NATIONAL PIROGOV MEMORIAL MEDICAL UNIVERSITY, VINNYTSIA

COURSE SYLLABUS

For the training of master's students

MEDICINAL PLANTS IN PHARMACY

Specialty	226 Pharmacy, Industrial Pharmacy Specialisation: 226.01 Pharmacy
Educational Programme	Educational and Professional Programme (EPP) "Pharmacy", 2023
Higher Education Level	Second (Master's) level
Academic Year	2026–2027
Status of the Discipline	Elective
Language of Instruction	Ukrainian, English
Total Workload	3.0 ECTS credits / 90 hours
Year of Study / Semester	Year III / Semesters 5–6 (full-time study)
Developer(s)	S. D. Kryklyva, Candidate of Biological Sciences, Associate Professor
Instructor(s), Guest Lecturers	V. V. Rodinkova, Doctor of Biological Sciences, Professor S. D. Kryklyva, Candidate of Biological Sciences, Associate Professor
Venue and Contact Details	Department of Pharmacy, 56 Pyrohova Street, Vinnytsia Telephone: 55–39–52; Email: pharmacy@vnmu.edu.ua

1. DESCRIPTION OF THE ACADEMIC DISCIPLINE

ABSTRACT

"Medicinal Plants in Pharmacy" is an elective component of the Educational and Professional Programme "Pharmacy", within the general training cycle for the Master of Pharmacy degree. The course comprises 3 ECTS credits and is taught in the third year of study.

The discipline focuses on pharmacopoeial and non-pharmacopoeial medicinal plants, algae, fungi, and bee products used in pharmacy for the treatment of diseases.

The programme provides knowledge required for the successful study of professional disciplines. It examines medicinal plants according to their applications in conventional medicine and their effects on the human body, and develops skills in identifying medicinal plants, determining their taxonomic classification, and understanding their medical uses.

Prerequisites for the Educational Component. The discipline builds on and is integrated with Pharmaceutical Botany, Biology with the Fundamentals of Genetics, General and Inorganic Chemistry, Information Technology in Pharmacy, Latin, and Ukrainian.

PURPOSE AND OBJECTIVES

The course aims to provide theoretical knowledge of the modern classification of medicinal plants and selected active constituents; introduce the historical and contemporary use of medicinal plants in Ukraine's pharmaceutical sector; and explain the importance of further research into medicinal plants and their use in the treatment of common human diseases.

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 02. The ability to think abstractly and to analyse and synthesise information.

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 05. The ability to communicate orally and in writing in the state language and to communicate in a foreign language, primarily English, at a level that supports effective professional practice.

GC 06. Skills in using information and communication technologies.

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

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 20. The ability to organise and carry out the harvesting of medicinal plant raw materials in accordance with Good Agricultural and Collection Practices (GACP), ensuring the quality of medicinal plant raw materials and medicines derived from them. The ability to anticipate and evaluate approaches to the conservation and protection of wild medicinal plant populations in accordance with applicable legislation.

Post-requisites for the Educational Component. The discipline provides a foundation for Pharmacognosy, Medicinal Plant Resource Studies, and selected topics in Medical Biology, Organic and Biological Chemistry, Microbiology, Pharmacy-based Drug Technology, Industrial Drug Manufacturing Technology, Biopharmaceutics, Pharmacology, Phytotherapy, Clinical Pharmacy, and Perfume and Cosmetic Product Technology. Integration with these disciplines develops the ability to apply course knowledge in further study and professional practice.

2. LEARNING OUTCOMES

Upon successful completion of the academic discipline, the student will be able to:
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 06. Communicate professionally in the state language, use oral communication skills in a foreign language, analyse professional texts, and translate foreign-language information sources.
PLO 13. Predict and determine the effects of environmental factors on the quality and consumer characteristics of medicines of natural and synthetic origin and other pharmacy products; organise their storage in accordance with their physicochemical properties and Good Storage Practices (GSP).
PLO 24. Organise and carry out the sustainable harvesting of medicinal plant raw materials. Develop and implement measures for the protection, regeneration, and sustainable use of wild medicinal plant species.

