



SYLLABUS

Discipline for the preparation of a Doctor of Philosophy Degree:

Fundamentals of Aerobiology

Specialty	"Biology"
Educational and scientific program	"Biology and biochemistry", 2024
Level of higher education	Third (educational and scientific)
Academic year	2024-2025
Discipline status (compulsory / elective)	normative, vocationally elective
Teaching language	English
Total load	1.5 ECTS credits
Course / semester	1st course / 2 semester
Compiled (s)	Doctor of Biological Sciences, Prof. V.V. Rodinkova, rodinkova@vnmu.edu.ua
Teacher (s), lecturers	Doctor of Biological Sciences, Prof. V.V. Rodinkova, Ph.D. Biol. Sciences, Assoc. L.V. Kremenskaya
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1. DESCRIPTION OF THE DISCIPLINE
ANNOTATION

The educational and scientific level of higher education provides for a person to acquire theoretical knowledge, abilities, skills and other competencies sufficient to develop new ideas, solve complex problems in the field of professional and / or experimental and innovative activities, master the methodology of scientific and pedagogical activities, and also conducting their own scientific research, the results of which should be scientific novelty, theoretical and practical value (Law of Ukraine "On Higher Education", 2014).

The postgraduate student was asked questions of studying the quantitative and qualitative composition of bioaerosol components, their practical importance in relation to the impact on the health of the population and on the state of other biotic components of ecosystems of seasonal allergy factors that cause various waves of exacerbation of this disease in Ukraine and in the world, the latest data on methods and possibilities of control levels of these factors in the ambient air.

Goals and Objectives

The goal of teaching the discipline "Fundamentals of Aerobiology" is to provide graduate students with knowledge, skills and abilities to identify biotic factors of atmospheric air that can affect human health, skills in predicting their appearance in the air, obtaining new safety

facts related to the influence of the above factors and the prevention of such influence and the introduction into practice of the acquired skills and knowledge.

The main tasks of studying the discipline "Fundamentals of aerobiology" is the formation of a system of knowledge, professional skills, research and innovation activities and practical skills in the course of practical activities in education, in particular, teaching, health care, environmental protection, and environmental monitoring.

2. LEARNING RESULTS

After successfully studying the discipline, the applicant will be able to:

RS 1 demonstrate continuous development of their own intellectual and cultural level, self-ability to formulate hypotheses, objectives and tasks of scientific research

RS 5 Develop design and plan research

RS 6 perform original scientific research

RS 7 Explain the principles of specificity and sensitivity of the methods of investigation, the information content of selected indicators

RS 8 Be able to improve and introduce new research methods in the chosen direction of the scientific project and educational activity

RS 9 Analyze the results of scientific research, use the methods of statistical research

RS 10 introduce the results of scientific research into the educational process, medical practice and society

RS 11 Present the results of scientific research in the form of presentations, poster reports, publications

RS 13 organize educational process

RS 14 Assess the effectiveness of the educational process, recommend ways to improve it

RS 15 organizations to carry out the work of the team (students, colleagues, Interdisciplinary team)

RS 17 observe academic virtue, be responsible for the reliability of the scientific results obtained

3. DISTRIBUTION BY TYPES OF ACTIVITIES AND HOURS OF TRAINING

Type of occupation	Hours
Lectures	4
Practical lessons	14
Independent work	27
Total	45

4. Thematic plan

No.	Names of informative modules and topics
1	Aerobiology as a science, the main components of bioaerosols, methods of their study and the practical significance of the data obtained for medicine, ecology and other sectors of the national economy.

2	Biological particles as aeroallergens and pathogens of humans, animals and plants.
3	Morphological and systematic features of airborne allergens and pathogens, their classification, seasonality of appearance and distribution in the air
4	Pollen of trees as a seasonal component of bioaerosols, its groups, morphological features.
5	Pollen of cereals and other monocotyledonous plants as a seasonal component of bioaerosols, its morphological features
6	Weed pollen as a seasonal component of bioaerosols, its groups, morphological features and seasonality
7	Fungal spores as a seasonal component of bioaerosols, their groups, distribution features and opportunities for practical study
8	Cross-reactivity between allergen groups
9	Viruses and bacteria as a component of bioaerosols, their dispersion and transmission routes, in particular, with the help of other biological particles.
10	Indoor inhalation allergens. The principles of personal protection when working with biologically hazardous components of bioaerosols.
11	Modeling and predicting the content of practically important biological particles in the atmosphere. Pollen calendar. Allergy forecast.
12	Practical application of aerobiological knowledge to control diseases of humans, animals and plants. Control of knowledge for the course.

