MINISTRY OF HEALTH OF UKRAINE

ODESA NATIONAL MEDICAL UNIVERSITY

Department of General and Clinical Pharmacology and Pharmacognosy

APPROVE

Vice-Rector for Scientific and Pedagogical Work

_____ Eduard BURYACHKIVSKY

September 01, 2025

WORK PROGRAM OF THE DISCIPLINE

"PRODUCTION PRACTICE IN PHARMACOGNOSIS"

Level of higher education: second (master's)
Field of knowledge: 22 "Healthcare"
Specialty: 226 "Pharmacy, industrial pharmacy"
Specialization: 226.01 "Pharmacy"
Educational and professional program: Pharmacy, industrial pharmacy

2025

The work program is based on the educational and professional program "Pharmacy, Industrial Pharmacy" for the training of specialists of the second (master's) level of higher education in specialty 226 "Pharmacy, Industrial Pharmacy" specialization 226.01 "Pharmacy" field of knowledge 22 "Healthcare", approved by the Academic Council of ONMedU (minutes No. 10 dated June 27, 2024).

Developers:
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The work program was approved at a meeting of the Department of General and Clinical Pharmacology and Pharmacognosy.

Protocol No. _1__ dated "_28_" August 2025

Head of the Department  Yaroslav ROZHKOVSKYI

Agreed with the guarantor of the OPP  Liana UNGURIAN

Approved by the subject-specific cyclic methodological commission for pharmaceutical disciplines of ONMedU

Протокол № _1_ від «_29_» серпня_ 2025 р.

Голова комісії  Наталія ФІЗОР

Reviewed and approved at the meeting of the department
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Minutes No. ____ dated "____"._____ 20__

Head of the department _____ _____
(signature) (First name LAST name)

Reviewed and approved at the department meeting _____
_____

Minutes No. ____ dated "____"._____ 20__

Head of Department _____ _____
(signature) (First Name LAST NAME

1. DESCRIPTION OF THE ACADEMIC DISCIPLINE

Name of indicators	Field of knowledge, specialty, specialization, level of higher education	Characteristics of the academic discipline
Total quantity: Credits – 4 Hours – 120	Discipline: And "Healthcare and Social Security" Specialty: I 8 "Pharmacy (by specialization)" Higher education level: second (master's)	*Full-time study* *Year of preparation: V* *Semester: X* *Lectures – 0 hours* *Seminars – 0 hours* *Practical – 80 hours* *Independent work – 40 hours* *Final control form – differential assessment*

2. GOALS AND OBJECTIVES OF THE ACADEMIC DISCIPLINE, COMPETENCES, PROGRAM LEARNING OUTCOMES

Goal: consolidation, expansion and improvement of theoretical knowledge obtained by higher education students while studying the pharmacognosy course, as well as acquisition, assimilation and improvement of practical skills and abilities in the identification of LR and morphologically similar species; harvesting, drying and storage of LR; basics of LR cultivation and rules of environmentally friendly production of LR; identification of thickets of wild LR and provision of recommendations on rational nature management.

Task:

1. studying the issues of procurement of standard LRS;
2. studying approaches to the collection of LRS of different morphological groups;
3. studying issues of primary processing of LRS;
4. study of drying methods taking into account the morphological features and chemical composition of raw materials;
5. studying ways to bring the LRS to a standard state;
6. studying approaches to packaging, labeling of LRS; storage of LRS.

The process of studying the discipline is aimed at forming elements of the following competencies:

The ability to solve research and/or innovative problems in the field of pharmacy and to critically reflect on and solve practical problems in professional pharmaceutical activities using the principles, theories and methods of fundamental, chemical, technological, biomedical and socio-economic sciences; to integrate knowledge and solve complex issues, to formulate judgments with insufficient or limited information; to clearly and unambiguously convey one's own knowledge, conclusions and their validity to a professional and non-professional audience. The ability to continue learning with a high degree of autonomy .

– **General (GC):**

ZK01. The ability to think abstractly, analyze and synthesize, learn and be modernly trained.
ZK02. Knowledge and understanding of the subject area and understanding of professional activity.
ZK03. Ability to communicate in the state language both orally and in writing.

– **Professional (FC):**

FC01. Ability to integrate knowledge and solve complex pharmacy problems in broad or multidisciplinary contexts.
FC02. Ability to collect, interpret and apply data necessary for professional activities, research and implementation of innovative projects in the field of pharmacy.
FC08. Ability to solve pharmacy problems in new or unfamiliar environments with incomplete or limited information, taking into account aspects of social and ethical responsibility.
FC12. Ability to clearly and unambiguously communicate one's own knowledge, conclusions and arguments in the field of pharmacy to specialists and non-specialists, in particular to students.
FC16. Ability to organize and carry out production activities of pharmacies for the manufacture of medicines in various dosage forms according to doctors' prescriptions and requirements (orders) of medical and preventive institutions, including justification of technology and selection of auxiliary materials in accordance with the rules of Good Pharmacy Practice (GPP).
FC19. Ability to organize and carry out quality control of medicinal products of natural and synthetic origin in accordance with the requirements of the current edition of the State Pharmacopoeia of Ukraine, quality control methods (QC), technological instructions, etc.; prevent the distribution of low-quality, falsified and unregistered medicinal products.
FC20. Ability to develop and evaluate quality control methods for medicinal products of natural and synthetic origin, including active pharmaceutical ingredients, medicinal plant raw materials and excipients using physical, chemical, physicochemical, biological, microbiological, pharmaco-technological methods; standardize medicinal products in accordance with current requirements.

