



**MINISTRY OF HEALTH OF UKRAINE
NATIONAL UNIVERSITY OF PHARMACY
Faculty of Pharmacy
Department of Pharmacognosy and Nutriciology**

PHARMACOGNOSTIC ANALYSIS OF NEW MPM

**WORK PROGRAM
of educational component**

training for _____ **the second (master's) level** _____
(Higher Educational Level Name)
specialty _____ **«226 Pharmacy, Industrial Pharmacy»** _____
(Code and Specialty Name)
knowledge industry _____ **«22 Healthcare»** _____
(Code and Knowledge Field Name)
of educational program _____ **«Pharmacy»** _____
(Educational Program Name)

Kharkiv-2023

The work program of the educational component "Pharmacognostic analysis of new MPM" in specialty 226 «Pharmacy, Industrial pharmacy» educational program «Pharmacy» (4.10д)англ for applicants for higher education 5 year of study.

EDUCATIONAL COURSE TEAM:

KYSLYCHENKO Viktoriia, head of the Department of Pharmacognosy and Nutriciology, doctor of pharmaceutical sciences, professor; KRIVORUCHKO Olena, professor of the higher education institution of the Department of Pharmacognosy and Nutriciology of the National University of Pharmacy, Doctor of Pharmacy. Sciences, professor; TARTYNSKA Ganna, associate professor of the institution of higher education of the Department of Pharmacognosy and Nutriciology of the National University of Pharmacy, candidate of pharmacology. Science, associate professor.

Work program were reviewed at the Department of Pharmacognosy and Nutritiology meeting
Record from « 1 » of September 2023 № 1

Head of the Department



Prof. Viktoriia KYSLYCHENKO

Work program has been approved at the meeting of the Methodical Commission of chemical disciplines
session

Record from « 5 » of September 2023 № 1

Head of the Specialized Committee



Prof. Viktoriya GEORGIYANTS

1. Description of the educational component

Language of study: *English*

Status of the educational component: *selective*

Prerequisites for studying the educational component: As an educational component "Pharmacognostic analysis of new MPM":

- is based on the knowledge gained by students when studying pharmacognosy, pharmacology, pharmaceutical chemistry, clinical pharmacy;
- forms the ability to apply knowledge from this discipline in the process of further education and professional activity;
- plays a leading role in solving such urgent problems as the creation of effective medicines from natural raw materials, improving the quality of medicinal plant raw materials (MPM) and preparations of plant origin, rational use of natural resources, etc.

The subject of the educational component "Pharmacognostic analysis of new MPM" is the study of the chemical composition of new types of plants and plant raw materials with the aim of creating phytopreparations and dietary supplements (DS) based on biologically active substances (BAS).

Information content of the educational component. 90 hours of 3.0 ECTS credits are allocated to the study of the educational component.

1. The purpose and tasks of the educational component

The purpose of teaching the educational component "Pharmacognostic analysis of new MPM": to teach students of higher education the methods of pharmacognostic screening of medical plant raw materials (MPM), taking into account the current legal status in Ukraine and the world in the field of phyto remedial production, methods of preparation of various dosage forms, as well as the ability to find and determine by morphological signs official and unofficial medicinal plants in nature, periods of their rational harvesting, drying conditions and use, which is necessary in the practical activity of a pharmacist.

The main **tasks** of the educational component "Pharmacognostic analysis of new MPM" are to study the methods of pharmacognostic screening; to study medicinal plants, which are promising sources of BAS, and can be used to create new phyto remedies; learn the concept of identity and benignity of MPM; explain the methods of harvesting, drying, and storage of MPM depending on the morphological groups and classes of BAS; apply the characteristics of medicinal plants and MPM in professional activity; to develop a plan of measures for the rational procurement of raw materials; apply knowledge of the chemical composition of MPM when collecting, storage and analysis of raw materials of plant; draw a conclusion about the quality of raw materials based on the results of the pharmacopoeial analysis; to interpret the relationship between the chemical structure of BAS and pharmacological action; develop information sheets, make reports for doctors and provide consultations to the population on issues related to medical plants (MP), raw materials and drugs of natural origin.