5. TEACHING METHODS

Teaching methods: lecture, explanation, conversation, research organization, practical task, story, illustration, observation, laboratory research, educational discussion, dispute, discussion of any issue of educational material, cognitive games by modeling life situations that arouse interest in educational subjects, creating a situation of interest in the process of teaching educational material, creating a situation of novelty of educational material, reliance on life experience

6. Final control of the discipline - Differential Credit

FORMS OF ASSESSMENT

Verbal control: main question, additional, auxiliary; a question in the form of a problem; individual, frontal survey and combined; written control; programmable control.

7. ASSESSMENT SYSTEM

The form of the final control of progress (for differential Credit): the assessment in the discipline of the applicant consists of the sum of the points of the current control and the points received for the exam / credit lesson.

Form of current monitoring of progress (for differential Credit): the sum of the points of current monitoring is determined based on the assessments of the current educational

activities of the applicant from all topics according to the traditional 4-point system (excellent, good, satisfactory, unsatisfactory)

8. Evaluation criteria for the marks

The "excellent" is given when the applicant knows the content of the topic of the lesson in full, illustrating the answers with a variety of examples; gives comprehensive, accurate and clear answers without any leading questions; presents the material without errors and inaccuracies; freely solves problems and performs practical tasks of varying degrees of complexity, independently generates innovations and ideas.

The mark "good" is given on the condition that the applicant knows the content of the topic of the lesson and understands well, answers the questions correctly, consistently and systematically, but they are not exhaustive, although the applicant answers additional questions without errors; solves all problems and performs practical tasks, feeling difficulties only in most cases.

The mark "satisfactory" is given to the applicant based on his knowledge of the entire content of the topic of the lesson and with a satisfactory level of his understanding. The job seeker is able to solve modified (simplified) problems with the help of leading questions; solves problems and performs practical skills, feeling difficulties in simple cases; It is NOT easy to independently systematically state the answer, but answers the directly posed questions correctly.

The "unsatisfactory" is mark "given in cases when the knowledge and skills of the applicant do not meet the requirements of the "prescriptive" mark.

Assessment of independent work.

Evaluation of the independent work of applicants, provided for in the topic next to classroom work, is carried out during the current control of the topic in the corresponding practical lesson. Assessment of topics that are only for independent work and are not included in the topics of classroom training, is controlled when conducting a differentiated test.

RATING SCALE

The sum of points for all kinds of learning activities	Assessment ECTS	Assessment by the national scale
		For the Credit
180-200	A	enrolled
170-179.9	B	
160-169.9	C	
141-159.9	D	
120-140.99	E	
	FX	Not enrolled with the possibility of the further rework
	F	Not enrolled with compulsory re-study of the discipline

9. Methodological support of

educational content (synopsis or extended lecture plan), plans for practical (seminar) classes, independent work, questions, methodological instructions, assignments or cases for the current and final control of the knowledge and skills of applicants), web resources, atlases and programs for identifying pollen grains and spores of fungi, a set of microscopic air samples from 2009-2024 from the database of the laboratory for the study of allergenic environmental factors of VNMU (LVAFD), reference samples of pollen and spores of fungi LVAFD, volumetric aerobiological device Burkard of the "Hirst" type.

10. DISCIPLINE POLICIES The

implementation of educational tasks and work in the discipline must comply with the requirements of the "Code of Academic Integrity and Corporate Ethics of VNMU named after M.I. Pirogov" (https://www.vnmu.edu.ua/downloads/other/kodex_akad_dobro.PDF).

The procedure for distance learning is regulated by the Regulation on the introduction of elements of distance learning at VNMU N.I. Pirogov ([https://www.vnmu.edu.ua/ General information / Basic documents](https://www.vnmu.edu.ua/General%20information/Basic%20documents)). The main training platforms for conducting training sessions are Microsoft Team, Google Meets. The procedure for conducting practical classes and lectures, practicing and consultations in distance learning is published on the department's web page (<https://www.vnmu.edu.ua/department-pharmacy/> for graduate student or [https://www.vnmu.edu.ua / Department of Pharmacy / News](https://www.vnmu.edu.ua/Department%20of%20Pharmacy/News)).