Program learning outcomes for the discipline:

PRN01. Have and apply specialized conceptual knowledge in the field of pharmacy and related fields, taking into account modern scientific achievements.
PRN03. Have specialized knowledge and skills for solving professional problems and tasks, including for the purpose of further developing knowledge and procedures in the field of pharmacy.
PRN07. Collect necessary information on the development and production of medicinal products, using professional literature, patents, databases and other sources; systematize, analyze and evaluate it, in particular, using statistical analysis.
PRN11. Determine the advantages and disadvantages of medicines of natural and synthetic origin of various pharmacological groups, taking into account their chemical, physicochemical, biopharmaceutical, pharmacokinetic, pharmacodynamic characteristics and the type of dosage form. Recommend medicines and other pharmacy products to consumers, providing advisory assistance and pharmaceutical care.
PRN15. Predict and determine the impact of environmental factors on the quality and consumer characteristics of medicinal products of natural and synthetic origin and other pharmacy products, organize their storage in accordance with their physicochemical properties and the rules of Good Storage Practice (GSP).

Expected learning outcomes. As a result of studying the academic discipline, a higher education applicant must:

Know:

- basic principles and principles of collecting personal data;
- basic principles of LR cultivation;
- main harvesting dates taking into account the vegetation phase of the LR;
- basics of processing and drying of LRS according to the physicochemical properties of its biologically active substances;
- methods of standardization and storage of LRS;
- rational use of natural resources.

Be able:

- the ability to identify medicinal plants of forests, steppes, meadows, reservoirs and adjacent territories used in scientific medicine by external signs;
- recognize and distinguish admixtures of botanically similar plant species by morphological characteristics in order to obtain official LRS;
- to get acquainted with the methods of introducing and cultivating LR, methods of reproducing natural LR thickets;
- introduction and cultivation of medicinal plants; select sites, prepare and cultivate soil, control seed varieties, apply fertilizers, planting material and seeds, carry out nursery work, care for crops, cultivate soils, harvest using good agricultural practices and production practices (GACP);
- identify LR thickets in natural phytocenoses and map them;
- conduct a geobotanical description of the LR and LRS, which were familiarized with during the internship; - herbariumize and properly design herbarium specimens of LR and morphologically similar plants.
- determine the optimal timing of collecting LRS of the morphological groups "leaves", "grass", "flowers", "bark", "rhizomes and roots", "seeds", "buds", taking into account the dynamics of the accumulation of biologically active substances in LRS;
- apply rational methods of collecting LRS of the morphological groups "leaves", "grass", "flowers", "bark", "rhizomes and roots", "seeds", "buds";
- conduct briefings for LRS procurers on safety rules when harvesting raw materials for poisonous and potent LRs;
- carry out primary processing of LRS of the morphological groups "leaves", "grass", "flowers", "bark", "rhizomes and roots", "seeds", "buds", using modern equipment;
- to dry LRS containing polysaccharides, vitamins, essential oils, glycosides, phenolic compounds, cardiosteroids, tannins, alkaloids, under appropriate conditions using modern equipment and drying devices;
- pack and label samples of LRS, taking into account the characteristics of the chemical composition, in accordance with the requirements of regulatory documentation and current orders;
- prepare premises and provide appropriate conditions for storage of medicinal plant raw materials; - store medicinal plant raw materials of various morphological groups depending on their chemical composition in accordance with the requirements of regulatory documentation and current orders;

- carry out quality control of LRS during storage. - accept LRS from procurers and the public, conduct commodity analysis and determine the identity and good quality of LRS;
- bring non-standard LRS into a standard state using the necessary technological operations, in accordance with the requirements of current orders and analytical regulatory documentation;
- develop and implement a set of measures aimed at preserving and multiplying rare forest thickets or those listed in the Red Book of Ukraine;
- provide recommendations on rational use of nature;
- work independently with educational and reference literature;
- apply knowledge of practical pharmacognosy when studying specialized disciplines.

3. CONTENT OF THE PRACTICE

Topic 1 Familiarization with the calendar, the practice base, the content of the main works, the time and conditions of their implementation; with the organization of work, tasks and internal regulations of the practice base, the content of the practice report. Instruction on safety precautions during practice. Geobotanical classification of LR, belonging to a certain phytocenosis, morphological characteristics of plants. Geobotanical description of LR according to the received individual tasks.

Topic 2 Types of plant communities, their ecological characteristics, species composition of protected areas and plants. Species composition and ecological and morphological features of forest phytocenoses. Forest stratification. Medicinal plants of steppes and meadows. Water-coastal and marsh plants. Synanthropic vegetation. Types of weeds.

