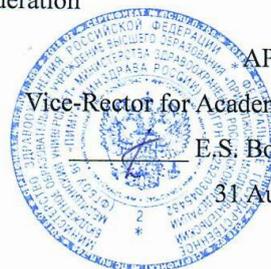


Federal State Budgetary Educational Institution of Higher Education
"Privolzhsky Research Medical University"
Ministry of Health of the Russian Federation



APPROVED
Vice-Rector for Academic Affairs
E.S. Bogomolova
31 August 2021

WORKING PROGRAM

Name of the academic discipline: **Pharmacognosy**

Specialty: **33.05.01 PHARMACY**

Qualification: **PHARMACIST**

Department: **Pharmaceutical Chemistry and Pharmacognosy**

Mode of study: **full-time**

Labor intensity of the academic discipline: **360 academic hours**

Nizhny Novgorod
2021

The working program has been developed in accordance with the Federal State Educational Standard for the specialty 33.05.01 Pharmacy, approved by order of the Ministry of Science and Higher Education of the Russian Federation No. 219 dated March 27, 2018.

Developers of the working program:

O.A.Vorobeva, Associate Professor of the Department, PhD;

The program was reviewed and approved at the department meeting (protocol No. 1 of 08/29/2022)

Head of the Department of Pharmaceutical Chemistry
and pharmacognosy, Ph.D. _____  /O.V. Zhukova/

29 August 2021

AGREED

Deputy Head of EMA ph.d. of biology _____  Lovtsova L.V.

(signature)

29 August 2021

1. The purpose and objectives of mastering the academic discipline pharmacognosy (hereinafter discipline).

The purpose of mastering the discipline: *participation in forming the relevant competencies UC-1,4; GPC-1,6; PC-4,5.*

Tasks of the discipline.

As a result of completing the discipline, the student should

Know:

- characteristics of the raw material base of medicinal plants;
- general principles of rational procurement of medicinal plant materials and measures for the protection of natural, exploited thickets of medicinal plants;
- system of classification of medicinal plant materials (chemical, pharmacological, botanical, morphological);
- nomenclature of medicinal plant raw materials and medicines of plant and animal origin, approved for use in medical practice;
- basic information about the distribution and distribution areas of medicinal plants used in medical practice;
- methods of macroscopic and microscopic analyzes of whole and crushed medicinal raw materials;
- morphological and anatomical diagnostic signs of MRM approved for use in medical practice, possible impurities;
- the main groups of biologically active compounds of natural origin and their most important physical and chemical properties, the ways of biosynthesis of the main groups of biologically active substances;
- basic methods for the qualitative and quantitative determination of biologically active substances in medicinal products, biological standardization of medicinal products;
- requirements for packaging, labeling, transportation and storage of medicinal products in accordance with regulatory documents;
- the main ways and forms of the use of medicinal herbs in pharmaceutical practice and industrial production;
- basic information about the use of medicinal products of plant and animal origin in medical practice.

Be able to:

- carry out safety precautions with medicinal plants and medicinal raw materials;
- to carry out qualitative and microchemical reactions to the main biologically active substances contained in medicinal plants and raw materials;
- to determine the stocks and possible volumes of preparations of medicinal plant materials;
- perform analysis and quality control of medicines in accordance with applicable requirements;
- carry out statistical processing and registration of the results of pharmacognostic analysis, make a conclusion about the good quality of medicinal plant materials in accordance with current requirements;
- carry out the acceptance of medicinal plant materials, take samples necessary for its analysis, in accordance with applicable requirements;
- analyze, according to the methods of quantitative determination provided for by the relevant regulatory documents, medicinal plant materials for the content of fatty and essential oils, tannins.

Possess:

- the skills of identifying medicinal plants by external signs in live and herbaric species;
- technique for preparing micropreparations of various morphological groups of medicinal plant materials;

- the technique of conducting qualitative and microchemical reactions to the main biologically active substances contained in medicinal plants and raw materials, the skills of conducting resource research;

- skills in interpreting the results of the analysis of medicines to assess their quality, standard operating procedures for determining the order and execution of documents for the declaration of compliance of the finished product with the requirements of regulatory documents.

2. Position of the academic discipline in the structure of the General Educational Program of Higher Education (GEP HE) of the organization.

The discipline Pharmacognosy 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 5,6,7 semesters.

2.2. The following knowledge, skills and abilities formed by previous academic disciplines are required for mastering the discipline: latin, physics, general and inorganic chemistry, physical and colloidal chemistry, botany, biology, physiology with the basics of anatomy, microbiology, analytical chemistry, organic chemistry, biological chemistry.

2.3. Mastering the discipline is required for forming the following knowledge, skills and abilities for subsequent academic disciplines: pharmacology, pharmaceutical technology, pharmaceutical chemistry, modern methods of pharmaceutical analysis, communicative foundations of pharmaceutical activity, clinical pharmacology with the basics of pharmacotherapy, biotechnology, toxicological chemistry, medical and pharmaceutical commodity science, fundamentals of ecology and nature conservation, biopharmacy; and practitioners: study practice in pharmacognosy, study practice in general pharmaceutical technology, work practice in technology, work practice in drug quality control, work practice in pharmaceutical consulting and informing.

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.	UC-1.	Able to realize critical analysis of problem situations based on a systematic approach, develop strategy actions	UC-1.1. Analyzes the problem situation as a system identifying its components and connections between them UC-1.3. Critically assesses reliability of information sources, works with conflicting information from different sources	<ul style="list-style-type: none"> methodology of abstract thinking for systematization of processes and construction of cause-and-effect relationships; modern theoretical and experimental methods for the implementation of own and borrowed results of scientific research into practice. 	<ul style="list-style-type: none"> abstract, analyze and synthesize the information received; highlight and to systematize the essential properties and connections of objects, to identify the main patterns of the objects under study; search, select and analyze information obtained from various sources in order to make the best decision at the modern 	<ul style="list-style-type: none"> methods of self-control, abstract and analytical thinking; skills in analyzing methodological problems that arise in solving research and practical problems, including those in interdisciplinary areas; skills of presenting an independent point of view

					scientific level, in accordance with professional tasks and the requirements of legal documents.	
2.	UC-4.	Able to apply modern communication technologies including in a foreign language(s), for academic and professional interaction	UC-4.2. Compiles, translates from a foreign language into the state language of the Russian Federation and from the state language of the Russian Federation into a foreign one, as well as edits various academic texts (abstracts, essays, reviews, articles, etc.) incl. in a foreign language	the basics of a professional foreign language for the correct translation and editing of various academic and legal texts (reviews, scientific articles, pharmacopoeial articles, etc.), from a foreign language into the state language of the Russian Federation and from the state language of the Russian Federation into a foreign language	translate and edit various academic and regulatory texts (reviews, scientific articles, pharmacopoeial articles, etc.), from a foreign language into the state language of the Russian Federation and from the state language of the Russian Federation into a foreign language	skills of self-translation and editing of various academic and regulatory texts (reviews, scientific articles, pharmacopoeial articles, etc.), from a foreign language into the state language of the Russian Federation and from the state language of the Russian Federation into a foreign language
3.	GPC-1.	Able to use basic biological, physical-chemical, chemical, mathematical methods for the development, research and examination of medicines, the manufacture of medicinal products	GPC-1.1. Applies basic biological methods of analysis for the development, research and examination of pharmaceuticals and medicinal plant raw materials GPC-1.2. Applies basic physical-chemical and chemical analysis methods for the development, research and examination of medicinal products and medicinal plant raw materials GPC-1.4. Applies mathematical methods and performs mathematical processing of data obtained during the development of medicines, as well as research and examination of medicines and medicinal plant raw materials	<ul style="list-style-type: none"> • organization of a system of state control over the production and manufacture of drugs; • the main regulatory documents, production and manufacture, quality control, storage and use of medicines (domestic and international standards (GMP, GLP, GCP, GPP), pharmacopoeias, orders of the Ministry of Health of the Russian Federation, guidelines and instructions approved by the Ministry of Health of the Russian Federation) for examination using chemical, biological, physico-chemical and other methods; • pharmacopoeial methods of analysis used in the analysis of medicinal products using chemical, biological, physico-chemical and other methods. 	<ul style="list-style-type: none"> • apply chemical, biological, physico-chemical and other methods of analysis during the examination of medicines. 	<ul style="list-style-type: none"> • ensuring the process of quality control of medicines with equipment and consumables; • basic chemical, biological, physico-chemical and other methods of analysis during the examination of medicines.