2. Competencies and planned learning outcomes

The **educational component** "Pharmacognostic analysis of new MPM" ensures that students acquire the following competencies:

integral: the ability to solve typical and complex specialized tasks and practical problems in professional pharmaceutical activity in the field of health care on a socially oriented basis or in the learning process, which involves conducting chemical, biopharmaceutical, biomedical, sociological, etc. research and/or implementation of innovations and is characterized by uncertainty of conditions and requirements; integrate knowledge, critically consider and solve complex issues, make decisions in difficult unpredictable conditions, formulate judgments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility; clearly and unambiguously convey your conclusions and knowledge, rationally substantiating them, to a professional and non-specialist audience.

- **general:**

GC 6. Knowledge and understanding of the subject area and understanding of professional activity.

- **special (professional):**

PC 16. The ability to organize and carry out the procurement of medicinal plant raw materials in accordance with the rules of the Good Practice of Cultivation and Collection of Raw Materials of Plant Origin, as a guarantee of the quality of medicinal plant raw materials and medicines based on them. The ability to predict and calculate ways to solve the problem of preservation and protection of thickets of wild medicinal plants, in accordance with current legislation.

PC 20. Ability to develop methods of quality control of medicinal products, including active pharmaceutical ingredients, medicinal plant raw materials and auxiliary substances using physical, chemical, physico-chemical, biological, microbiological, pharmacotechnological and pharmaco-organoleptic control methods.

Integrative final **program learning outcomes** (PLO), the formation of which is facilitated by the educational component:

PLO 7. Perform professional activities using creative methods and approaches.

PLO 28. Organize and carry out rational procurement of medicinal plant raw materials. Develop and implement measures for the protection, reproduction and rational use of wild species of medicinal plants.

As a result of studying the educational component, the student must:

know:

- characteristics of the raw material base of MP (wild and cultivated);
- regulatory and legal bases for the use of wild resources of the Republic of Belarus at the current stage;
- organization of procurement of MPM;
- a system of rational nature management, protection and reproduction of the resources of the MP;
- general rules for harvesting MPM and measures to protect natural exploitation thickets of MP;
- basics of industrial cultivation of MP;
- MPM standardization system;
- types of MPM classification (chemical, pharmacological, botanical, morphological);
- the nomenclature of MP, MPM and medicinal products of plant, which are allowed for use in medical practice and use in industrial production; • influence of geographical and environmental factors on the productivity of medicinal plants; variability of the chemical composition of MP;
- macroscopic and microscopic methods of analysis of whole, crushed, and briquetted medicinal plant raw materials; features of fee analysis;
- main groups of BASs of natural origin and their physical and chemical properties; the main ways of biosynthesis of the main groups of BAS;
- methods of isolation and purification of BAS from MPM;
- the main qualitative reactions to different groups of BAR and determination of the content of active substances in MPM; biological standardization of MPM;
- numerical indicators that regulate the benignity of MPM and methods of their determination;
- requirements for packaging, marking, transportation and storage of MPM in accordance with the quality control methods (CQM);
- system of standardization and certification of MPM, herbal preparations in Ukraine; documentation of MPM analysis results; legal meaning of the certificate;
- the main methods and forms of MPM application in pharmaceutical practice and industrial production;
- the main directions of use of herbal in medicine;
- safety rules when working with MP and MPM.

be able:

- to determine by morphological features MP in live and herbarium form;
- carry out procurement and drying, primary processing and storage of medicinal raw materials;
- to identify MPM based on microscopic analysis;
- recognize impurities of morphologically similar plant species during collection, reception and certification of raw materials;
- carry out qualitative and microchemical reactions on the main groups of BARs contained in MP and raw materials;
- apply thin-layer chromatography for MPM analysis;
- determine the content of MPM BAS by the methods provided for by the relevant CQM;
- carry out reception of MPM and select samples necessary for its analysis, according to CQM;
- carry out determination of loss in mass during drying, ash and extractive substances in raw materials by the methods provided for by the CQM;
- carry out statistical processing and registration of analysis results.

to possess:

the recipient of a higher education degree (master's degree) must possess *general* and *special (professional)* competencies (*expected learning outcomes*).