Working off missed classroom lessons, re-passing control measures, as well as procedures for appealing the results of control measures are carried out in accordance with the "Regulations on the organization of the educational process for applicants for the degree of Doctor of Philosophy in Vinnitsa National Medical University. M.I. Pirogov" (https://www.vnmu.edu.ua/downloads/other/pologPhD_org.pdf)

11. EDUCATIONAL RESOURCES The

educational and methodological support of the discipline is published on the website of the department.

The link for Educational materials <https://drive.google.com/drive/u/6/folders/1xyWi9X2mxSRHYYe4J9hVujfxgMEP7SG4>

LITERATURE

Basic (Basic)

1 A.I. Turos, I.M. Kovtunenکو, V.V. Rodinkova, O.B. Prikhodko. Using the volumetric method to determine changes in the concentration of pollen of allergenic plants. Guidelines. State Institution "Institute of Hygiene and Medical Ecology named after A. N. Marzeev of the National Academy of Medical Sciences of Ukraine, 2014/8/15 - 28 pages.A.

2.I. Turos, I. M. Kovtunenکو, V. V. Rodinkova, O.B Prikhodko, DV Plakhotnaya. Determination of pollen allergens in the ambient air. Methodical recommendations. State Institution "Institute of Hygiene and Medical Ecology named after AN Marzeeva National Academy of Medical Sciences of Ukraine, 2014/8/15 - 32 pages.

3. Scientific substantiation of the monitoring system and prevention of the impact of allergenic factors of biological origin on the health of the urban population of Ukraine [Text]: textbook. dis. ... Dr. biol. Sciences: 14.02.01 / Rodinkova Viktoriya Valerevna; Nat. acad. honey. Sciences of Ukraine, State. institution "Institute of Hygiene and Medical Ecology named after A. N. Marzeev." - Kiev, 2015. - 40 p.: Fig.

4. Šaulienė, I., Šukienė, L., Daunys, G., Valiulis, G., Vaitkevičius, L., Matavulj, P. ... & Sofiev, M. 2019. Automatic pollen recognition with the Rapid-E particle counter: the first-

level procedure, experience and next steps. *Atmospheric Measurement Techniques*, 12 (6), 3435-3452

5. Bastl, K., Kmenta, M., & Berger, UE 2018 Defining pollen seasons: background and recommendations. *Current allergy and asthma reports*, 18 (12), 1-10.

6. Allergenic pollen: A Review of the Production, Release, Distribution and Health Impacts / eds.: M. Sofiev, K.-C. Bergmann. - Demand (Germany): Springer Science + Business Media Dordrecht, 2013. -- 247 p.

7. Ester Gaya and Katie Scott. *Fungarium*. Templar Publishing in association with RBG Kew, 2024. - 86 pp.

8. Estelle Levetin, Karen McMahon. *Plants and Society*. Seventh Edition. Published by McGraw-Hill Education, 2 Penn Plaza, New York, 2016. -- 528 pages

9. *Pollen Terminology: An illustrated handbook* / M. Hesse, H. Halbritter, R. Zetter [et al.]. - Wien; New-York: Springer, 2009. -- 266 p.

10. Sulmont G. The pollen content of the air: identification key [Electronic Resource] / G. Sulmont; translation: Beverly Adams-Groom; production: Julie Collet; Studio Bouquet. - Saint Etienne (France), 2008. -- (Reseau National de Surveillance Aerobiologique). - 1 CD-ROM; 12 sm. - SystemRequirements: 32, 64 Mb RAM; Windows 2000, XP. - Entitled from the CD container.

11. Kagen S. *The Classic Collection Transcribed* / Steve Kagen, Walter H. Lewis, Estelle Levetin; Aeroallergen PhotoLibrary of North America. - Appleton (Wisconsin): DePass Media Productions, 2004-2005. - P. 35, 132.

12. Presentations of lectures of the course

13. Lecture notes for the course

Additional

1. *Illustrated reference book of regulated pests in Ukraine* / Ukrglavgoskarantin. - M., 2009. -- 248s.

2. Kupriyanova L.A. *Pollen and plant spores of the flora of the European part of the USSR: in 2 volumes. Vol. 1* / L. A. Kupriyanova, L. A. Aleshina. - Moscow: Nauka, 1972. -- 172 p.