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

Part-time Study

Type of Learning Activity	Hours
Lectures	4
Practical Classes	8
Independent Study (IS)	78
Total	90

4. THEMATIC PLAN

No.	Module and Topic Titles
Module 1	**Medicinal Plants in Pharmacy by Area of Application**
1	Introduction to the course. Classification of plants according to their effects on the human body and expected outcomes. Rules for harvesting medicinal plant raw materials. History of medicinal plant research. Officially recognised and pharmacopoeial medicinal plants and plants used in traditional medicine. Classification by effects on the human body and expected outcomes. Composition of medicinal plant raw materials. Factors influencing the accumulation of biologically active substances. Main groups of active constituents. Rules for collecting, drying, and storing medicinal plant raw materials.
2	Medicinal plants affecting the nervous system. Plants with stimulating effects on the nervous system: antidepressants, analeptics, and adaptogens. Plants that suppress nervous system activity and produce analgesic, hypnotic, and sedative effects.
3	Medicinal plants used in the treatment of respiratory diseases. Plants used to produce medicines with expectorant properties. Medicinal plants with antitussive properties. Plants used to manufacture bronchodilators.

No.	Module and Topic Titles
4	Medicinal plants affecting the cardiovascular system. Medicinal plants with antiarrhythmic and hypotensive effects. Plants with hypertensive properties, including neurostimulant, tonic, and immunostimulant effects. Plants used to lower blood cholesterol levels through antiatherosclerotic effects. Plants with venotonic properties and plants used in anaemia.
5	Medicinal plants used in the treatment of digestive system diseases. Plants that stimulate appetite. Plants with emetic and antiemetic effects. Plants used for disorders of gastric and intestinal function. Plants with laxative properties.
6	Medicinal plants affecting the endocrine system. Medicinal plants as sources of phytoestrogens. Approaches to regulating testosterone levels using plants. Plants used in the treatment of thyroid diseases. Effects of selected medicinal plants on pancreatic function.
7	Medicinal plants affecting the urinary system. Plants used to produce antiseptic and diuretic agents. Plants used to produce antiseptic, anti-inflammatory, calming, and diuretic agents. Plants used in urolithiasis and cystitis for their antispasmodic effects.
8	Medicinal plants used in the treatment of bacterial and fungal infections. Medicinal plants with bactericidal properties. Phytoncides: their significance and applications. Plants used in traditional medicine for fungal infections of the skin and nails.
9	Medicinal plants used for skin diseases and in cosmetology. Plants used to produce bactericidal and anti-inflammatory agents for pyoderma. Plants used for trophic ulcers and eczema. Medicinal plants in cosmetology and perfumery.
10	Medicinal plants affecting the musculoskeletal system. Plants used for musculoskeletal injuries, arthritis, and osteoarthritis. Plants used for rheumatic joint disorders and gout. Plants used to strengthen bone tissue.
11	Medicinal plants with immunomodulatory effects. Plants that activate the immune system. Medicinal plants with antiviral properties.
12	Medicinal plants and aromatherapy. Effects of selected plant aromas on well-being. Aromatic plants used in the treatment of behavioural and psychological disorders. Houseplants as sources of aromatherapeutic effects.
13	Nectar- and pollen-producing plants as sources of bee products. Classification of nectar-producing plants. Abiotic factors affecting nectar secretion. Bee products, their types and applications.

5. FORMS AND METHODS OF ASSESSMENT OF LEARNING OUTCOMES

Ongoing Assessment during Practical Classes	Methods: oral and/or written assessment and testing, computer-based assessment and testing, completion of situational tasks.
Final Assessment of the Academic Discipline – Pass/Fail Assessment	Conducted during the final practical class and determined on the basis of ongoing academic performance in accordance with 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
Assessment Tools for Learning Achievement	Theoretical questions, tests, situational tasks, practical assignments, and demonstration of practical skills.

6. ASSESSMENT CRITERIA

Assessment of students' knowledge is carried out in accordance with the current 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)

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 for All Learning Activities	ECTS Grade	National Grade: Examination, Course Project (Paper), Practical Training	National Grade: Pass
180–200	A	Excellent	Passed
170–179.99	B	Good	Passed
160–169.99	C	Good	Passed
141–159.99	D	Satisfactory	Passed
122–140.99	E	Satisfactory	Passed
60–121.99	FX	Unsatisfactory, with the possibility of retaking	Failed, with the possibility of retaking
0–59.99	F	Unsatisfactory, with mandatory repetition of the discipline	Failed, with mandatory repetition of the discipline

Criteria for Assessing Students’ Knowledge

Assessment of Oral/Written Responses during Ongoing Assessment

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) 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

The completion of learning activities and all academic work within the discipline must comply with 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), the Law of Ukraine "On Education" (Article 42), the Law of Ukraine "On Academic Integrity", and the University Code of Academic Integrity (https://www.vnmu.edu.ua/downloads/other/kodex_akad_dobr_edit%202026.pdf).

