SYLLABUS OF AN ACADEMIC DISCIPLINE

Academic degree - Bachelor's
Specialty 202 Plant Protection and Quarantine
Academic programme Plant Protection and Quarantine

Year of study 2, semester 3,4
Form of study full-time, part-time
Number of ECTS credits 6
Language(s) of instruction English

Lecturer of the discipline	Bashta O.V., associate professor, Dr. PhD; Vuiek A.O., assistant, Dr. PhD
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URL of the e-learning course on the NULES e-learning portal	https://elearn.nubip.edu.ua/course/view.php?id=3047

ACADEMIC DISCIPLINE DESCRIPTION

General mycology is one of the main profiling disciplines in the training of a specialist in plant protection. It is closely related to many general biological and special disciplines: botany, plant physiology, microbiology, soil science, agriculture, plant biochemistry and biotechnology, general and agricultural phytopathology, plant immunity, zoology, general and agricultural entomology, plant breeding, breeding and seed production.

The goal of general mycology as a science is to study the morphological and biological properties and distribution activity.

In the process of implementing the program, students study the structure of fungi, their metabolism, the physiologically active substances they produce, the basics of taxonomy, the peculiarities of ecological groups of fungi, their importance in nature and human economic activity.

As a result of studying general mycology, the student should:

to know the task, purpose and objects of general mycology, the structure of mushrooms and their physiological properties, the peculiarities of growth in relation to the substrate, changes in mycelium, its resting stages, reproduction of various groups of mushrooms;

be able to independently determine the group to which fungi belong by the structure of the mycelium (higher, lower), isolate a micromycete and study its growth features, determine the method of reproduction, establish the ability to form an anamorph and teleomorph, find out the conditions of its existence and assign it to the group of parasitism (obligate and facultative saprotrophs and parasites).

According to the OS "Bachelor" in the specialty "Protection and Quarantine of Plants", 180 hours are allocated to the study of the discipline, of which 60 hours are lectures, 60 hours are laboratory classes, independent work of students 60 hours. The final control of knowledge and skills is carried out according to the modular rating system in the form of test tasks, a test, an exam.

Competences of the discipline:

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 12. Skills of performing safe activities.

Expected Learning Outcomes (ELO):

ELO 6. Correctly use appropriate methods of observation, description, identification, classification, cultivation of objects of agrobiocenoses and maintenance of their stability in order to preserve natural diversity.

ELO 16. Know the main historical stages of development of the subject are

ACADEMIC DISCIPLINE STRUCTURE

Topic	Hours (lectures/laboratory, practical, seminars)	Learning outcomes	Tasks	Assessment
3 semester				
Module 1. STRUCTURE OF FUNGI				
Topic 1.1 The structure of the vegetative body	6/3	To know the purpose and objects of general mycology, the structure of fungi and their physiological properties, the peculiarities of growth in relation to the substrate, changes in mycelium, its resting stages, reproduction of various groups of fungi; to be able to independently determine the group to which fungi belong based on the structure of the mycelium (higher, lower), isolate micromycetes and parasites).	Availability of completed laboratory works in the workbook and sending their electronic file for verification. Performance of independent works and their assessment. Oral answers to questions for laboratory and independent works. Modular test.	7
Topic 1.2. Mycelium and its variations	6/5			7
Topic 1.3. Fungi as a constituent structure of the vegetative body of lichens	2/2			3
Module 2. BIOCHEMICAL PROPERTIES OF FUNGI				
Topic 2.1. Nutrition of fungi	4/4	Know the features of fungal nutrition and requirements for their active growth, study the main groups of metabolites that are necessary for the growth and development of fungi, as well as secondary metabolites that are beneficial or dangerous for human life; to be able to independently identify groups of metabolites,	Availability of completed laboratory works in the workbook and sending their electronic file for verification. Performance of independent works and their assessment. Oral answers to questions for laboratory and independent works. Modular test.	6
Topic 2.2. Fungal metabolism	4/4			6
Topic 2.3. Biologically active substances of fungi	8/12			6

		conduct research on their presence and activity.		
Total for 3 semester				**70**
Examination				30
4th semester				
Module 3. GEOGRAPHICAL DISTRIBUTION AND ECOLOGICAL GROUPS OF FUNGI				
Topic 3.1 Geographic distribution of fungi	4/5	Know ecological groups of fungi, their geographical distribution; to be able to independently determine the group to which fungi belong based on their place of existence and relationships with plants and other organisms; find out its conditions of existence and assign it to the group of parasitism (obligate and facultative saprotrophs and parasites)	Availability of completed laboratory works in the workbook and sending their electronic file for verification. Performance of independent works and their assessment. Oral answers to questions for laboratory and independent works. Modular test.	5
Topic 3.2 Ecological groups of fungi	6/10			10
Module 4. REPRODUCTION OF FUNGI				
Topic 1.1 Vegetative	4/3	Know the types and stages of reproduction of fungi from different classes; be able to independently determine the class to which fungi belong by the type of reproduction; establish the ability to form anamorph and teleomorph, to have holomorph.	Availability of completed laboratory works in the workbook and sending their electronic file for verification. Performance of independent works and their assessment. Oral answers to questions for laboratory and independent works. Modular test.	5
Topic 4.2 Reproductive	16/12			15
Total for 4 semester				**70**
Examination				**30**
Total for the course				**100**

