

Summary of the working program of the academic discipline

«BOTANY»

General Educational Program of higher education (specialist's degree programs)

33.05.01 PHARMACY

Department: **BIOLOGY**

1. The purpose of mastering the discipline (*participation in the formation of relevant competencies – specify the codes*):

OPK-1. Capable of using basic biological, physico-chemical, chemical, mathematical methods for the development, research and examination of medicines, the manufacture of medicines.

2. Position of the academic discipline in the structure of the General Educational Program (GEP).

2.1. The discipline **BOTANY** refers to the core part (*or the part formed by the participants of educational relations*) of Block 1 of GEP HE (Academic discipline index).

The discipline is taught in 1,2 semester/1 year of study.

3. Deliverables of mastering the academic discipline and metrics of competence acquisition

Mastering the discipline aims at acquiring the following universal (UC) or/and general professional (GPC) or/and professional (PC) competencies

№	Competence code	The content of the competence (or its part)	Code and name of the competence acquisition metric	As a result of mastering the discipline, the students should:		
				know	be able to	possess
1.	GPC-1	Capable of using basic biological, physico-chemical, chemical, mathematical methods for the development, research and examination of medicines, the manufacture of medicines	IA-1GPC-1 Applies basic biological methods of analysis for the development, research and examination of medicines and medicinal plant raw materials	- biological patterns of plant life development; - a variety of morphological and anatomical structures of vegetative and generative organs of the plant; - plant groups, including medicinal species studied in the course of pharmacognosy; - diagnostic signs of plants used in the determination of raw materials; - the main provisions of the doctrine of the	independently work with botanical literature, analyze what you read and use the results to solve practical problems; - work with a microscope, binoculars; - prepare the necessary micro-preparations, using the appropriate chemical reagents; - carry out	basic information transformation technologies: text, tabular editors, Internet search; - botanical conceptual apparatus; - microscopy technique of micro-preparations of plant objects; - skills of making a preliminary diagnosis of the systematic position of the

				cell; - the main types of reproduction of organisms and their development cycles; - fundamentals of systematics of prokaryotes, fungi, lower and higher plants; - rare and endangered plant species subject to protection and listed in the "Red Book".	morphological and anatomical description of tissues and organs of medicinal plants; - to determine medicinal plant species by the complex of morphological and diagnostic signs; - to recognize the age characteristics of plants in the process of ontogenesis; - rational use and protection of medicinal plant species.	plant; - methods of plant research in order to diagnose medicinal plants and their impurities.
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4. Volume of the academic discipline and types of academic work

Total labor intensity of the discipline is 7 CU (144 AH)

Type of educational work	Labor intensity		Labor intensity (AH) in semesters	
	volume in credit units (CU)	volume in academic hours (AH)	1	2
Classroom work, including	3,6	130		
Lectures (L)	0,8	28	16	12
Laboratory practicum (LP)*	2,8	102	50	52
Practicals (P)				
Seminars (S)				
Student's individual work (SIW)	2,4	86	42	44
Mid-term assessment				
credit/exam (<i>specify the type</i>)	1	36		36
TOTAL LABOR INTENSITY	7	252	108	144

5. Sections of the academic discipline and competencies that are formed

№	Competence code	Section name of the discipline	The content of the section in teaching units
1.	GPC-1	Fundamentals of cytology	<ol style="list-style-type: none"> 1. Botany as a biological science. The main stages of the development of botany. The importance of botany for pharmacy. 2. Prokaryotic cell on the example of cyanobacteria. 3. The structure of the eukaryotic cell. Fundamental differences between plant, fungal and animal cells. A plant cell. 4. Ergastic substances. Carbohydrates, proteins, fats, their role in the vital activity of the cell. The value of spare substances for pharmacy and medicine. 5. Excretory substances. The use of crystals in pharmacy for the diagnosis of plant raw materials. Essential oils, balms, resins, gums, their use in pharmacy and medicine
		Plant tissues, structure, functions and topography	<ol style="list-style-type: none"> 1. The concept of plant tissues. Principles of classification of plant tissues. 2. A group of educational tissues (meristems). Features of the structure of meristem cells and their localization in the plant body. 3. A group of integumentary tissues. Their origin, localization in the plant body, functions and structural features. 4. A group of conductive tissues. Their origin, localization in the plant body, functions and structural features. 5. A group of mechanical fabrics. Their origin, localization in the plant body, functions and structural features. 6. Group of basic tissues: assimilation, storage, respiratory (aerenchyma). Their origin, localization in the plant body, functions and structural features. 7. A group of secretory tissues. General characteristics, classification and functions. Application of plant isolation products in medicine and national economy.
		Organs of higher plants. Morphological and anatomical structure	<ol style="list-style-type: none"> 1. The concept of organs in plants. Vegetative and reproductive organs. 2. The stem is the axial structural element of the shoot. Stem functions. Anatomical structure of the stem. Differences in the structure of the stem in dicotyledonous and monocotyledonous plants. Differences in the features of the anatomical structure of dicotyledonous and coniferous trees. The biological role of wood. 3. The leaf is a lateral structural element of the shoot. Parts of the sheet. Simple and complex leaves. Anatomical structure of the leaf in connection with its functions. Dorsoventral, isolateral leaves. A leaf of a coniferous plant. Dependence of morphological features and anatomical structure of the leaf on external factors. Light and shadow leaves. Leaf mosaic. Metamorphoses of a leaf and its parts 4. The root. Root zones. The primary anatomical structure of the root. The appearance of cambium and the transition to the secondary structure of the root in dicotyledonous plants. Secondary structure of the root. Features of the anatomical

		<p>structure of roots in herbaceous and woody dicotyledonous and coniferous plants. Features of the anatomical structure of thickened roots and tubers. Specialization and metamorphosis of roots.</p> <p>5. Reproductive organs of angiosperms: flower and fruit. The structure of the flower and its functions. Androce. Gynoecium. Pollination and fertilization. The phenomenon of apomixis. Modern ideas about the origin of the angiosperm flower.</p> <p>6. The biological role of the inflorescence. Classification of inflorescences.</p> <p>7. Fruits. Classification of fruits based on the structure of the guinea worm: apocarpia, monocarpia, cenocarpia and pseudomonocarpia. The fruits are fractional and segmented, juicy and dry, single-seeded and multi-seeded, opening and non-opening. Coplodia. Methods of distribution of fruits and seeds.</p>
	Systematics of plant organisms	<p>1. Taxonomy. Definition of taxonomy. Taxonomy tasks. Taxonomic categories and taxa, binary nomenclature.</p> <p>2. Eukaryote domain. The main divisions of algae.</p> <p>3. The kingdom of Fungi. The main divisions of fungi, lichens and their characteristics.</p> <p>4. The kingdom of the plant. General characteristics of plants. Features of the structure of the reproductive organs.</p> <p>5. Department of bryophytes (MOSESSES).</p> <p>6. Department of lycopodium-like.</p> <p>7. Department of equisetum-like.</p> <p>8. Department of fern-like.</p> <p>9. Department of gymnosperms.</p> <p>10. Department angiosperms, or flowering plants</p> <p>11. A systematic review of the families of the angiosperms</p>
	Elements of plant physiology	Plant growth and development. Phytohormones. Photosynthesis.