educational Literature, 2020. 232 p.

6. Complex systems of protection of agricultural crops from diseases: Education. manual / Turenko V.P., Bilyk M.O., Kuleshov A.V. and others; under the editorship V. P. Turenko, M. O. Bilyka; HNAU named after VV Dokuchaeva. Kind. 2nd, add. Kharkiv: Maidan, 2019. 330 p.

7. List of pesticides and agrochemicals permitted for use in Ukraine /edited by V.U. Yashchuk. Kyiv: UnivestMedia, 2023. 1023 p.

8. Agricultural phytopathology: a textbook / I. L. Markov and others; under the editorship I. L. Markov. Kyiv: Interservice, 2017. 573 p.

Internet resources:

1. Educational and informational portal of the National University of Bioresources and Nature Management of Ukraine: website. URL: https://elearn.nubip.edu.ua

2. Journal. Quarantine and plant protection : website. URL: http://archive.nbuv.gov.ua/Portal/chem_biol/Kizr/

3. Journal. European Journal of Plant Pathology : website. URL: https://www.springer.com/journal/10658

4. European and Mediterranean Organization for Plant Protection. European and Mediterranean Plant Protection Organization : website. URL: https://www.eppo.int/

5. National Scientific Agricultural Library of the National Academy of Agricultural Sciences: website. URL: https://dnsgb.com.ua

6. Scientific library of the National University of Bioresources and Nature Management of Ukraine: website. URL: https://nubip.edu.ua/structure/library

7. Periodically harmful and potentially dangerous hazelnut diseases and their prevention: website. URL: https://www.pro-of.com.ua/periodichno-shkidlivi-ta-potencijno-nebezpechni-xvorobi-funduka-ta-їx-profilaktika/

8. Blueberry diseases: website. URL: https://content.ces.ncsu.edu/leaf-diseases-of-blueberry

9. State Production and Consumer Service. Plant protection : website. URL: https://dpss.gov.ua/fitosanitaria-kontrol-u-sferi-nasinnictva-tarozsadnictva/fitosanitrij-kontrol/fitosanitrij-monitoring

10. Ministry of Environmental Protection and Natural Resources of Ukraine. State register of pesticides and agrochemicals approved for use in Ukraine: website. URL: https://mepr.gov.ua/upravlinnya-vidhodamy/derzhavnyj-reyestr-pestytsydiv-i-agrohimikativ-dozvolenyh-do-vykorystannya-v-ukrayini/

11.Official site of the Syngenta company: website. URL: https://www.syngenta.ua/products/search/crop-protection

12. AgroMage:website.URL:https://agromage.com