ASSESSMENT POLICY

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

SCALE FOR ASSESSING STUDENTS 'KNOWLEDGE AND SKILLS

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

RECOMMENDED SOURCES OF INFORMATION

Main:

1. Evolution of Fungi and Fungal-Like Organisms. Ed. S. Pöggeler, T. James 2d Edition. Springer Nature: Switzerland. 2023. 331 pp.
2. Fantastic Fungi: How Mushrooms Can Heal, Shift Consciousness, and Save the Planet by Paul Stamets. San Rafael: Earth aware. 2019. 353 pp.
3. Lowenfels J. Teaming with fungi: the organic grower's guide to mycorrhizae / Jeff Lowenfels. Other titles: Organic grower's guide to mycorrhizae Description: Portland, Oregon: Timber Press. 2017. 208 pp.
4. Norflus F. Using Open Resources to Teach Mycology / The American Biology Teacher (2021). Vol. 83 (8). P. 504–512.
5. Sheldrake M. Entangled life: how fungi make our worlds, change our minds and shape our future. NY: Random House. 2020. 345 p.
6. States of the World's Plants and Fungi. Royal Botanic Gardens Kew. 2020. 100 pp.
7. The Lives of Fungi: A Natural History of Our Planet's Decomposers. By Britt A. Bunyard. Princeton (New Jersey): Princeton. University Press. 2022. 288 pp.
8. Ecology of mushrooms. Review: G.L. Antonyak, Z.I. Kalinets-Mamchur, I.O. Dudka, N.O. Babich, N.E. Panas. Ecology of mushrooms. - Lviv, 2013. - 628 p.
9. Kostikov I.Yu., Jagan V.V., Demchenko E.M. etc. Botany. Algae and mushrooms: education. manual. - K.: Aristei, 2006. - 476 p.
10. Leontiev D. V., Akulov O. Yu. General mycology: Textbook for higher educational institutions. — H.: Ed. "Osnova" group, 2007. — 228 p.: 375 illustrations.
11. Leontiev D.V., Serbyn A.G., Rosikhin V.V., Buryak V.V., Panasenko A.I., Yurchenko I.A., Kochergina A.V., Parchenko V.V., Kaplaushenko A.H. Medical mycology with the basics of

mycotoxicology. Textbook for higher education institutions / under the editorship. D.V. Leontieva, A.G. Serbina. - Kharkiv: 2010. - 142 p.
12. Dictionary of the fungi. 10 ed by Minter D. W., Stalpers J. A., Kirk P. M., Cannon P. F. CAB International, Wallngford U.K. 2009.- 616p.
13. Roy H., Vega F., Chandler D. at al. The Ecology of Fungal Entomopathogens. – London; New York: Springer Science+Business Media, B.V., 2010. 199 p.
14. Pictorial Atlas of Soil and Seed Fungi: Morphologies of Cultured Fungi and Key to Species. / T. Watanabe, 3d Ed., CRC Press, 2010, 486.
15. The Fungi. Sarah C. Watkinson, Lynne Boddy, Nicholas Money. Third Edition, 2015. – 452.

Addition:

1. Fungal Machines: Sensing and Computing with Fungi (Emergence, Complexity and Computation, 47) by A. Adamatzky. Switzerland: Springer. 2023. 570 pp.
2. Meetings with remarkable mushrooms: forays with fungi across hemispheres / Alison Pouliot. Chicago: The University of Chicago Press. 2023. 233 pp.
3. Mystical Mushrooms: Discover the Magic and Folklore of Fantastic Fungi by Aurora Kane. New York: Rock Point. 2023. 243 pp.
4. Bisko N.A., Lomberg M.L., Mitropolska N.Yu., Mykhaylova O.B. Collection of mushroom cultures (IBK). – /Institute of Botany named after M.G. Kholodny National Academy of Sciences of Ukraine. - Kyiv: "Alterpress", 2016. - 120 p.
5. Koval E.Z., Rudenko A.V., Honcharuk V.V., Voloshchuk N.M. Penicillium in the environment. Part 1. - K.: Nauk. dumka, 2014. - 386 p.
6. Koval E.Z., Rudenko A.V., Honcharuk V.V., Voloshchuk N.M. Penicillium in the environment. Part 2: Determinant of penicillium and sources of their existence. - K.: Nauk. dumka, 2014. - 386 p.
7. Prydyuk N.P. Mushroom flora of Ukraine. Bolbitievye and silk mushrooms. - Kyiv: LLC NPP, Interservice, 2015. - 598 p.
8. Prodromus of spore plants of Ukraine: lichens [Text]: monograph / S. Ya. Kondratyuk [and others]; Under the editorship P. M. Tsarenko. - K.: Naukova dumka, 2021. - 730 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. Fungi of Ukraine http://www.cybertruffle.org.uk/
3. Red Book of Ukraine: http://redbook-ua.org/category/fungi/
4. ASCOfrance http://www.ascofrance.com/
5. Forest pests: http://www.forestryimages.org/pests.cfm
6. Index Fungorum http://www.indexfungorum.org/
7. Mycobank http://www.mycobank.org
8. Mycorhizal Associations: http://mycorrhizas.info/evol.html
9. Pyrenomecetes of South Western France http://pyrenomycetes.free.fr/
10. Xylariaceae: Home http://mycology.sinica.edu.tw/Xylariaceae/