


National Pirogov Memorial Medical University, Vinnytsya


"APPROVE"

Vice-Rector of higher education institution
for Research, Education and Teaching


prof. of HEI Oksana SEREBRENNIKOVA
" 2 " 09 2022

" AGREED "

Head of the Department Pharmacy


prof. of HEI Olena KRYVOVIAZ
" 1 " 09 2022 year

**SYLLABUS
of academic discipline
PHARMACEUTICAL BOTANY**

Specialty	226 Pharmacy, Industrial Pharmacy
Educational level	Master of Pharmacy
Educational programme	EPP Pharmacy, 2022
Academic year	2022-2023
Department	<i>Department of Pharmacy</i>
Lecturer (if lectures are given)	Prof. Rodinkova V.V.
Contact information	<i>pharmacy@vnmua.edu.ua</i>
Syllabus compiler	Kryklyva S.D., Assoc. Prof., PhD of Biol. Sci.

1. Status and structure of the discipline

Discipline status	required
Discipline code in EPP/ discipline place in EPP	OK 19
Course / semester	2 rd year (IV semester)
The amount of discipline (the total number of hours / number of credits ECTS)	150 hours / 5 credits ECTS
Number of content modules	2 chapter
The structure of the discipline	Lectures - 18 hours Practical classes 98 hours Independent work 34 hours
Language of study	English
Form of study	Full - time (<i>or remote by order</i>)

2. Description of the discipline

Short annotation of the discipline, relevance.

"Pharmaceutical Botany" is a mandatory component of the educational and professional program "Pharmacy, Industrial Pharmacy", a cycle of professional training of the second level, designed for 5 credits, which students receive during 2 semesters for 2 years of study.

The main focus of the program "Pharmaceutical Botany" is to obtain knowledge of the discipline, the study of which is necessary for the successful mastering of disciplines.

The subject area of the program is the study is the practical use of modern achievements of pharmaceutical botany, the program is focused on gaining knowledge about the practical use of the achievements of pharmaceutical botany in pharmacy, the formation of skills in plant analysis methods at morphological, anatomical, systematic level. with scientific literature and make a literary review of individual topics for self-study.

Prerequisites

Pharmaceutical botany is based on the study of biology by students with the basics of genetics, general and inorganic chemistry, information technology in pharmacy, Latin and Ukrainian and is integrated with these disciplines.

The purpose of the discipline and its significance for professional activity.

The aim of the discipline "Pharmaceutical Botany" is to achieve an understanding of the structure, chemical composition and functions of plant cells, tissues, organs and organisms in general, to learn the theoretical foundations of the structure, classification, taxonomy, ecology and geography of medicinal plants and fungi. medicine, pharmacy, etc .; master the methods and procedures of macro- and microscopic analysis of plant organs and use knowledge of morphology, anatomy, ecology of medicinal plants in specific situations.

Postrequisites

This discipline lays the foundations for the study of higher education: pharmacognosy, resource science of medicinal plants, teaching practice in pharmacognosy, medicinal toxicology, toxicological and forensic chemistry, drug technology, technology of medicinal cosmetics, biological chemistry, pharmaceutical biotechnology. Integration with these disciplines and the formation of skills for the application of knowledge in pharmaceutical botany in the process of further study, as well as in professional activities.

Learning outcomes.

Academic discipline "Pharmaceutical Botany" provides the acquisition of higher education by such competencies as:

Integral ability to solve complex problems and critically comprehend, solve practical problems in professional pharmaceutical and / or research and innovation activities using the provisions, theories and methods of basic, chemical, technological, biomedical and socio-economic sciences; integrate knowledge and solve complex issues, formulate judgments on insufficient or limited information; clearly and unambiguously convey their own knowledge, conclusions and their validity to professional and non-professional audience.

General competencies, the formation of which is facilitated by the discipline:

GC 2. Ability to apply knowledge in practical situations.

GC 3 . The desire to preserve the environment.

GC 4. Ability to abstract thinking, analysis and synthesis, to learn and be modernly trained.

GC 8. Ability to communicate in the native language both orally and in writing, the ability to communicate in a second language

GC 9 Skills in the use of information and communication technologies.

GC 11 Ability to evaluate and ensure the quality of work performed.

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

Special competencies, the formation of which is facilitated by the discipline:

SC 16. Ability to organize and procure medicinal plant raw materials in accordance with the rules of Good Practice for the Cultivation and Collection of Herbal Raw Materials (GACP), as a guarantee of the quality of medicinal plant raw materials and medicinal products based on it. Ability to predict and calculate ways to solve the problem of conservation and protection of thickets of wild medicinal plants, in accordance with current legislation.

