Додаток 3
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НАЦІОНАЛЬНИЙ УНІВЕРСИТЕТ БІОРЕСУРСІВ І ПРИРОДОКОРИСТУВАННЯ УКРАЇНИ

НУБіП

TRADERE PROGREDI PROSPICERE

COURSE SYLLABUS
«PEST MANAGEMENT IN FOREST OF EASTERN EUROPE»

Degree of higher education - Master
Specialization 205 Forestry
Educational programme «Forestry»
Academic year 2023-2024, semester 2
Form of study full-time
Number of ECTS credits 6
Language of instruction English

Lecturer of the course	**Tokarieva O.V., Puzrina N.V.**
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Course page on eLearn	https://elearn.nubip.edu.ua/course/view.php?id=4318

COURSE DESCRIPTION

The purpose of the discipline is to train masters of the English-language master's program on the ability to timely monitor and predict epiphytosis and outbreaks of pathogens and pests and prescribe appropriate measures to combat them. Objectives of the discipline: to ensure the timely assimilation of external signs of the pathological process of the disease on the tree plant; to teach masters to make a qualified short-term, long-term and long-term forecast for the main pathogens and pests.

The subject of the discipline is to study the basics of monitoring and forecasting epiphytosis and outbreaks of pathogens and pests, reasonable prediction of the timing, level of spread and development of the pest (disease) and possible phenomena and processes in the phytosanitary state of biocenoses in the future.

Prerequisites for studying the course: studying the course requires that you have a basic knowledge of botany, entomology, phytopathology, soil science, meteorology, physics.

The discipline provides the formation of a number of competencies:

Integral competence (IC):

The ability to solve complex tasks and problems in the field of forestry and hunting or in the process of learning, which involves conducting research or implementing innovations and is characterized by the uncertainty of conditions and requirements.

General competencies:

GC 7. Ability to work in an international context.

Special (professional, subject) competencies

PC 3. Ability to assess regional features of natural and climatic conditions for the organization of efficient forestry, the implementation of forest functions of various functions and increase forest area.

Program learning outcomes of the educational programme:

PLO 2. Fluently communicate orally and in writing in Ukrainian and foreign languages when discussing professional issues, research and innovation in the field of forestry.

COURSE STRUCTURE

Topic	Hour (lectures / practical work)	Learning outcomes	Task	Evaluation
Module 1. Phytosanitary monitoring of forest stands				
Topic 1. Ecology and Dynamics of Forest Diseases	3/3	Know the basics of forest biocenology as a component of forest protection. To study the causes of non-infectious pathologies of forests: windbreaks and snowdrifts, snowdrifts, snow, frost and ice, excessive moisture, drought, erosion processes, industrial emissions, recreational loads, forestry activities. cancer and vascular diseases	Make of practical work 1.	9
Topic 2. Ecological groups of microorganisms of forest biocenoses: theoretical and applied aspect	2/2	Analyse ways to preserve pathogens in adverse conditions and winter. There are primary and secondary infections. Place the types and periods of penetration of pathogens in the resident plant: through intact external protected tissue, root hairs, roots, flowers, seeds, through natural holes (stomata, lentils, etc.) through various mechanical damage and wounds. Learn the terms: inoculation, infectious downloads.	Make of practical work 2.	9
Topic 3. Phytosanitary monitoring of dominant pests	2/2	Distinguish ecological groups of microorganisms: soil saprotrophs, forest soil saprotrophs, xylotrophs, saprotrophs, xylotrophs-parasites. Distinguish mycorrhizal fungi, fungi-caprotrophs, fungi-carbonyls, fungi-mycophiles. Know the peculiarities of the nutrition of microorganisms. To study the ecology and dynamics of pathogens of woody plants and terminology in forest pathology.	Make of practical work 3.	9