4.	GPC-6.	Able to understand the principles of modern information technologies and use them to solve the tasks of professional activity	GPC-6.2. Performs an effective search for information necessary to solve the tasks of professional activity using legal reference systems and professional pharmaceutical databases GPC-6.3. Uses specialized software for mathematical processing of observational and experimental data in solving problems of professional activity	modern means of computing technology	use modern computer technology and basic office applications And graphic packages; evaluate way of implementing information systems and devices for solving task	methods of practical use modern computers to search information processing and fundamentals numerical methods for solving applied tasks
5.	PC-4.	Able to participate in monitoring the quality, effectiveness and safety of medicines and medicinal plant raw materials	PC-4.3. Conducts pharmacognostic analysis of medicinal plant raw materials and medicinal herbal preparations	<ul style="list-style-type: none"> • laws and legislative acts of the Russian Federation, regulatory and methodological materials of the Ministry of Health of Russia, regulating the procedure for quality control of medicines in the conditions of pharmaceutical organizations; • methods of analysis used in the quality control of drugs in the conditions of pharmaceutical organizations; • monitor drug quality assurance systems; • the process of providing equipment and consumables for quality control in the conditions of pharmaceutical organizations; 	<ul style="list-style-type: none"> • apply chemical, physico-chemical methods of intrapharmacy quality of drugs in the conditions of pharmaceutical organizations; • draw up documentation of the established form for the control of manufactured medicinal products in the conditions of pharmaceutical organizations; • monitor drug quality assurance systems; • provide the process of quality control in pharmaceutical organizations with equipment and consumables. 	<ul style="list-style-type: none"> • basic chemical and physico-chemical methods of intrapharmacy quality control of drugs in the conditions of pharmaceutical organizations; • registration of documentation of the established sample for the control of manufactured drugs in the conditions of pharmaceutical organizations.
6.	PC-5.	Able to take part in planning and organizing the resource provision of a pharmaceutical organization	PC-5.7. Organizes control over the availability and storage conditions of medicines for medical use and other products of the pharmacy assortment	the main regulatory and legal documents (legal, legislative and administrative) relating to the conditions of storage and transportation of medicinal herbal raw materials and herbal medicinal products in the conditions	<ul style="list-style-type: none"> • apply the regulatory framework governing the storage of medicinal herbal raw materials and medicinal herbal preparations; • determine the indicator "description, packaging, labeling" during acceptance con- 	<ul style="list-style-type: none"> • skills in applying normative and legislative acts regulating the conditions of storage and transportation of medicinal herbal raw materials and medicinal herbal preparations. • determination of indicators "description, packaging, labeling" during acceptance

				<p>of pharmaceutical organizations.</p> <ul style="list-style-type: none"> • rules for the storage and transportation of medicinal herbal raw materials and medicinal herbal preparations, including poisonous and potent PKKN lists, narcotic, psychotropic, precursors, substances of lists A and B, as well as over-the-counter drugs, depending on chemical and physico-chemical drug properties, container properties 	<p>trol;</p> <ul style="list-style-type: none"> • ensure and control the conditions of storage and transportation of medicinal herbal raw materials and medicinal herbal preparations 	<p>control;</p> <ul style="list-style-type: none"> • skills to control compliance with the conditions of storage and transportation of medicinal herbal raw materials and medicinal herbal preparations
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4. Sections of the academic discipline and competencies that are formed when mastering them

p / no.	Competence code	Section name of the discipline	The content of the section in teaching units
1	UC-1,4 GPC-1,6 PC-4,5	Introduction to pharmacognosy. Methods of pharmacognostic analysis.	<p>Definition of pharmacognosy as a science and discipline. Basic concepts. Categories of RD for raw materials. FS structure. NTD and its role in improving the quality of medicinal products. Determination of the authenticity and good quality of MRM. Methods of pharmacognostic analysis. General characteristics of polysaccharides, vitamins, lipids. Classification. Physicochemical characteristics. Methods for isolation and quantification in MRM. Features of the collection, drying, packaging and storage of raw materials. Analysis of raw materials. Ways of use and medicines. Determination of saponification number, acid and iodine numbers. Methods for the quantitative determination of fatty oil in VP.</p> <p>Organization of acceptance of LRS. Sampling methods for whole raw materials and packaged products. Description of the documentation accompanying the acceptance of raw materials and sampling. Identification of impurities in MR and MR. Determining the authenticity of MP and MP in comparison with closely related species by their macro-</p>

			and microscopic features.
2.	UC-1,4 GPC-1,6 PC-4,5	MRM containing polysaccharides, fats, vitamins	<p>MP and MRM containing polysaccharides. Determination of the authenticity and good quality of the roots of Althea; large plantain leaves, coltsfoot; succession herbs, plantain species; linden flowers; flax seeds, plantain flea; thallus of kelp. Acquaintance with plants - sources of starch and inulin, various types of orchis. Acquaintance with tropical plants - figs, unabi.</p> <p>MP and MRM containing fatty oils. Acquaintance with plants - sources of fatty oils: apricot, peach, almond, olive, sunflower, corn, castor bean, flax. Acquaintance with tropical plants - chocolate tree, coconut palm, noble laurel, peanut, sesame, cotton tree. Characterization of animal fats and fat-like substances.</p> <p>MP and MRM containing vitamins. Determination of the authenticity and good quality of rose hips, mountain ash, viburnum, black currant, sea buckthorn; nettle leaves, strawberries; shepherd's purse herbs, buckwheat; marigold flowers; stigma with columns of corn. Acquaintance with the fruits of citrus fruits containing ascorbic acid, growing in the subtropics. Quantitative determination of ascorbic acid in VP.</p>
3.	UC-1,4 GPC-1,6 PC-4,5	MPRS containing compounds of terpenoid structure	<p>Definition of the term "terpenoids". Spreading. Classification. Physicochemical characteristics. Methods for isolating essential oils from plant materials. Determination of indicators of authenticity and good quality of essential oil. Methods for the quantitative determination of essential oil in herbs. Features of collection, drying, packaging and storage of essential oil raw materials. Analysis of raw materials containing essential oil. Ways of use and medicines.</p> <p>Determination of authenticity and good quality: peppermint leaves, sage, lemon balm, eucalyptus species; herbs thyme, common thyme, oregano, wormwood tarragon; wild rosemary shoots; fruits of fennel, anise, cumin, coriander, juniper, garden dill; buds of birch, poplar; chamomile and fragrant chamomile flowers, arnica and rose species; rhizomes with valerian roots; rhizomes and roots of elecampane; calamus rhizomes; yarrow herbs, wormwood; hop seedlings; spruce cones. Study of pine and fir products. Acquaintance with tropical plants - rosemary,</p>