Topic 3 Diagnosis of official medicinal plants and possible impurities in them, distinctive features. Vegetation phases. Herbalization of medicinal plants. Terms of harvesting medicinal plants of wild medicinal plants.

Topic 4 Familiarization with the biological features of LR, with the methods and techniques of their cultivation. Selection of plots, soil preparation. Methods of reproduction of LR. Planting material: seed categories, varietal control. Types of fertilizers, fertilizer application.

Topic 5 Sowing, crop care, soil cultivation. Harvesting, technical means, care of cultivated LR using good cultivation practices (GACP). Agrotechnical conditions for growing LR cultivated on the basis of practice.

Topic 6 Organization of LRS harvesting. Mastering techniques for rational collection of LRS of different morphological groups.

Topic 7 Mastering the methods of primary processing, drying of LRS. The importance of primary processing for obtaining good-quality LRS. Methods of primary processing of LRS of different morphological groups. Drying of LRS of different chemical and morphological groups. Methods of drying LRS - natural and artificial.

Topic 8 Bringing LRS to a standard state. Packaging and labeling, transportation of LRS. Familiarization with the storage conditions of LRS. Preparation of premises for storage of LRS. Rules for storing LRS of different morphological and chemical groups. Quality control of LRS during storage.

Topic 9 Identification of LR thickets. Periodicity of exploitation of LR thickets. Requirements for rational collection and periodicity of LR harvesting in a specific thicket.

Topic 10 Rare, endangered species of wildlife. Red and Green Books of Ukraine. System of measures for protection, rational use of nature and reproduction of wildlife reserves in the region.

4. Structure of the academic discipline

Topic name	Number of hours of full-time study			Number of hours of correspondence study		
	Total	including		Total	including	
		practical	SRZ		practical	SRZ
Topic 1 Familiarization with the calendar, the practice base, the content of the main works, the time and conditions of their implementation; with the organization of work, tasks and internal regulations of the practice base, the content of the practice report. Instruction on safety precautions during practice. Geobotanical classification of LR, belonging to a certain phytocenosis, morphological characteristics of plants. Geobotanical description of LR according to the received individual tasks.	12.0	8.0	4.0	12.0	1.0	10.0
Topic 2 Types of plant communities, their ecological characteristics, species composition of protected areas and plants. Species composition and ecological and morphological features of forest phytocenoses. Forest stratification. Medicinal plants of steppes and meadows. Water-coastal and marsh plants. Synanthropic vegetation. Types of weeds.	12.0	8.0	4.0	14.0	1.0	12.0
Topic 3 Diagnosis of official medicinal plants and possible impurities in them, distinctive features. Vegetation phases. Herbalization of medicinal plants. Terms of harvesting medicinal plants of wild medicinal plants.	12.0	8.0	4.0	12.0	0.0	12.0
Topic 4 Familiarization with the biological features of LR, with the methods and techniques of their cultivation. Selection of plots, soil preparation. Methods of reproduction of LR. Planting material: seed categories, varietal control. Types of fertilizers, fertilizer application.	12.0	8.0	4.0	14.0	0.0	14.0
Topic 5 Sowing, crop care, soil cultivation. Harvesting, technical means, care of cultivated LR using good cultivation practices (GACP). Agrotechnical conditions for growing LR cultivated on the basis of practice.	12.0	8.0	4.0	16.0	0.0	16.0
Topic 6 Organization of LRS harvesting. Mastering techniques for rational collection of LRS of different morphological groups.	12.0	8.0	4.0	16.0	0.0	16.0
Topic 7 Mastering the methods of primary processing, drying of LRS. The importance of primary processing for obtaining good-quality LRS. Methods of primary processing of LRS of different morphological groups. Drying of LRS of different chemical and morphological groups. Methods of drying LRS - natural and artificial.	12.0	8.0	4.0	12.0	0.0	12.0
Topic 8 Bringing LRS to a standard state. Packaging and labeling, transportation of LRS. Familiarization with the storage conditions of LRS. Preparation of premises for storage of LRS. Rules for storing LRS of different morphological and chemical groups. Quality control of LRS during storage.	12.0	8.0	4.0	6.0	0.0	6.0
Topic 9 Identification of LR thickets. Periodicity of exploitation of LR thickets. Requirements for rational collection and periodicity of LR harvesting in a specific thicket.	12.0	8.0	4.0	6.0	0.0	6.0
Topic 10 Rare, endangered species of wildlife. Red and Green Books of Ukraine. System of measures for protection, rational use of nature and reproduction of wildlife reserves in the region.	10.0	6.0	4.0	6.0	0.0	6.0
Differential credit	2.0	2.0			2.0	
Total : hours:	120.0	80.0	40.0	120.0	4.0	116.0

5. TOPICS OF LECTURES / SEMINARS / PRACTICAL / LABORATORY CLASSES

5.1. Full-time form of education

5.1.1. Lecture topics

Lectures are not provided.

5.1.2. Seminar topics

Seminars are not provided.

