

**NATIONAL UNIVERSITY OF LIFE AND ENVIRONMENTAL SCIENCES OF
UKRAINE**

V.F. Peresyphkin Department of Phytopathology

APPROVED

Faculty Plant Protection,
Biotechnologies and Ecology
21“_may_”2026

CURRICULUM OF ACADEMIC DISCIPLINE
AGRICULTURAL PLANT PATHOLOGY

Area 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
Developed by: Vuiek A.O., Senior Lecturer, Dr. PhD

Description of the discipline AGRICULTURAL PLANT PATHOLOGY

The discipline is taught during the final year of the Bachelor's degree programme in Specialty 202 Plant Protection and Quarantine. The course focuses on the study of diseases of agricultural crops, their causal agents and distribution areas, diagnostic symptoms, the influence of biotic and abiotic environmental factors on disease development, sources and reservoirs of infection, as well as methods of disease management and integrated disease control systems for major agricultural crops.

Upon successful completion of the course, students should be able to:

Know: the objectives, scope, and significance of agricultural phytopathology; the distribution of plant diseases and their impact on crop productivity; diagnostic symptoms of major plant diseases; the morphological, biological, ecological, and pathogenic characteristics of plant pathogens; sources, reservoirs, and pathways of pathogen survival and dissemination; principles and methods of disease prevention and management in agricultural crops; integrated approaches to plant disease control.

Be able to: identify the most common and economically important diseases of agricultural crops based on diagnostic symptoms; identify disease causal agents using their morphological characteristics; plan and implement agronomic, breeding, seed health, chemical, and biological plant protection measures; justify the selection and application of plant protection products according to the phytosanitary status of crops; select and recommend disease-resistant crop varieties and hybrids for agricultural production; develop integrated disease management systems for agricultural crops.

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

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

The aim of the course “Agricultural plant pathology” is to provide students with comprehensive knowledge of diseases of agricultural crops, the diversity and biological characteristics of their causal agents, their distribution and economic importance, diagnostic symptoms on different plant organs, the influence of biotic and abiotic environmental factors on disease development, sources and routes of pathogen survival and dissemination, as well as modern plant protection methods and integrated disease management systems for agricultural crops.

Competences acquired:

Integral competence (IC):

The ability to solve complex specialized tasks and practical problems of professional activity in plant protection and quarantine and to apply 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.

GC 11. Ability to work in an international context, taking into account international and regional standards for phytosanitary measures, as well as the requirements of international and regional plant protection and quarantine organizations.

Special (professional) competences (PC):

PC 1. Ability to carry out phytosanitary diagnostics of plant diseases, insects, mites, nematodes, rodents, and weeds using modern principles and methods.

PC 3. Ability to forecast the development and spread of harmful organisms, enabling the implementation of state policy in the field of plant protection and quarantine.

PC 4. Ability to detect, localize, and eradicate regulated harmful organisms based on inspection results and phytosanitary expertise.

PC 5. Ability to develop and apply plant protection technologies in agricultural and other designated areas.

PC 7. Ability to coordinate phytosanitary monitoring for the detection, identification, and determination of biological and ecological characteristics of harmful organisms in Ukraine in accordance with WTO SPS Agreement and European Union legislation.

PC 8. Ability to comprehensively apply methods for long-term regulation of the development and spread of harmful organisms to economically non-damaging levels based on forecasting, economic thresholds of harm, effectiveness of beneficial organisms, and energy-efficient and environmentally friendly technologies ensuring reliable plant protection and environmental safety in accordance with WTO SPS Agreement and EU legislation.

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

Expected Learning Outcomes (ELO):

ELO 6. Correctly apply appropriate methods of observation, description, identification, classification, and cultivation of agrobiocenosis objects, as well as methods for maintaining their stability to preserve natural biodiversity.

ELO 7. Develop technological maps for organizing plant protection measures.

ELO 8. Possess knowledge of professional disciplines (entomology, phytopathology, mycology, virology, helminthology, acarology, pest monitoring, plant immunity, fundamentals of plant quarantine, rodentology, weed science, phytopharmacology, phytosanitary monitoring, mechanization, crop production, economics and entrepreneurship, management, fundamentals of scientific research, storage and processing technologies of crop

production, fruit and vegetable production) to the extent necessary for specialized professional activity in plant protection and quarantine.

ELO 9. Develop technological maps for organizing plant protection measures.

ELO 14. Apply international and national standards and practices in professional activity.