			<p>ginger, azhgon, iris, star anise, cinnamon, clove, lavender, cardamom, nutmeg, camphor laurel, turmeric, black pepper, vanilla, saffron, iris, marjoram, lemon, wormwood.</p> <p>MP and MPRS containing iridoids, monoterpene bitters, phytoecdysones and xanthenes. Determination of the authenticity and good quality of motherwort herb, types of centaury, alpine kopek; water shamrock leaves; dandelion roots, gentian; rhizomes and roots of the evading peony; rhizomes with leuzea roots.</p>
4.	UC-1,4 GPC-1,6 PC-4,5	MRM containing glycosides	<p>Definition of the term "glycosides". Distribution in the plant world. Physicochemical characteristics. Features of the collection of raw materials. Drying, packaging and storage of raw materials. Analysis of raw materials. Ways of use and medicines.</p> <p>MP and MRM containing thio- and cyanogenic glycosides. Determination of the authenticity and good quality of fresh garlic and onion bulbs, mustard seeds and bitter almonds, black elder flowers.</p> <p>MP and MRM containing cardiac glycosides. Determination of the authenticity and good quality of foxglove leaves: purple, woolly, large-flowered, lily of the valley; herbs of adonis, lily of the valley, jaundice; lily of the valley flowers; rhizomes with hellebore roots. Acquaintance with tropical plants - strophanthus Kombe, sea onion, oleander, jute, Greek obit.</p> <p>MP and MRM containing saponins. Determination of the authenticity and good quality of the roots of aralia, ginseng, licorice species; rhizomes with roots of cyanosis, zamaniha, Dioscorea Nipponskaya; herbs of tribulus, astragalus woolly-flowered; horse chestnut seeds. Acquaintance with tropical plants - smilaks, stamen orthosiphon, yucca, agave, hay fenugreek, common ivy, phytolacca.</p>
5.	UC-1,4 GPC-1,6 PC-4,5	MRM containing phenolic compounds	<p>Classification. Physicochemical characteristics. Methods of isolation, qualitative and quantitative analyzes of MRM containing phenolic compounds. Collection, drying, packaging and storage of raw materials. Analysis of raw materials. Ways of use and medicines.</p> <p>MP and MPRS containing simple phenols, phenol glycosides, lignans, coumarins and chromones. Determination of the authenticity and good quality of the leaves of bearberry, lingonberry, fig, holly willow; rhizomes and</p>

			<p>roots of rhodiola, eleutherococcus, podophyllum, bloater; fruits of milk thistle, large ammi, parsnip, visnaga, psoralea; sweet clover herbs; seeds of horse chestnut, lemongrass; willow bark.</p> <p>MP and MRM containing phenylpropanoids. General characteristics. Collection, drying, packaging and storage of raw materials. Analysis of raw materials. Ways of use and medicines. Determination of the authenticity and good quality of echinacea herb, milk thistle fruits, artichoke leaves, white mistletoe leaves, common lilac bark, rhizomes and roots of Rhodiola rosea.</p> <p>MP and MRM containing anthracene derivatives. Determination of the authenticity and good quality of senna leaves, aloe; buckthorn bark; rhubarb roots, horse sorrel; rhizomes and roots of madder, fruits of joster.</p> <p>LR and HR with little known chemical composition. General characteristics. Collection, drying, packaging and storage of raw materials. Analysis of raw materials. Ways of use and medicines. Determination of the authenticity and good quality of stonecrop, oats; kidney tea leaves; raspberries, carrots; chaga; shoots of Kalanchoe; burdock roots; mullein flowers.</p> <p>MP and MPRS containing flavonoids. Determination of the authenticity and good quality of motherwort herb, knotweed knotweed, pepper knotweed, bird knotweed, horsetail, cudweed, succession, lespedeza, multi-veined volodushka, Canadian goldenrod, types of violets and St. John's wort; immortelle flowers, black elderberry, cornflower, tansy, hawthorn species; chokeberry fruit, hawthorn species; roots of harrow, skullcap; hemp datiski leaves, Amur velvet; stalks of the common bean. Acquaintance with tropical plants - ginkgo, Japanese Sophora, hibiscus sabdariffa.</p> <p>MP and MRM containing tannins. Determination of the authenticity and good quality of the bark of oak species, rhizomes of cinquefoil, serpentine, bergenia, rhizomes with burnet roots, seedlings of alder species, bird cherry fruits, blueberries, skumpia leaves, sumac, Chinese tea. Acquaintance with tropical plants - witch hazel, pomegranate tree. Sources of galls.</p>
6.	UC-1,4	MRM containing alkaloids	Definition of the term "alkaloids". Classifica-

	GPC-1,6 PC-4,5		<p>tion. Physicochemical characteristics. Methods for isolating, qualitative and quantitative analyzes of VP containing alkaloids. The contribution of domestic and foreign scientists to the study of alkaloid plants. Collection, drying, packaging and storage of raw materials. Analysis of raw materials. Ways of use and medicines.</p> <p>Determination of the authenticity and good quality of belladonna leaves, henbane, dope ordinary, Chinese tea; herbs of thick-fruited sophora, club moss, yellow machka, large celandine, cataranthus, small periwinkle, incarnate passionflower, harmala, anabasis, flat-leaved ragwort, goat's rue, species: ephedra, Macleia, thermopsis; rhizomes with hellebore roots; barberry roots, rauwolfia; rhizomes of the capsule, scopolia; stephania tubers; colchicum bulbs; ergot sclerotium; fruits of red pepper, mordovnik, sleeping pills poppy; dope seeds Indian, thermopsis lanceolate. Acquaintance with tropical plants - coca bush, cinchona, hydrastis, physostigma, pilocarpus, coffee tree, chocolate tree, lobed nightshade, chilibuha.</p>
7.	UC-1,4 GPC-1,6 PC-4,5	MPV containing raw materials of animal origin	<p>Raw materials of animal origin used in medicine. General information. Prospects for the use of animal raw materials and natural preparations in medicine. quality requirements. Analysis. Determination of the authenticity and good quality of bodyagi. Acquaintance with leeches, antlers, mummy, spermaceti, lanolin, snake venoms, waste products of honey bees.</p>
8.	UC-1,4 GPC-1,6 PC-4,5	Analysis of crushed VP	<p>Nomenclature of dosage forms. Analysis of crushed medicinal plant materials. General characteristics of the fees from the LRS. Nomenclature of official fees. Quality requirements, analysis, ways of use, application.</p>
9.	UC-1,4 GPC-1,6 PC-4,5	Fundamentals of herbal medicine and homeopathy	<p>The main provisions of modern phytotherapy. Principal indications and limitations of phytotherapy. LR and their classification in terms of phytotherapy. Problems of scientific research in the field of medicinal plants and herbal medicine. Features of the use of medicinal plant materials in medical practice.</p> <p>The concept of homeopathy. Characteristics of raw materials of plant and animal origin used in homeopathy.</p> <p>General characteristics. Quality requirements and analysis of medicinal plant materials.</p>

			General characteristics. Study of the nomenclature of MP and MRM used as dietary supplements. Collection, drying, packaging and storage of raw materials. Analysis of raw materials. Analysis of biologically active additives created on the basis of VP.
10.	UC-1,4 GPC-1,6 PC-4,5	Resource science	The role and importance of resource science in the system of rational use of medicinal plant resources. Basic geobotanical and resource science concepts and their use in resource science. The influence of climatic factors on the distribution and nature of plant life. Critical factors of plant life. Indicators of heat and moisture supply. Plant resources of the world, the Russian Federation and the Nizhny Novgorod region, questions of their use in pharmacy.

5. Volume of the academic discipline and types of academic work

Type of study work	Labor intensity		Labor intensity by semesters (ACh)		
	volume in credit units (CU)	volume in academic hours (AH)	5	6	7
classroom work, including	5.39	194	66	64	64
Lectures (L)	1.17	42	14	14	14
Practicals (P)	4.22	152	52	50	50
Student's individual work (SIW)	3.61	130	42	44	44
Mid-term assessment	1	36	-	-	36
exam	-	-	-	-	exam
TOTAL LABOR CAPACITY	10	360	108	108	144

6. Content of the academic discipline

6.1 Sections of the discipline and types of academic work

No. p/p	semester number	Name of the section of the academic discipline	Types of academic work* (in AH)						
			L	LP	P			SIW	Total
1.	5	Introduction to pharmacognosy. Methods of pharmacognostic analysis. Commodity analysis.	4	-	15	-	-	10	29
2.	5	MRM containing polysaccharides, fats, vitamins	6	-	15	-	-	16	37
3.	5	MPRS containing compounds of terpenoid structure	4	-	22	-	-	16	42
4.	6	MRM containing glycosides	5	-	12	-	-	12	30
5.	6	MRM containing phenolic compounds	9	-	38	-	-	32	78

6.	7	MRM containing alkaloids	4	-	12	-	-	18	34
7.	7	MPV containing raw materials of animal origin	2	-	3	-	-	4	9
8.	7	Analysis of crushed VP	-	-	9	-	-	6	15
9.	7	Fundamentals of herbal medicine and homeopathy	2	-	9	-	-	6	17
10.	7	resource science	6	-	17	-	-	10	33
		TOTAL	42	-	152			130	324

* - L – lectures; LP – laboratory practicum; P – practicals; S – seminars; SIW – student's individual work.

