



NATIONAL PIROGOV MEMORIAL MEDICAL UNIVERSITY, VINNYTSIA

COURSE SYLLABUS

For the training of master's students

ALLERGENS OF MEDICINAL PLANTS

Specialty	I8 Pharmacy, Industrial Pharmacy
Educational Programme	Educational and Professional Programme (EPP) "Pharmacy, Industrial Pharmacy", 2025
Higher Education Level	Second (Master's) level
Academic Year	2026–2027
Status of the Discipline	Elective, EC 11
Language of Instruction	Ukrainian
Total Workload	3.0 ECTS credits / 90 hours
Year of Study / Semester	Year II / Semester IV (full-time study)
Developer(s)	V. V. Rodinkova, Doctor of Biological Sciences, Professor
Instructor(s), Guest Lecturers	V. V. Rodinkova, Doctor of Biological Sciences, Professor
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1. DESCRIPTION OF THE ACADEMIC DISCIPLINE

ABSTRACT

Seasonal allergic diseases are among the most common conditions associated with exposure to airborne pollen and spores. During periods of active plant flowering, the use of medicines in group R09, intended to relieve rhinitis symptoms and other manifestations of allergy, increases considerably. Particular attention should be paid to proteins in different pollen types that can cross-react with one another and with components of herbal medicinal products. This creates a risk of adverse reactions in patients with seasonal allergy who use natural remedies without appropriate supervision.

The course introduces the main types of aeroallergens and their structure; mechanisms of cross-reactivity between pollen proteins and medicinal plant raw materials; principles of pharmacotherapy for seasonal allergic diseases; and contemporary strategies for the safe use of medicines, including recommendations on avoiding potentially hazardous natural preparations in patients at high risk of allergic reactions.

The course complements theoretical knowledge and develops practical skills in risk analysis and the selection of appropriate treatment. It broadens students' perspectives, encourages research activity, and supports their professional development in pharmacy.

Prerequisites for the Educational Component. The elective course builds on Pharmaceutical Botany, Microbiology, Medical Biology, Cell Biology, Organic Chemistry, Information Technology in Pharmacy, Ukrainian, and Latin.

PURPOSE AND OBJECTIVES

The course aims to develop knowledge of the structure and properties of allergenic proteins in plant raw materials and the mechanisms of their cross-reactivity with pollen allergens, together with practical skills in identifying risks and selecting safe pharmacotherapeutic strategies for patients with seasonal allergic diseases.

The principal objectives are to study medicinal plant components relevant to public health, analyse their potential allergenicity, and introduce contemporary approaches to the prevention and treatment of seasonal allergic diseases. The course develops knowledge in healthcare and environmental protection, broadens students' perspectives, and strengthens research skills and professional development.

Integral Competence

The ability to solve complex tasks and critically analyse and address practical problems in professional pharmaceutical and/or research and innovation activities using the principles, theories, and methods of fundamental, chemical, technological, biomedical, and socioeconomic sciences; integrate knowledge and resolve complex issues; formulate judgements based on incomplete or limited information; and communicate knowledge, conclusions, and their rationale clearly and unambiguously to specialist and non-specialist audiences.

General Competencies

GC 01. Commitment to environmental conservation.

GC 03. Knowledge and understanding of the subject area and professional practice.

GC 04. The ability to adapt and act in new situations and demonstrate initiative.

GC 07. The ability to choose a communication strategy and work in a team with experts from other fields of knowledge and economic activity.

GC 08. The ability to assess and ensure the quality of work performed.

GC 09. The ability to conduct research at an appropriate level.

Specific Competencies

SC 01. The ability to collect, interpret, and apply data required for professional practice, research, and the implementation of innovative projects in pharmacy.

SC 02. The ability to integrate knowledge and solve complex pharmaceutical problems in broad or multidisciplinary contexts.

SC 03. The ability to address pharmaceutical problems in new or unfamiliar environments with incomplete or limited information, taking account of social and ethical responsibility.

SC 05. The ability to demonstrate and apply communication skills and the fundamental principles of pharmaceutical ethics and deontology, based on moral obligations and values, professional ethical standards, and responsibility, in accordance with the Ethical Code of Pharmaceutical Professionals of Ukraine and WHO guidance.

SC 07. The ability to provide public health education to prevent common diseases and hazardous infectious, viral, and parasitic diseases, and to promote their timely detection and adherence to treatment, taking account of their biomedical and microbiological characteristics.