Modules and topics	Number of hours													
	full-time							part-time						
	weeks	total	including					in total	including					
			l	p	lab	ind	s.st		l	p	lab	ind	s.st	
2	3	4	5	6	7	8	9	10	11	12	13	14		
Module 1. Diseases of cereal and leguminous crops														
Topic 1. Introduction. Aim and objectives of the course. Wheat diseases and their control system.		8	3		4		1		2					
Topic 2. Barley diseases and measures to reduce their harmfulness.		5	2		2		1							
Topic 3. Rye diseases and their control system.		4			1		3							
Topic 4. Oat diseases and their control system.		4			1		3							
Topic 5. Maize diseases and their control system.		5	2		2		1							
Topic 6. Rice diseases and their control system.		5	1		1		3							
Topic 7. Millet diseases and their control system.		5	1				4							
Topic 8. Buckwheat diseases and their control system.		5	1				2							
Topic 9. Sorghum, sudangrass, and forage grasses diseases. Disease management system.		3	1				2							
Topic 10. Pea diseases and their control system.		7	2		2		3							
Topic 11. Soybean diseases and their control system.		5	2		2		2							
Topic 12. Bean, faba bean, lupin, vetch, and chickpea diseases. Disease management system.		4	1		1		2							
Topic 13. Perennial leguminous grasses diseases and integrated disease management system.		3					3							
Total for module 1		60	16		15		30	62	2					
Module 2. Diseases of industrial crops														
Topic 1. Sunflower diseases and their control system.		8	2		3		3		2					
Topic 2. Hemp diseases and measures to limit their development.		6	1		1		5							
Topic 3. Flax diseases and measures to limit their		7	1		1		6							

their disease control systems.													
Total for module 2	58	15		15		28							
Total hours	240	60		60		120	240						
Course project (work) <hr/> (if included in the curriculum)	15												

2. Topics of lectures

No.	Topic	Hours
	Semester 7	
1.	Integrated disease management system for wheat.	3
2.	Integrated disease management system for barley.	2
3.	Integrated disease management system for maize.	2
4.	Integrated disease management system for rice.	1
5.	Integrated disease management system for millet.	1
6.	Integrated disease management system for sorghum.	1
7.	Integrated disease management system for forage grasses.	1
8.	Integrated disease management system for pea.	2
9.	Integrated disease management system for soybean.	2
10	Integrated disease management system for bean, faba bean, lupin, vetch, and chickpea.	1
11	Integrated disease management system for sunflower.	3
12	Integrated disease management system for hemp.	3
13	Integrated disease management system for flax.	2
14	Integrated disease management system for castor bean.	2
15	Integrated disease management system for rapeseed.	2
16	Integrated disease management system for tobacco and shag.	2
17	Integrated disease management system for wheat.	2
18	Integrated disease management system for barley.	3
	Semester 8	
1.	Integrated disease management system for potato.	3
2.	Integrated disease management system for tomato.	3
3.	Integrated disease management system for cabbage vegetable crops.	2
4.	Integrated disease management system for onion and garlic.	2
5.	Integrated disease management system for carrot.	2
6.	Integrated disease management system for cucurbit crops.	2
7.	Integrated disease management system for leafy vegetable crops.	2
8.	Integrated disease management system for pome fruit crops.	3
9.	Integrated disease management system for stone fruit crops.	2
10	Integrated disease management system for strawberry.	2
11	Integrated disease management system for currant and gooseberry.	2
12	Integrated disease management system for raspberry and blueberry.	2
13	Integrated disease management system for grapevine.	2
14	Integrated disease management system for nut crops.	2
15		
16		

3. Topic of laboratory (practical, seminars) classes

№	Topic title	Hours
1	Smut diseases of wheat	2
2	Rust diseases and root rots of wheat	2
3	Other wheat diseases	2
4	Barley diseases	2
5	Rye and oat diseases	2
6	Soybean diseases	2
7	Pea diseases	2
8	Clover and alfalfa diseases	2
9	Sunflower diseases	2
10	Flax diseases	2
11	Rapeseed diseases	2
12	Tobacco and shag diseases	2
13	Hop diseases	2
14	Sugar beet diseases	2
15	Diseases of sugar beet root crops	2
16	Potato diseases	4
17	Tomato diseases	2
18	Cabbage diseases	2
19	Onion and garlic diseases	2
20	Carrot diseases	2
21	Cucumber diseases	3
22	Leafy vegetable crop diseases	2
23	Pome fruit crop diseases	4
24	Stone fruit crop diseases	4
25	Strawberry diseases	2
26	Currant diseases	1
27	Raspberry diseases	1
28	Blueberry diseases	1
29	Grapevine diseases	3
30	Walnut and hazelnut diseases	2

4. Topics of self-study

№ s/n	Topic title	Hours
1	Diseases of oat, rye, rice, millet, buckwheat, and forage grasses. Plant disease management systems.	15
2	Diseases of chickpea, bean, faba bean, lupin, lentil, vetch, clover, alfalfa, and sainfoin. Plant disease management systems.	15
3	Diseases of flax and hemp. Plant disease management systems.	15
4	Diseases of tobacco, shag, and hops. Plant disease management systems.	15
5	Diseases of cabbage vegetable crops, onion, garlic, and umbrella crops. Plant disease management systems.	15
6	Diseases of cucurbit and leafy vegetable crops. Plant disease management systems.	15
7	Diseases of berry and nut crops. Plant disease management systems.	15

5. Methods of assessing expected learning outcomes:

(select necessary or add)

- oral or written survey;
- interview;
- test;
- defending laboratory/practical, design/graphical works, projects;
- peer-to-peer assessment, self-assessment.

