Appendix to the working program

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

BANK OF ASSESSMENT TOOLS FOR DISCIPLINE PHARMACOGNOSY

Training program (specialty): 33.05.01 PHARMACY

Department: Pharmaceutical Chemistry and Pharmacognosy

Mode of study: full-time

Nizhniy Novgorod
2022

1. Bank of assessment tools for the current monitoring of academic performance, mid-term assessment of students in the discipline Pharmacognosy

This Bank of Assessment Tools (BAT) for the discipline "Pharmacognosy" is an integral appendix to the working program of the discipline "Pharmacognosy". All the details of the approval submitted in the WPD for this discipline apply to this BAT.

2. List of assessment tools

The following assessment tools are used to determine the quality of mastering the academic material by students in the discipline Pharmacognosy:

No	Assessment tool	Brief description of the assessment tool	Presentation of the assessment tool in the BAT
1	Test	A system of standardized tasks that allows you to automate the procedure of measuring the level of knowledge and skills of a student	Bank of test tasks
2	Course work (project)	A tool of verifying the ability to present the results of theoretical, calculated, analytical, experimental studies	List of coursework topics (projects)
3	Colloquium	A tool of controlling the mastering of study materials of a topic, section or sections of a discipline, organized as a class in the form of an interview between a teacher and students.	Questions on topics/sections of the discipline
4	Interview	A tool of control organized as a special conversation between the teacher and the student on topics related to the discipline being studied, and designed to clarify the amount of knowledge of the student on a specific section, topic, problem, etc.	Questions on topics/sections of the discipline
5	Situational tasks	A method of control that allows you to assess the criticality of thinking and the degree of the material comprehension, the ability to apply theoretical knowledge in practice.	List of tasks
6	Report	The product of the student's independent work, which is a public presentation about the results obtained by solving a certain educational, practical, research or scientific topic	Topics of reports, presentations

3. A list of competencies indicating the stages of their formation in the process of mastering the educational program and the types of evaluation tools

Code and wording of the competence*	Stage of competence formation	Controlled sections of the discipline	Evaluation tools

UC-1. ability to carry out critical analysis of problem situations based on a systematic approach, develop an action strategy	Entry, Current, Mid-term	**Section 1.** Introduction to pharmacognosy. Methods of pharmacognostic analysis. Commodity analysis. Section 2. LRS containing polysaccharides, fats, vitamins Section 3. LRS containing terpenoid compounds Section 4. LRS containing glycosides Section 5. LRS containing phenolic compounds Section 6. LRS containing alkaloids Section 7. LRS containing raw materials of animal origin Section 8. Analysis of crushed LRS Section 9. Fundamentals of herbal medicine and homeopathy Section 10. Resource Science Section 11. All sections of the discipline Section 12. Exam	Tests, control questions, situational tasks, interview
UC-4 abstract ability to apply modern communication technologies, including in a foreign language(s), for academic and professional interaction	Entry, Current, Mid-term	**Section 1.** Introduction to pharmacognosy. Methods of pharmacognostic analysis. Commodity analysis. Section 2. LRS containing polysaccharides, fats, vitamins Section 3. LRS containing terpenoid compounds Section 4. LRS containing glycosides Section 5. LRS containing phenolic compounds Section 6. LRS containing alkaloids Section 7. LRS containing raw materials of animal origin Section 8. Analysis of crushed LRS Section 9. Fundamentals of herbal medicine and homeopathy Section 10. Resource Science Section 11. All sections of the discipline Section 12. Exam	Tests, control questions, situational tasks, interview
GPC-1 abstract. ability to use basic biological, physico-chemical, chemical, mathematical methods for the development, research and examination of medicinal products, manufacturing of	Entry, Current, Mid-term	**Section 1.** Introduction to pharmacognosy. Methods of pharmacognostic analysis. Commodity analysis. Section 2. LRS containing polysaccharides, fats,	Tests, control questions, situational tasks, interview, summary