SC 09. The ability to counsel patients on prescription and non-prescription medicines, other pharmacy products, and healthy nutrition; provide pharmaceutical care when selecting and supplying medicines of natural and synthetic origin by evaluating their benefit–risk balance and compatibility, biopharmaceutical, pharmacokinetic, pharmacodynamic, physicochemical and chemical characteristics, indications and contraindications, and the individual patient's health status.

SC 10. The ability to monitor the effectiveness and safety of medicines used by the population on the basis of their clinical and pharmaceutical characteristics.

Post-requisites for the Educational Component. In accordance with the sectoral higher education standard, this elective course complements biological, professionally oriented, and specialist disciplines and provides a foundation for Pharmacognosy, Educational Practice in Pharmacognosy, and Pharmacology.

2. LEARNING OUTCOMES

Students study the allergenic components of medicinal plants, their biochemical nature, and their potential cross-reactivity with airborne pollen proteins. Particular attention is given to methods for investigating plant raw materials, assessing their safety for patients with seasonal allergic diseases, and contemporary approaches to pharmacotherapy.

Upon successful completion of the course, students will know: the objectives, purpose, and methods of investigating allergenic proteins in medicinal plants; the general morphology and biochemical characteristics of potentially allergenic pollen and plant raw materials; principles of cross-reactivity between pollen proteins and medicinal plants; and contemporary approaches to the pharmacotherapy of seasonal allergic diseases and the prevention of adverse reactions.

Students will be able to identify groups of plant allergens independently; justify methods for monitoring and assessing the safety of herbal medicinal products; describe environmental sources of allergenic proteins and their effects on human health; predict seasonal allergy risks using current data; and apply this knowledge to select appropriate pharmacotherapeutic strategies and avoid hazardous natural remedies.

Programme Learning Outcomes

PLO 01. Apply specialised knowledge, abilities, and skills from general and professional disciplines in professional practice.

PLO 02. Critically analyse scientific and applied problems in pharmacy.

PLO 03. Assess and ensure the quality and effectiveness of pharmaceutical activities.

PLO 08. Develop and make effective decisions to solve complex pharmaceutical tasks independently and through joint discussion; define individual and team objectives with regard to public and production interests, overall strategy, and existing constraints; and determine the best ways to achieve these objectives.

PLO 09. Develop and implement innovative pharmaceutical and related interdisciplinary projects, taking account of technical, social, economic, ethical, legal, and environmental aspects.

PLO 10. Provide public health education in professional practice during outbreaks of infectious, viral, and parasitic diseases.

PLO 12. Promote health preservation, disease prevention, and the rational prescribing and use of medicines. Perform professional duties conscientiously and comply with legislation on the promotion and advertising of medicines. Apply psychological communication skills to establish trust and mutual understanding with colleagues, physicians, patients, and consumers.

PLO 14. Identify the advantages and disadvantages of medicines from different pharmacological groups, taking account of their chemical, physicochemical, biopharmaceutical, pharmacokinetic, and pharmacodynamic characteristics. Recommend non-prescription medicines and other pharmacy products while providing advice and pharmaceutical care.

PLO 15. Formulate, substantiate, and communicate information clearly and specifically to specialists and non-specialists, including higher education students, drawing on personal knowledge, professional experience, and the main trends in global pharmacy and related fields.

3. FORMS OF ORGANISATION OF THE EDUCATIONAL PROCESS AND THEIR SCOPE

Full-time Study

Type of Learning Activity	Hours
Lectures:	14
Practical Classes:	16
Independent Study (IS):	60
Total	90

4. THEMATIC PLAN

No	Module and Topic Titles
Lectures	
1	Allergens of medicinal plants and bioaerosols: components, research methods, and significance for medicine, pharmacy, and ecology. Biological particles as causes of allergy and pathogens of humans, animals, and plants.
2	Morphological and taxonomic characteristics of pollen allergen sources. Tree pollen: types, classification, and seasonal airborne distribution.
3	Allergens of herbaceous plant pollen and fungal spores: classification, seasonality, and factors determining their distribution.
4	Molecular allergens of pollen, foods, and medicinal plant raw materials: cross-reactions, patient risks, and contemporary methods for forecasting environmental concentrations of biological particles.
5	Indoor allergens and bioaerosol components, including viruses, bacteria, and plant material. Geographical patterns, clinical manifestations, and contemporary diagnosis, prevention, and treatment of seasonal allergic diseases.
Practical Classes	
1	Allergens of bioaerosols and medicinal plants: characteristics and practical significance for medicine and pharmacy.
2	Methods for investigating allergenic bioaerosol components. Pollen morphology.
3	Tree pollen as a source of seasonal allergens: groups, morphological characteristics, and practical identification.
4	Pollen of grasses and other monocotyledonous medicinal plants: morphology and allergenicity.
5	Weed pollen as a bioaerosol component: groups, morphology, seasonality, and patient risks.
6	Ascomycete fungal spores: distribution, allergenic properties, and practical study methods.
7	Basidiomycete and other fungal spores: distribution, allergenicity, and practical research methods.
8	Viruses and bacteria as bioaerosol components: dispersal, transmission routes, and effects on the course of allergic diseases.
9	Molecular allergens of pollen and medicinal plant raw materials: identification methods and practical significance.

