MINISTRY OF HEALTH OF THE REPUBLIC OF BELARUS
Educational Institution
BELARUSIAN STATE MEDICAL UNIVERSITY

APPROVED
by Rector of the Educational Institution
«Belarusian State Medical University»
S.P.Rubnikovich
28.06.2023
Reg. No. UD-4-07-0912-1-1-2/2324/p.

PROGRAM
OF PRACTICAL SESSIONS

IN BOTANICAL PRACTICE

for the specialty
7-07-0912-01 «Pharmacy»

2023

The program is based on the educational standard of higher education in the specialty 7-07-0912-01 « Pharmacy », approved and enforced by the Resolution of the Ministry of Education of the Republic of Belarus from 01.09.2023 № 302/127; and on the curriculum of the higher educational institution in the specialty 7-07-0912-01 «Pharmacy», approved 17.05.2022, registration No7-07-0912-01 /2324/mf.

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RECOMMENDED FOR APPROVAL:

By the Organization of Pharmacy Department of educational institution «Belarusian State Medical University» (protocol № 10 from 16.05.2023);

By the Council of the Medical Faculty for International Students of the educational institution «Belarusian State Medical University»
(protocol №. 9 of 27.06.2023)

EXPLANATORY NOTE

The purpose of the students' botanical practice is to consolidate and deepen the knowledge gained in the process of theoretical training, to master students with practical skills in solving problems related to the use of medicinal plants and plant resources, to form the necessary skills and competencies necessary for subsequent independent professional activity in the specialty «Pharmacy».

The educational practice of students is aimed at the formation of their practical skills in the studied academic disciplines, the consolidation of theoretical knowledge, the development of primary skills.

The objectives of the educational practice are:

the expansion and systematization of knowledge gained during the study of the discipline «Pharmaceutical Botany»;

the formation of students' scientific knowledge about taxonomic diversity, external and internal structure, reproduction, relationships with the external environment, as well as the basics of cultivation and use of medicinal plants;

formation of students' skills and abilities necessary for conducting pharmacognostic analysis;

mastering the skills of cultivation, harvesting, storage of medicinal plant raw materials.

As a result of passing botanical studying practice **student must**

know:

fundamentals of plant systematics;

latin names of families and species of medicinal plants under study;

diversity of morphological and anatomical structures of vegetative and generative organs of plants;

signs of plants used in the diagnosis of medicinal plant raw materials;

fundamentals of phytocenology, geography and ecology of plants; principles of rational exploitation of medicinal plant populations;

be able to:

to establish the systematic affiliation of the plant with the help of a determinant;

to make a plan for the morphological description of vegetative and generative organs of a plant

to perform basic histochemical reactions in the analysis of plant objects and interpret their analytical effect

to diagnose vegetative organs of a plant by microscopic signs;

to analyze the anatomical structure of plant organs to explain the main diagnostic features of families and other plant taxa using the example of a herbarium sample;

apply the skills of reading and writing in Latin for the names of the taxa of the plant world; herbalize plants

identify medicinal plants by external signs in living and herbalized species;

conduct a geobotanical description of phytocenoses;

to collect samples of medicinal plants and medicinal plant raw materials;

possess:

skills of preparation of temporary micro-preparations and analysis of anatomical structure of vegetative organs of plants;

skills in compiling morphological descriptions of plants and their species identification.

In total, 54 academic hours are allocated for full-time and part-time students to study botany during 1 week at the end of 2 semesters.

Of these, 26 hours of practical training, 4 hours of guided independent work (hereinafter – USR), 24 hours of independent student work (hereinafter – SR).

In accordance with the schedule of the educational process, during the first two weeks after the end of the internship, the student passes a differentiated credit to the head of the practice from the Department of Pharmacy organization of the medical university. The form of the credit is reviewed annually and adopted at a meeting of the department.

Differentiated credit is accepted if the student has a report about the implementation of the practice program, the practice diary, the completed individual task. The diary is published annually by the Department of Pharmacy Organization in the editorial and Publishing department of the University and is used by students without fail.

A student who has not completed the internship program and (or) received an unsatisfactory mark when passing the differentiated credit, by order of the rector of the medical university, is repeatedly (no more than once) sent to practice in his free time from school to complete the internship program in full.

The mark on practice is taken into account when summing up the results of the intermediate certification of students.