4. The educational component structure

Names of content modules and topics	The amount of hours				
	the whole amount	including			
		l.	pract	sem	self-study
Module 1. Pharmacognostic screening of promising types of MPM. Ways of complex MPM processing.					
<i>Content module 1. The current situation of the production of phytopreparations. Standardization. Normative documentation on MPM. Requirements for phytoremedies in Ukraine and various countries of the world. Modern approaches, substantiation and selection of criteria for standardization of phytoremedies and raw materials of plant containing carbohydrates, real lipids, lipoids, terpenes.</i>					
Topic 1. The current situation of the production of phytopreparations. Standardization. Normative documentation on MPM. Requirements for phytoremedies in Ukraine and various countries of the world.	9,0	1,0	2,0	-	6,0
Topic 2. Modern approaches, substantiation and selection of standardization criteria for phytoremedies and raw materials of plant containing carbohydrates and real lipids.	12,0	1,0	3,0	-	8,0
Topic 3. Modern approaches, substantiation and selection of criteria for standardization of phytoremedies and raw materials of plant containing lipoids.	7,5	0,5	2,0	-	5,0
Topic 4. Modern approaches, substantiation and selection of criteria for standardization of phytoremedies and raw materials of plant containing terpenes.	12,0	1,0	3,0	-	8,0
Control content module 1.	8,0	-	3,0	-	5,0
The whole amount of hours for the content module 1	48,5	3,5	13,0	-	32,0
<i>Content module 2. Modern approaches, substantiation and selection of standardization criteria for phytoremedies and raw materials of plant containing phenolic compounds, nitrogen- and sulfur-containing compounds.</i>					
Topic 5. Modern approaches, substantiation and selection of criteria for standardization of phytoremedies and raw materials of plant containing simple phenolic compounds, hydroxycinnamic acids, coumarins, chromones.	14,0	1,0	3,0	-	10,0
Topic 6. Modern approaches, substantiation and selection of standardization criteria for phytoremedies and raw materials of plant containing anthracene derivatives and tannins.	7,5	0,5	2,0	-	5,0
Topic 7. Modern approaches, substantiation and selection of standardization criteria for phytoremedies and raw materials of plant containing nitrogen- and sulfur-containing compounds.	11,0	1,0	2,0	-	8,0
Control content module 2.	8,0	-	3,0	-	5,0
The whole amount of hours for the content module 2	40,5	2,5	10,0	-	28,0
Semester credit from the module 1	1,0	-	1,0	-	-
<i>Total for Module 1</i>	90,0	6,0	24,0	-	60,0

5. Content of the program of the educational component

Module 1. Pharmacognostic screening of promising types of MPM. Ways of complex MPM processing.

Content module 1. *The current situation of the production of phytopreparations. Standardization. Normative documentation on MPM. Requirements for phytoremedies in Ukraine and various countries of the world. Modern approaches, substantiation and selection of criteria for standardization of phytoremedies and raw materials of plant containing carbohydrates, real lipids, lipoids, terpenes.*

Topic 1. **The current situation of the production of phytopreparations. Standardization. Normative documentation on MPM. Requirements for phytoremedies in Ukraine and various countries of the world.**

Ways of complex MPM processing. Preparation and analysis of lipophilic substances from promising types of medicinal plant and mineral raw materials.

Topic 2. Modern approaches, substantiation and selection of standardization criteria for phytotherapies and raw materials of plant containing carbohydrates and real lipids. General characteristics. Interaction with other drugs and food products. Preparation and analysis of carbohydrates and true lipids from promising types of plant raw materials.

Topic 3. Modern approaches, substantiation and selection of criteria for standardization of phytotherapies and raw materials of plant containing lipoids. General characteristics. Interaction with other drugs and food products. Production and analysis of lipoids from promising types of plant raw materials.

Topic 4. Modern approaches, substantiation and selection of criteria for standardization of phytotherapies and raw materials of plant containing terpenes. General characteristics. Interaction with other drugs and food products. Production and analysis of terpenes from promising types of plant raw materials.

Content module 2. Modern approaches, substantiation and selection of standardization criteria for phytotherapies and raw materials of plant containing phenolic compounds, nitrogen- and sulfur-containing compounds.

Topic 5. Modern approaches, substantiation and selection of standardization criteria for phytotherapies and raw materials of plant containing simple phenols, hydroxycinnamic acids, coumarins, chromones. General characteristics. Interaction with other drugs and food products. Production and analysis of simple phenols, hydroxycinnamic acids, coumarins, chromones from promising types of plant raw materials.