No	Module and Topic Titles
10	Cross-reactions between pollen, food, and medicinal plant allergens: practical examples and risk assessment.
11	Characteristics of seasonal allergic diseases caused by bioaerosol components and medicinal plants.
12	Modelling and forecasting environmental concentrations of allergenic particles: practical applications in disease management.
13	Contemporary diagnosis, prevention, and treatment of seasonal allergic diseases. Allergy forecasts and e-health services.
14	Assessment of practical skills.
15	Final assessment: pass/fail.
Independent Study	
1	Laboratory glassware, instruments, and equipment for investigating allergenic plant components.
2	Current developments and prospects in methods for studying allergens in plant raw materials and bioaerosols.
3	History of medicinal plant allergen research in Ukraine and worldwide.
4	Microbiological methods for studying fungal spores and their allergenicity.
5	Principles of personal protection when working with potentially allergenic herbal preparations and bioaerosols.
6	Principles of morphological classification of potentially allergenic pollen grains.
7	Morphological types of fungal spores and their role in allergic reactions.
8	Cross-reactivity between pollen, food, and medicinal plant allergens.
9	Effects of allergenic bioaerosol components on human and plant health.
10	Dispersal and transmission of allergenic particles and other bioaerosol components, including viruses and bacteria.
11	Indoor inhalant allergens: sources, characteristics, and prevention.
12	Methods for removing allergenic and hazardous biological particles from the air.
13	Modelling bioaerosol composition and forecasting allergen concentrations.
14	Types of atmospheric composition systems and models used in allergy forecasting.
15	Methods and practical applications of mapping emission sources of allergenic biological particles.
16	Automatic monitoring of bioaerosol composition as a basis for real-time allergy forecasting.
17	Communicating information to the public on the prevention of seasonal allergic diseases.
18	Natural medicinal products: risks for patients with seasonal allergy.
19	Contemporary methods for diagnosing allergy to medicinal plants.
20	Ethical and legal aspects of medicinal plant use in patients with allergy.
21	E-health services for monitoring and preventing seasonal allergic diseases.
22	International standards and protocols in allergology and pharmacotherapy.

Practical classes include theoretical discussion of the topic and acquisition of the following practical skills:

1. Use basic biological terminology and communicate orally and in writing on professional matters using scientific terms in the state language.
2. Apply basic techniques for handling microscopic specimens of bacteria, plant pollen, and fungal spores.
3. Follow the principal rules for microscope use.
4. Assess airborne concentrations of allergenic plant pollen and fungal spores.
5. Plan and conduct experimental research, analyse data, and present results.

Independent study includes preparation for practical classes, study of assigned topics outside the classroom, writing reports, and preparing presentations, diagrams, and tables. Mastery of independent study topics is assessed during final assessment.

Individual work includes reviewing scientific literature, preparing topic reviews for presentation at student scientific society meetings, conducting scientific and practical research, and participating in subject competitions, scientific conferences, and student research competitions.

Schedules for practical classes, independent study topics, and the scope and areas of individual work are published on the Department's website. Access route: VNMU website → Department of

Pharmacy → For Students → Full-time Study → Pharmacy, Industrial Pharmacy → Year II → Teaching and Learning Materials. Access requires the student's institutional account: s000XXX@vnmu.edu.ua.

5. FORMS AND METHODS OF ASSESSMENT OF LEARNING OUTCOMES

Ongoing Assessment during Practical Classes	Oral and/or written assessment, testing, electronic assessment, situational tasks, laboratory investigations, interpretation and evaluation of results, and recording a protocol in the workbook.
Interim Assessment of Thematic Sections	Oral and/or written assessment, electronic testing, situational tasks, and assessment of practical skills.
Final Assessment of the Academic Discipline – Pass/Fail Assessment	Testing and oral assessment in accordance with the Regulations on the Organisation of the Educational Process at VNMU: https://www.vnmu.edu.ua/downloads/other/polog_organiz_ocv_proc(2026).pdf
Assessment Tools for Learning Achievement	Theoretical questions, tests, practical assignments, and demonstration of practical skills.

