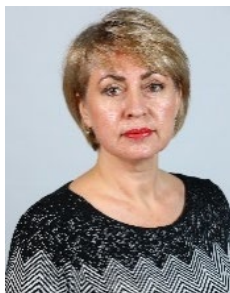


SYLLABUS OF THE EDUCATIONAL COMPONENT

PHARMACEUTICAL BOTANY

for applicants for higher education of the 1st and 2nd years of study full-time higher education
(2023/2024 year of study)
of educational program "Pharmacy"
in specialty "226 Pharmacy, industrial pharmacy"
specialization 226.01 Pharmacy
field of knowledge "22 Healthcare"
training for second (master's) level of higher education

TEACHERS



GONTOVA
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MASHTALER
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- 1. The name of higher education establishment and department:** the National University of Pharmacy, Pharmacognosy and Nutciology Department
- 2. Address of the department:** Kharkiv, street Valentinovskaya, 4, 4th floor, phone numb. +38(0572)67-93-63.
- 3. Web site of the department:** <https://cnc.nuph.edu.ua/>

4. Information about teachers:

Gontova Tetiana Mykolayivna

The Doctor of Pharmacy, Professor of the institution of higher education, the Pharmacognosy and Nutciology Department of National University of Pharmacy. Experience of scientific and pedagogical activity - 26 years. Teach the course: "Pharmaceutical Botany". Research interests: pharmacognostic study and standardization of medicinal plant raw materials.

Mashtaler Viktoriya Volodymyrivna

PhD of Pharmacy, associate professor of the institution of higher education, the Pharmacognosy and Nutciology Department of National University of Pharmacy. Experience of scientific and pedagogical activity - 12 years. Teach the course: "Pharmaceutical Botany". Research interests: morphological and anatomical study of medicinal plants.

5. Consultations take place online according to the schedule posted on the website of the Department of Pharmacognosy and Nutrition every Thursday from 12.10 to 12.50. Consultations are conducted by a teacher who reads the discipline.

6. Summary of the educational component: The educational component "Pharmaceutical Botany" is a mandatory educational component for the second (master's) level in the specialty 226 "Pharmacy, industrial pharmacy" of the educational program "Pharmacy". After studying the educational component, higher education applicants will get knowledge about medicinal plants, their anatomical and morphological structure, the basics of life, reproduction, geographical distribution, classification, applications, basics of ecology, structure, development and placement of plant communities on the globe.

7. The purpose statement of studying the educational component: to provide basic theoretical knowledge, practical skills and abilities in botany, which are necessary during the analysis of medicinal plant raw materials, determination of macro- and microscopic diagnostic signs, systematic belonging of medicinal plant species, conditions of their growth and use in medicine.

8. Competences in accordance with the educational program:

Soft-skill / general (GC):

GC 12. Ability to conduct research at an appropriate level.

Hard-skill / Professional (special) competences (PC):

PC 2. The ability to collect, interpret and apply data necessary for professional activity, research and implementation of innovative projects in the field of pharmacy.

PC 10. The ability to ensure the proper storage of medicines and other products of the pharmacy assortment in accordance with their physicochemical properties and the rules of Good Storage Practice (GSP) in healthcare facilities.

9. The program learning outcomes: (PLO):

PLO 17. Predict and determine the impact of environmental factors on the quality and consumer characteristics of medicinal products of natural and synthetic origin and other products of the pharmacy assortment, organize their storage in accordance with their physicochemical properties and the rules of Good Storage Practices (GSP).

10. Status of the educational component: compulsory.

11. Prerequisites of the educational component: in order to successfully study and acquire competencies from the educational component "Pharmaceutical Botany", the higher education applicant needs the knowledge obtained during the study of the educational components "Biology with the basics of genetics", "General and inorganic chemistry", "Organic chemistry", "English language", "Latin language in Pharmacy".

12. The volume of the educational component: 8 ECTS credits, 240 hours, of which lectures – 24 hours, practical classes – 76 hours, independent work – 140 hours.

13. Organization of training

The format of teaching the educational component: conducting lectures, practical classes.

Content of the educational component:

Модуль 1. Anatomy and morphology of vegetative organs of plants

Content module 1. Structural-functional, and chemical features of plant cells and tissues, their signs that have diagnostic significance

Topic 1. Introduction to pharmaceutical botany. Fundamentals of botanical microtechnique.

Topic 2. Modern understanding of the structure of a plant cell. Structures of a plant cell that have diagnostic significance in microscopic analysis of plant raw materials.

Topic 3. Vacuoles and cell sap.

Content module 2. Structural-functional, and chemical features of tissues, their signs that have diagnostic significance

Topic 4. Plant tissue and their classification.