General competencies formed in the study of this discipline:

PLO 2. Apply knowledge of general and professional disciplines in professional activities.

PLO 28. Organize and conduct rational procurement of medicinal plant raw materials. Develop and implement measures for the protection, reproduction and rational use of wild species of medicinal plants.

3. Content and logistic of the discipline

Module 1. Anatomy and morphology of plants Content module 1. Structural-functional and chemical features of plant cells, their features of diagnostic value Content module 2. Structural and functional features of plant tissues, their features that have diagnostic value in the analysis of plant raw materials Content module 3. Anatomical structure of vegetative organs of plants Content module 4. Morphological structure and functions of plant organs.	III semester 75 hours / 2,5 credits	Lectures 10 Practical classes 60 Topics for self-study 5 hours.
Module 2. Systematics of plants. Content module 5. Review of some families of subclasses ranunculides, caryophyllides, dileniids, rosides and their medicinal representatives Content module 6. Review of some families of subclasses of lamid, asterids, lilies and their medicinal representatives, some medicinal representatives of monocotyledonous and dicotyledonous classes, gymnosperms, higher spores,	IV semester 75 hours / 2,5 credits	Lectures 8 Practical classes 38 Topics for self-study 29 hours.

algae, fungi and lichens. Elements of phytoecology and geobotany.		
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The discipline includes 24 topics, which are structured in 2 modules.

Module 1. Anatomical and morphological structure of plants.

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

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

Topic 2. Modern idea of the structure of the plant cell. Plant cell structures of diagnostic value in microscopic analysis of plant raw materials.

Topic 3. Vacuoles and cell sap.

Content module 2. Structural and functional features of plant tissues, their features that have diagnostic value in the analysis of plant raw materials

Topic 4. Plant tissues and their classification.

Topic 5. Structural-functional and topographic characteristics of creative, integumentary, basic and excretory tissues.

Topic 6. Structural-functional and topographic characteristics of mechanical and conductive tissues. Conducting beams.

Content module 3. Anatomical structure of vegetative organs of plants

Topic 7. Anatomy of the root.

Topic 8. Anatomy of the stem of aboveground shoots and rhizomes.

Topic 9. Anatomical structure of the leaf.

Content module 4. Morphological structure and functions of plant organs

Topic 10. Introduction to plant morphology. Plant organs and the integrity of the plant organism. Reproduction of plants.

Topic 11. Vegetative organs. Morphology of root and shoot and their metamorphoses. Vegetative reproduction.

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

Topic 13. Morphology of fruit, seeds and cotyledons.

Topic 14. The cycle of development of angiosperms.

Module 2. Systematics of plants.

Content module 5. Review of some families of subclasses ranunculides, caryophyllides, dileniids, rosides and their medicinal representatives

Topic 1. Introduction to plant taxonomy. Fundamentals of botanical classification. Angiosperms. Magnoliophyte system.

Topic 2. Review of Brassicaceae Polygonacea families, characteristics of representatives of medical significance and their medicinal representatives.

Topic 3. Review of the Brassicaceae Rosacea families and their medicinal representatives.

Topic 4. Review of the Fabaceae Apiaceae families, celery and their medicinal representatives.

Content module 6. Review of some families of subclasses of lamid, asterids, lilies and their medicinal representatives, some medicinal representatives of monocotyledonous and dicotyledonous classes, gymnosperms, higher spores, algae, fungi and lichens. Elements of phytoecology and geobotany

Topic 5. Review of families of Solanaceae Lamiaceae, nettle and their medicinal representatives.

Topic 6. Review of the Asteraceae family and its medical representatives.

Topic 7. Review of the Poaceae family and its medical representatives.

Topic 8. Review of flowering medicinal plants of different families, distributed in Ukraine.

Topic 9. Review of medicinal representatives of gymnosperms, higher spores, algae, fungi and lichens distributed in Ukraine.

Topic 10. Elements of phytoecology and geobotany. Plant protection, rational use and conservation of medicinal plant resources.

The topics of the lecture course reveal the problematic issues of the relevant sections of the discipline.

Practical classes provide a theoretical justification of the main issues of the topic and the acquisition of the following practical skills:

1. work with a microscope;
2. manufacture, study and describe micropreparations, perform histochemical reactions;
3. dissect, describe the generative organs of the plant, make flower formulas;
4. determine, recognize the anatomical and morphological features of plant organs, their metamorphosis;
5. identify the morphological characteristics of plants and their belonging to certain taxa; identify plants by herbarium specimens, drawings, photos, in nature;
6. describe and reflect the external and internal structure of plant organs, summarize the results, formulate conclusions and argue them, draw up research results.