Topic 6. Modern approaches, substantiation and selection of standardization criteria for phytotherapies and raw materials of plant containing anthracene derivatives and tannins. General characteristics. Interaction with other drugs and food products. Production and analysis of anthracene derivatives and tannins from promising types of plant raw materials.

Topic 7. Modern approaches, substantiation and selection of standardization criteria for phytotherapies and raw materials of plant containing nitrogen- and sulfur-containing compounds. General characteristics. Interaction with other drugs and food products. Production and analysis of nitrogen- and sulfur-containing compounds from promising types of plant raw materials.

6. Topics of lectures

№	Name of topic	The amount of hours
1.	Topic 1. The current situation of the production of phytopreparations. Standardization. Normative documentation on MPM. Requirements for phytotherapies in Ukraine and various countries of the world.	1,0
2.	Topic 2. Modern approaches, substantiation and selection of standardization criteria for phytotherapies and raw materials of plant and containing carbohydrates and real lipids.	1,0
3.	Topic 3. Modern approaches to the analysis of raw materials of plant containing lipoids.	0,5
4.	Topic 4. Modern approaches to the analysis of raw materials of plant containing terpenes.	1,0
5.	Topic 5. Modern approaches to the analysis of raw materials of plant containing simple phenolic compounds, hydroxycinnamic acids, coumarins, chromones.	1,0
6.	Topic 6. Modern approaches to the analysis of raw materials of plant containing anthracene derivatives and tannins.	0,5
7.	Topic 7. Modern approaches to the analysis of raw materials of plant containing nitrogen- and sulfur-containing compounds.	1,0
The whole amount of hours		6,0

7. Topics of seminars

Not provided for in the working curriculum.

8. Topics of Practical lessons

№	Name of topic	The amount of hours
1.	Topic 1. The current situation of the production of phytopreparations. Standardization. Normative documentation on MPM. Requirements for phytoremedies in Ukraine and various countries of the world.	2,0
2.	Topic 2. Modern approaches, substantiation and selection of standardization criteria for phytoremedies and raw materials of plant containing carbohydrates and real lipids.	3,0
3.	Topic 3. Modern approaches to the analysis of raw materials of plant containing lipoids.	2,0
4.	Topic 4. Modern approaches to the analysis of raw materials of plant containing terpenes.	3,0
5.	Control content module 1.	3,0
6.	Topic 5. Modern approaches to the analysis of raw materials of plant containing simple phenolic compounds, hydroxycinnamic acids, coumarins, chromones.	3,0
7.	Topic 6. Modern approaches to the analysis of raw materials of plant containing anthracene derivatives and tannins.	2,0
8.	Topic 7. Modern approaches to the analysis of raw materials of plant containing nitrogen- and sulfur-containing compounds.	2,0
9.	Control content module 2.	3,0
10.	Semester credit from the module 1	1,0
The whole amount of hours		24,0

9. Topics of laboratorial lessons

Not provided for in the working curriculum.

10. Self-study work

№	Name of topic	The amount of hours
1.	Topic 1. The current situation of the production of phytopreparations. Standardization. Normative documentation on MPM. Requirements for phytoremedies in Ukraine and various countries of the world.	6,0
2.	Topic 2. Modern approaches, substantiation and selection of standardization criteria for phytoremedies and raw materials of plant containing carbohydrates and real lipids.	8,0
3.	Topic 3. Modern approaches to the analysis of raw materials of plant containing lipoids.	5,0
4.	Topic 4. Modern approaches to the analysis of raw materials of plant containing terpenes.	8,0
5.	Control content module 1.	5,0
6.	Topic 5. Modern approaches to the analysis of raw materials of plant containing simple phenolic compounds, hydroxycinnamic acids, coumarins, chromones.	10,0
7.	Topic 6. Modern approaches to the analysis of raw materials of plant containing anthracene derivatives and tannins.	5,0
8.	Topic 7. Modern approaches to the analysis of raw materials of plant containing nitrogen- and sulfur-containing compounds.	8,0
9.	Control content module 2.	5,0
The whole amount of hours		60,0

Tasks for Self-study work

Topic 1. The current situation of the production of phytopreparations. Standardization. Normative documentation on MPM. Requirements for phyto remedies in Ukraine and various countries of the world. Ways of complex MPM processing. Preparation and analysis of lipophilic substances from promising types of medicinal plant and mineral raw materials.