6. Teaching methods (select necessary or add):

- problem-based method;
- practice oriented studying method;
- case method;
- project education method;
- flipped classroom, mixed education method;
- research based method;
- learning discussions and debates method;
- team work, brainstorm method

7. 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
<i>Module 1.</i>		
Laboratory work 1.	ELO 7, 9. To possess methods of observation and description of disease symptoms in cereal and leguminous crops, as well as knowledge of morphological and biological characteristics of pathogens. To be able to visually diagnose plant diseases and identify causal agents. To understand pathogen life cycles, their specialization, and sources of infection. To justify the application of integrated measures for plant disease management.	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
<i>MODULE 2.</i>		
Laboratory work 9.	ELO 7, 9. To possess methods of observation and description of disease symptoms in cereal and leguminous crops, as well as knowledge of morphological and biological characteristics of pathogens. To be able to visually diagnose plant diseases and identify causal agents. To understand pathogen life cycles, their specialization, and sources of infection. To justify the application of integrated measures for plant disease management.	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.		

Total for module 1		100	
<i>MODULE 3.</i>			
Laboratory work 1.	ELO 7, 9. To possess methods of observation and description of disease symptoms in cereal and leguminous crops, as well as knowledge of morphological and biological characteristics of pathogens. To be able to visually diagnose plant diseases and identify causal agents. To understand pathogen life cycles, their specialization, and sources of infection. To justify the application of integrated measures for plant disease management.	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 1			100
<i>MODULE 4.</i>			
Laboratory work 9.	ELO 7, 9. To possess methods of observation and description of disease symptoms in cereal and leguminous crops, as well as knowledge of morphological and biological characteristics of pathogens. To be able to visually diagnose plant diseases and identify causal agents. To understand pathogen life cycles, their specialization, and sources of infection. To justify the application of integrated measures for plant disease management.	7	
Laboratory work 10.		7	
Laboratory work 11.		9	
Laboratory work 12.		7	
Self-study 3.		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 2			100
Class work	$(M1 + M2)/2 * 0,7 \leq 70$		
Exam/credit	30		
Total for year	$(\text{Class work} + \text{exam}) \leq 100$		
Course project/work (if any)		100	

8.2. Scale for assessing student's knowledge

Student's rating, points	National grading (exam/credits)
90-100	excellent
74-89	good
60-73	satisfactory
0-59	unsatisfactory

8.3. Assessment policy

<i>Deadlines and exam retaking rules</i>	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
<i>Academic integrity rules</i>	Cheating during tests and exams is prohibited (including using mobile devices). Term papers and essays must have correct references to the literature used
<i>Attendance rules</i>	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=3049>

- references to digital educational resources:

CABI Crop Protection Compendium <https://www.cabi.org/cpc/>

FAO Plant Production and Protection Division <https://www.fao.org/plant-health/en/>

USDA National Plant Diagnostic Network (NPDN) <https://www.npdn.org/>

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

2. Workbook for conducting laboratory work of the discipline "AgriculturalPhytopathology" for students of the specialty 202-plant protection andquarantine.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. 124p.<http://dspace.nubip.edu.ua:8080/jspui/handle/123456789/6395>

3. Agricultural phytopathology. Methodical instructions for courseworkbystudents of the BA "Bachelor" specialty 202 "Protection and quarantineof plants"/comp.: M.Y. Pikovsky, D.T. Gentosh, N.M. Voloshchuk Kyiv: "CPKOMPRINT",2022. 45 p.

10. Recommended Literature

1. Agrios G. N. Plant Pathology. 6th ed. Academic Press, 2020.
2. Strange R., Scott P. R. Plant Disease: A Threat to Global Food Security. Springer, 2021.
3. Horst R. K. Westcott's Plant Disease Handbook. 8th ed. Springer, 2020.
4. Bockus W. W., Bowden R. L., Hunger R. M., Morrill W. L., Murray T. D. Compendium of Wheat Diseases and Pests. 3rd ed. APS Press, 2021.
5. Sharma K. K. et al. Advances in Plant Pathology and Crop Protection. Springer, 2022.
6. Pikovskiy M. Y. Protection of fruit and vegetable crops from harmful organisms. Part 1. Phytopathology : study guide. Kyiv : RIV NUBiP of Ukraine, 2025. 236 p.