SYLLABUS OF THE EDUCATIONAL COMPONENT
Resource science of medicinal plants

for higher education students of the 5th year of full-time education (2023/2024)
((4.10д)* years of age for foreign citizens studying English)
educational program «Pharmacy»
specialty «226 Pharmacy, industrial pharmacy»
field of knowledge «22 Healthcare»
the second (master's) level of higher education
TEACHERS

Andrii POPYK **aicnc2016@gmail.com**

1. Name of higher education institution and unit: National University of Pharmacy, Department of Chemistry of Natural Compounds and Nutriciology.

2. Address of the department: street Valentinovskaya, 4, Kharkiv, 61168

3. Web-site of the department: https://cnc.nuph.edu.ua/

4. Information about teachers:

Andrii POPYK

Candidate of Pharmaceutical Sciences Associate Professor of the institution of higher education, Department of Pharmacognosy and Nutriciology of the National University of Pharmacy. Experience of scientific and pedagogical activity – 11 years. Reads courses: «Pharmacognosy with the basics of resource science», «Nutriciology», «Pharmacognostic basis of phytotherapy». Research interests: chemistry of natural compounds, plant cultivation.

5. Consultations: *online, take place every Tuesday from 12.05 to 12.50*

6. Abstract of the educational component: based on the learning outcomes, higher education students will be able to: according to the results of training, applicants for higher education. Will be able to: to be guided in modern problems of maintenance of pharmaceutical production of MPM; predict and find promising species of plants - sources of specific biologically active substances; to estimate stocks of medicinal raw materials on concrete thickets; develop and forecast the effectiveness of the rational use and restoration of plant resources; organize and conduct procurement, acceptance and standardization of medicinal plant raw materials, including in the field; to carry out a set of measures aimed at storage and multiplication of LR thickets and plants listed in the "Red Book of Ukraine"; organize agro-technical measures and conduct expert evaluation of their effectiveness; to carry out harvesting and drying, primary processing and storage of medicinal raw materials; recognize impurities of morphologically similar plant species during harvesting, acceptance and certification of raw materials; calculate yields, operational stocks and annual possible harvest of wild medicinal plants.

7. The purpose of teaching the educational component: to teach students to assess the stocks of medicinal raw materials in specific thickets, to know the resources of the plant world for human health and obtain the data necessary for the development of a program of rational use, protection and reproduction of resources, as well as to deepen knowledge of medicinal plants.

8. Competencies according to the educational program:

Soft-skills / General competences (GC):

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

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

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 (GACP), 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.

9. Program learning outcomes (PLO):

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

10. Status of the educational component: *Mandatory*

11. Prerequisites of the educational component: based on the knowledge obtained by students of higher education while studying the Latin language, botany, organic chemistry, biological chemistry, analytical chemistry, biophysics, physical and colloidal chemistry, normal and pathological human physiology;

12. The amount of the educational component:

(4,10д) – 90 hours 3 credits ECTS*:6 hours - lectures, 24 hours - practical lessons, 60 hours of independent work.*

13. Organization of training:

The form of teaching the educational component: conducting lectures, practical lessons.

The content of the educational component:

Module 1. Choosing objects of a resource study. Composing a calendar plan of resource examination of the region. Exposure of MP brushwood of the region according to the literature and report data. Composure of working routes. Description of associations that include MP. Estimation of the sizes of MPM reserves using methods of registration grounds, model specimens and projecting covering.

Content module 1. Choosing objects of a resource study. Composing a calendar plan of resource examination of the region. Exposure of MP brushwood of the region according to the literature and report data. Composure of working routes. Description of associations that include MP.

Topic 1. *World flora and its abundance. Tasks of Medicinal Plants' Resource Science. Geobotanical bases of Medicinal Plants' Resource Science.* Characteristic of phytocenoses. Influence of development phase of a plant and environmental factors on production and accumulation dynamics of active components.

Topic 2. Raw material base of MP in Ukraine. Wildly grown and cultivated MP in Ukraine. Choosing objects of a resource study. Officinal and non-officinal plants of Ukraine.

Topic 3. *An Ecosystem. Connections in an ecosystem.* Environmental changes as a result of human activity: environmental pollution; melioration; recovery of one's health - deterioration of environmental "health"; air pollution. Composing a calendar plan of resource examination of a region.

Topic 4. *Legal status of plant species, prohibition and restrictions of their uses.* Laws protecting the species included in the Red Book of Ukraine. Composure of working routes. Description of plant communities including medicinal plants.

Content module 2. Estimation of the sizes of MPM reserves using methods of registration grounds, model specimens and projecting covering. Working out recommendations on rational collection of MP.

Topic 5. *Methods of MPM productivity determination.* Exposure of MP brushwood of the region according to the literature and report data.

Topic 6. *Recording of MPM reserves.* Location of territories and objects of Nature reserve fund of Ukraine. Estimation of the sizes of MPM reserves using methods of registration grounds, model specimens and projecting covering. Calculation of biological, operational reserve and possible volume of annual collection of MPM.

Topic 7. *Composing plans of MPM collection volumes. Execution of cartographic materials.* Food plants as the source of BAC. Enlargement of raw material base of the sources of BAC using methods of biotechnology.