6. ASSESSMENT CRITERIA

Assessment is conducted in accordance with the Regulations on the Organisation of the Educational Process at VNMU: [https://www.vnmu.edu.ua/downloads/other/polog_organiz_ocv_proc\(2026\).pdf](https://www.vnmu.edu.ua/downloads/other/polog_organiz_ocv_proc(2026).pdf)

Type of Assessment	Assessment Criteria / Scale
Ongoing Assessment	According to the traditional grading scale: 5 – “Excellent”, 4 – “Good”, 3 – “Satisfactory”, 2 – “Unsatisfactory”
Interim Assessments	According to the traditional grading scale
Assessment of Practical Skills	According to the traditional grading scale
Pass/Fail Assessment	According to the 200-point scale (the arithmetic mean of the grades obtained during the semester is converted into points). Passed: 122–200 points. Failed: fewer than 122 points.

GRADING SCALE: NATIONAL AND ECTS

Total Score	ECTS Grade	National Grade: Pass/Fail
180–200	A	Passed
170–179.99	B	Passed
160–169.99	C	Passed
141–159.99	D	Passed
122–140.99	E	Passed
0–121.99	FX	Failed, with the possibility of retaking
0–121.99	F	Failed, with mandatory repetition of the discipline

Criteria for Assessing Students' Knowledge

The grade “Excellent” is awarded when a student demonstrates comprehensive knowledge of the topic, illustrating responses with a variety of relevant examples; provides complete, accurate, and clear answers without prompting or leading questions; presents the material without errors or inaccuracies; confidently solves problems and completes practical tasks of varying levels of complexity; and independently generates innovative ideas.

The grade “Good” is awarded when a student demonstrates good knowledge and understanding of the topic and provides correct, coherent, and well-structured answers, although they may not be fully comprehensive. The student answers additional questions correctly and

without significant errors; successfully solves problems and completes practical tasks, experiencing difficulties only with the most complex assignments.

The grade “Satisfactory” is awarded when a student demonstrates knowledge of the overall content of the topic and a satisfactory level of understanding. With the help of guiding questions, the student is able to solve modified (simplified) problems; solves problems and completes practical tasks, although experiencing difficulties even with relatively simple assignments; is unable to formulate a coherent and systematic response independently but provides correct answers to direct questions.

The grade “Unsatisfactory” is awarded when a student’s knowledge and skills do not meet the requirements for the grade “Satisfactory”.

The assessment criteria for all other types of students’ academic work are based on the requirements of the Regulations on the Organisation of the Educational Process at National Pirogov Memorial Medical University, Vinnytsia,

([https://www.vnmu.edu.ua/downloads/other/polog_organiz_ocv_proc\(2026\).pdf](https://www.vnmu.edu.ua/downloads/other/polog_organiz_ocv_proc(2026).pdf)) and are specified in the programme of the academic discipline.

Assessment of Students’ Independent Study

Students’ independent study undertaken as part of a topic alongside contact hours is assessed as part of the ongoing assessment of that topic during the relevant practical class.

The maximum number of points a student may receive upon completion of the discipline is 200 points. The minimum passing score is 122 points.

7. METHODOLOGICAL SUPPORT

Teaching and learning materials (lecture notes or extended lecture outlines), thematic plans for lectures, practical classes and independent study, assignments for ongoing assessment, methodological guidelines, and teaching manuals.

8. ACADEMIC DISCIPLINE POLICIES

Students are entitled to high-quality educational services, access to current scientific and educational information, and qualified advice while studying the course and acquiring practical skills. The Department’s policy is student-centred and based on the regulatory documents of the Ministry of Education and Science and the Ministry of Health of Ukraine, the University Statute, the Regulations on the Organisation of the Educational Process at VNMU, and the principles of academic integrity.

Compliance with Internal Regulations and Safety Requirements. The instructor provides a safety briefing at the first practical class, recorded in the safety briefing register. Students who have not completed the briefing are not admitted to practical classes.

Preparation for Practical Classes. Students must arrive prepared and complete the assignments for the current topic. Students must attend on time. Late students are not admitted and must make up the class according to the established procedure. Appropriate work clothing is required; students without it are not admitted.