medicinal products		vitamins Section 3. LRS containing terpenoid compounds Section 4. LRS containing glycosides Section 5. LRS containing phenolic compounds Section 6. LRS containing alkaloids Section 7. LRS containing raw materials of animal origin Section 8. Analysis of crushed LRS Section 9. Fundamentals of herbal medicine and homeopathy Section 10. Resource Science Section 11. All sections of the discipline Section 12. Exam	
GPC -6 ability to understand the principles of modern information technologies and use them to solve professional tasks	Entry, Current, Mid-term	**Section 1.** Introduction to pharmacognosy. Methods of pharmacognostic analysis. Commodity analysis. Section 2. LRS containing polysaccharides, fats, vitamins Section 3. LRS containing terpenoid compounds Section 4. LRS containing glycosides Section 5. LRS containing phenolic compounds Section 6. LRS containing alkaloids Section 7. LRS containing raw materials of animal origin Section 8. Analysis of crushed LRS Section 9. Fundamentals of herbal medicine and homeopathy Section 10. Resource Science Section 11. All sections of the discipline Section 12. Exam	Tests, control questions, situational tasks, interview, summary
PC-4. ability to participate in monitoring the quality, effectiveness and safety of medicinal products and medicinal plant raw	Entry, Current, Mid-term	**Section 1.** Introduction to pharmacognosy. Methods of pharmacognostic analysis. Commodity analysis. Section 2. LRS containing polysaccharides, fats, vitamins Section 3. LRS containing terpenoid compounds Section 4. LRS containing glycosides Section 5. LRS containing	Tests, control questions, situational tasks, interview, summary

		phenolic compounds Section 6. LRS containing alkaloids Section 7. LRS containing raw materials of animal origin Section 8. Analysis of crushed LRS Section 9. Fundamentals of herbal medicine and homeopathy Section 10. Resource Science Section 11. All sections of the discipline Section 12. Exam	
PC-5 ability to take part in planning and organizing the resource support of a pharmaceutical organization	Entry, Current, Mid-term	**Section 1.** Introduction to pharmacognosy. Methods of pharmacognostic analysis. Commodity analysis. Section 2. LRS containing polysaccharides, fats, vitamins Section 3. LRS containing terpenoid compounds Section 4. LRS containing glycosides Section 5. LRS containing phenolic compounds Section 6. LRS containing alkaloids Section 7. LRS containing raw materials of animal origin Section 8. Analysis of crushed LRS Section 9. Fundamentals of herbal medicine and homeopathy Section 10. Resource Science Section 11. All sections of the discipline Section 12. Exam	Tests, control questions, situational tasks, interview, abstract

4. The content of the assessment tools of entry, current control

Entry /current control is carried out by the discipline teacher when conducting classes in the form of: tests, control questions, situational tasks, individual survey, abstract.

4.1. The tasks for assessing the competencies *of UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5* are presented on the PIMU Educational Portal:

https://sdo.pimunn.net/course/view.php?id=340

https://sdo.pimunn.net/course/view.php?id=1131

4.2. Questions for colloquiums and interviews *(UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5)* are presented on the PIMU Educational Portal:

https://sdo.pimunn.net/course/view.php?id=340

https://sdo.pimunn.net/course/view.php?id=1131

4.3. Tasks (assessment tools) submitted for the exam (*UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5)* are presented on the PIMU Educational Portal:

https://sdo.pimunn.net/course/view.php?id=1131

5. The content of the assessment tools of mid-term assessment

Mid-term assessment is carried out in the form of an exam

The fund of assessment tools for conducting current monitoring and intermediate certification of students in this discipline is presented on the PIMU Educational portal :