Students are entitled to high-quality educational services and a safe learning environment under martial law, emergency situations and states of emergency; access to up-to-date scientific and educational information; and qualified academic guidance and support in studying the discipline and acquiring practical skills.

The Department's policy on the provision of educational services is student-centred and is based on the regulatory documents of the Ministry of Education and Science of Ukraine and the Ministry of Health of Ukraine, the University Statute, the procedures governing the provision of educational services, including in emergency situations, as stipulated by the principal regulations and administrative directives governing the organisation of the educational process at National Pirogov Memorial Medical University, Vinnytsia, as well as on the principles of academic integrity.

Academic Integrity. When studying the discipline and completing all types of learning assignments and/or research activities, students must comply with the Law of Ukraine "On Education" (Article 42), the Law of Ukraine "On Academic Integrity", and the Code of Academic Integrity of National Pirogov Memorial Medical University, Vinnytsia (University website → General Information → Key Documents → Code of Academic Integrity). In the event of a violation of academic integrity principles, appropriate measures shall be taken in accordance with the applicable regulatory documents.

Compliance with VNMU Internal Regulations and Safety Requirements during Practical Classes. At the first practical class, the instructor provides a safety briefing on appropriate conduct on the Department premises, informs students of the location of the shelter and the evacuation route to the shelter in accordance with the approved evacuation plan, explains the rules of conduct while proceeding to and remaining in the shelter, and provides instructions on all actions stipulated by the Emergency Response Plan (pursuant to Order No. 505 dated 30 August 2023). In the event of an air raid alert or any other emergency warning signal, the instructor suspends the class. The instructor and students proceed together to the shelter and remain there until the warning signal is cancelled. Once the alert has been lifted, the instructor and students either resume the class in the Department's classrooms or students independently complete the remaining learning material, which is subsequently assessed at the next class.

Requirements for Preparation for Practical Classes

Students are required to participate actively in the educational process: attend classes and come adequately prepared; complete the test tasks related to the current topic in their workbooks and fill in the required diagrams and tables; actively participate in discussions of the class topic; complete all assignments specified in the programme; search for additional information relevant to the topic and present it to their peers.

Students are expected to arrive at classes on time. Late arrival is not permitted in accordance with the Internal Regulations for Students of VNMU. A student who arrives more than 10 minutes late is not admitted to the class and is required to make up the missed class in accordance with the established procedure.

For specialties within Field of Study I "Healthcare and Social Security", students are required to wear a medical coat during practical classes. Students who fail to comply with this requirement are not admitted to the class.

Students are expected to be polite, courteous, and respectful in their interactions with teaching staff, other University employees, fellow students, and other persons studying at VNMU. Students must maintain a quiet and orderly environment and demonstrate appropriate conduct on the Department premises.

In its activities, the Department adheres to the principles of mutual respect and tolerance. Students are expected to uphold the same principles.

Students must comply with safety regulations while on the Department premises.

When working in teaching and research laboratories, students must comply with the applicable safety regulations (published on the website of the Department of Pharmacy). When completing practical assignments, students must keep their workstations clean and orderly and leave them tidy upon completion of the practical work.

Use of Mobile Phones and Other Electronic Devices. The use of mobile phones and other electronic devices during classes is not permitted, except for emergency calls or when such devices are used to present supplementary materials relevant to the topic of the class.

Absence from Classes. Missed classes must be made up in accordance with the procedure established by the current Regulations on the Organization of the Educational Process at National Pirogov Memorial Medical University, Vinnytsia (https://www.vnmu.edu.ua/downloads/other/polog_organiz_ocv_proc(2026).pdf), at the times specified in the make-up schedule published on the website of the Department of Pharmacy (VNMU website), either with the instructor on duty or with the student's regular instructor. Making up a missed class involves completing the assignments related to the topic of the missed class in accordance with the specific requirements of the discipline.

Mastery of lecture topics is assessed during practical classes, seminars (including the assessment of practical skills), and final assessment, in accordance with 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)

Admission to Final Assessment. The procedure for admission to final assessment in the discipline is set out in the current 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).

Students are admitted to final assessment provided that they have no outstanding academic requirements: the average grade for ongoing assessment must be at least 3.0 (72 points on the 120-point scale); all final sessions for the content modules must have been completed with a passing grade ("3" or higher); and all missed practical classes must have been made up with a passing grade ("3" or higher). Otherwise, the student must improve their average grade by making up unsatisfactory grades and must make up all missed classes.

Additional Points for Individual Assignments. Students may receive additional points in the discipline for the successful completion of individual assignments, the content of which is published on the Department's website as part of the teaching and learning materials for the discipline. The number of points awarded is determined based on the results of the individual assignment in accordance with the current 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).