Topic 2. General characteristics. Interaction with other drugs and food products. Preparation and analysis of carbohydrates and true lipids from promising types of plant raw materials.

Topic 3. General characteristics. Interaction with other drugs and food products. Production and analysis of lipoids from promising types of plant raw materials.

Topic 4. General characteristics. Interaction with other drugs and food products. Production and analysis of terpenes from promising types of plant raw materials.

Topic 5. General characteristics. Interaction with other drugs and food products. Production and analysis of simple phenols, hydroxycinnamic acids, coumarins, chromones from promising types of plant raw materials.

Topic 6. General characteristics. Interaction with other drugs and food products. Production and analysis of anthracene derivatives and tannins from promising types of plant raw materials.

Topic 7. General characteristics. Interaction with other drugs and food products. Production and analysis of nitrogen- and sulfur-containing compounds from promising types of plant raw materials.

11. Criteria and evaluation order of educational outcomes.

Scheme of accrual and distribution of points for full-time higher education applicants

Current testing and independent work Module 1									Total
Content module 1					Content module 2				60-100
T 1	T 2	T 3	T4	CM1 T 1-4	T 5	T 6	T 7	CM2 T5-7	
3-5	3-5	3-5	3-5	18-30	3-5	3-5	3-5	21-35	

The criteria for evaluating the knowledge and skills of students of higher education from the educational component "Pharmacognosy with the basics of resource science" were developed in accordance with the "Regulations on the procedure for evaluating students' knowledge in the credit-modular organization of the educational process at the National University of Pharmacy". The evaluation of the success of a higher education student in the educational component is a rating, presented on a one-point scale and defined according to the ECTS system and the traditional scale adopted in Ukraine.

Evaluation of the current educational activity (carried out during each class) - test written control, control of theoretical knowledge, practical skills and abilities.

Evaluation (in points) is reflected in the calendar and thematic plans of practical classes.

Evaluation criteria	Points
<p>Theoretical training:</p> <ul style="list-style-type: none"> - showed in-depth knowledge of the theoretical material on the topic of the lesson, which is presented in the textbook, lecture texts and additional literature; - well completed the written homework on working out the questions and objects of the independent work; - gave comprehensive answers to the questions of initial knowledge control and received "5". <p>Practical training:</p> <ul style="list-style-type: none"> - determined by morphological features MP in herbarium form, gave its full characteristics; - demonstrated a good mastery of the technique of macroscopic analysis of MPM; - recognized impurities of morphologically similar plant species; - identified MPM based on microscopic analysis; - conducted a qualitative/quantitative analysis of the main group of biologically active substances contained in MPM; - carried out MPM reception and took samples necessary for its analysis, according to quality control methods; - determined the content of loss in mass during drying in MPM; ashes; extractive substances; degree of infestation by pests; 	5