Topic 4. Monitoring of dominant pathogens of woody plants	2/2	Know bacteria, viruses, rickettsiae, mycoplasmas as integral components of the forest biocenosis. Know the role of microorganisms in the processes of small circulation and in forest pathology and trophic connections. Features of distribution and differences of bacterioses, viruses, rickettsitosis, mycoplasmosis. Know the basic research methods.	Make of practical work 4.	9
Topic 5. Methods and technology of pathological examinations	2/2	Know the features of monitoring, ferromonitoring. Get acquainted with traditional methods of monitoring pathogens, the nature of the formation and localization of diapause stages, critical periods of development of pathogens. Distinguish between phenological and synoptic forecast.	Make of practical work 5.	9
Topic 6. Basics of forecasting. Types of forecasts	2/2	To study the features of monitoring, development and harmfulness of the dominant pathogens. Be able to predict the spread and harmfulness. Know sampling methods.	Make of practical work 6.	9
Topic 7. Prediction of mass outbreaks of insect number	2/2	To study the features of monitoring pathogens on buds, leaves and fruits. Be able to conduct surveys of forest crops and young growth, medieval plantations. Know the basics of forest pathological monitoring. Analysis of world trends in modern technologies of biomethod development.	Make of practical 7 and independent works 1.	16
Credit test 1				30
Total				100
Module 2. Integrated forest protection in eastern Europe				
Topic 8. Leaf Defoliation and Discoloration	2/2	Know the general basics of forecasting. Distinguish types of forecast, their purpose. Acquaintance with the rules of forecasting: short-term,	Make of practical work 8.	9

		long-term, long-term. Assess the factors that affect the intensity of plant damage and the course of the disease. To study the types of infectious chains. Be able to develop a mathematical model for long-term prediction of pathogens, taking into account the conditions for their favorable development.		
Topic 9. Integrated pest management (part 1)	2/2	Phytosanitary and climatic information for forecasting. Ecological and biological features of the causative agents of major diseases of needles and leaves. Drawing up a protection system based on the results of the forecast. Drawing up a protection system based on the results of the forecast. Compilation of nomograms to determine the timing of chemical treatments against diseases of pine needles and leaves according to meteorological data. Construction of prognostic models of epiphytosis of pine and leaf diseases.	Make of practical work 9.	9
Topic 10. Integrated pest management (part 2)	2/2	Analyse phytosanitary and climatic information for forecasting. Study of ecological and biological features of pathogens of major vascular diseases. Study of ecological and biological features of the causative agents of major cancers. Make a prognosis for the development of the causative agent of poplar cytosporosis, infectious drying of oak, pine sulfur cancer, larch cancer, vascular mycosis of oak, elm graphosis, pine cancer. Drawing up a protection system based on the results of the forecast. Forecasting the spread of vascular and root diseases on the basis of	Make of practical work 10.	9

		phytosanitary and meteorological information.		
Topic 11. Beneficial insects in the forest	2/2	Analyse the integrated-dynamic theory of mass reproduction of pests. Know the regulatory mechanisms of the dynamics of the number of major coniferous and leaf-eating species of pests. Know the basics of predicting mass outbreaks of leaf-eating, coniferous rodents, stem and polyphagous pests. Drawing up a protection system based on the results of the forecast. Construction of prognostic models of mass outbreaks of pests.	Make of practical work 11.	9
Topic 12. Birds and bats for pest suppression	2/2	Analyse the problems facing forest protection in terms of modeling. To have an idea of the mathematical model and the universal method of cognition of reality - the method of mathematical modeling. Know the main parameters of the model - realism, accuracy, generality. Identify the main stages of modeling complex systems: problem selection; setting a task and limiting the degree of its complexity; defining a hierarchy of goals and objectives; choice of ways to solve the problem; modeling; evaluation of possible strategies; implementation of results.	Make of practical work 12.	9
Topic 13. Weeds in the forest	2/2	Ability to mathematically formalize a real object. Know the main types of mathematical models: deterministic and stochastic; static and dynamic; constructive and descriptive (descriptive); matrix; optimization; self-organizing; simulation models and their general characteristics.	Make of practical work 13.	9
Topic 14. Plant quarantine	3/3	Know the main factors of population size: initial (initial)	Make of practical 14	16

		population size (density); weather conditions (biohydrothermal index (BHTI); entomophages and pathogens; resistance and protective reaction of the plantation). Know the critical periods in the development of major coniferous and leaf-eating pests and the number of generations required to analyse the weather conditions that have developed for them. Be able to calculate BHTI conditions for the development of coniferous and leaf-eating forest pests and the appropriate level of threat to plantations.	and independent work 2.	
Credit test 2				30
Total				100
Total for 1 semester				70
Exam	30/30			30
Total per course				100

ASSESSMENT POLICY

Policy regarding deadlines and resits:	Assignments submitted after the deadline without valid reasons will be graded lower. Resitting of modules will be allowed with the permission from the lecturer and in the presence of valid reasons (e.g. medical reasons).
Academic honesty policy:	Cheating during tests and exams is strictly prohibited (including the use of mobile devices). Coursework and research papers must contain correct citations for all sources used.
Attendance policy:	Class attendance is mandatory. In case of objective reasons (such as illness or international internships), individual learning may be allowed (in online format by the approval of the dean of the faculty).

