

**Odessa National Medical University**  
**Faculty of Pharmacy**  
**Department of Pharmacology and Pharmacognosy**

**Syllabus course**

**Pharmacognosy**

<b>Amount</b>	8.5 credits / 255 hours
<b>Semester, year of study</b>	I semester, II semester, 3 years of study
<b>Days, time, place</b>	According to the schedule in the auditorium 108,109 of the Department of Pharmacology and Pharmacognosy (pharmacognosy cycle). Street Malinowski - 37
<b>Teacher (s)</b>	Rozhkovsky Yaroslav Vladimirovich, Doctor of Medicine, Professor Boyko Iryna Anatoliivna, Ph.D., senior lecturer Bogatu Svitlana Ihorivna, Candidate of Medical Sciences, Assistant Chernogoryuk Valeria Valerievna, assistant
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<b>Workplace</b>	Office № 107 of the Department of Pharmacology and Pharmacognosy (pharmacognosy cycle). Street Malinowski - 37
<b>Consultations</b>	<i>Eye consultations</i> : Thursday from 15.00 to 17.00; Saturday from 9.00 to 13.00 <i>Online consultations</i> : Thursday from 15.00 to 17.00; Saturday from 9.00 to 13.00 <a href="https://moodle.odmu.edu.ua/">https://moodle.odmu.edu.ua/</a> or via <i>Telegram / viber</i>

### **COMMUNICATION**

Communication with students will be through face-to-face meetings. In case of transition to distance learning, communication with students will be carried out by means of E-mail and programs: Microsoft Teams, Telegram and Viber.

### **COURSE ANNOTATION**

#### *The subject of study of the discipline*

**The subject of study** of the discipline "Pharmacognosy" are medicinal plants (LR), medicinal plant raw materials (LRS), as well as some products of plant and animal origin as sources of medicinal raw materials. Modern pharmacognosy is based on the chemical classification of biologically active substances (BAS), introduces students to the patterns of their distribution in nature, the ways of biosynthesis. The sequence of teaching the course of pharmacognosy corresponds to the sequence of

biochemical processes in the plant organism, takes into account the biogenetic features of different groups of BAS.

*Prerequisites and postrequisites of the course (Place of discipline in the educational program):*

Pharmacognosy is based on the knowledge gained by students in the study of Latin, pharmaceutical botany, organic, biological, analytical chemistry, biophysics, physical and colloid chemistry, normal and pathological human physiology; lays the foundations for students to study pharmaceutical and toxicological chemistry, pharmacology, drug technology, clinical pharmacy, which involves the integration of teaching with these disciplines and the formation of skills to apply knowledge of pharmacognosy in further education and professional activities.

*The purpose of the course.*

The purpose of teaching the discipline "Pharmacognosy" is to teach students on morphological grounds to find and identify medicinal plants in nature, to know the periods and rational methods of collection, primary processing, drying conditions, packaging, storage rules of LRS; perform commodity, macroscopic, microscopic, phytochemical, luminescent and chromatographic analysis of LRS, products of its processing and raw materials of animal origin, which is necessary in the practice of the Master of Pharmacy.

*Tasks of the discipline :*

- study of the chemical composition of medicinal plants, ways of biosynthesis and dynamics of formation of biologically active substances, their accumulation in organs and tissues in the process of ontogenesis of plants and under the influence of environmental factors;
- search for optimal conditions for collection, drying and storage of medicinal plant raw materials;
- standardization of medicinal plant raw materials; development of projects of quality control methods (QMS) and processing of the current analytical normative documentation (AND);
- improvement of methods for determining the identity of the plant, purity and good quality of raw materials;
- medicinal resource science, namely: study of the geographical distribution of medicinal plants, identification of thickets, inventory accounting, mapping them and determining possible volumes of procurement, development and implementation of measures to restore natural resources of the most valuable species;
- plant biotechnology - the cultivation of isolated plant cells and tissues for the release of biologically active substances.