Students must observe safety rules during practical classes and while on Department premises. Discussions must demonstrate tolerance, courtesy, and respect for peers and instructors. Workstations must remain orderly and must be cleaned after practical work.

Mobile Phones and Other Electronic Devices. Their use during classes is permitted only at the instructor’s direction.

Academic Integrity. Students must follow the VNMU Code of Academic Integrity. A violation during ongoing or final assessment results in a grade of “2”, which must be made up according to the established procedure within two weeks.

Absence from Classes. Missed classes must be made up according to the Regulations on the Organisation of the Educational Process at VNMU, at the times specified in the make-up schedule published on the Department’s website and noticeboards.

Admission to Final Assessment. Admission is governed by the University Regulations. Students must have made up all missed contact classes required by the programme and obtained the minimum score corresponding to grade “3” on the national scale.

Additional Points for Individual Work. Successful completion of individual work may earn 6–12 points, depending on its scope and significance, in accordance with University Regulations.

Resolution of Conflict Situations. Students may submit an appeal, which is considered under the Regulations on the Consideration of Appeals from Higher Education Students at VNMU.

Distance Learning Policy. Distance learning is governed by the Regulations on the Introduction of Elements of Distance Learning at VNMU. Procedures for practical classes, lectures, make-up classes, and consultations are published on the Department’s webpage.

Communication with the Instructor. Communication takes place through Microsoft Teams, messaging applications, or email, as selected by the instructor, during working hours.

9. LEARNING RESOURCES

Teaching and learning materials are published on the Department’s website: <https://www.vnmua.edu.ua> → Department of Pharmacy → For Students → Full-time Study → Pharmacy, Industrial Pharmacy → Year II.

Consultations take place twice a week according to the consultation schedule. Class schedules, group allocation to instructors, and questions for interim and final assessments are published on the Department’s webpage.

LITERATURE

Core Literature for Allergens of Medicinal Plants

1. Dramburg, S., Hilger, C., Santos, A. F., et al. (2023). EAACI Molecular Allergology User’s Guide 2.0. *Pediatric Allergy and Immunology*, 34(Suppl. 28), e13854. [Full text / publisher](#)
2. Ključevšek, T., and Kreft, S. (2025). Allergic potential of medicinal plants from the Asteraceae family. *Health Science Reports*, 8(2), e70398. [Full text / publisher](#)
3. Sousa-Pinto, B., Bousquet, J., et al. (2026). Allergic Rhinitis and Its Impact on Asthma (ARIA)—EAACI Guidelines—2024–2025 Revision: Part I—Guidelines on Intranasal Treatments. *Allergy*, 81(4), 954–976. [Full text / publisher](#)

Supplementary Literature for Allergens of Medicinal Plants

1. Kato, Y., Morikawa, T., and Fujieda, S. (2025). Comprehensive review of pollen-food allergy syndrome: Pathogenesis, epidemiology, and treatment approaches. *Allergology International*, 74(1), 42–50. [Full text / publisher](#)
2. Farooq, Q., Oteros, J., and Galán, C. (2025). Advancing in the pollen frontier: a comprehensive evaluation and meta-analysis of automatic pollen monitoring systems. *Aerobiologia*, 41, 527–546. [Full text / publisher](#)
3. Lim, X. Y., Lau, M. S., Zolkifli, N. A., et al. (2024). Medicinal plants for allergic rhinitis: A systematic review and meta-analysis. *PLOS ONE*, 19(4), e0297839. [Full text / publisher](#)

ELECTRONIC RESOURCES

University website: <https://www.vnmua.edu.ua>

University Library: <https://library.vnmua.edu.ua>

Ministry of Health of Ukraine: <https://moz.gov.ua>

World Health Organization: <https://www.who.int>

National Scientific Medical Library of Ukraine: <https://library.gov.ua>

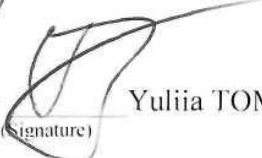
WHO/IUIS Allergen Nomenclature Database: <https://www.allergen.org>

EAACI Molecular Allergology User’s Guide 2.0: <https://eaaci.org/books/molecular-allergology-users-guide-2-0/>

Allergy forecasts and patient information: <https://allergy.org.ua/allergoprognoz/>

Finnish Meteorological Institute SILAM atmospheric composition forecasts: <https://silam.fmi.fi>
The course syllabus for "Allergens of Medicinal Plants" was discussed and approved at the meeting of the Department of Pharmacy (Minutes No. 1 dated 26 August 2026).

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