5.1.3. Topics of practical classes

No. p.p	Topic of practical classes	Number of hours
1	Familiarization with the calendar, the practice base, the content of the main works, the time and conditions of their implementation; with the organization of work, tasks and internal regulations of the practice base, the content of the practice report. Instruction on safety precautions during the practice. Geobotanical classification of LR, belonging to a certain phytocenosis, morphological characteristics of plants. Geobotanical description of LR according to the received individual tasks.	8
2	Types of plant communities, their ecological characteristics, species composition of protected areas and plants. Species composition and ecological and morphological features of forest phytocenoses. Forest stratification. Medicinal plants of steppes and meadows. Aquatic and coastal plants. Synanthropic vegetation. Types of weeds.	8
3	Diagnosis of official medicinal plants and possible impurities in them, distinctive features. Vegetation phases. Herbalization of medicinal plants. Terms of harvesting medicinal plants of wild medicinal plants.	8
4	Introduction to the biological characteristics of LR, methods and techniques of their cultivation. Selection of sites, soil preparation. Methods of LR propagation. Planting material: seed categories, varietal control. Types of fertilizers, fertilizer application.	8
5	Sowing, crop care, soil cultivation. Harvesting, technical means, care of cultivated LR using good cultivation practices (GACP). Agrotechnical conditions for growing LR cultivated on the basis of practice.	8
6	Organization of LRS harvesting. Mastering techniques for rational collection of LRS of different morphological groups.	8
7	Mastering the methods of primary processing, drying of LRS. The importance of primary processing for obtaining good-quality LRS. Methods of primary processing of LRS of different morphological groups. Drying of LRS of different chemical and morphological groups. Methods of drying LRS - natural and artificial	8
8	Bringing LRS to a standard state. Packaging and labeling, transportation of LRS. Familiarization with the storage conditions of LRS. Preparation of premises for storage of LRS. Rules for storing LRS of different morphological and chemical groups. Quality control of LRS during storage.	8

No. p.p	Topic of practical classes	Number of hours
9	Detection of LR thickets. Periodicity of exploitation of LR thickets. Requirements for rational collection and periodicity of LRS harvesting in a specific thicket	8
10	Rare, endangered species of LR. Red and Green Books of Ukraine. System of measures for the protection, rational use of nature and reproduction of LR stocks in the region.	8
	Total:	80

5.1.4. Topics of laboratory classes
Laboratory classes are not provided.

5.2. Correspondence form of education
5.2.1. Lecture topics

Lectures are not provided.

5.2.2. Seminar topics
Seminars are not provided.

5.2.3. Topics of practical classes

No. p.p	Topic of practical classes	Number of hours
1	Familiarization with the calendar, the practice base, the content of the main works, the time and conditions of their implementation; with the organization of work, tasks and internal regulations of the practice base, the content of the practice report. Instruction on safety precautions during the practice. Geobotanical classification of LR, belonging to a certain phytocenosis, morphological characteristics of plants. Geobotanical description of LR according to the received individual tasks.	2
2	Types of plant communities, their ecological characteristics, species composition of protected areas and plants. Species composition and ecological and morphological features of forest phytocenoses. Forest stratification. Medicinal plants of steppes and meadows. Water-coastal and marsh plants. Synanthropic vegetation. Types of weeds	2
	Total:	4

5.2.4. Topics of laboratory classes
Laboratory classes are not provided **.**

6. INDEPENDENT WORK OF A HIGHER EDUCATION STUDENT
6.1. Full-time form of education

No. n/a	Topic name and content	Volume in hours
1	Topic 1. Conducting a geobotanical description of the LR and LRS, which were familiarized with during the internship and according to the individual tasks received (LR herbarium, LRS samples). Preparation for practical training 2.3.	4
2	Topic 2. Recognition of impurities of botanically related plant species by morphological features in order to obtain official LRS. Determination of distinctive diagnostic features for the following types of LR and related species /impurities/: marshmallow; stinging nettle; peppermint; chamomile; valerian; wormwood; coltsfoot, horsetail; lily of the valley; buckthorn brittle; pepperwort; purple dried flower; male fern; dog nettle; sand cinquefoil; three-parted series; common mealybug. Preparation for practical classes 4,5,6.	4
3	Topic 3. Herbarium and proper design of herbarium specimens of LR and morphologically similar plants. Preparation for practical classes 7,8,9.	4
4	Topic 4. Determination of optimal phenophases and terms of harvesting LRS of the morphological groups "leaves", "grass", "flowers", "bark", "rhizomes and roots", "seeds", "buds", taking into account the dynamics of accumulation of biologically active substances in LRS; application of rational rules, techniques and methods for harvesting LRS of the morphological groups "leaves", "grass", "flowers", "bark", "rhizomes and roots", "seeds", "buds". Preparation for practical classes 10,11,12.	4
5	Topic 5. Primary processing of LRS of the morphological groups "leaves", "grass", "flowers", "bark", "rhizomes and roots", "seeds", "buds", using modern equipment. Preparation for practical classes 13,14,15.	4
6	Topic 6. Drying of LRS containing polysaccharides, vitamins, essential oils, glycosides, phenolic compounds, cardiosteroids, tannins, alkaloids, under appropriate conditions using modern equipment and drying devices; selection of drying conditions for LRS according to an individual task, performance of practical actions for drying LRS, controlling its process, determining the end of LRS drying; development of the optimal drying regime for LRS of different morphological and chemical groups. Preparation for practical classes 16,17,18.	4
7	Topic 7. Packaging, labeling and transportation of LRS, taking into account the characteristics of the chemical composition, in accordance with the requirements of regulatory documentation and current orders. Preparation for practical classes 19,20,21.	4