6.2. Thematic schedule of educational work types:

6.2.1 Thematic schedule of lectures

No. p / p	Name of lecture topics	Volume in AH		
		5	6	7
1.	Definition of pharmacognosy as a science and discipline. Basic concepts. Ways and methods of revealing new medicinal plants. Classification systems LR and LRS. Tasks of pharmacognosy at the present stage of development. The main stages in the development of pharmacognosy. Scientists are pharmacognostics. Brief description of the main directions of scientific research. Chemical screening of LR. Geochemical ecology of the Republic of Latvia. The main scientific centers for the study of LR.	1		
2.	Categories of RD for raw materials. FS structure. LRS standardization system. NTD and its role in improving the quality of medicinal products. The procedure for the development and approval of regulatory documentation regulating the quality of raw materials. Requirements for the quality of medicinal plant raw materials. Methods of pharmacognostic analysis. Organization of MRM acceptance. Sampling methods for whole raw materials and packaged products. Description of the documentation accompanying the acceptance of raw materials and sampling. Determination of the authenticity and good quality of MRM.	1		
3.	Raw material base of PM. Rational methods of collecting VP. Primary processing, drying, packing, transportation, storage. Procurement organizations and their functions.	1		
4.	The main groups of biologically active substances of medicinal plants. Variability of the chemical composition of medicinal plants in the process of ontogenesis. Pharmaceutical concept of active, concomitant and ballast substances. The relationship of the chemical composition of medicinal plant materials with pharmacological action.	1		
5.	MP and MRM containing polysaccharides. General characteristics. Classification. Physicochemical characteristics. Features of the collection, drying, packaging and storage of raw materials. Analysis of raw materials. Ways of use and medicines.	2		

6.	The concept of lipids, classification. Physical and chemical properties. Methods for obtaining and cleaning. storage features. Evaluation of the quality of fatty oils, methods of analysis. medical application.	2		
7.	The concept of vitamins, their classification. Physical and chemical properties. Features of harvesting, drying, storage of raw materials. Assessment of the quality of raw materials, methods of analysis. Ways of using raw materials, medical applications.	2		
8.	The concept of terpenes, classification, patterns of formation (biosynthesis) in plants. The role of domestic scientists in the study of the topic. The concept of essential oils. Classification of essential oils and medicinal plant materials. The role of essential oils in plant life. Patterns of formation, accumulation (localization of essential oils in plant materials), distribution of essential oils in plants, raw material base. Features of harvesting, drying, storage of raw materials.	1		
9.	Physical and chemical properties of essential oils. Methods for isolating essential oils. Determining the authenticity, purity and good quality of essential oils. Pharmacopoeial methods for the quantitative determination of essential oils in medicinal plant raw materials.	1		
10.	MP and MRM containing terpenoids and aromatic compounds. Analysis of raw materials, ways of use and medicines.	1		
eleven.	Definition of the concepts of "iridoids and bitterness". Classification. Physicochemical characteristics. Features of the collection, drying, packaging and storage of raw materials. Analysis of raw materials. Ways of use and medicines.	1		
12.	The concept of glycosides, their classification. Physical and chemical properties. Features of harvesting, drying, storage of raw materials. The concept of heterosides, classification. Definition of the concepts "thio- and cyanogenic glycosides". General characteristics. Collection, drying, packaging and storage of raw materials. Analysis of raw materials. Ways of use and medicines.		1	
13.	The concept of cardiac glycosides, classification. Physical and chemical properties. Features of the collection, drying, packaging and storage of raw materials. Analysis of raw materials. Raw material standardization. Ways of use and medicines.		2	
14.	The concept of saponins, classification. Structural features of aglycone and sugar component. Physical, chemical and biological properties of saponins. Assessment of the quality of raw materials, methods of analysis. Ways of using raw materials, medical applications.		2	
15.	General characteristics of natural phenolic compounds. Classification. The concept of simple phenolic compounds and phenolcarboxylic acids, classification. Physical and chemical properties. Features of harvesting, drying and storage of raw materials. Assessment of the quality of raw materials, methods of analysis. Ways of using raw materials, medical applications. MP and MPRS of different chemical composition and contain-		2	

	ing phenylpropanoids. General characteristics. Collection, drying, packaging and storage of raw materials. Analysis of raw materials. Ways of use and medicines.			
16.	The concept of coumarins, chromones, lignans. Classification. role in plant life. Physical and chemical properties. Assessment of the quality of raw materials, methods of analysis. Ways of using raw materials, medical applications. Definition of the concept of "xanthones". General characteristics. Collection, drying, packaging and storage of raw materials. Analysis of raw materials. Ways of use and medicines.		1	
17.	The concept of anthracene derivatives, classification. Patterns of formation (biosynthesis), localization and distribution in plants. role in plant life. Physical and chemical properties. Assessment of the quality of raw materials, methods of analysis. Ways of using raw materials, medical applications.		2	
18.	The concept of flavonoids, classification. Physical and chemical properties. Patterns of formation (biosynthesis), localization and distribution in plants. role in plant life. Assessment of the quality of raw materials, methods of analysis. Ways of using raw materials, medical applications.		2	
19.	Definition of the concept of "tannins". Classification. Physico-chemical characteristics. Collection, drying, packaging and storage of raw materials. Analysis of raw materials. Ways of use and medicines.		2	
20.	The concept of alkaloids, classification. Patterns of formation (biosynthesis) and distribution in plants. role in plant life. Physical and chemical properties of alkaloids.			1
21.	Assessment of the quality of raw materials, methods of analysis. Methods for isolating, qualitative and quantitative analyzes of VP containing alkaloids. The contribution of domestic and foreign scientists to the study of alkaloid plants. Collection, drying, packaging and storage of raw materials.			1
22.	MP and MRM containing alkaloids. Analysis of raw materials. Ways of use and medicines.			2
23.	Medicinal raw materials of animal origin (modern ideas and prospects for use in medicine): leeches, antlers, mummy, snake venom, bee venom, honey, royal jelly, propolis, pollen (pollen), perga. Fat-like substances (waxes). Lanolin, beeswax, spermaceti: composition, physical and chemical properties, medical use.			2
24.	Fundamentals of phytotherapy. MRM used in dietary supplements			2
25.	The role and importance of resource science in the system of rational use of medicinal plant resources. Basic geobotanical and resource science concepts and their use in resource science.			1
26.	The influence of climatic factors on the distribution and nature of plant life. Critical factors of plant life. Indicators of heat and moisture supply.			1
27.	Plant resources of the world and the Russian Federation. The main geoclimatic zones of Russia, their floristic composition, the importance of medicinal plants in resource science.			2

28.	Plant resources of the Nizhny Novgorod region, questions of their use in pharmacy. Rational use of medicinal plant resources and their protection. Influence of environmental factors on the quality of medicinal plant raw materials.			2
	TOTAL (total - 42 AH)	14	14	14