Topic 8. *Nature reserve fund. Descriptions, ecological and phytocoenological features, state of natural resources and their protection. Characteristic of phytocenoses.*

Topic 9. *Biotechnological aspects of enlargement of raw material base of the sources of BAC.* Composing a project of guidelinesi on MPM collection. MP cultivation, control over BAC biosynthesis. Ways of influence on the MP productivity.

Topic 10. *New prospective medicinal plants of the world. Current state of their plant material base.* Working out recommendations on rational collection of medicinal plants. Introduction of medicinal plants.

14. Types and forms of control:

Types and forms of control:

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.

When *studying the educational component* «Resource science of medicinal plants», students of higher education take a semester credit.

Form of control - semester credit.

Conditions for admission to control of substantial module: the presence of a minimum number of points for topics (lessons) of the substantial module, for control of content module 1 (for control of Substantial module 2),

Conditions for admission to semester control: current rating of more than 60 points, availability of the minimum number of points for control of substantial module 1 and 2, absence of unworked passes of practical classes, fulfillment of all requirements stipulated by the work program of the educational component.

15. Evaluation system of the educational component:

The results of the semester control in the form of a semester credit are evaluated on a 100-point, undifferentiated scale ("passed", "failed") and on the ECTS scale.

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

Types of assessment	Maximum number of points (% of the number of points per module - for content modules)
Module 1.	
Content module 1: • assessment of topics (1-4) (work in classes 1-4): work in classes (oral survey, writing input controls, solving logical problems); • control of content module 2: assessment 1 (solving theoretical, practical and logical tasks)	50 (50 %)
Content module 2: • assessment of topics (5-10) (work in classes 5-10): work in classes (oral survey, writing input controls,	50 (50 %)

The independent work of students of higher education is evaluated during the current control and during the control of the content module

15. Policies of the educational component:

Academic Integrity Policy. It is based on the principles of academic integrity stated in the Provisions of the document "On measures to prevent cases of academic plagiarism at the NUPh". Writing off during the assessment of the success ofa higher education student during control activities in practical (seminar, laboratory) classes, control of content modules and the semester exam is prohibited (including with 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 enroll it.

Class attendance policy. A student of higher education is obliged to attend classes (Provisions of the document "On theorganization of the educational process of the NUPh") 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 debt. The completion of missed classes by a student of higher education is carried out in accordance with the Provisions of the document "Regulations on the completion of missed classes by students and the procedure for eliminating academic differences in the curricula of the NUPh " in accordance with the schedule for making up missed classes established by the department. Increasingthe rating and liquidating academic debt from the educational component is carried out by the students in accordancewith the procedure specified in the Provisions of the document "On the procedure for evaluating the results of training of studentsof higher education at the NUPh ".

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 assessment from the educational component (appeals). Applicants of 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 Provisions of the document "Regulations on appealing the results of the semester control ofthe knowledge of students of higher education at the NUPh ".

16. Informational and educational and methodological support of the discipline:

Mandatory literature	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. byV.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. Kislychenko, L.V. Lenchyk, I.G. Gurieva et al.; ed. by V.S. Kyslychenko. – Kharkiv : NUPh : Golden Pages, 2019. - 584 p.
Additional literature for in-depth study of the educational component	1. Закон України Про рослинний світ : Закон України від 9 квітня 1999 р. // Відомості Верховної Ради України (ВВР). – 1999. – № 22–23. – С. 198. 2. Червона книга України. Рослинний світ / за ред. Я. П. Дідуха — К. : Глобалконсалтинг, 2009. – 900 с. 3. British Pharmacopoeia Commission, 2016. British Pharmacopoeia. London: TSO. 4. European Pharmacopoeia. 8th ed including supplements 1 (2014), 2 (2014), 3 (15), 4 (15), 5(2015). Council of Europe, Strasbourg, France. 2014. 5. Textbook of Pharmacognosy and Phytochemistry - E-Book / Shah B., Seth A. – Elsevier Health Sciences, 2012. – 620 p. 6. WHO Monographs on selected medicinal plants. - Vol. 4. – World Health Organization: Geneva, 2009. – 456 p. Gokhale S. B., Kokate C. K., Purohit A. P. A textbook of Pharmacognosy. 29th Edition. 2017. 284 p. 7. Kumar N. A Textbook Of Pharmacognosy. A.I.T.B.S. Publishers, India. 2010. 502 p. 8. Shah B. N., Seth A.K. Textbook of Pharmacognosy and Phytochemistry. Elsevier. 2010. 587 p. 9. Singh A. A Textbook of Pharmacognosy. Pharma Book Syndicate. 2013. 836 p. 10. Text book of Pharmacognosy and Phytochemistry / A. Dhole, V. Dhole, V. Yeligar, Ch. Magdum. Pharma Career Publication, 2019. 778 p.
Current electronic information resources (magazines, websites) for in-depth study of the educational component	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
Moodle distance learning system	https://pharmel.kharkiv.edu/moodle/course/view.php?id=4493

17. Technical and software of the educational component: computers for testing, multimedia device, screen.