No. n/a	Topic name and content	Volume in hours
8	Topic 8. Preparation of premises and provision of appropriate conditions for storage of medicinal plant raw materials; storage of medicinal plant raw materials of various morphological and chemical groups depending on the composition in accordance with the requirements of regulatory documentation and current orders; implementation of quality control of medicinal plant raw materials during storage. Preparation for practical classes 22,23,24.	4
9	Topic 9. Identification of LR thickets and determination of their area in natural phytocenoses, their mapping, determination of the possibility of harvesting medicinal plant raw materials in the identified thickets; Elaboration of requirements for rational collection and periodicity of harvesting of LRS of different morphological groups in a specific thicket. Preparation for practical classes 25,26,27.	4
10	Topic 10. Development and implementation of a set of measures aimed at preserving and multiplying thickets of medicinal plants that are rarely found or listed in the Red Book of Ukraine; cultivation of medicinal plants on an industrial scale, taking into account the agrotechnical conditions for growing medicinal plants and the rules of environmentally friendly production of medicinal plants according to GACP Preparation for practical classes 28,29,30.	4
	Total :	**40**

6.2. Correspondence form of education

No. n/a	Topic name and content	Volume in hours
1	Conducting a geobotanical description of the LR and LRS, which were familiarized with during the internship and according to the individual tasks received (LR herbarium, LRS samples)	10
2	Recognition of impurities of botanically related plant species by morphological features in order to obtain official LRS. Determination of distinctive diagnostic features for the following types of LR and related species /impurities/: marshmallow; stinging nettle; peppermint; chamomile; valerian; wormwood; coltsfoot, horsetail; lily of the valley; buckthorn brittle; pepperwort; purple dried flower; male fern; dog nettle; sand cinquefoil; three-parted series; common mealybug.	12
3	Herbarium and proper design of herbarium specimens of LR and morphologically similar plants.	12

No. n/a	Topic name and content	Volume in hours
4	Determination of optimal phenophases and terms of harvesting LRS of the morphological groups "leaves", "grass", "flowers", "bark", "rhizomes and roots", "seeds", "buds", taking into account the dynamics of accumulation of biologically active substances in LRS; application of rational rules, techniques and methods for harvesting LRS of the morphological groups "leaves", "grass", "flowers", "bark", "rhizomes and roots", "seeds", "buds"	14
5	Carrying out primary processing of LRS of morphological groups "leaves", "grass", "flowers", "bark", "rhizomes and roots", "seeds", "buds", using modern equipment;	16
6	Drying of LRS containing polysaccharides, vitamins, essential oils, glycosides, phenolic compounds, cardiosteroids, tannins, alkaloids, under appropriate conditions using modern equipment and drying devices; selection of drying conditions for LRS according to an individual task, performance of practical actions for drying LRS, controlling its process, determining the end of LRS drying; development of the optimal drying regime for LRS of different morphological and chemical groups	16
7	Packaging, labeling and transportation of LRS, taking into account the characteristics of the chemical composition, in accordance with the requirements of regulatory documentation and current orders	12
8	Preparation of premises and provision of appropriate conditions for storage of medicinal plant raw materials; storage of medicinal plant raw materials of various morphological and chemical groups depending on the composition in accordance with the requirements of regulatory documentation and current orders; implementation of quality control of medicinal plant raw materials during storage.	6
9	Identification of LR thickets and determination of their area in natural phytocenoses, their mapping, determination of the possibility of harvesting medicinal plant raw materials in the identified thickets; Elaboration of requirements for rational collection and periodicity of harvesting of LRS of different morphological groups in a specific thicket.	6
10	Development and implementation of a set of measures aimed at preserving and multiplying thickets of medicinal plants that are rarely found or listed in the Red Book of Ukraine; cultivation of medicinal plants on an industrial scale, taking into account the agrotechnical conditions for growing medicinal plants and the rules of environmentally friendly production of medicinal plants according to GACP	6
	Total :	**116**

7. FORMS AND METHODS OF TEACHING

Forms of training:

The discipline is taught in the form of practical classes; organization of independent work of the applicant.

Teaching methods:

Practical classes: conversation, solving situational problems, demonstration of collecting and preparing raw materials.

Independent work: independent work with the textbook, independent work with tests.

8. FORMS OF CONTROL AND CRITERIA FOR ASSESSING LEARNING OUTCOMES

Forms of current control: oral interview, testing, assessment of practical skills, solving situational tasks, assessment of activity in the lesson.

Forms of final control: differential test.