6.2.2. Thematic plan of practicals

No . p / p	Name of topics of practicals	Volume in AH by semester		
		5	6	7
1.	Introduction to pharmacognosy. Macroscopic method of analysis. Test control.	3		
2.	Microscopic method of analysis. Test control.	3		
3.	Rules for the acceptance of medicinal products (angro and packaged products). Mastering the methods for determining the good quality of MMR of various morphological groups for authenticity, crushing, the content of impurities and the degree of infestation with barn pests of MMR.	3		
4.	<i>Seminar</i> "Commodity Analysis of LRS". Solution of situational problems. Test control.	3		
5.	<i>intermediate control</i> . Testing practical skills and abilities (analysis of an unknown whole and crushed VP). Solution of situational problems.	3		
6.	MP and MPRS containing polysaccharides <i>Objects for laboratory research</i> : types of marshmallow, violets; plantain large; coltsfoot, tripartite succession, species of linden, flax, kelp, burdock, echinacea purpurea. <i>Objects for self-study</i> : plantain flea, orchis, sources of starch, gums and inulin, unabi. Test control.	3		
7.	MP and MRM containing fatty oils <i>Objects for laboratory research</i> : the most useful flax and castor bean. <i>Objects for self-study</i> : apricot, peach, almond, olive, sunflower, corn, chocolate tree, coconut tree, laurel, peanut, sesame, cotton tree, pumpkin species. Characteristics of animal fats and fat-like substances: lanolin, wax, spermaceti. Test control.	3		
8.	Phytochemical analysis of VP containing fatty oils. Determination of saponification number, acid, iodine, ether and peroxide numbers. Methods for the quantitative determination of fatty oil in VP.	3		
9.	MP and MRM containing vitamins <i>Objects for laboratory research</i> : types of wild rose, stinging nettle, wild strawberry, shepherd's purse, mountain ash, common viburnum, black currant, sea buckthorn, marigold, corn, cudweed marsh, tripartite string. <i>Objects for self-study</i> : buckwheat, citrus fruits, intoxicating hareslip. Quantitative determination of ascorbic acid in VP. Test control.	3		

10.	<i>intermediate control.</i> Testing practical skills and abilities in the analysis of MRM containing polysaccharides, vitamins, fatty and essential oils. Solution of situational problems. Test control.	3		
eleven	Phytochemical analysis of VP containing essential oils. Determination of indicators of authenticity and good quality of essential oil. Methods for the quantitative determination of essential oil in herbs.	3		
12.	MP and MRM containing aliphatic and monocyclic monoterpenes <i>Objects for laboratory research:</i> peppermint, medicinal sage, lemon balm, eucalyptus species, garden dill, coriander seed, common cumin, lavender, cardamom. <i>Objects for self-study:</i> types of essential oil rose.	3		
13.	MP and MRM containing bicyclic monoterpenes, resins and balms <i>Objects for laboratory research:</i> valerian officinalis, common juniper, pine, fir, spruce, tansy, nutmeg, rosemary. <i>Objects for self-study:</i> camphor laurel, raw materials of camphor, pine products.	2		
14.	MP and MRM containing sesquiterpenes <i>Objects for laboratory research:</i> calamus, elecampane, wormwood, chamomile species, common yarrow, birch species, black poplar, wild rosemary, linden species, hops, ginger, turmeric, black pepper. <i>Objects for self-study:</i> types of arnica, wormwood, pyrethrum.	3		
15.	MP and MPRS containing aromatic terpenoids <i>Objects for laboratory research:</i> common fennel, thyme, common thyme, oregano, common anise, cinnamon species, clove, star anise, vanilla, saffron. <i>Objects for self-study:</i> tarragon, tarragon, irises.	3		
16.	MP and MPRS containing iridoids, monoterpene bitters (glycosides) <i>Objects for laboratory research:</i> types of motherwort, medicinal dandelion, evasive peony, types of centaury, water shamrock. <i>Objects for self-study:</i>	2		
17.	<i>intermediate control.</i> Testing practical skills and abilities in the analysis of medicinal herbs containing essential oils and bitterness. Solution of situational problems. Test control.	3		
18.	<i>Intermediate control for the 5th semester.</i> Testing of practical skills and abilities in the analysis of MRM containing polysaccharides, vitamins, fatty and essential oils, bitterness. Test control.	3		
19.	<i>Seminar</i> "MP and MRM containing glycosides". Solution of situational problems. Test control.		2	
20.	MP and MRM containing thio- and cyanogenic glycosides <i>Objects for laboratory research:</i> black elderberry, types of mustard, garlic, onion, bitter almonds. <i>Objects for self-study:</i>		1	
21.	MP and MPRS containing cardiac glycosides and phytoecdysone <i>Objects for laboratory research:</i> purple foxglove, woolly fox-		3	

	glove, large-flowered foxglove, May lily of the valley, spreading jaundice, spring adonis, hellebore, oleander, leuzea. <i>Objects for self-study:</i> strophanthus Combe, sea bow, jute, Greek obvonik.			
22.	MP and MRM containing saponins <i>Objects for laboratory research:</i> types of licorice, blue cyanosis, Manchurian aralia, ginseng, horse chestnut, staminate orthosiphon. <i>Objects for self-study:</i> nipponian Dioscorea, high lure, creeping tribulus, woolly-flowered astragalus, smilax, yucca, agave, hay fenugreek, common ivy, phytolacca.		3	
23.	<i>intermediate control.</i> Testing of practical skills in the analysis of MRM containing glycosides. Solution of situational problems. Test control.		3	
24.	<i>Seminar "Phenolic biologically active substances".</i> Solution of situational problems. Test control.		2	
25.	MP and MPRS containing simple phenols and phenol glycosides <i>Objects for laboratory research:</i> bearberry, lingonberry, bergenia, male fern, rosea rhodiola, raspberry, holly willow. <i>Objects for self-study:</i> Quantitative determination of arbutin in MRM.		3	
26.	MP and MPRS containing phenylpropanoids and lignans <i>Objects for laboratory research:</i> eleutherococcus prickly, Schisandra chinensis, milk thistle. <i>Objects for self-study:</i> podophyllum thyroid.		3	
27.	MP and MPRS containing coumarins, chromones and xanthones <i>Objects for laboratory research:</i> parsnips, sweet clover, carrot-shaped visnaga, horse chestnut, figs, burdock species, yellow gentian. <i>Objects for self-study:</i> siberian bloater, large ammi, psoralea drupes, sowing carrots, alpine kopeck. Test control.		3	
28.	MP and MRM containing anthracene derivatives <i>Objects for laboratory research:</i> holly cassia, alder buckthorn, Tangut rhubarb, aloe, madder dye, laxative joster, types of St. John's wort. <i>Objects for self-study:</i> horse sorrel. Test control.		3	
29.	MP and MPRS containing biologically active substances of a little-studied composition <i>Objects for laboratory research:</i> white mistletoe, common artichoke, common oats, chaga, echinacea. <i>Objects for self-study:</i> stonecrop large, species of mullein, Kalanchoe.		3	
thirty.	<i>intermediate control.</i> Testing of practical skills in the analysis of MRM containing phenolic compounds. Solution of situational problems. Test control		3	
31.	MP and MPRS containing flavonoids <i>Objects for laboratory research:</i> Highlander, Pepper Highlander, Highlander, Bird's Wort, Types of St. John's Wort, Types of Motherwort, Field Horsetail, Cowweed Swamp, Three-part Series, Sandy Helichrysum, Types of Violet, Black Elder, Blue		3	