<ul style="list-style-type: none"> - determined the morphological and anatomical characteristics of individual components, as well as the numerical indicators of official medicinal collections by methods of macro-, microscopic and phytochemical analysis; - submitted a well-designed laboratory journal to the teacher for verification. 	
<p>Theoretical training:</p> <ul style="list-style-type: none"> - showed a good knowledge of the theoretical material on the topic of the lesson, which is presented in the textbook and lecture texts; - completed a written homework on working out the issues and objects of the independent work; - gave incomplete answers to the questions of initial knowledge control and received "4". <p>Practical training:</p> <ul style="list-style-type: none"> - determined by morphological features MP in herbarium form, but gave an incomplete description of it; - demonstrated mastery of the technique of macroscopic analysis of MPM; - recognized impurities of morphologically similar plant species; - identified MPM based on microscopic analysis; - conducted/conducted with small errors qualitative/quantitative analysis of the main group of biologically active substances contained in MPM; - carried out MPM reception and took samples necessary for its analysis, according to quality control methods; - determined / determined with small errors in MPM the content of loss in mass during drying; ashes; extractive substances; degree of infestation by pests; - determined / determined with small errors the morphological and anatomical features of individual components, as well as the numerical indicators of official medicinal collections by methods of macro-, microscopic and phytochemical analysis. - handed the prepared laboratory journal to the teacher for verification. 	4
<p>Theoretical training:</p> <ul style="list-style-type: none"> - showed knowledge of the theoretical material on the topic of the lesson in the amount that is considered necessary and sufficient to perform the practical part of the lesson; - completed a written homework on processing questions and objects of independent work with errors; - gave incomplete answers to the initial knowledge control questions and received a "3". <p>Practical training:</p> <ul style="list-style-type: none"> - determined by morphological features MP in herbarium form, but gave an incomplete description of it; - demonstrated not very good mastery of the technique of macroscopic analysis of MPM; - did not recognize impurities of morphologically similar plant species; - identified MPM based on microscopic analysis; - carried out qualitative/quantitative analysis of the main group of biologically active substances contained in MPM with errors; - carried out MPM reception and took samples necessary for its analysis, according to quality control methods; - incorrectly determined the content of loss in mass during drying in MPM; ashes; extractive substances; degree of infestation by pests; - determined with errors the morphological and anatomical features of individual components, as well as the numerical indicators of official medicinal collections by methods of macro-, microscopic and phytochemical analysis. - handed over to the teacher for checking a laboratory journal with minor errors. 	3
<p>Theoretical training:</p> <ul style="list-style-type: none"> - did not show/showed knowledge of the theoretical material on the subject of the lesson in an amount that is not considered sufficient to perform the practical part of the lesson; - did not complete / completed written homework on processing questions and objects of independent work with gross errors; - did not give/gave incomplete answers to questions 1-4 of the initial knowledge control. <p>Practical training:</p> <ul style="list-style-type: none"> - did not determine / determined with gross errors according to the morphological features of MP in the herbarium form; - did not demonstrate / demonstrated with gross errors mastery of the technique of macroscopic analysis of MPM; - did not recognize impurities of morphologically similar plant species; - did not identify /identified with gross errors of MPM based on microscopic analysis; 	0-2

<ul style="list-style-type: none"> - did not conduct / conducted with gross errors qualitative / quantitative analysis of the main group of biologically active substances contained in MPM; - did not conduct MPM reception and did not take samples necessary for its analysis, according to quality control methods; - did not determine / determined with gross errors in MPM the content of loss in mass during drying; ashes; extractive substances; degree of infestation by pests; - did not determine / determined with gross errors morphological and anatomical features of individual components, as well as numerical indicators of official medicinal collections by methods of macro-, microscopic and phytochemical analysis. - handed over to the teacher for checking the laboratory journal, which was designed with major flaws. 	
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If a student of higher education is unprepared for a practical class, he can be admitted to the practical part of the class only after an individual conversation with the teacher on the subject of the class.

**Evaluation criteria
initial controls of practical classes on the Pharmacognostic analysis of new MPM**

№ question	Evaluation criteria	Points
1	The physicochemical properties of the BAS class, its methods of obtaining, identification, quantification, numerical indicators of the quality of MPM, biological action and application of MPM are given in full.	5
	Incomplete or minor errors are given on the issues of physico-chemical properties of the BAS class, its methods of obtaining, identification, methods of quantitative determination of BAS, the value of numerical indicators of the quality of MPM, biological action and application of MPM.	4
	The physico-chemical properties of the BAS class, its methods of obtaining, identification, quantitative determination, numerical quality indicators of MPM, biological effect and application of MPM are given with errors and inaccuracies.	3

Criteria for evaluating content modules 1-2 from the Pharmacognostic analysis of new MPM

Evaluation criteria	Points
A complete answer has been provided regarding the sample preparation of MPM for chromatographic studies, the correct selection of the extractant for MPM extraction, the reagent for carrying out identification reactions, the method of quantitative analysis of BAS, the method of determining numerical indicators. The problem is correctly solved with full justification of its solution.	5
There is an incomplete answer to the questions regarding the sample preparation of MPM for chromatographic studies, the choice of extractant for MPM extraction, reagents for carrying out identification reactions, the method of quantitative analysis of BAS, the method of determining numerical indicators. The solution to the problem is not fully substantiated, there are not significant errors in the solution.	4
Partly and not all questions were answered regarding sample preparation of MPM for chromatographic studies, choice of extractant for MPM extraction, reagents for carrying out identification reactions, method of quantitative analysis of BAS, method of determining numerical indicators. The problem was solved with errors, no justification for solving the problem was given.	3

12. Forms of progress and semester supervision of academic achievements

Current control of theoretical and practical knowledge in the form of an oral, written and test survey using standardized methods for diagnosing knowledge, abilities and skills is carried out at each laboratory session in accordance with the specific goals of the topic and during the individual work of the teacher for topics that are not included in the structure of the lesson and are developed by the student of higher education independently.