Criteria for assessing the learning outcomes of higher education applicants during current control

Rating	Evaluation criteria
Perfectly "5"	The applicant is fluent in the material, actively participates in the discussion and solution of a situational clinical problem, confidently demonstrates practical skills during the examination of the patient and the interpretation of clinical, laboratory and instrumental research data, expresses his opinion on the topic of the lesson, and demonstrates clinical thinking.
Good "4"	The applicant has a good command of the material, participates in the discussion and solution of a situational clinical problem, demonstrates practical skills during the examination of the patient and the interpretation of clinical, laboratory and instrumental research data with some errors, expresses his opinion on the topic of the lesson, and demonstrates clinical thinking.
Satisfactorily "3"	The applicant does not have sufficient knowledge of the material, participates uncertainly in the discussion and solution of a situational clinical problem, demonstrates practical skills during the examination of the patient and the interpretation of clinical, laboratory and instrumental research data with significant errors.
Unsatisfactorily "2"	The applicant does not possess the material, does not participate in the discussion and solution of a situational clinical problem, does not demonstrate practical skills during the examination of the patient and the interpretation of clinical, laboratory and instrumental research data.

Only those applicants who have fulfilled the requirements of the curriculum in the discipline, have no academic debt, and their average score for current academic activity in the discipline is at least 3.00 are allowed to take the final test in the form of a differentiated assessment.

Differentiated assessment is carried out: in the last lesson (the lesson is separated as a separate control measure) after the end of classes before the start of the examination session - in the case of a tape learning system, in the last lesson of the educational component - in the case of a cyclical learning system.

The methodology for conducting final (semester) control of the educational component in the form of differentiated assessment is unified and involves the use of standardized forms.

Criteria for assessing the learning outcomes of higher education applicants during final control

Rating	Evaluation criteria
Perfectly "5"	The applicant worked systematically throughout the semester, demonstrated versatile and deep knowledge of the program material during the exam, is able

	to successfully complete the tasks provided for by the program, has mastered the content of the main and additional literature, has realized the interrelationship of individual sections of the discipline, their importance for the future profession, has demonstrated creative abilities in understanding and using the educational program material, has demonstrated the ability to independently update and replenish knowledge; the level of competence is high (creative);
Good "4"	The applicant has demonstrated full knowledge of the curriculum material, successfully performs the tasks provided for by the program, has mastered the basic literature recommended by the program, has shown a sufficient level of knowledge in the discipline and is capable of independently updating and renewing it in the course of further study and professional activity; the level of competence is sufficient (constructive-variative)
Satisfactorily "3"	An applicant who has demonstrated knowledge of the basic curriculum material to the extent necessary for further study and subsequent work in the profession, copes with the tasks provided for by the program, made individual errors in the answers to the exam and when performing exam tasks, but has the necessary knowledge to overcome the errors made under the guidance of a scientific and pedagogical worker; the level of competence is average (reproductive)
Unsatisfactorily "2"	The applicant did not demonstrate sufficient knowledge of the main educational and program material, made fundamental errors in performing the tasks provided for by the program, cannot use the knowledge in further training without the help of a teacher, and failed to master the skills of independent work; the level of competence is low (receptive-productive)

9. DISTRIBUTION OF POINTS OBTAINED BY HIGHER EDUCATION STUDENTS

Points in the academic discipline for applicants who have successfully completed the program are converted into a traditional four-point scale according to the absolute criteria given in the table :

National assessment for discipline	Total points for the discipline
Excellent ("5")	185 – 200
Good ("4")	151 – 184
Satisfactory ("3")	120 – 150
Unsatisfactory ("2")	Below 120

A multi-point scale (200-point scale) characterizes the actual success of each applicant in mastering the academic discipline. The conversion of the traditional assessment into a 200-point scale is performed by the University's information and technology department using the "Contingent" program according to the appropriate formula: Average score of success (current success in the discipline) x 40.

The ECTS rating scale evaluates the achievements of applicants in an academic discipline who are studying in the same course of the same specialty, according to the points they received, by ranking, namely:

ECTS grade	Statistical indicator
AND	Top 10% of applicants

IN	Next 25% of applicants
WITH	Next 30% of applicants
D	Next 25% of applicants
THERE ARE	Next 10% of applicants

The ECTS scale establishes the applicant's belonging to the group of the best or worst among the reference group of fellow students (faculty, specialty), that is, his rating. When converting from a multi-point scale, as a rule, the boundaries of the grades "A", "B", "C", "D", "E" do not coincide with the boundaries of the grades "5", "4", "3" according to the traditional scale. The grade "A" on the ECTS scale cannot be equal to the grade "excellent", and the grade "B" - to the grade "good", etc. Applicants who received grades "FX" and "F" ("2") are not included in the list of ranked applicants. Such applicants automatically receive an "E" grade after retaking. The "FX" grade is given to applicants who have scored the minimum number of points for current educational activities, but who have not passed the final test. A grade of "F" is given to students who have attended all classroom classes in the academic discipline, but have not achieved a grade point average (3.00) for their current academic activity and are not admitted to the final examination .