	Cornflower, Common Tansy, Types of Hawthorn, Aronia Aronia, Field Harrow, Ginkgo, Sophora japonica, common bean. <i>Objects for self-study:</i> lespedeza, multi-veined volodushka, Canadian goldenrod, Baikal skullcap, hemp datisk, Amur velvet, hibiscus sabdariffa.			
32.	Phytochemical analysis of medicinal products and medicinal products containing flavonoids. Quantitative determination of flavonoids in VP. Test control.		3	
33.	MP and MRM containing tannins <i>Objects for laboratory research:</i> species of oak, cinquefoil erect, burnet, snake mountaineer, thick-leaved bergenia, species of alder, bird cherry, blueberry, skumpiya, Chinese tea, pomegranate tree. <i>Objects for self-study:</i> tannic sumac, witch hazel, sources of galls.		3	
34.	Phytochemical analysis of medicinal products and medicinal products containing tannins. Quantitative determination of tannins in VP. Test control.		3	
35.	<i>intermediate control.</i> Testing practical skills and abilities in the analysis of MRM containing flavonoids and tannins (analysis of an unknown whole and crushed MRM). Solution of situational problems. Test control.		3	
36.	<i>Intermediate control for the 6th semester.</i> Testing practical skills and abilities in the analysis of MRM containing glycosides and phenolic compounds. Test control.		3	
37.	<i>Seminar</i> "MP and MRM containing alkaloids. Solution of situational problems. Test control.			2
38.	MP and MRM containing acyclic alkaloids and alkaloids with a nitrogen atom in the side chain, pyrrolizidine, pyridine, piperidine and tropane alkaloids <i>Objects for laboratory research:</i> types of belladonna, common dope, types of ephedra, red pepper. <i>Objects for self-study:</i> black henbane, Indian dope, magnificent colchicum, flat-leaved ragwort, scopolia, coca bush, leafless anabasis, medicinal goat's rue.			1
39.	MP and MPRS containing alkaloid derivatives of quinolizidine, quinoline and isoquinoline <i>Objects for laboratory research:</i> large celandine, yellow capsule, sleeping pill poppy, common barberry. <i>Objects for self-study:</i> types of thermopsis and Macleia, thick-fruited Sophora, ram-moon, mordovnik, cinchona, stephania smooth, yellow machok, hydrastis.			2
40.	MP and MRM containing purine and steroid alkaloids and indole and imidazole derivatives <i>Objects for laboratory research:</i> ergot, small periwinkle, Chinese tea, hellebore Lobel, snake rauwolfia, chilbukha, coffee tree, chocolate tree, harmala. <i>Objects for self-study:</i> incarnate passionflower, pink catharanthus, lobed nightshade, physostigma, pilocarpus.			1
41.	Phytochemical analysis of VP containing alkaloids. Methods for the qualitative and quantitative determination of alkaloids in medicinal plants. Test control.			3

42.	<i>intermediate control</i> . Testing of practical skills in the analysis of MRM containing alkaloids (analysis of an unknown whole and crushed MRM). Solution of situational problems. Test control.			3
43.	Analysis of raw materials of animal origin. <i>Objects for laboratory research</i> : lanolin, wax, antlers, honey bee waste products. <i>Objects for self-study</i> : spermaceti, bodyaga, medicinal leeches, mumiyo, snake venoms. Definition of authenticity and good quality.			1
44.	<i>intermediate control</i> . Checking practical skills and abilities in the analysis of raw materials of animal origin. Test control			2
45.	Analysis of cut and crushed medicinal plant materials. Determining the authenticity of MP and MP in comparison with closely related species by their macro- and microscopic features. Identification of impurities in MR and MR. <i>Objects for laboratory research</i> : filter bags (oregano herb, chamomile flowers, bearberry leaves, tansy flowers, immortelle flowers, etc.), assorted angro raw materials.			3
46.	Analysis of powdered medicinal plant materials. Determining the authenticity of MP and MP in comparison with closely related species by their microscopic features.			1
47.	Fee Analysis <i>Objects for laboratory research</i> : fees (thoracic, gastric, laxative, choleric), etc.			2
48.	<i>intermediate control</i> . Testing practical skills and abilities (analysis of an unknown whole and crushed VP). Test control			3
49.	<i>Seminar</i> Fundamentals of Phytotherapy and Homeopathy. Solution of situational problems. Test control.			3
50.	Analysis of finished dosage forms with MRM <i>Objects for laboratory research</i> : briquettes (yarrow grass, eucalyptus leaves, senna leaves, St. John's wort); granules (cotweed herb, motherwort herb, corn stigmas); "Cough pills with thermopsis herb and licorice root", "Cough pills with thermopsis herb", "Vikair", "Rhubarb root pills", extracts, tinctures, etc.			3
51.	Analysis of homeopathic medicines. <i>Objects for laboratory research</i> : finished dosage forms.			3
52.	<i>Seminar</i> "Geobotany". Solution of situational problems. Test control.			2
53.	Ecological and economic assessment of wild medicinal plants			3
54.	Expeditionary resource survey of the territory. Determination of the yield of medicinal plants (methods of registration sites, model specimens, projective coverage). Calculation of the size of the stock and possible volumes of annual harvesting of medicinal plant materials			3
55.	Cultivation of medicinal plants. The main operations for the cultivation and processing of raw materials. Compilation of maps of cultivation of medicinal plants.			3
56.	<i>Intermediate control</i> to test the practical skills and abilities of the analysis of medicinal products			3
57.	<i>Intermediate test discipline control</i>			3
	TOTAL (total - 152 Ah)	52	50	50

6.2.3. Types and topics of student's individual work (SIW)

No. p / p	Types and topics of SIW	Volume in AH by semester		
		5	6	7
1.	Working with lecture material which provides for the development of lecture notes and educational literature	10	8	10
2.	Search and review of literature and electronic sources of information on a given problem	8	6	6
3.	Writing an abstract, making a presentation for a report on a given problem	2	4	6
4.	Doing homework (problem solving)	6	3	7
5.	The study of material submitted for independent study	5	5	7
6.	Preparing for laboratory work, practical and seminar classes	5	3	3
7.	Preparing for the test and colloquium	4	3	3
8.	Preparing for credit and certification	2	2	2
9.	Course work	-	10	-
	TOTAL (total - 130 Ah)	42	44	44

7. Types of assessment formats for ongoing monitoring and mid-term assessment

No. p / p	semester number	Types of control	Name of section of academic discipline	Competence codes	Assessment formats		
					types	number of test questions	number of test task options
1.	5	Control of the development of the topic, control of the student's independent work	Introduction to pharmacognosy. Methods of pharmacognostic analysis. Commodity analysis.	UC-1,4 GPC-1,6 PC-4,5	Tests, control questions	10	Computer testing (option is formed by random sampling)
					Situational tasks	4	-
2.	5	Control of the development of the topic, control of the student's independent work	MRM containing polysaccharides, fats, vitamins	UC-1,4 GPC-1,6 PC-4,5	Tests, control questions	10	Computer testing (option is formed by random sampling)
					Situational tasks	10	-
3.	5	Control of the development of the topic, control of	MPRS containing compounds of terpenoid structure	UC-1,4 GPC-1,6 PC-4,5	Tests, control questions	10	Computer testing (option is formed by ran-

		the student's independent work					dom sampling)
					Situational tasks	10	-
4.	6	Control of the development of the topic, control of the student's independent work	MRM containing glycosides	UC-1,4 GPC-1,6 PC-4,5	Tests, control questions	10	Computer testing (option is formed by random sampling)
					Situational tasks	5	-
5.	6	Control of the development of the topic, control of the student's independent work	MRM containing phenolic compounds	UC-1,4 GPC-1,6 PC-4,5	Tests, control questions	10	Computer testing (option is formed by random sampling)
					Situational tasks	10	-
6.	7	Control of the development of the topic, control of the student's independent work	MRM containing alkaloids	UC-1,4 GPC-1,6 PC-4,5	Tests, control questions	10	Computer testing (option is formed by random sampling)
					Situational tasks	10	-
7.	7	Control of the development of the topic, control of the student's independent work	MPV containing raw materials of animal origin	UC-1,4 GPC-1,6 PC-4,5	Tests, control questions	10	Computer testing (option is formed by random sampling)
					Individual survey	5	-
8.	7	Control of the development of the topic, control of the student's	Analysis of crushed VP	UC-1,4 GPC-1,6 PC-4,5	Tests, control questions	10	Computer testing (option is formed by random

		independent work					sampling)
					Individual survey	5	-
9.	7	Control of the development of the topic, control of the student's independent work	Fundamentals of herbal medicine and homeopathy	UC-1,4 GPC-1,6 PC-4,5	Tests, control questions	10	Computer testing (option is formed by random sampling)
					Situational tasks	10	-
					Individual survey	5	-
					Essay	-	-
10.	7	Control of the development of the topic, control of the student's independent work	Resource science	UC-1,4 GPC-1,6 PC-4,5	Tests, control questions	10	Computer testing (option is formed by random sampling)
					Situational tasks	5	-
11.	7	Course projects (works)	All sections of the discipline	UC-1,4 GPC-1,6 PC-4,5	Individual survey	5	-
12.	7	Exam	All sections of the discipline	UC-1,4 GPC-1,6 PC-4,5	Tests, control questions	4	Computer testing (option is formed by random sampling)