The student's independent work involves preparation for practical classes and intermediate tests, studying topics for independent extracurricular work, writing essays, preparing presentations, tables. The control of mastering the topics of independent extracurricular work is carried out at the intermediate control classes and the final control of the discipline.

Individual work includes the study of scientific literature, preparation of reviews on the topics provided for presentation at the meetings of the student scientific circle, the implementation of scientific and practical researches, participation in specialized competitions, scientific and practical conferences and organization of students' research works.

Thematic plans of lectures, calendar plans of practical classes, thematic plan of independent extracurricular work, volume and directions of individual work are published on the website of the department.

The route for obtaining materials: Department of Pharmacy / for students / Full-time education / (specialty) / II course / Educational materials / or through the link [https://www.vnmueu.ua/departament of Pharmacy #](https://www.vnmueu.ua/departament%20of%20Pharmacy%20#). Access to the materials is carried out through the student's corporate account s000XXX@vnmueu.ua.

4. Forms and methods of monitoring academic performance

Current control in practical studies	Methods: <i>oral or written survey, testing, electronic survey, solving situational problems, conducting laboratory studies, interpreting them and evaluating their results (drawing up a protocol in a workbook)</i>
Control of mastering the thematic section of the discipline at intermediate control lessons	Methods: <i>oral or written survey, electronic testing, situational problem solving, control of practical skills</i>
Final semester control at the end of the III semester - credit, at the end of the IV semester - exam; (If provided by the curriculum)	According to the Regulation of the Academic process in VNMU named after M.I. Pirogov (link https://www.vnmueu.ua/General information)
Final control of the discipline - <i>exam</i>	Methods: pre-examination testing, oral questioning (according to the Regulation of the Academic process in VNMU named after M.I. Pirogov (link

	https://www.vnmua.edu.ua/General information)
Learning success diagnostic tools	Theoretical questions, tests, clinically-oriented situational tasks, practical tasks, practical skills demonstration

5. Assessment criteria

Knowledge assessment is carried out in accordance with the Regulations of the Academic process in VNMU named after M.I. Pirogov (link <https://www.vnmua.edu.ua/General> information)

Continuous assessment	On a four point system of traditional assessments: 5 «excellent», 4 «good», 3 «satisfactory», 2 «unsatisfactory»
Midpoint separation assessment	On a four-point system of traditional assessments
Control of practical skills	According to the four-point system of traditional assessments
Pass-fail exam	On a 200-point scale (the arithmetic average grade for the semester is converted into points) Credited: 122 to 200 points Not credited: less than 122 points (See Grading Scale)
Final control of the discipline	<i>Sum of points for pre-examination testing (12-20 points) and oral questioning (38-60 points) (for disciplines included in Step 1,2)</i> Exam grade: 71-80 points - "excellent" 61-70 points - "good" 50-60 points - "satisfactory" Less than 50 points - "unsatisfactory" / did not pass
Discipline assessments:	Current academic assessment - from 72 to 120 points (conversion of the average traditional assessment of practical class on a 120-point scale): 60% of the grade for the discipline Final control - from 50 to 80 points: 40% of the grade for the discipline Individual work - from 1 to 12 points From 122 to 200 points in total.

Discipline Score Scale: National and ECTS

The sum of grades for all types of educational activities	Score ECTS	Score on a national scale	
		For exam, course project (work), practice	for credit test
180-200	A	excellent	credited
170-179,9	B	good	
160-169,9	C		
141-159,9	D	satisfactory	
122-140,99	E	satisfactory	-
122-140,99	E	-	credited

119-61	FX	unsatisfactory with the possibility of reassembly	is not credited with the possibility of reassembling
1-60	F	unsatisfactory with a mandatory reexamination of discipline	is not credited with mandatory reexamination of discipline

7. Policy of discipline / course

The student has the right to receive high-quality educational services, access to contemporary scientific and educational information, qualified advisory assistance during the study of discipline and mastering practical skills. The policy of the department during the providing of educational services is a student-centered, based on normative documents of the Ministry of Education and the Ministry of Health of Ukraine, the Statute of the University and the Procedure for the Providing of Educational Services regulated by the main principles of the organization of the educational process in VNMU named after M.I.Pirogov and the principles of academic integrity.

Observance of VNMU regulations, safety measures at practical classes. Safety instruction is given at the first practical lesson by the teacher. The briefing is recorded in the Safety Instruction Log. A student who has not been instructed is not allowed to practice.

Requirements for preparation for practical classes. The student must be prepared for a practical lesson, tasks to prepare for the current topic must be completed.

The student must come to class on time, without delay. A student who is late is not allowed to study and must work it in the prescribed manner.

In practical classes, the student must be dressed in a work uniform. Students who do not have a work uniform are not allowed to study.

