

SYLLABUS OF THE EDUCATIONAL COMPONENT

Pharmacognostic analysis of new MPM

for students of higher education, 5th year of full-time education (4.10д)

educational program «Pharmacy»

specialty «226 Pharmacy, industrial pharmacy»

field of knowledge «22 Health care»

the second (master's) level of higher education

TEACHERS



Ganna TARTYNSKA

annatartynskaya1984@gmail.com



Kateryna SKREBTSOVA

skrebtsovakate@gmail.com



Andrii POPYK

aicnc2016@gmail.com



Viktoriia PROTSKA

vvprotskaya@gmail.com

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

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

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

4. Information about teachers:

Ganna TARTYNSKA

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

Andrii POPYK

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

Kateryna SKREBTSOVA

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

Viktoriia PROTSKA

Candidate of Pharmaceutical Sciences, assistant of the institution of higher education, Department of Pharmacognosy and Nutriciology of the National Pharmaceutical University. Experience of scientific and pedagogical activity – 6 years. Reads courses: «Pharmacognosy with the basics of resource science», «Basics of rational nutrition», «Nutriciology», «Pharmacognostic analysis of new MPM», «Pharmacognostic basis of phytotherapy». Research interests: chemistry of natural compounds, plant cultivation.

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

6. Brief summary of the educational component: Pharmacognostic analysis of new MPM is a highly specialized applied science that studies the biological, biochemical and medicinal properties of plants, natural raw materials and products from them; provides knowledge, skills and abilities in the identification of medicinal plants (MP), determination of stocks, procurement, storage and analysis of medicinal plant raw materials, as well as individual products of plant and animal origin. The educational component is based on the chemical classification of medicinal plants, introduces higher education students to the ways of biosynthesis of medicinal plants, the patterns of distribution of medicinal plants in nature, the peculiarities of the exploitation of medicinal plant thickets, the organization of their protection and reproduction in natural conditions. The sequence of teaching the course of pharmacognosy with the basics of resource science corresponds to the sequence of biochemical processes in the plant organism, takes into account the biogenetic features of different groups of BAS. First, MP and medicinal plant raw materials (MPM), which contain primary metabolites (carbohydrates, lipids, peptides and proteins), are considered, then – compounds of secondary biosynthesis, formed through mevalonic acid or the shikimate pathway, etc. When studying in a laboratory session, preference is given to classic objects of pharmacognosy and raw materials that are harvested and processed in Ukraine.

7. The purpose of teaching the educational component: teach students of higher education the methods of pharmacognostic screening of MPM, taking into account the current legal status in Ukraine and the world in the field of the production of phytoremedies, methods of preparation of various medicinal forms, as well as the ability to find and identify official and unofficial medicinal plants in nature by morphological signs, the periods of their rational harvesting, conditions of drying and use, which are necessary in the practical activity of a pharmacist.

8. Competences in accordance with the educational program:

Soft-skills / General competences (GC):

GC 02. Knowledge and understanding of the subject area; understanding of professional activity.

GC 05. Ability to evaluate and ensure the quality of performed works.

GC 09. Ability to use information and communication technologies

GC 11. Ability to apply knowledge in practical situations, make informed decisions.

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

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

PC 1. Ability to integrate knowledge and solve complex pharmacy problems in broad or multidisciplinary contexts.

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

PC 3. Ability to solve pharmacy problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility.

PC 4. The ability to clearly and unambiguously convey one's own knowledge, conclusions and arguments in the field of pharmacy to specialists and non-specialists, in particular to people who are studying.

PC 6. The ability to consult on prescription and non-prescription drugs and other products of the pharmacy assortment; pharmaceutical care during the selection and sale of an over-the-counter medicinal product by evaluating the risk/benefit ratio, compatibility, indications and contraindications guided by data on the health status of a specific patient, taking into account the biopharmaceutical, pharmacokinetic, pharmacodynamics and physicochemical features of the medicinal product and other products of the pharmacy assortment .

PC 10. Ability to ensure proper storage of medicines and other products of the pharmacy assortment in accordance with their physico-chemical properties and the rules of Good Storage Practice (GSP) in healthcare facilities. FC 19. 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 (quality control methods), technological instructions, etc.; to prevent the distribution of low-quality, falsified and unregistered medicinal products.

PC 19. 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.; to prevent the distribution of low-quality, falsified and unregistered medicinal products.

PC 20. Ability to develop and evaluate methods of quality control of medicinal products of natural and synthetic origin, including active pharmaceutical ingredients, medicinal plant raw materials and auxiliary substances using physical, chemical, physico-chemical, biological, microbiological and pharmaco-technological methods; carry out standardization of medicinal products in accordance with current requirements.

9. The program learning outcomes: (PLO):

PLO 1. To have and apply specialized conceptual knowledge in the field of pharmacy and related fields, taking into account modern scientific achievements.

PLO 2. Critically consider scientific and applied problems in the field of pharmacy.

PLO 3. To have specialized knowledge and skills/skills for solving professional problems and tasks, including for the purpose of further development of knowledge and procedures in the field of pharmacy.

PLO 6. Develop and make effective decisions to solve complex/complex problems of pharmacy personally and based on the results of joint discussion; formulate the goals of one's own activity and the activity of the collective, taking into account public and industrial interests, the general strategy and existing limitations, determine the optimal ways to achieve goals.