Students' educational practice is conducted in the classrooms of the Department of Pharmacy Organization, natural phytocenoses on the territory and surroundings of Minsk, as well as on the basis of the State Scientific Institution "Central Botanical Garden of the National Academy of Sciences of Belarus".

Students of the correspondence form of education, working in a specialty corresponding to the specialty of training at a medical university, can practice at their place of work.

Educational practice is not combined with the educational process.

The general management and organization of students' practice is entrusted to the head of the practice from the educational institution «Belarusian State Medical University» (hereinafter referred to as the Medical University).

The general and direct management of the students' practice in the educational botanical practice is carried out by the head of the practice from the Department of Pharmacy Organization of the Medical University.

Scientific and methodological guidance of the practice of the medical university students is carried out by the Medical Faculty for International Students.

THE CONTENT OF THE PRACTICE

Introduction

To get acquainted with program и and calendar plan of practice, goals, tasks, stages of internship. Responsibilities of the student during the internship. Acquaintance with the rules of labor protection in botanical practice. Rules for the collection and herbarization of plants.

Discussion of an individual task, requirements for its implementation and design. Rules for the preparation of reporting documentation for practice.

Early spring plants

Early spring plants of various phytocenoses. Geobotanical and ecological-morphological description of plants. Medicinal types. Identification and herbarization of early spring plants.

Greenhouse and indoor medicinal plants

Plants of tropical and subtropical flora cultivated in the greenhouse. Plants of tropical and subtropical flora cultivated in a greenhouse. Introduced plants in the open ground of the botanical garden. Morpho-anatomical features of the structure of plants in connection with habitat conditions. Medicinal plants.

Forest phytocenosis

The forest as a plant community. Classification of forest phytocenoses. Features of living conditions of plants in forest phytocenoses. The levels of the community. Floristic composition by tiers. The species composition of the tree layer. Dominants and edificators, their influence on the formation of forest phytocenosis. Species composition and structure of the undergrowth. Herbaceous-shrub layer, species composition. Plants are epiphytes. Mosses and lichens as indicators of ecological conditions. Drawing up a description of forest phytocenoses. Medicinal plants growing in the forest. Determination and herbarization of forest phytocenosis plants.

Coastal water phytocenoses. River. Swamp

General characteristics, species composition. The main ecological groups of coastal aquatic plants: hygrophytes, hydrophytes, hydatophytes, adaptation to habitat conditions. Medicinal plants of coastal aquatic phytocenoses. Identification and herbarization of semi-aquatic and aquatic plants.

Meadow phytocenoses

The meadow as a plant community. Ecological types of meadows in Belarus. Polydominance of meadow flora. Life forms of meadow plants, species composition of different types of meadows. Hygrophytes, mesophytes and xerophytes, their adaptations to the conditions of existence. Compilation of a geobotanical description of meadow phytocenoses. Medicinal plants of meadow phytocenoses. Definition and herbarization of plants of meadow phytocenoses.

Synanthropic and ruderal plants. Agrocenoses

Segetal and ruderal plants, features of their biology. Plants are cosmopolitan. Familiarization with the basics of plant cultivation in the field training area: preparation of seed, soil, plant care techniques (weeding, loosening, watering, transplanting, etc.).

Agrocenoses as a special type of plant community. Structure of agrophytocenoses, species composition. Medicinal plants of agrophytocenoses and ruderal communities. Identification and herbarization of plants.

Work with an individual task.

Differentiated exam

Presentation of practice diary, report, individual task, oral interview.

FORMS OF PRACTICE

Educational botanical practice is carried out in the following forms:

the passage of statutory occupational safety briefings;

compliance with the requirements of safe performance of work in the workplace;

compliance with the internal labor regulations of the practice base;

registration and submission of reporting documentation on the implementation of the internship program provided for by the internship program.

study of documentation in the scope of tasks defined by the internship program;

visiting various phytocenoses;

herbarization of medicinal plants;

working with determinants and establishing the species of the plant;

cultivation of medicinal plants;

compilation of morphological and geobotanical descriptions.