Resolution of Conflict Situations

In the event of misunderstandings or concerns regarding the quality of educational services, assessment of academic performance, or other conflict situations involving an instructor, students should first raise their concerns directly with the instructor. If the issue remains unresolved, the student has the right to submit an appeal to the Head of the Department in accordance with the Regulations on the Consideration of Appeals from Higher Education Students at National Pirogov Memorial Medical University, Vinnytsia (VNMU website → General Information → Key Documents).

Students also have the right to contact the student self-government bodies, the administration of the Faculty (Institute), or the University administration, either directly or through the designated feedback channels ("trust boxes"), links and addresses for which are available on the official VNMU website.

The Department recognises that a student-centred approach entails students' responsibility for the conscious and active acquisition of knowledge and for proper compliance with the rules and requirements established by applicable legislation and VNMU regulatory documents. The Department reserves the right to inform the relevant University bodies of any violations committed by students.

Policy on Blended Learning

The organisation of blended learning is governed by the Regulations on the Introduction of Elements of Distance Learning at National Pirogov Memorial Medical University, Vinnytsia (VNMU website → General Information → Key Documents). The main online learning platforms used for classes are Microsoft Teams and Google Meet.

The procedures for conducting practical classes, lectures, make-up classes, and consultations in the distance learning format are published on the Department's webpage (VNMU website → Department of Pharmacy → For Students/Postgraduate Students → Mode of Study → Year of Study → Teaching and Learning Materials).

Communication with the Instructor. Students may contact the instructor via Microsoft Teams chat, messaging applications (Viber, Telegram, WhatsApp), or email, as determined by the instructor, during working hours.

9. LEARNING RESOURCES

Teaching and learning materials for the discipline are available on the Department's website. The materials can be accessed via: VNMU website → Department of Pharmacy → For Students/Postgraduate Students.

LITERATURE

Core Literature for Medicinal Plants in Pharmacy

1. Heinrich, M., Barnes, J., Prieto-Garcia, J., Gibbons, S., and Williamson, E. M. (Eds.). (2024). Fundamentals of Pharmacognosy and Phytotherapy. 4th ed. Elsevier. Publisher / source

2. Lord, R. (2022). Clinical Herbalism: Plant Wisdom from East and West. Elsevier. Publisher / source

3. European Medicines Agency. (2025). Guideline on Good Agricultural and Collection Practice (GACP) for Starting Materials of Herbal Origin. Revision 1. EMA/HMPC/246816/2005. Publisher / source

Supplementary Literature for Medicinal Plants in Pharmacy

1. Khoobchandani, M., and Ghosh, S. (Eds.). (2024). Medicinal Applications of Phytopharmaceuticals. Springer. Publisher / source

2. Jha, S., and Halder, M. (Eds.). (2023). Medicinal Plants: Biodiversity, Biotechnology and Conservation. Springer. Publisher / source

3. Mohamed, A. A., and Alotaibi, B. M. (2023). Essential oils of some medicinal plants and their biological activities: a mini review. Journal of Umm Al-Qura University for Applied Sciences, 9, 40–49. Publisher / source

4. Boyacioglu, D. (Ed.). (2022). Bee Products and Their Applications in the Food and Pharmaceutical Industries. Elsevier. Publisher / source

ELECTRONIC RESOURCES

University website: https://vnmu.edu.ua
University Library: https://library.vnmu.edu.ua
World Health Organization: https://www.who.int/en/
Testing Board: https://www.testcentr.org.ua/uk/
Ministry of Health of Ukraine: https://moz.gov.ua/
Public Health Center of the Ministry of Health of Ukraine: https://phc.org.ua/kontrol-zakhvoryuvan
Plant Cell: https://en.wikipedia.org/wiki/Plant_cell
Plant Cell Anatomy: http://www.enchantedlearning.com/subjects/plants/cell/
Plant Cell Structure and Parts: http://www.buzzle.com/articles/plant-cell-structure-and-parts.html
Krok 1 Pharmacy: Pharmaceutical Botany. Test 1: https://testkrok.org.ua/?test=31340

The course syllabus for the academic discipline "Medicinal Plants in Pharmacy" was discussed and approved at the meeting of the Department of Pharmacy (Minutes No. 1 dated 26 August 2026).

Course Coordinator:
Doctor of Biological Sciences, Professor _____ (Signature) Viktoriia RODINKOVA

Acting Head of the Department of Pharmacy:
Candidate of Pharmaceutical Sciences, Associate Professor _____ (Signature) Yuliia TOMASHEVSKA