https://sdo.pimunn.net/course/view.php?id=340

https://sdo.pimunn.net/course/view.php?id=1131

5.1 The list of control tasks and other materials necessary for the assessment of knowledge, skills and work experience

5.1.1. Questions for *the Pharmacognosy exam*

1. Pharmacognosy as a science. Stages of pharmacognosy development. Scientific schools of pharmacognosy in Russia.
2. Standardization of medicinal plant raw materials. Regulatory documentation regulating the quality of raw materials.
3. The concept of pharmacognostic analysis, its specifics. Methods of pharmacognostic analysis. Sample preparation during qualitative and quantitative analysis.
4. Commodity research analysis of medicinal plant raw materials: goals and objectives. Basic concepts in commodity analysis: raw materials "angro", packaged raw materials. Stages of commodity analysis. Receiving raw materials for analysis, taking an average sample and analytical samples. Cases when raw materials are rejected without analysis.
5. Commodity science analysis of medicinal plant raw materials: methods for determining authenticity, grinding, impurities; determination of infestation with barn pests. Value of the analysis.
6. Commodity analysis of medicinal plant raw materials: methods for determining humidity, ash, extractives, microbiological and radionuclide purity. The importance of these methods for determining good quality.
7. Preparation of medicinal plant raw materials (rational terms of preparation depending on the morphological group of raw materials and chemical composition, collection technique, primary processing).
8. Drying of medicinal plant raw materials (methods and methods of drying in connection with the chemical composition and morphological group of raw materials). Types of dryers. Bringing raw materials to standard condition. Package. Marking.
9. Storage of medicinal plant raw materials in pharmacies and warehouses. Division of raw materials into groups based on storage characteristics. Shelf life of raw materials of different morphological groups. Raw material quality indicators that are subject to changes during storage. Pests of raw materials, methods of protection and control.
10. Roots", "rhizomes", "bark": general techniques and methods of macroscopic and microscopic analysis of medicinal plant raw materials. Luminescent microscopy. Value of the analysis.
11. "Leaves", "flowers", "herbs": general techniques and methods of macroscopic and microscopic analysis of medicinal plant raw materials. Value of the analysis.
12. "Fruits", "seeds": general techniques and methods of macroscopic and microscopic analysis of medicinal plant raw materials. Luminescent microscopy. Value of the analysis.
13. Chemical composition of medicinal plants. Primary and secondary metabolites of plants. Forms of secondary metabolite content: glycosides and aglycones. Types of glycosides. Pharmaceutical concept of active, concomitant and ballast substances. Relationship of the chemical composition of medicinal plant raw materials with pharmacological action.
14. The concept of polysaccharides, their classification. The main types of polysaccharides used in medical practice, their raw material base. Methods of analysis. Ways to use raw materials, medical applications.
15. Concepts of fats and their classification. Physical and chemical properties. Methods of receiving and cleaning data. Storage features. Fat quality indicators. Medical use. Fat-like substances (waxes): lanolin, spermaceti, their use in medicine.
16. The concept of vitamins, their classification. Physical and chemical properties. Features of raw material preparation, drying, and storage. Raw material quality assessment, analysis methods. Ways to use raw materials, medical applications.

17. The concept of essential oils. Classification of essential oils and medicinal plant raw materials. Methods of obtaining and purifying essential oils. Ways to use raw materials, medical applications.
18. Regularities of formation, accumulation, and distribution of essential oils in plants. Pathways of biosynthesis. Role for plant life. Localization of essential oils in vegetable raw materials. Excretory formations (drawings). Features of preparation, drying, storage of essential oil raw materials.
19. Physical and chemical properties of essential oils. Determination of authenticity, purity and good quality of essential oils. Pharmacopoeial methods of quantitative determination of essential oils in medicinal plant raw materials.
20. The difference between fatty and essential oils. Chemical constants of fatty and essential oils: definition, physical meaning.
21. Concepts of bitterness and their classification. Physical and chemical properties. Features of raw material preparation, drying, and storage. Raw material quality assessment, analysis methods. Ways to use raw materials, medical applications.
22. The concept of saponins, their classification. Features of the structure of aglycone and sugar component. Physical, chemical and biological properties of saponins. Ways to use raw materials, medical applications.
23. The concept of cardiac glycosides, their classification. Features of the structure of aglycone and sugar component. Physical and chemical properties. Features of raw material preparation, drying, and storage. Ways to use raw materials, medical applications.
24. Physical and chemical properties of cardiac glycosides. Raw material quality assessment, analysis methods. Ways to use raw materials, medical applications.
25. Simple phenols, phenolic acids and alcohols, phenylacetic acids and alcohols. Physical and chemical properties. Features of raw material preparation, drying, and storage. Raw material quality assessment, analysis methods. Ways to use raw materials, medical applications.
26. The concept of coumarins and chromones, their classification. Role for plant life. Physical and chemical properties. Raw material quality assessment, analysis methods. Ways to use raw materials, medical applications.
27. The concept of phenylpropanoids and lignans. Physical and chemical properties. Regularities of formation, accumulation and distribution in plants. Ways to use raw materials, medical applications.
28. The concept of anthracene derivatives and their classification. Regularities of formation(biosynthesis), localization and distribution in plants. Role for plant life. Ways to use raw materials, medical applications.
29. Physical and chemical properties of anthracene derivatives. Raw material quality assessment, analysis methods.
30. Concepts of flavonoids, their classification. Regularities of formation(biosynthesis), localization and distribution in plants. Role for plant life. Ways to use raw materials, medical applications.
31. Physical and chemical properties of flavonoids. Raw material quality assessment, analysis methods.
32. The concept of tannins, their classification. Physical and chemical properties, methods of raw material analysis. Ways to use raw materials, medical applications.
33. The concept of alkaloids. Regularities of formation (biosynthesis) and distribution in plants. Role for plant life. Ways to use raw materials, medical applications.
34. Classification of alkaloids. Physical and chemical properties. Raw material quality assessment, analysis methods.
35. Beekeeping products (honey, parchment, royal jelly, pollen, propolis, beeswax). Receiving, medical use, and medications.
36. Bee venom. Snake poisons. Technology of production, processing, and storage. Medical use.
37. Hirudotherapy.
38. Reindeer husbandry products.
39. Fees. Classification and analysis methods. Rules for drawing up fees.
40. The concept of herbal medicine. Basic principles.
41. The concept of homeopathy. Main provisions. LRS as a component of homeopathic remedies.