INFORMATION AND METHODOLOGICAL PART

CALENDAR AND THEMATIC PLAN OF THE EDUCATIONAL PRACTICE

Name of work	Number of hours		
	In-class	supervised student independent work	In-class
Safety briefing. Acquaintance with the calendar-thematic plan, program, guidelines and practice assignments.	3	-	-
Acquaintance with early spring plants, their geobotanical and ecological-morphological description.	3	3	-
Acquaintance with greenhouse and indoor medicinal plants of subtropical, tropical, desert flora, studying the conditions of their growth, features of introduction, application.	3	3	-
The study of medicinal plants growing in forest phytocenoses. Acquaintance with the structure of forest phytocenoses.	5	3	-
Acquaintance with the plants of swamps and coasts of water bodies, the features of the morphological and anatomical structure of	3	3	-

hygro-, hydro- and mesophytes. Study of medicinal coastal aquatic plants, features of their herbarization and harvesting.			
Acquaintance with meadow phytocenoses, its species composition, morphological features of plants of this phytocenoses. The study of medicinal plants of meadow phytocenoses.	3	3	-
Acquaintance with ruderal and synanthropic plants, their biological features, medicinal value. The study of agrophytocenosis, its features of cultivation, productivity, the presence of weeds, the cultivation of medicinal plants.	6	3	-
Work with an individual task. Making a diary of practice Drawing up a report. Delivery of a differentiated exam.	-	6	4
Total:	26	24	4

LIST OF PRACTICAL SKILLS TO BE ACQUIRED DURING PRACTICE AND THE LEVELS OF THEIR MASTERING

Levels of mastering practical skills:

1 – to know theoretically, to be professionally oriented, to know the indications for conducting;

2 – to know theoretically, to evaluate, to take part in the work of personnel;

3 – know theoretically, do it yourself.

№	Practical skills	Recommended	
		Number	Level of development
1.	Herbarization of medicinal plants	10	3
2.	Determining the species and systematic belonging of a plant using a determinant	5	3
3.	Carry out a geobotanical description of phytocenoses	5	1
4.	Master the basic techniques of cultivating medicinal plants	2	2
5.	Make a preparation of a medicinal plant or medicinal herbal raw materials	1	2
6.	Compilation of morphological descriptions of plants	5	3

TOPICS OF INDIVIDUAL TASKS

During the internship, the student independently performs an individual task. The individual task on educational practice includes10 copies of herbarium samples of a given plant, collected and dried according to all the rules, or a fixed plant object of a given volume.

Plants for herbarium specimens, the method of herbarization, the mounting of the herbarium are discussed at the first introductory lesson.

Herbarization includes the following stages: harvesting of plants, drying, determination, production of herbarium and its storage. Dried plants are mounted on a herbarium sheet made of thin cardboard or stiff paper.

At the bottom in the right corner of the herbarium sheet, a label is glued containing information characterizing the collected plant:
Latin and russian names;
Species and family;
Gathering place;
Typical habitat (for example: in a broad-leaved forest, in stagnant reservoirs);
Date of collection of the plant;
Surnames and initials of the responsible persons who collected and identified this species.

NORMATIVE LEGAL ACTS

1. Об охране окружающей среды: Закон Республики Беларусь от 26.11.1992 № 1982-XII (ред. от 31.12.2021 № 142-З).

2. Лесной кодекс Республики Беларусь : принят Палатой представителей 03.12.2015, одобрен Советом Республики 09.12.2015 : от 24.12. 2015 № 332-З.

3. Государственная фармакопея Республики Беларусь (ГФ РБ II) : в 2-х т. / под общ. ред. А. А. Шерякова. – Молодечно : Победа, 2012. – Т. 1 : Общие методы контроля качества лекарственных средств. – 1220 с.

4. Хоружик, Л.И. Красная книга Республики Беларусь: редкие и находящиеся под угрозой исчезновения виды дикорастущих растений / гл. редколлегия: Л.И. Хоружик, Л.М. Сущеня, В.И. Парфенов. - Минск: БелЭн, 2005. - 456 с.

SAMPLE QUESTIONS FOR THE GRADED CREDIT

1. Life forms of plants with examples of plants that occur in places of botanical practice.
2. Examples of annual and perennial herbaceous plants that occur in places of practice and their systematic position.
3. Examples of plants with different types of branching shoots studied during practice and their systematic position.
4. Examples of plants with metamorphoses of vegetative organs studied during practice and their systematic position.
5. Examples of plants studied during the internship, and their systematic position, which have a system of main root and a system of subordinate roots.
6. Examples of plants studied during the internship, and their systematic position with a different stem shape, with a different position of the stem in space, with shortened and elongated shoots.
7. Examples of plants studied during the internship.with different types of leaf arrangement,

8. Examples of plants and their systematic position with various leaf blade shapes, tip shapes, base shapes, leaf blade edge shapes and venation types studied during the internship.