8. Educational, methodological and informational support for mastering the academic discipline (printed, electronic publications, the Internet and other network resources)

8.1. Key literature references

N o.	Name according to bibliographic requirements	Number of copies	
		In the library	At the department
1	Pharmacognosy: textbook Electronic resource / I. A. Samylina, G. P. Yakovlev. - M. : GEOTAR-Media, 2014. - 976 p. - Access mode: http://www.studmedlib.ru/book/ISBN9785970430712.html	-	Electronic variant
2	State Pharmacopoeia of the Russian Federation Electronic	-	EBS "Student

	resource/ XIII Vol. 1: M.: - 2015. .- Access mode: http://www.femb.ru/feml		Advisor"
3	State Pharmacopoeia of the Russian Federation Electronic resource / XIII Vol. 3.: M.: - 2015. .- Access mode: http://www.femb.ru/feml	-	EBS "Student Advisor"
4	Samylina, I.A. Pharmacognosy [Electronic resource]: textbook / I.A. Samylina, G.P. Yakovlev.–M. : GEOTAR-Media, 2016.–Access mode: http://www.studmedlib.ru/book/ISBN9785970439111.html	EBS "Student Advisor"	EBS "Student Advisor"

8.2. Further reading

No	Name according to bibliographic requirements	Number of copies	
		In library	At the department
1	Slesarev, V.I. Chemistry. Fundamentals of living chemistry: a textbook for universities / V.I. Slesarev. - St. Petersburg: Himizdat, 2000. - 768 p.	1	-
2	Pharmacognosy. Ecotoxicants in medicinal plant raw materials and phytopreparations: textbook / IV Gravel, Ya.N. Shoikhet, G. P. Yakovlev, I. A. Samylina. □ M. : GEOTAR-Media, 2012. □304 p.	1	-
3	Bobkova, N.V. Pharmacognosy. Test tasks and situational tasks [Electronic resource]: study guide / N.V. Bobkova; ed. I.A. Samylina.–M. : GEOTAR-Media, 2011.–Access mode: http://www.studmedlib.ru/book/ISBN9785970416907.html	EBS "Student Advisor"	Electronic variant
4	Pharmacognosy. Test tasks and situational tasks: textbook / ed. I. A. Samylina. - M. : GEOTAR-Media, 2013. - 288 p.	1	-
5	Pharmacognosy. Medicinal raw materials of plant and animal origin: textbook / ed. ed. G. P. Yakovleva. - 2nd ed. correct and additional - St. Petersburg. : SpecLit, 2010. □863 p.	51	Electronic variant
6	Samylina, I. A. - Pharmacognosy. Atlas. In 3 vols T.1: General part. Terms and techniques of microscopic analysis in pharmacognosy: a study guide / I. A. Samylina, O. G. Anosova. - M. : GEOTAR-Media, 2007. - 192 p.	2	Electronic variant
7	Samylina, I. A. Pharmacognosy. Atlas. In 3 tons T.2: Medicinal plant materials. Anatomical and diagnostic features of pharmacopoeial and non-pharmacopoeial medicinal plant raw materials: a textbook / I. A. Samylina, O. G. Anosova. - M. : GEOTAR-Media, 2007. - 384 p.	2	Electronic variant
8	Samylina, I. A. - Pharmacognosy. Atlas. In 3 tons T.3: Medicinal plant materials, fees. vegetable powders. Medicines based on crushed plant raw materials: a textbook / I. A. Samylina, V. A. Ermakova, N. V. Bobkova, O. G. Anosova. - M. : GEOTAR-Media, 2009. - 488 p.	1	Electronic variant
9	Samylina, I.A. Pharmacognosy. Atlas. Volume 1 [Electronic resource] / Samylina I.A., Anosova O.G. - M. : GEOTAR-Media, 2010. □ Access mode: http://www.studmedlib.ru/book/ISBN9785970415764.html	EBS "Student Advisor"	EBS "Student Advisor"
10	Samylina, I.A. Pharmacognosy. Atlas. Volume 2 [Electronic resource] / Samylina I.A., Anosova O.G. - M. : GEOTAR-Media, 2010. - Access mode:	EBS "Student Advisor"	EBS "Student Advisor"

	http://www.studmedlib.ru/book/ISBN9785970415788.html		
ele ve n	Pharmacognosy. Atlas. Volume 3 [Electronic resource] / Samylina I.A., Ermakova V.A., Bobkova I.V., Anosova O.G. - M. : GEOTAR-Media, 2010. □ Access mode: http://www.studmedlib.ru/book/ISBN9785970415801.html	EBS "Student Advisor"	EBS "Student Advisor"
12	Sorokina, A.A. Pharmacognosy. Concepts and terms: textbook / A. A. Sorokina and I. A. Samylina; Ed. organization GOU VPO Moscow Medical Academy. THEM. Sechenov Roszdrav. -M. : Medical Information Agency, 2007. □ 86 p.	1	-
13	Kurkin, V. A. Pharmacognosy: textbook / V. A. Kurkin. - Samara: Etching; SamGMU, 2004. □ 1180 p.	98	-
14	Kurkin, V. A. Pharmacognosy: a textbook for students of pharmaceutical universities (faculties) / V. A. Kurkin; Ed. organization Samara State Medical University. - 2nd ed., revised. and additional - Samara: Etching, 2007. - 1239 p.	70	Electronic variant
15	Selected lectures on pharmacognosy: textbook / V. F. Levinova, M. D. Reshetnikova, A. V. Khlebnikov, N. A. Startseva, A. B. Yakovlev; ed. G. I. Oleshko. - Perm : B.I., 2003. - 295 p.	56	-
16	Muravyova, D. A. Pharmacognosy: textbook / D. A. Muravyova, I. A. Samylina and G. P. Yakovlev. - 4th ed., revised. and additional .. - M. : Medicine, 2002. □ 656 p.	101	Electronic variant
17	European Pharmacopoeia 8th Edition. Vol. 1 and 2 with Supplements. Strasbourg: EDQM, 2013. 3503 p.	Electronic variant	-
18.	The United States Pharmacopeia (USP 38) and the 33rd edition of the National Formulary (NF 33) Second Supplement. Washington, DC: The United States Pharmacopeial Convention. 2015. 815 p.	Electronic variant	-

8.3. Electronic educational resources for teaching academic subjects

8.3.1. Internal Electronic Library System of the University (IELSU)

Name of the electronic resource	Brief description (content)	Access conditions	Number of users
Internal Electronic Library System of the University (IELSU)	Proceedings of the teaching staff of the Academy: textbooks and teaching aids, monographs, collections of scientific papers, scientific articles, dissertations, abstracts of dissertations, patents.	from any computer on the Internet, using an individual login and password [Electronic resource] - Access mode: http://95.79.46.206/login.php	Not limited