*Expected results*

According to the study of the discipline, students must

***know:***

- basic concepts of pharmacognosy, methods of pharmacognostic analysis, subject and tasks of pharmacognosy, its significance for the practical activities of the master of pharmacy;
- main stages of pharmacognosy development; main and modern directions of scientific research in the field of medicinal plants;
- characteristics of the raw material base of medicinal plants (wild and cultivated);

- normative-legal bases of use of resources of wild medicinal plants at the present stage;
- organization of LRS procurement;
- system of rational nature management, protection and reproduction of resources of medicinal plants;
- general rules for harvesting LRS and measures for the protection of natural operational thickets of medicinal plants;
- basics of industrial cultivation of medicinal plants;
- LRS standardization system;
- types of LRS classification (chemical, pharmacological, botanical, morphological);
- nomenclature of medicinal plants, medicinal products and medicinal products of plant and animal origin, which are permitted for use in medical practice and use in industrial production;
- basic information on the distribution and places of growth of medicinal plants used in medicine and pharmaceutical production;
- the impact of geographical and environmental factors on the productivity of medicinal plants; variability of their chemical composition;
- macroscopic and microscopic methods of analysis of whole, crushed, powdered and briquetted LRS;
- features of the analysis of drug fees;
- morphological and anatomical features of LRS, approved for use in medical practice; possible impurities;
- main groups of BAS of natural origin and their physical and chemical properties;
- main ways of biosynthesis of the main groups of BAS;
- methods of isolation and purification of BAS from LRS;
- basic qualitative reactions to different groups of BAS, their identification using TLC and determination of the content of active substances in LRS;
- biological standardization of LRS;
- numerical indicators that regulate the quality of LRS and methods for their determination;
- requirements for packaging, labeling, transportation and storage of LRS in accordance with the ICC;
- system of standardization and certification of LRS, phytopreparations in Ukraine; documentation of the results of LRS analysis; legal significance of the certificate;
- basic methods and forms of application of LRS in pharmaceutical practice and industrial production;
- main directions of application in medicine of medicines of plant and animal origin;
- safety rules when working with medicinal plants and LRS.

***be able:***

- to determine by morphological features medicinal plants in live and herbarium form;

- to carry out harvesting and drying, primary processing and storage of medicinal raw materials;
- identify LRS on the basis of microscopic analysis;
- have the technique of macroscopic analysis of LRS;
- to determine the identity of medicinal plant raw materials of different morphological groups in whole, crushed and powdered form, as well as in the form of briquettes, tablets and other forms using a determinant;
  - recognize impurities of morphologically similar plant species during harvesting, acceptance and certification of raw materials; to carry out qualitative and microchemical reactions to the main groups of biologically active substances contained in medicinal plants and raw materials;
    - apply thin layer chromatography for LRS analysis;
    - determine the content of biologically active substances in plant raw materials by the methods provided by the relevant MCC;
  - to carry out acceptance of LRS and to take the samples necessary for its analysis, according to MKYA;
  - to determine moisture, ash and extractives in raw materials by the methods provided by MCY;
  - to carry out statistical processing and registration of results of the analysis.

## **COURSE DESCRIPTION**

### *Forms and methods of teaching*

The course will be presented in the form of lectures (30 hours) and practical (140 hours), organization of independent work of students (85 hours), a total of 255 hours.

The study of the discipline should be implemented on the basis of methods of problem statement, heuristic, research, interactive (project method).

### *The content of the discipline*

Topic 1. General part of pharmacognosy.

Topic 2. Methods of pharmacognosy.

Topic 3. Carbohydrates. Glycosides.

Topic 4. Fats and fat-like substances.

Topic 5. Proteins and proteins. Macro- and microelements. Organic acids. Glucosinolates (thioglycosides) and cyanogenic glycosides.

Topic 6. Vitamins.

Topic 7. Terpenoids. Iridoids.

Topic 8. Essential oils. LR and LRS, in the essential oil of which monoterpenoids predominate.

Topic 9. Essential oils. LR and LRS, in the essential oil of which sesquiterpenoids and sesquiterpene lactones predominate.

Topic 10. Essential oils. LR and LRS, in the essential oil of which aromatic compounds predominate.

Topic 11. Diterpenoids. Resins and balms.

Topic 12. Triterpenoids. Steroids. Saponins.

Topic 13. Cardioglycosides.

Topic 14. Phenolic compounds.

Topic 15. Coumarins and chromones.

Topic 16. Lignans. Xanthoni.

Topic 17. Flavonoids.

Topic 18. Quinones.

Topic 19. Tannins.

Topic 20. Alkaloids. Proto- and pseudoalkaloids.

Topic 21. Alkaloids. True alkaloids.

Topic 22. LR and raw materials that contain various biologically active substances. Tissue culture.

Topic 23. Commodity analysis.

#### *List of recommended reading*

1. Pharmacognosy: textbook (I-III years) / I.A. Бобкова, Л.В. Варлахова. - 3rd edition All-Ukrainian specialized publishing house "Medicine" 2018, 504p.

2. Pharmacognosy: a basic textbook. for students. higher pharmacy. textbook zakl. (pharmac. f-tiv) IV level of accreditation / V.S. Кисличенко, І.О. Журавель, С.М. Marchyshyn and others; for order. V.S. Кисличенко. - Kharkiv: NUPh: Golden Pages, 2015. - 736 p.