Topic 5. Structural-functional and topographic characteristics of meristematic, covering, basic and secretory tissues.

Topic 6. Structural-functional and topographic characteristics of mechanical and conducting tissues. Conductive bundles.

Content module 3. Morphological and anatomical structure and functions of vegetative plant organs

Topic 7. Introduction to morphology and anatomy of plants. Plant organs and integrity of a plant organism. Propagation of plants.

Topic 8. Anatomy of the root. Anatomy of the stem and rhizome of monocots.

Topic 9. Anatomy of the stem and rhizome of dicots. Anatomy of the stem of arboreal plants.

Topic 10. Anatomical structure of the leaf.

Topic 11. Morphology of the roots and shoots and their metamorphoses. Vegetative propagation.

Module 2. Morphology of generative organs of plants. A systematic review of some families of medicinal plants and mushrooms with elements of phytoecology and phytocenology

Content module 4. Structure and function of generative organs of plants, their taxonomic and diagnostic signs. Sexual propagation of plants

Topic 12. Generative organs of the plant. Morphology of the flower and inflorescence.

Topic 13. Sexual propagation of flowering plants.

Topic 14. Morphology of the fruit, seed and collective fruit.

Content module 5. Systematics of plants. An overview of some families of Ranunculidae, Caryophyllidae, Dilleniidae, and Rosidae subclasses, and their medicinal representatives

Topic 15. Introduction to plant taxonomy. Fundamentals of botanical classification. Angiosperms. System of Magnoliophyta.

Topic 16. An overview of Brassicaceae and Leguminosae families and their medicinal representatives.

Topic 17. An overview of Ericaceae and Rosaceae families and their medicinal representatives.

Topic 18. An overview of Polygonaceae and Apiaceae families and their medicinal representatives.

Topic 19. An overview of Poaceae family and its medicinal representatives.

Content module 6. *An overview of some families of Lamiidae, Asteridae, and Liliidae subclasses and their medicinal representatives, some medicinal representatives of monocotyledons and dicotyledons, gymnosperms, ferns, algae, fungi, and lichens classes. Elements of phytoecology and geobotany*

Topic 20. An overview of Solanaceae and Lamiaceae families and their medicinal representatives.

Topic 21. An overview of Asteraceae family and its medicinal representatives.

Topic 22. An overview of flowering medicinal plants of different families common in Ukraine.

Topic 23. An overview of medicinal representatives of gymnosperms, ferns, algae, fungi, and lichens common in Ukraine.

Topic 24. Elements of phytoecology and geobotany. Protection of flora, rational use and preservation of medicinal plant resources.

14. Forms and types of academic achievements supervision:

Forms and types of academic achievements supervision:

Progress supervision: theoretical and practical knowledge are in the form of an oral examination of the performance of tasks of extracurricular independent work; selective oral survey; written control of assimilation of the material of the topic of each lesson, individual sections of the educational component, content modules; computer control of Licensing Exam tests on content module topics; oral defense of educational and research work.

Supervision of content modules: is conducted in the last classes of studying topics of content modules. The form of knowledge diagnosis of higher education applicants is written control and testing based on the test base of the licensing exam Krok 1 (botany).

Semester exam: answers to test questions (theoretical part); description of objects and medicinal plants in accordance with the proposed points (practical part).

Semester control form: semester credit, semester exam.

Conditions for admission to the supervision of content modules: applicants of higher education who have attended all practical classes or completed missed classes and completed all types of work provided for by the work program of the educational component are allowed to control the content modules.

Conditions for admission to semester supervision: applicants of higher education who have attended all practical classes or made up for missed classes, completed all types of work provided for in the work program of the educational component, and when studying the content module (modules) have scored a number of points not less than the minimum (current rating) are admitted (the semester control is more than 60 points).

15. Evaluation system of the educational component

Evaluation system of the educational component: *the results of the semester supervision in the form of a semester credit are evaluated on a 100-point, non-differentiated scale ("passed", "failed") and on the ECTS scale.*

The results of semester supervision in the form of a semester exam are evaluated according to the ECTS scale, a 100-point scale and a four-point scale ("excellent", "good", "satisfactory", "unsatisfactory").