SCALE OF ASSESSMENT OF STUDENT KNOWLEDGE

Student rating, points	**National grade based on exam results**	
	exams	**credits**
90-100	excellent	passed
74-89	good	
60-73	satisfactory	
0-59	unsatisfactory	not passed

RECOMMENDED SOURCES OF INFORMATION

1. Пузріна Н. В. Математичне моделювання чисельності шкідників та збудників хвороб лісу. Київ : Видавничий цент НАУ, 2014. 38 с.
2. Пузріна Н. В. Прогноз збудників хвороб та шкідників. Курс лекцій. Житомир : Полісся, 2015. 58 с.
3. Токарєва О.В., Мєшкова В.Л., Пузріна Н.В. Pest management in forests of Eastern Europe: manual. Київ : КОМПРИНТ, 2022. 320с.
4. David G. James. Beneficial Insects, Spiders, and Other Mini-Creatures in Your Garden. Washington : Washington State University, 2014. 21 p.
5. Lakatos F., Mirtchev S. Manual for visual assessment of forest crown condition. FAO. 2014. 23 p.
6. Marshall Bradley, Fern, Barbara W. Ellis, and Deborah L. Martin, eds. The Organic Gardener's Handbook of Natural Pest and Disease Control: A Complete Guide to Maintaining a Healthy Garden and Yard the Earth-Friendly Way. New York: Rodale Press, 2010. 408 p.
7. Miller K. V., Miller J. H. Forestry herbicide influences on biodiversity and wildlife habitat in southern forests. Wildlife Society Bulletin, 2004. Vol.32, No. 4, 1049–1060.
8. Sandy Perry, Carolyn Randall. Forest Pest Management. Michigan : Michigan State University, 2000 111 p.
9. Sow A., Seye D., Faye E., Benoit L., Galan M., Haran J., Brevault T. Birds and bats contribute to natural regulation of the millet head miner in tree-crop agroforestry systems. Crop Protection, 2020. 32 p.
10. Vasic V., Konstantinovic B., Orlovic S. Weeds in Forestry and Possibilities of Their Control, 2012. 26 p.
11. Forests. Manual on methods and criteria for harmonized sampling, assessment, monitoring and analysis of the effects of air pollution on forests. Hamburg, Germany. 2010. URL : http://www.icp-forests.org/Manual.htm (дата звернення: 20.05.2023).
12. Frank S., Bradley L., Moore K. Integrated Pest Management. 2018. URL : http://content.ces.ncsu.edu/8-integrated-pest-management-ipm (дата звернення: 20.05.2023).
13. Klass C., Hoffmann M.P. Attracting Beneficial Insects. 2014. URL : http://blogs.cornell.edu/horticulture/about/basic-gardening-info/garden-beneficialinsects/ (дата звернення: 20.05.2023)
14. Merrill Richard. Attracting Beneficial Insects to the Garden with Beneficial Flowers. Renee's Garden. 2014. URL : http://www.reneesgarden.com/articles/beneficials.html (дата звернення: 20.05.2023).
15. Pest Management Options: Birds and Bats for Pest Suppression. URL : https://intermountainfruit.org/pest-management/birds-bats (дата звернення: 20.05.2023).
16. Plant Quarantine. URL : https://www.bioversityinternational.org/fileadmin/bioversity/publications/Web_version/174/ch09.htm (дата звернення: 20.05.2023).
17. Sanitary rules in the forest of Ukraine. URL : https://zakon.rada.gov.ua/laws/show/555-95-%D0%BF#Text (дата звернення: 20.05.2023).
18. The Law of Ukraine On Plant Quarantine. URL : http://www.vertic.org/media/National%20Legislation/Ukraine/UA_Law_Plant_Quarantine.pdf (дата звернення: 20.05.2023).