10. METHODOLOGICAL ENSURANCE OF DISCIPLINE

- Work program of the academic discipline
- Syllabus of the academic discipline
- Multimedia presentations
- Methodological developments for practical classes
- Methodological recommendations for independent work of higher education students

11. QUESTIONS FOR PREPARATION FOR THE FINAL TEST

1. The purpose and objectives of the production practice in pharmacognosy at the present stage, its role in the practical activities of a pharmacist.
2. Nomenclature of medicinal plants based on practice.
3. Raw material base of medicinal plants of Ukraine, rational use of nature. Plants of the Red Book of Ukraine.
4. Natural phytocenoses and associations as plant groups of medicinal plants, the phytocenotic role of medicinal plants. What materials are used to study natural vegetation as the main source of medicinal plants?
5. Typical species and life forms of medicinal plants of various phytocenoses.
6. Examples of wild medicinal plants of different phytocenoses: - forest; - steppe; - wetland; - segetal, ruderal.
7. What botanically related species to chamomile, mountain arnica, coltsfoot, lily of the valley, valerian, marshmallow, horsetail, etc. are found in nature and what external features distinguish the official species of these botanically related species?
8. The principle of introducing medicinal plants into culture. Nomenclature of cultivated medicinal plants. Organizations engaged in the cultivation of medicinal plants.

9. The main methods of propagation of medicinal plants in culture, requirements for agricultural techniques for growing marshmallow, valerian, St. John's wort, marigolds, peppermint, chamomile, common dog nettle, blue cyanosis, three-parted succession, plantain.
10. Methods for increasing the yield of medicinal plant raw materials.
11. The main types of work on caring for medicinal plants when growing them at different periods of their development.
12. Examples of cultured LRs.
13. Examples of LRS with a mixed raw material base.
14. Fundamentals and methods of organizing the procurement of medicinal plant raw materials.
15. Safety rules when working with LRS.
16. Rules, methods, optimal terms for collecting LRS of different morphological groups.
17. Methods of drying LRS of different morphological and chemical groups.
18. What is primary processing of LRS and to what extent is it carried out?
19. What types of processing of LRS are carried out to bring it to a standard state? What does the concept of "standard raw materials" mean?
20. Technique for bringing the LRS to a standard state. AED requirements for the good quality of the LRS.
21. Rules for packaging and labeling of LRS according to the AED.
22. Storage rules, types of packaging and labeling of packaging units of pharmaceuticals of different chemical and morphological groups in the pharmacy and in the warehouse.
23. Rules for the transportation of medicinal plant raw materials.
24. How is the receipt of LRS carried out in the pharmacy and at the warehouse? What AED is used when receiving LRS?
25. Rules for accepting LRS according to the State Federal University and the Federal University of the Arts XI.
26. Types of control and quality indicators of LRS.
27. Give examples of medicinal plants, the volumes of harvesting of which are not limited in Ukraine, provided that the collection rules are observed.
28. What environmental protection measures must be observed when harvesting LRS of different morphological groups?
29. What biological norm of raw materials should be collected per unit area when harvesting grass, leaves, flowers, fruits, roots and rhizomes?
30. What is the periodicity of harvesting and what periodicity /repetition/ should be observed when harvesting herbs, leaves, flowers, fruits, roots and rhizomes?
31. Main measures for the protection of medicinal plants in the region.
32. List of medicinal plants that are not subject to harvesting in Ukraine.
33. Industrial areas of wild medicinal plants that are not subject to exploitation. Why?

12. RECOMMENDED READING

Main literature :

1. Pharmacognosy: textbook (I–III grades) / I.A. Bobkova, L.V. Varlakhova. – 3rd edition All-Ukrainian Specialized Publishing House “Medicine” 2018, 504p.

2. Pharmacognosy: basic manual for students of higher pharmaceutical schools (pharmaceutical faculties) of the IV level of accreditation / V.S. Kyslychenko, I.O. Zhuravel, S.M. Marchyshyn and others; edited by V.S. Kyslychenko. - Kharkiv: National University of Pharmacy: Golden Pages, 2015. - 736 p.

3. Textbook on the discipline "Pharmacognosy" / Ya. V. Rozhkovsky, B.V. Prystyupa, I.A. Boyko, N.V. Gerasymyuk, V.V. Chernogoryuk -: Methodological development of the Department of Pharmacognosy of ONMedU. – Odesa: ONMedU, 2019 – 51 p.

4. State Pharmacopoeia of Ukraine: in 3 volumes / State Enterprise "Ukrainian Scientific Pharmacopoeial Center for the Quality of Medicinal Products". – 2nd ed. – Kharkiv: State Enterprise "Ukrainian Scientific Pharmacopoeial Center for the Quality of Medicinal Products", 2015. – Vol. 1. – 1500 p.

5. Regulations on practice at the Danylo Halytsky Lviv National Medical University / B.S. Zimenkovsky, M.R. Gzhegotsky, I.I. Solonynko. – Lviv, 2015. – 22 p.

6. Regulations on the working curriculum of the discipline and methodological recommendations for its development. – Lviv, 2015. – 17 p.