Points from the educational component are calculated according to this ratio::

Types of evaluation	Maximum number of points (% of the number of points per module - for content modules)
Module 1	
Content module 1. Structural, functional and chemical features of plant cells, their signs of diagnostic significance <i>Evaluation of topics 1-3 (work in classes 1-2): performance of extracurricular independent work tasks; performance of classroom work tasks, oral survey, defense of independent educational and research work, written control.</i> <i>Control of content module 1 (work in lesson 2): written control and testing based on the test base of the licensing exam Krok 1 (botany).</i>	25 (25%)

Content module 2. Structural and functional features of plant tissues, their signs that have diagnostic value in the analysis of plant raw materials <i>Evaluation of topics 4-6 (work in classes 3-4): performance of extracurricular independent work tasks; performance of classroom work tasks, oral examination, written control.</i> <i>Control of content module 2 (work in lesson 4): written control and testing based on the test base of the licensing exam Krok 1 (botany).</i>	25 (25%)
Content module 3. Anatomical and morphological structure and functions of vegetative organs of plants <i>Evaluation of topics 7-11 (work in classes 5-9): performance of extracurricular independent work tasks; performance of classroom work tasks, oral examination, defense of independent educational and research work, written control.</i> <i>Control of content module 3 (work in lesson 10): written control and testing based on the test base of the licensing exam Krok 1 (botany).</i>	50 (50%)
Semester Supervision of Module 1	100
Module 2	
Content module 4. Structure and functions of generative organs of plants, their taxonomic and diagnostic features. Sexual reproduction of plants <i>Evaluation of topics 12-14 (work in classes 11-12): performance of extracurricular independent work tasks; performance of classroom work tasks, defense of independent educational and research work, written control.</i> <i>Control of content module 4 (work in lesson 12): written control and testing based on the test base of the licensing exam Krok 1 (botany).</i>	30 (30%)
Content module 5. Systematics of plants. Review of some families of subclasses Ranunculida, Caryophyllida, Dileniida, Rosida, Liliida and their medicinal representatives <i>Assessment of topics 15-19 (work in classes 13-15): performance of extracurricular independent work tasks; performance of classroom work tasks, oral examination, written control.</i> <i>Control of content module 5 (work in lesson 15): written control and testing based on the test base of the licensing exam Krok 1 (botany).</i>	30 (30%)
Content module 6. Review of some families of the subclasses Lamiida, Asterida and their medicinal representatives, some medicinal representatives of the monocotyledonous and dicotyledonous, gymnospermous, higher spore classes, algae, fungi and lichens. Elements of phytocology and geobotany <i>Assessment of topics 20-24 (work in classes 16-19): performance of extracurricular independent work tasks; performance of classroom tasks, oral examination, written control, test control.</i> <i>Control of content module 6 (work in lesson 19): written control and testing based on the test base of the licensing exam Krok 1 (botany).</i>	40 (40%)
Semester Supervision of Module 2	100

The individual work of applicants for higher education is evaluated during the progress supervision and during the content module supervision.

16. Academic policies of the educational component:

Academic Integrity Policy. It is based on the principles of academic integrity stated in the POL "On measures to prevent cases of academic plagiarism at the National University of Pharmacy". Cheating during the evaluation of an applicant for higher education during supervision activities in practical (seminar, laboratory) classes, supervision of content modules and the semester exam is prohibited (including the use of mobile devices). Abstracts must have correct text references to the used literature. The detection of signs of academic dishonesty in the student's written work is a reason for the teacher not to credit it.

Class attendance policy. An applicant for higher education is obliged to attend classes (POL "On the organization of the educational process of the National University of Pharmacy ") according to the schedule (<https://nuph.edu.ua/rozklad-zanyat/>), to observe ethical norms of behavior.

Policy regarding deadlines, working out, rating increase, liquidation of academic debts. The completion of missed classes by an applicant for higher education is carried out in accordance with the POL

"Regulations on the completion of missed classes by applicants and the procedure for eliminating academic differences in the curricula of the National University of Pharmacy" in accordance with the schedule for working out missed classes established by the department. Increasing the rating and liquidating academic debts from the educational component is carried out by the applicants in accordance with the procedure specified in the POL "On the procedure for evaluating the results of training of applicants for higher education at the National University of Pharmacy ". Applicants of higher education are obliged to comply with all deadlines set by the department for the completion of written works from the educational component. Works that are submitted late without valid reasons are assessed at a lower grade - up to 20% of the maximum number of points for this type of work.

Policy on appeals of evaluation of the educational component (appeals). Applicants for higher education have the right to contest (appeal) the evaluation of the educational component obtained during control measures. The appeal is carried out in accordance with the POL "Regulations on appealing the results of the final supervision of knowledge by applicants of higher education at the National University of Pharmacy".