3. Kupriyanova L.A. *Pollen and plant spores of the flora of the European part of the USSR: in 2 volumes. Vol. 2* / L. A. Kupriyanova, L. A. Aleshina. - M.: Nauka, 1978. -- 184 p.

4. *Pollen prognosis as a means of preventing seasonal allergies in Vinnitsa* / V. Rodinkova, L. V. Kremenskaya, A. S. Belous, A. A. Palamarchuk // II Vseukr. congress of ecologists from the international participation (Ecology / Ecology -2011): Sat. sciences. articles. T. 1. - M., 2011. -- S. 244-247.

5. Rodinkova V.V. *Calendar of dusting of the main allergens in Vinnitsa: what you need to know to protect yourself from hay fever* / V. Rodinkova // *News of medicine and pharmacy*. - 2012. - No. 15 (425). - S. 18-20.

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2. *Airborne pollen in Kiev (Ukraine): gravimetric sampling* / V. D. Savitsky, L. G. Bezus'ko, N. G. Butich [et al.] // *Aerobiologia*. – 1996. – № 12. – P. 209–211

9. Horner W. E. The What Where When and Why of Outdoor Mold Spores / W. E. Horner // AAAAI Session 1205, Basic Aerobiology Course, March 2008. – Atlanta, GA. - 2008. – 8 p
3. Assessing and controlling the spread and the effects of common ragweed in Europe. Final Report to the European Commission, DG Environment / J. M. Bullock, D. Chapman, S. Schafer [et al.] // NERC Centre for Ecology and Hydrology. – 2012. – Retrieved from URL : [https://circabc.europa.eu/sd/d/d1ad57e8-327c-4fdd-b908-dadd5b859eff/FinalFinal Report.pdf](https://circabc.europa.eu/sd/d/d1ad57e8-327c-4fdd-b908-dadd5b859eff/FinalFinal%20Report.pdf)
4. Cecchi L. Vulnerability of Human Health to Climate [Electronic Resource] / L. Cecchi, G. D'Amato, I. Anessi-Maesano // [Climate Vulnerability](#). Understanding and Addressing Threats to Essential Resources / Editor-in-Chief: Roger Pielke. – 2013. – Vol. 1. – P. 105–113. – Retrieved from URL : <http://www.sciencedirect.com/science/referenceworks/9780123847041>.
5. Global atlas of allergy / European Academy of Allergy and Clinical Immunology ; eds.: C. A. Akdis, I. Agache. – Zurich : EAACI Headquarters, 2014. – 390 p.
6. Global atlas of asthma / European Academy of Allergy and Clinical Immunology ; eds.: C. A. Akdis, I. Agache. – Zurich : EAACI Headquarters, 2013. – 179 p.
7. Rotorod® Sampler [Electronic Resource] / Center for Pollen Studies of College of Saint Benedict, Saint John's University, 2009. – Retrieved from URL: http://www1.csbsju.edu/pollen/methodsprocedures/rotorod_sampler.htm
8. Mycobank : Fungal Databases Nomenclature and Species Banks [Electronic resource], 2013. - Retrieved from URL : <http://www.mycobank.org/>
9. SILAM [Electronic Resource] : [System for Integrated modeLling of Atmospheric composition] / Finnish Meteorological Institute. – Helsinki, 2013. – Retrieved from URL : <http://silam.fmi.fi>
10. Thibaudon M. Pollen: a biological pollutant? [Electronic resource] / M. Thibaudon // International Aerobiology Newsletter. – 2013. – July, issue 75. – P. 1. – Retrieved from URL : <https://docs.google.com/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbmVhZG9neWludGVybmF0aW9uYWx8Z3g6N2YyZThiZjE5MDVINGQ5NQ>

12. Інформаційні ресурси

1. <https://cdn1.sph.harvard.edu/wp-content/uploads/sites/142/2014/06/Fundamentals-of-Aerobiology.pdf>
2. <https://www.hindawi.com/journals/jpath/2013/493960/>
3. <https://www.rsb.org.uk/biologist-features/spotlight-on-aerobiology>
4. <https://aem.asm.org/content/aem/83/17/e00809-17.full.pdf>
5. <https://www.polleninfo.org/en/aerobiology/pollen-atlas.html>
6. <https://www.slideshare.net/shamroz7700/aerobiology>
7. Вебсайт «Все про алергію» <https://allergy.org.ua/>
8. <https://allergy.org.ua/category/roslini-alergeni/>
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