8.3.2. Electronic educational resources acquired by the University

No. p / p	Name of the electronic resource	Brief description (content)	Access conditions	Number of users
1.	DB "Medicine. Healthcare (HPE)" (EBS "Student	Educational literature + additional materials (audio, video, interactive materials, test tasks) for	from any computer on the Internet, using an individual login and password	General subscription of PIMU

	Consultant")	higher medical and pharmaceutical education	[Electronic resource] - Access mode: http://www.studmedlib.ru/	
2.	Electronic library system «BookUp»	Educational and scientific medical literature of Russian publishing houses, incl. translations of foreign publications	from university computers; from any computer on the Internet using an individual login and password Subscribed editions are available for reading.	General subscription of PIMU
3.	Electronic Medical Library "Doctor's Consultant"	National guidelines in all areas of medicine, clinical guidelines, textbooks, monographs, atlases, pharmaceutical reference books, audio and video materials, ICD-10 and ATC, recent publications in foreign journals with brief annotations in Russian	from any computer on the Internet, using an individual login and password	General subscription of PIMU
4.	Domestic electronic periodicals	Medical periodicals	from the university computers on the platform of the SCIENTIFIC electronic library eLIBRARY.RU Subscribed editions are available for reading.	General subscription of PIMU
5.	DB Medline Complete	Foreign full-text database of articles from scientific periodicals and collections of medical and natural science topics	from university computers; from any computer on the Internet, using an individual login and password	General subscription of PIMU
6.	Springer Electronic Collection	Full-text scientific publications (journals, books, articles, scientific protocols, conference materials, etc.) in the natural sciences, medical sciences and the humanities	from university computers	General subscription of PIMU
7.	Electronic collection "Freedom" on the Science Direct platform	Books and periodicals of the publishing house "Elsevier" in the natural sciences, medicine and humanities	from university computers	General subscription of PIMU
8.	DB Scopus	International Science Citation Abstract Database	from university computers	General subscription of

				PIMU
9.	DB Web of Science Core Collection	International Science Citation Abstract Database	from university computers; from any computer on the Internet, using an individual login and password	General subscription of PIMU
10.	DB Questel Orbit	Questel Patent Database	from university computers	General subscription of PIMU

8.3.3 Open access resources

No. p/n	Name of the electronic resource	Brief description (content)	Access conditions
1	Federal Electronic Medical Library (FEMB)	Includes electronic analogues of printed publications and original electronic publications that have no analogues recorded on other media (dissertations, abstracts, books, magazines, etc.).	from any computer on the Internet
2.	Scientific electronic library eLIBRARY.RU	The largest Russian information portal in the field of science, technology, medicine and education, containing abstracts and full texts of scientific articles and publications.	from any computer on the Internet.
3.	Scientific electronic library of open access CyberLeninka	Full texts of scientific articles with annotations published in scientific journals in Russia and neighboring countries.	from any computer on the Internet
4.	Russian State Library (RSL)	Abstracts for which there are copyright agreements with permission for their open publication	from any computer on the Internet
5.	Reference and legal system "Consultant Plus"	Federal and regional legislation, judicial practice, financial advice, legislative comments, etc.	from any computer on the Internet

9. Material and technical support for mastering an academic discipline

9.1. List of premises for classroom activities for the discipline

1. Lecture room
2. Classrooms for practical training, seminars, intermediate certification - in the same place.
3. Scientific laboratories for practical classes and laboratory workshops.

9.2. List of equipment for classroom activities for the discipline

1. A set of electronic presentations;
2. Multimedia complex (laptop, projector, screen): overhead multimedia projector Vega Focus 400 GLS (101042910) - 1 pc., multimedia projector BenQ NB 6110 (101042596) - 1 pc., Notebook HP Pavilion Notebook 15-ab234ur (101341033) - 1 PC.; Laptop ASUS Z99H (101041277) – 1 pc.; screen - 2 pcs.; information stand (101261001 and 101260845)
3. Complex of equipment for carrying out pharmacognostic analysis: laboratory tables, ex-

haust ventilation, laboratory glassware;

4. Instruments and equipment:

- 1) spectrophotometer UNICO 1200 (101043138) – 1 pc.,
- 2) laboratory microscope Micromed R-1 (101044064, 101044065, 101044066, 101044067, 101044068, 101044069) - 6 pcs.,
- 3) microscope Mikmed-1 Biolam (101042365, 101042366, 101042367, 101042368) - 4 pcs.,
- 4) Microscope MBS-10 (101042265, 101042266, 101042267, 101042268) - 4 pcs.,
- 5) Microscope Mikmed-1 MBS-9 (101042380) - 1 pc.,
- 6) RN-meter millivoltmeter RN-150M (101043000) - 1 pc.,
- 7) Liquid chromatograph LC-10AVP (101043413) – 1 pc.,
- 8) spectrophotometer Specord S100 Bio (101043137) – 1 pc.
- 9) Fourier IR spectrophotometer IRAffinity-1S (101241054) – 1 pc.,
- 10) Rotary evaporator LEKI RE 52AA (101041294) – 1 pc.,
- 11) Scales EK-400N (101041435) - 1 pc.,
- 12) Spectrophotometer UV-1800 scanning 2-beam (101240610) - 1 pc.,
- 13) Analytical balance ATX-224 (101240947) - 1 pc.,
- 14) Infrared Fourier spectrophotometer (101040380) - 1 pc.,
- 15) Water purification system MILLIPORE Elix-3 (101041324) – 1 pc., AA-7000F atomic absorption spectrophotometer (101340100) – 1 pc., Liquid chromatograph LC-20AD Prominence (101240611) – 1 pc., Chromatographic column C 18 (101040683)) - 1 PC.
- 16) Computer Pentium 4 (101041937) - 1 pc.,
- 17) Printer HP LJ 1010 laser (101042738) - 1 pc.,
- 18) Refrigerator 2-chamber Atlant XM-4012-000 (101065445) - 1 pc.
- 19) Exhaust cabinet 1460*700*2100 (101260844) - 1 pc.,
- 20) Exhaust cabinet 1800*700*2100 (101260842, 101260843) - 2 pcs.,
- 21) fume hood 1460*700*2100 (101261000) – 1 pc.

9.3. A set of licensed and freely distributed software, including domestic production

Item no.	Software	number of licenses	Type of software	Manufacturer	Number in the unified register of Russian software	Contract No. and date
1	Wtware	100	Thin Client Operating System	Kovalev Andrey Alexandrovich	1960	2471/05-18 from 28.05.2018
2	MyOffice is Standard. A corporate user license for educational organizations, with no expiration date, with the right to receive updates for 1 year.	220	Office Application	LLC "NEW CLOUD TECHNOLOGIES"	283	without limitation, with the right to receive updates for 1 year.
3	LibreOffice		Office Application	The Document Foundation	Freely distributed software	
4	Windows 10 Education	700	Operating systems	Microsoft	Azure Dev Tools for Teaching Subscription	
5	Yandex. Browser		Browser	«Yandex»	3722	
6	Subscription to MS Office Pro for 170 PCs for FGBOU VO "PIMU" of the Ministry of Health of Russia	170	Office Application	Microsoft		23618/HN10 030 LLC "Softline Trade" from 04.12.2020

10. List of changes to the working program (to be filled out by the template)

Federal State Budgetary Educational Institution of Higher Education
 "Privolzhsky Research Medical University"
 Ministry of Health of the Russian Federation
 (FSBEI HE "PRMU" of the Ministry of Health of Russia)

Department of
Name of the department

CHANGE REGISTRATION SHEET

working program for the academic discipline
NAME OF THE ACADEMIC DISCIPLINE

Field of study / specialty / scientific specialty: _____ (code, name)

Training profile: _____
 (name) - for master's degree programs

Mode of study: _____
 full-time/mixed attendance mode/extramural

Position	Number and name of the program section	Contents of the changes made	Effective date of the changes	Contributor's signature
1				

Approved at the department meeting
 Protocol No. _____ of _____ 20__

Head of the Department

_____ / _____
 department name, academic title signature print name