Control of content modules - control of theoretical knowledge in the form of an oral, written and test survey of applicants for higher education, as well as practical skills in determining the identity and benignity of MPM. Control refers to knowledge and skills, both acquired in classes, and objects and topics developed independently by students of higher education.

Form of control - semester credit.

13. Methodological support

1. Curriculum of the educational component.
2. Work program of the educational component.
3. Syllabus of the educational component.
4. Calendar-thematic plans for lectures and practical classes.
5. Textbooks, workshops, etc.
6. List of theoretical questions for independent work of applicants for higher education.
7. List of theoretical questions for monitoring content modules.
8. Collection of MP herbariums and samples of MPM.

14. Reading suggestions

The main reading suggestions

1. Pharmacognosy: textbook for higher school students / V.S. Kyslychenko, L.V. Upyr, Ya.V. Dyakonova, V.Yu. Kuznetsova, I.G. Zinchenko, O.A. Kyslychenko; ed. by V.S. Kyslychenko. – Kharkiv : NUPh : GoldenPages, 2011. – 552 p.; il.
2. Medicinal plants resource science : handbook for students of higher schools / V.S. Kyslychenko, L.V. Upyr, I.G. Zinchenko, O.A. Kyslychenko, S.I. Stepanova; ed. by V.S. Kyslychenko. – Kharkiv : NUPh : Golden Pages, 2012. – 168 p.
3. Pharmacognosy: textbook for students of higher / V.S. Kyslychenko, L.V. Lenchyk, I.G. Gurieva et al.; ed. by V.S. Kyslychenko. – Kharkiv : NUPh : Golden Pages, 2019. - 584 p.
4. Gokhale S. B., Kokate C. K., Purohit A. P. A textbook of Pharmacognosy. 29th Edition. 2017. – 284 p.
5. Kumar N. A Textbook Of Pharmacognosy. A.I.T.B.S. Publishers, India. 2010. – 502 p.13.
6. Shah B. N., Seth A.K. Textbook of Pharmacognosy and Phytochemistry. Elsevier. 2010. – 587 p.
7. Singh A. A Textbook of Pharmacognosy. Pharma Book Syndicate. 2013. – 836 p.
8. Text book of Pharmacognosy and Phytochemistry / A. Dhole, V. Dhole, V. Yeligar, Ch. Magdum. Pharma Career Publication, 2019. – 778 p.

Supplementary reading suggestions

1. British Pharmacopoeia Commission, 2016. British Pharmacopoeia. London: TSO.
2. European Pharmacopoeia. 8th ed including supplements 1 (2014), 2 (2014), 3 (15), 4 (15), 5(2015). Council of Europe, Strasbourg, France. 2014.
3. Textbook of Pharmacognosy and Phytochemistry - E-Book / Shah B., Seth A. – Elsevier Health Sciences, 2012. – 620 p.
4. European Pharmacopoeia. 8th ed including supplements 1 (2014), 2 (2014), 3 (15), 4 (15), 5(2015). Council of Europe, Strasbourg, France. 2014.

15. Electronic resources, including the Internet

1. Website of the Department of Pharmacognosy and Nutriciology – www.cnc.nuph.edu.ua
2. Website of the NUPh library – <http://lib.nuph.edu.ua>
3. Electronic archive of the NUPh – <http://dSPACE.nuph.edu.ua>
4. Center for Distance Technologies of the National Academy of Sciences of Ukraine – pharmel.kharkiv.edu
5. NUPh. Online tests – <http://tests.nuph.edu.ua>
6. Vernadsky National Library of Ukraine – <http://www.nbuv.gov.ua>
7. V.G. Korolenko Kharkiv State Scientific Library – <http://korolenko.kharkov.com>