The student must follow the rules of safety in practical classes and during the stay in the department.

When discussing theoretical issues, students should demonstrate tolerance, courtesy and respect for their colleagues and the teacher; when performing practical tasks, the workplace should be kept in order and cleaned after the practical work.

Use of mobile phones and other electronic devices. The use of mobile phones and other electronic devices in the classroom is allowed only on the instructions of the teacher.

Academic integrity. During the study of the discipline the student must be guided by the Code of Academic Integrity of VNMU named after M.I. Pirogov. In case of violation of the norms of academic integrity during the current and final controls, the student receives a grade of "2" and must work it in the prescribed manner for two weeks.

Missed classes. Missed classes are practiced in the manner prescribed by the Regulations on the organization of the educational process at VNMU named after MI Pirogov at the time determined by the schedule of exercises, published on the website of the department and posted on the information stands of the department.

The procedure for admission to the final control of the discipline is given in the Regulations on the organization of the educational process in National Pirogov Memorial Medical University, Vinnytsya. Students who do not have missed classes, provided for in the

curriculum of the discipline / course, and have scored the minimum number of points, which corresponds to the national scale "3", are admitted to the final control.

Additional individual points. Individual points in the discipline according to the Regulations on the organization of the educational process in National Pirogov Memorial Medical University, Vinnytsya, a student can receive for individual work in its successful implementation. The number of points, depending on the volume and significance of such work can be in the range of 6 - 12.

Conflict resolution. In case of conflict situations, the applicant for higher education has the right to submit an application, which is considered in accordance with the Regulations on the consideration of applications from applicants for higher education in National Pirogov Memorial Medical University, Vinnytsya.

Politics in terms of distance learning. The order of distance learning is regulated by the Regulations on the introduction of elements of distance learning in National Pirogov Memorial Medical University, Vinnytsya. The procedure for conducting practical classes and lectures, exercises and consultations during distance learning is published on the website of the department.

Teacher feedback is provided through a distance learning platform (Microsoft Teams), messengers or email (at the teacher's option) during working hours.

8.Educational resources.

Educational and methodological support of the discipline is published on the website of the department (<https://www.vnmuedu.ua/> department of pharmacy / for students). Consultations are held twice a week according to the schedule.

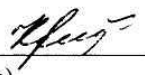
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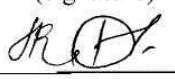
1. T.M. Gontova, A.H. Serbin, S.M. Marchyshyn, V.P. Rudenko, Ya. S. Kichymasova. Pharmaceutical Botany: textbook. – Ternopil : TSMU, 2013. – 380 p.
2. Rodinkova V. Botany Electronic Book. Plant Anatomy Section. Chapter 1_Cell Structure_Cell Wall [Electronic Resource]: Manual for the University Students of Pharmaceutical Specialties / V. Rodinkova. – Vinnytsya. – 2008 - 1 DVD-ROM 120 Min/4,7 GB; 12 cm. – System requirements: Pentium ; 32 Mb RAM ; Windows 95, 98, 2000, XP; MS Word, PowerPoint 97-2007. — Title from container.
3. R.Gulko. Explanatory dictionary of medical botany. – NOVA KNYHA. Vinnytsya – 2006. – 220p.
4. Molecular Expressions. Cell Biology and Microscopy. Structure and Function of Cells and Viruses [Electronic Resource]. – Mode of access: URL: <http://micro.magnet.fsu.edu/cells/plantcell.html>. - Title from the screen
5. Wikipedia The Free Encyclopedia. Plant Cell [Electronic Resource]. – Mode of access: URL:http://en.wikipedia.org/wiki/Plant_cell http://en.wikipedia.org/wiki/Plant_cell. - Title from the screen
6. Plant Cell Anatomy [Electronic Resource]. – Mode of access: URL: <http://www.enchantedlearning.com/subjects/plants/cell/>. – Title from the screen.
7. Buzzle. Plant Cell Structure and Parts. [Electronic Resource]. – Mode of access: URL: <http://www.buzzle.com/articles/plant-cell-structure-and-parts.html>

1. **The timetable and distribution of groups** with assigned teachers are published on the web page of the department ((<https://www.vnmuedu.ua/> / department of pharmacy / for students).

2. Questions to the intermediate and final semester control (credit) of the discipline are published on the web page of the department (<https://www.vnmu.edu.ua> / department of pharmacy / for students).

The syllabus of the discipline " Pharmaceutical botany " was discussed and approved at the meeting of the department of Pharmacy (record № 1, dated "_1_" of September, 2022)

Responsible for the academic discipline  Svitlana KRYKLYVA
(signature)

Head of the department  Professor of HEI Olena KRYVOVIAZ
(signature)