17. Information and educational and methodical support of the educational component:

<p>The main reading suggestions</p>	<ol style="list-style-type: none"> 1. Pharmaceutical botany : textbook / Т. М. Gontova [et al.]; edited by Т. М. Gontova. – Ternopil : TSMU , 2013. – 380 p. 2. Сербін, А. Г. Фармацевтична ботаніка : підруч. для вузів / А. Г. Сербін, Л. М. Сіра, Т. О. Слободянюк ; за ред. Л. М. Сірої. – Вінниця : Нова Книга, 2015. – 488 с. 3. Test items with explains for preparing for license examination KROK-1 “Pharmacy” (BOTANY) / [Gontova Т. М., Kriukowa Ya. S., Gaponenko V. P., Mashtaler V. V., Mala O. S.]; under the editorship of Kriukowa Ya. S. – Kh.: NUPh, 2017. – 91 p. 4. Фотогербарий лекарственных растений=Photoherbarium of medicinal plants : учеб. пособие для студентов вузов / Т. Н. Гонтовая [и др.]; под общ. ред. Т. Н. Гонтовой, В. П. Руденко. – Харьков : НФаУ : Золотые страницы, 2017. – 240с.
<p>Supplementary reading suggestions for in-depth study of the educational component</p>	<ol style="list-style-type: none"> 1. Гонтова Т. М. Фармацевтична ботаніка. Анатомія, морфологія та систематика рослин з основами фітоєкології і фітоценології: метод. рек. до викон. аудит. та позааудит. роботи / Т. М. Гонтова, В. П. Руденко, О. В. Філатова. – Харків : НФаУ, 2019. – 119 с. 2. Атлас по анатомии растений (растительная клетка, ткани, органы) : учеб. пособие для студ. высш.учеб. заведений / А. Г. Сербин [и др.]. – Х. : Колорит, 2006. – 86 с. 3. Pharmaceutical botany : textbook / Т. М. Gontova [et al.]; edited by Т. М. Gontova. – Ternopil : TSMU ,2013. – 380 p. 4. Пішак, В. П. Фармацевтична ботаніка : Морфологія / В. П. Пішак, В. В. Степанчук. – Чернівці : Медуніверситет, 2013. – 224 с. 5. Фармацевтична енциклопедія / гол. ред. ради та автор передмови В. П. Черних. – 3-тє вид. перероб. і допов. – К. : «МОРІОН», 2016. – 1952 с. 6. Державна Фармакопея України. Доповнення 2 / ДП «Український науковий фармакопейний центр якості лікарських засобів». – 2-ге вид. – Харків : ДП «Український науковий фармакопейний центр якості лікарських засобів», 2018. – 336 с. 7. Державна Фармакопея України. Доповнення 3 / ДП «Український науковий фармакопейний центр якості лікарських засобів». – 2-ге вид. – Харків : ДП «Український науковий фармакопейний центр якості лікарських засобів», 2018. – 416 с. 8. Державна Фармакопея України. Доповнення 4 / ДП «Український науковий фармакопейний центр якості лікарських засобів». – 2-ге вид. – Харків : ДП «Український науковий фармакопейний центр якості лікарських засобів», 2020. – 600 с.

	Державна Фармакопея України. Доповнення 5 / ДП «Український науковий фармакопейний центр якості лікарських засобів». – 2-е вид. – Харків: ДП «Український науковий фармакопейний центр якості лікарських засобів», 2021. – 424 с.
Current electronic information resources (magazines, websites) for in-depth study of the educational component	Сайт кафедри фармакогнозії та нутріціології. – http://сnc.nuph.edu.ua Наукова бібліотека НФаУ – http://lib.nuph.edu.ua Електронний архів НФаУ – http://dspace.nuph.edu.ua Національна бібліотека України імені В. І. Вернадського – http://www.nbuv.gov.ua НФаУ. Тести on-line – http://tests.nuph.edu.ua/
Moodle distance learning system	Центр дистанційних технологій НФаУ https://pharmel.kharkiv.edu/moodle/course/view.php?id=1086

18. Technical support and software of the educational component: microscopes Micmed-1 with backlight; microscopes MC-10; monocular microscopes Granum W1001; Biolam microscopes; stereomicroscope; microscopes microscopes Granum L20, CCD video camera 5.0 Mpix USB 2,0 (universal for microscopes+ПЗ); microscope (MICROmed) XS-4130, microscope " Lumam P-8", microscopes PB-2610 monocular model PB 2610, microscopes (MICROmed) XS-5510, personal computers System unit VT Computers CPU INTEL Pentium G4400; workstation R-Line with a processor Intel Core i5-7400 (2019p); Personal Computer №1HP 200 G3 i3-8130U 21.5 (2019); Personal Computer №2 R-Line with a processor Intel Core i3-810, MS Windows 10 Professional; MS Office Standard 2016; MS Windows 10 Professional; MS Office Standard 2019; access point Wi-Fi, multimedia projector; multimedia screen; herbarium collection – more than 3000; medicinal plant raw materials collection - more than 500.