9. Examples of plants with triplicate, palpatosyllabic and pinnate leaves studied during the internship.

10. Examples of plants studied during the internship, with different types of flowers (different types of perianth, androcea, ginecea).

11. Examples of plants studied during the internship, with different types of inflorescences.

12. Examples of plants studied during the internship, with different types of fruits.

13. Examples of medicinal, vitamin-bearing, honey-bearing, poisonous plant species studied during the internship.

14. Water as an environmental factor. Adaptation of plants to various humidification conditions. Plants-hydrophytes, hygrophytes, mesophytes, xerophytes (sclerophytes and succulents) on the example of plants growing in places of practice.

15. Soil as an ecological factor. Adaptation of plants to different soil conditions on the example of plants studied during practice.

16. Heat as an environmental factor. Adaptation of plants to high and low temperatures on the example of plants studied during practice.

17. Define the concept of «phytocenosis» (plant community), describe its structure by the example of phytocenoses in places of practice.

18. Describe the structure of the meadow phytocenosis studied during practice and its species composition. Types of meadows.

19. Describe the structure of the studied forest phytocenosis and its species composition. Types of forests.

21. Analysis of the vertical structure of plant communities on the example of phytocenoses studied during practice.

22. What are endemic plants, cosmopolitans, relics? Give examples of plants of these groups that you have become familiar with in practice.

23. Give examples of the types of edifiers and assectors. studied during practice.

24. Name the protected areas, their role in the conservation of species composition. What are the nature conservation areas of Belarus that you know?

25. Name rare and endangered plant species found in places of practice that are subject to protection and listed in the Red Book.

26. Rules for collecting plants for herbarization, taking into account rational nature management.

27. Rules for drying plants for herbarization.

28. Herbarium mounting rules.

29. Diagnostic signs of the main studied families (Asteraceae, Apiaceae, Ranunculaceae, Polygonaceae, Lamiaceae, Rosaceae). on the example of plants studied during practice.

REQUIREMENTS FOR THE CONTENT OF REPORTING DOCUMENTS

During the educational practice student carries out program of practice under control of practice's supervisor.

During the practice student write a report about carrying out the program of educational practice according to the Appendix 1.

The report on educational practice must be signed by the student and practice's supervisor.

The report is prepared on paper in A4 format using the Ms Word- application and is carried out according to the the requirements of the state standard STB 6-38-2004 for details, text, document design and data in tables.

Reports on educational practice are stored according to the nomenclature of affairs of the department of the educational institution «Belarusian State Medical University», which is responsible for educational practice.

Appendix 1.

MINISTRY OF HEALTH OF THE REPUBLIC OF BELARUS
Educational Institution
BELARUSIAN STATE MEDICAL UNIVERSITY

REPORT

on the implementation of the educational botanical practice

Student _____
Specialty _____
Faculty _____
Year of study, group No. _____
Period of practice _____

№	List of practical skills	Recommended		Mastered	
		number	level of mastering	number (total)	level of mastering
1.	Herbarization of medicinal plants	10	3		
2.	Determining the species and systematic belonging of a plant using a determinant	5	3		
3.	Carry out a geobotanical description of phytocenoses	5	1		
4.	Master the basic techniques of cultivating medicinal plants	2	2		
5.	Make a preparation of a medicinal plant or medicinal herbal raw materials	1	2		
6.	Compilation of morphological descriptions of plants	5	3		

Student _____
(signature) Name

Head
of practice from the department

_____
(signature) Name

AUTHORS:

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Associate professor of the organization of pharmacy department, Ph.D of Biological Sciences _____ (signature) O.A.Kuzniatsova

The design of the educational practice program and accompanying documents meet the established requirements

Dean of the Medical Faculty for International Students of the educational institution «Belarusian State Medical University»
26 06 2023 O.S.Ishutin

Head of the practice of the educational institution «Belarusian State Medical University»
26 06 2023 N.A.Medved

Methodologist of the educational institution «Belarusian State Medical University»
26 06 2023 O.R.Romanovskaya

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