Additional literature :

1. Gulko R.M. Garden of medicinal plants in Lviv. – Vinnytsia: Nova kniga, 2006. – 240p.
2. State Pharmacopoeia of Ukraine (State Enterprise "Scientific and Expert Pharmacopoeial Center". – 1st ed. – Kharkiv: RIREG, 2001. – Supplement 1. – 2004. – 520 p.
3. State Pharmacopoeia of Ukraine: in 3 volumes / State Enterprise "Ukrainian Scientific Pharmacopoeial Center for the Quality of Medicinal Products". – 2nd ed. – Kharkiv: State Enterprise "Ukrainian Scientific Pharmacopoeial Center for the Quality of Medicinal Products", 2014. – Vol. 3. – 732 p.
4. Kovalev V.M., Pavliy O. I., Isakova B. I. Pharmacognosy with the basics of plant biochemistry. – Kh.: Prapor, ed. NFAU, 2000. 32 – 52 p.
5. Serbin A.G., Sira L.M., Slobodyanyuk T.O. Pharmaceutical Botany. Textbook. – Vinnytsia: NOVA KNYGA, 2007. – 488 p.
6. Solodovnichenko N.M., Zhuravlev M.S., Kovalev V.M. Medicinal plant raw materials and phytopreparations. - Kharkiv: Publishing House of the National Academy of Sciences "Golden Pages", 2001. - 407 p.
7. Workshop on the identification of medicinal plant raw materials: teaching aids. / [V. M. Kovalev, S. M. Marchyshyn, O. P. Khvorost and others]; edited by V. M. Kovalev, S. M. Marchyshyn. – Ternopil: TSMU, 2014. – 250 p.
8. Gulko R.M. Garden of medicinal plants in Lviv. – Vinnytsia: Nova kniga, 2006. – 240p.
9. Law of Ukraine "On Seeds and Planting Material" // Bulletin of the Verkhovna Rada of Ukraine. 2003. - N 13, p. 92 (As amended by Laws N 2505-IV (2505-15) dated 03/25/2005. - VVR. - 2005. - N 17, N 18-19, p. 267; N 1759-VI (1759-17) dated 12/15/2009. - VVR. - 2010. - N 9, p. 76.
10. Green Book of Ukraine / Under the general editorship of Corresponding Member of the NAS of Ukraine Ya.P. Didukh. – Kyiv: Alterpress, 2009. – 448p.
11. Instructions for organizing storage in pharmacies of various groups of medicines and medical devices, appendix to the order of the Ministry of Health of Ukraine No. 44 of March 16, 1996 // Legal aspects of pharmacy: Collection of regulatory legal acts as of February 10, 2001. – Kharkiv: Megapolis, – 2001. – P. 408 – 418.
12. Minarchenko V. M., Tymchenko I. A. Atlas of medicinal plants (chronology, resources and protection). – Kyiv: Phytocenter, 2002. – 172 p. 8. Minarchenko V. M. Medicinal vascular plants of Ukraine (medical and resource value). – Kyiv: Phytosociotsentr, 2005. – 324 p.
13. Order of the Ministry of Health of 08.05.2008 No. 240 "On approval of the Hygienic Standard" Hygienic standard of specific activity of 13790 radionuclides Cs Sr in herbal medicinal raw materials (substances) used for the manufacture of medicines".
14. Order of the Ministry of Health No. 179 of 03.10.95 "On approval of the Instructions on the work practice of students of medical, therapeutic, pediatric, medical and preventive, dental and pharmaceutical faculties of medical and pharmaceutical higher educational institutions of III-IV levels of accreditation".
15. Order of the Ministry of Environmental Protection and Nuclear Safety of Ukraine No. 46 dated 06.05.96 "On approval of standards for the use of non-wood plant resources".

16. Order of the Ministry of Ecology and Natural Resources of Ukraine No. 61 dated February 12, 2002 “On approval of the Instruction on the procedure for establishing standards for the special use of natural resources”.

17. Order of the Ministry of Health of Ukraine No. 35 of February 24, 2000 “On the features of graduate education in medical and pharmaceutical fields”.

18. Order of the Ministry of Education and Science No. 629 of July 29, 2004. “On approval of the components of industry standards for higher education in specialties 7.110201 “Pharmacy”.

19. Order of the Ministry of Education and Science of Ukraine dated 08.04.93 No. 93 “On approval of the Regulations on the practice of students of higher educational institutions of Ukraine”

13. ELECTRONIC INFORMATION RESOURCES

1. Botany in figures. Text & multimedia lectures [Electronic resource] / TN Gontovaya, VP Rudenko, Ya. S. Kichimasova, V. R. Gaponenko, M. A. Kulagina. – Electronic text, graphic data (1.31 GB). – Kh. : NPhAU, 2012. – 1 electronic optical disk (CD-ROM); system requirements: PC 486 and higher; 8 MB RAM; Win 98, WinXP, Win 7; SVGA 32768 and higher; 640x480; 4x CD-ROM drive; 16 bit sound card. – Disk in a container 18x13 cm.
2. Materials for independent work of higher education students in the discipline "Pharmaceutical Botany", which are posted on the website of the center for distance learning technologies of ONMedU. – Access mode: https://moodle.odmu.edu.ua/course/view.php?id=257
3. Official website of the ONMedU scientific library: https://onmedu.edu.ua/biblioteka/
4. The department's methodological work page on the ONMedU website: https://info.odmu.edu.ua/chair/pharmacognosy/files