3. Textbook on the discipline "Pharmacognosy" / Ya. V. Rozhkovsky, BV Prystupa, IA Boyko, NV Gerasimyuk, VV Chernogoryuk -: Methodical development of the Department of Pharmacognosy ONMedU. - Odessa: ONMedU, 2019 - 51 p.

4. State Pharmacopoeia of Ukraine: in 3 volumes / State Enterprise "Ukrainian Scientific Pharmacopoeial Center for Quality of Medicines". - 2nd type. - Kharkiv: State Enterprise "Ukrainian Scientific Pharmacopoeial Center for Quality of Medicines", 2015. - Vol. 1. - 1500 p.

Additional:

5. State Pharmacopoeia of Ukraine: in 3 volumes / State Enterprise "Ukrainian Scientific Pharmacopoeial Center for Quality of Medicines". - 2nd type. - Kharkiv: State Enterprise "Ukrainian Scientific Pharmacopoeial Center for Quality of Medicines", 2014. - Vol. 3. - 732 p.

6. Workshop on the identification of medicinal plant raw materials: textbook. way. / [B. M. Kovalev, SM Marchyshyn, OP Khvorost and others]; for order. VM Kovaleva, SM Marchishin. - Ternopil: TSMU, 2014. - 250 p.

## **EVALUATION**

*Methods of current control:* Evaluation of the success of the study of each topic of the discipline is performed on a traditional 4-point scale.

Current performance is calculated as the average current score, ie the arithmetic mean of all grades obtained by the student on a traditional scale, rounded to 2 (two) decimal places , for example 4.75.

Assessment of current control in the discipline:

The value of the assessment is "**excellent**": the student shows special creative abilities, is able to acquire knowledge independently, without the help of the teacher finds and processes the necessary information, is able to use acquired knowledge and skills to make decisions in unusual situations, convincingly argues answers.

The value of the grade "**good**": the student is fluent in the studied amount of material, applies it in practice, freely solves exercises and problems in standard situations, independently corrects mistakes, the number of which is insignificant.

The value of the assessment is "**satisfactory**": the student reproduces a significant part of the theoretical material, shows knowledge and understanding of the

basic provisions; with the help of the teacher can analyze the educational material, correct mistakes, among which there are a significant number of significant ones.

The value of the assessment is **"unsatisfactory"**: the student has the material at the level of individual fragments that make up a small part of the study material.

Only those students who do not have academic debts and have an average score of at least 3.00 for their current academic activity are allowed to take the final attestation.

Assessment of the current test control in the discipline:

- "5" - 100-91% of correct answers;
- "4" - 90-71% of correct answers;
- "3" - 70-60.5% of correct answers;
- "2" - less than 60% of correct answers.

*Forms and methods of final control:*

The form of final control of knowledge in the discipline is an exam.

The average score for the discipline is translated into the traditional grade from the discipline on a 4-point scale and is regarded as the ratio of this arithmetic mean to the percentage of mastering the required amount of knowledge in this subject.

GPA for discipline	The ratio received by the student average score for the discipline to the maximum possible value of this indicator	Score from discipline on a 4-point scale (traditional assessment)
4.45 - 5.0	185-200	5
3.75 - 4.44	151-184	4
3.0 - 3.74	120-150	3

*Independent work of students .*

Students' independent work, which is provided by the topic of the lesson along with the classroom work, is assessed during the current control of the topic in the relevant lesson. Assimilation of topics that are submitted only for independent work is checked at the last lesson.

## **COURSE POLICY** ("rules of the game")

***Deadline and recompilation policy:*** tasks to be completed on time according to the deadline. For late performance of the task the student receives an unsatisfactory grade. Rearrangement is carried out according to the approved schedule.

***Academic Integrity Policy :***

Observance of academic integrity by students of education provides:

- ♦ independent performance of educational tasks, tasks of current and final control of learning outcomes (for persons with special educational needs this requirement is applied taking into account their individual needs and opportunities);
- ♦ links to sources of information in the case of the use of ideas, developments, statements, information.

***Policy attendance and tardiness .*** To obtain a satisfactory grade, it is mandatory to attend and work in classrooms (lectures and seminars). The student is allowed to be late for no more than 10 minutes.

*Mobile devices:* You can use mobile devices in class with the permission of the teacher.

*Audience behavior:*

While in the audience are important: respect for colleagues; tolerance for others; susceptibility and impartiality; the ability to disagree with the opinion, but to respect the personality of the opponent (during discussions); careful argumentation of the opinion; adherence to the ethics of academic relations.