PLO 7. Collect the 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.

PLO 8. Formulate, argue, clearly and concretely convey to specialists and non-specialist's information based on one's own knowledge and professional experience, the main trends in the development of world pharmacy and related industries.

PLO 9. To carry out professional activities using information technologies, "Information databases", navigation systems, Internet resources, software and other information and communication technologies.

PRN 12. Determine the advantages and disadvantages of drugs of natural and synthetic origin of various pharmacological groups, taking into account their chemical, physicochemical, biopharmaceutical, pharmacokinetic and pharmacodynamics features and the type of dosage form. Recommend to consumer's medicinal products and other products of the pharmacy assortment with the provision of advisory assistance and pharmaceutical care.

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 physical and chemical properties and the rules of Good Storage Practices (GSP).

PLO 26. Provide and implement quality control of medicinal products of natural and synthetic origin and document its results; issue quality certificates and analysis certificates taking into account the requirements of the current edition of the State Pharmacopoeia of Ukraine, quality control methods (QC), technological instructions, etc.; take measures to prevent the distribution of low-quality, falsified and unregistered medicinal products.

PLO 27. Determine the main chemical and pharmaceutical characteristics of medicinal products of natural and synthetic origin; choose and/or develop quality control methods for the purpose of their standardization using physical, chemical, physico-chemical, biological, microbiological and pharmaco-technological methods in accordance with current requirements.

10. Status of the educational component: *selective.*

11. Prerequisites of the discipline:

- 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 (LPR) and preparations of plant origin, rational use of natural resources, etc.

12. The volume of the educational component: 3.0 ECTS credits (90 h): 6 hours - lectures, 24 hours - practical classes, 60 hours of independent work.

13. Organization of training:

Teaching format of the educational component: lectures, practical classes.

Content of the educational component:

Content module 1. *The current situation of the production of phytopreparations.*

Standardization. Normative documentation on LRS. Requirements for phyto remedies in Ukraine and various countries of the world. Modern approaches, substantiation and selection of criteria for standardization of phyto remedies and raw materials of plant and animal origin containing carbohydrates, real lipids, lipoids, terpenes.

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

Topic 2. Modern approaches, substantiation and selection of standardization criteria for phyto remedies and raw materials of plant and animal origin containing carbohydrates and real lipids.

Topic 3. Modern approaches, substantiation and selection of criteria for standardization of phyto remedies and raw materials of plant and animal origin containing lipoids.

Topic 4. Modern approaches, substantiation and selection of criteria for standardization of phyto remedies and raw materials of plant and animal origin containing terpenes.

Content module 2. *Modern approaches, substantiation and selection of standardization criteria for phyto remedies and raw materials of plant and animal origin containing phenolic compounds, nitrogen- and sulfur-containing compounds.*

Topic 5. Modern approaches, substantiation and selection of criteria for standardization of phyto remedies and raw materials of plant and animal origin containing simple phenolic compounds, hydroxycinnamic acids, coumarins, chromones.

Topic 5. Modern approaches, substantiation and selection of standardization criteria for phytoremedies and raw materials of plant and animal origin containing anthracene derivatives and tannins.

Topic 7. Modern approaches, substantiation and selection of standardization criteria for phytoremedies and raw materials of plant and animal origin containing nitrogen- and sulfur-containing compounds.

14. Forms and types of academic achievements supervision:

Forms and types of academic achievements supervision

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.

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

Conditions for admission to the semester control: current rating of more than 60 points, availability of the minimum number of points for the control of content modules 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)
Модуль 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 1 (solving theoretical, practical and logical tasks)	50 (50 %)
Content module 2: • assessment of topics (5-7) (work in classes 6- 11): work in classes (oral survey, writing input controls, solving logical problems); • control of content module 2 (solving theoretical, practical and logical tasks)	50 (50 %)
Semester control of the module	100

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

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 Ukraine". Writing off when evaluating the success of a student of higher education during control activities in practical (seminar, laboratory) classes, control of content modules and semester exams is prohibited (including using 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. 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 discipline:

The main reading suggestions	<ol style="list-style-type: none"> 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 for in-depth study of the educational component	<ol style="list-style-type: none"> 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.
Current electronic information	<ol style="list-style-type: none"> 1. Website of the Department of Chemistry of Natural Compounds – www.cnc.nuph.edu.ua

resources (magazines, websites) for in- depth study of the educational component	2. Website of the NUPh library – http://lib.nuph.edu.ua 3. Vernadsky National Library of Ukraine – http://www.nbu.gov.ua 4. V. N. Karazin Kharkiv National University (Official Website) – http://www.univer.kharkov.ua 5. Website of the KhNMU Scientific Library – http://libr.knmu.kharkov.ua 6. V.G. Korolenko Kharkiv State Scientific Library – http://korolenko.kharkov.com 7. The National Center for Biotechnology Information advances science and health - http://www.ncbi.nlm.nih.gov/pubmed .
Distance learning system Moodle	https://pharmel.kharkiv.edu/moodle/course/view.php?id=5090

18. Technical and software support of the educational component: computers for testing, multimedia device, screen, laboratory utensils, chemical reagents, solvents, chromatographic cameras, chromatographic paper, Silufol plates, titrated solutions, indicators, spectrophotometer, photoelectrocolorimeter.