Question	Competence code (according to the WPD)
1	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
2	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
3	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
4	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5

5	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
6	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
7	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
8	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
9	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
10	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
11	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
12	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
13	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
14	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
15	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
16	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
17	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
18	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
19	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
20	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
21	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
22	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
23	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
24	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
25	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
26	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
27	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
28	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
29	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
30	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
31	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
32	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
33	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
34	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
35	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
36	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
37	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
38	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
40	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5
41	UC-1, UC-4, GPC-1, GPC -6, PC-4, PC-5

5.1.3. Subject of coursework

1. Phytosterols of pumpkin seeds. Extraction, methods of qualitative and quantitative analysis. Standardization of raw materials. Features of medical use of raw materials and finished medicines.
2. Carotenoids of mountain ash fruits. Extraction, methods of qualitative and quantitative analysis. Standardization of raw materials. Features of medical use of raw materials and finished medicines.
3. Glycosides of horse chestnut seeds. Extraction, methods of qualitative and quantitative analysis. Standardization of raw materials. Features of medical use of raw materials and finished medicines.
4. Simple phenolic compounds of chaga. Extraction, methods of qualitative and quantitative analysis. Standardization of raw materials. Features of medical use of raw materials and finished medicines.
5. Mountaineer avian flavonoids. Extraction, methods of qualitative and quantitative analysis. Standardization of raw materials. Features of medical use of raw materials and finished medicines.

6. Flavonoids of hawthorn fruit. Extraction, methods of qualitative and quantitative analysis. Standardization of raw materials. Features of medical use of raw materials and finished medicines.
7. Polysaccharides of dandelion roots. Extraction, methods of qualitative and quantitative analysis. Standardization of raw materials. Features of medical use of raw materials and finished medicines.
8. Polysaccharides of kelp. Extraction, methods of qualitative and quantitative analysis. Standardization of raw materials. Features of medical use of raw materials and finished medicines.
9. Anthracene derivatives of aloe shoots. Extraction, methods of qualitative and quantitative analysis. Standardization of raw materials. Features of medical use of raw materials and finished medicines.
10. Oregano isoprenoids. Extraction, methods of qualitative and quantitative analysis. Standardization of raw materials. Features of medical use of raw materials and finished medicines.
11. Thyme isoprenoids. Extraction, methods of qualitative and quantitative analysis. Standardization of raw materials. Features of medical use of raw materials and finished medicines.
12. Peppermint isoprenoids. Extraction, methods of qualitative and quantitative analysis. Standardization of raw materials. Features of medical use of raw materials and finished medicines.
13. Fatty sunflower seed oil. Extraction, methods of qualitative and quantitative analysis. Standardization of raw materials. Features of medical use of raw materials and finished medicines.
14. Fatty pumpkin seed oil. Extraction, methods of qualitative and quantitative analysis. Standardization of raw materials. Features of medical use of raw materials and finished medicines.
15. Ginger fat oil. Extraction, methods of qualitative and quantitative analysis. Standardization of raw materials. Features of medical use of raw materials and finished medicines.
16. Flavonoids of mountain ash. Extraction, methods of qualitative and quantitative analysis. Standardization of raw materials. Features of medical use of raw materials and finished medicines.
17. Flavonoids of black currant. Extraction, methods of qualitative and quantitative analysis. Standardization of raw materials. Features of medical use of raw materials and finished medicines.
18. Citrus flavonoids. Extraction, methods of qualitative and quantitative analysis. Standardization of raw materials. Features of medical use of raw materials and finished medicines.
19. Development of analysis of anthracene derivatives of buckthorn bark by tlc method
20. Determination of capsaicin in capsicum fruits by tlc method
21. Coumarins of sweet clover and their determination by TLC method
22. Wild medicinal plants of the Left Bank of the Nizhny Novgorod region.
23. Wild medicinal plants of the Right bank of the Nizhny Novgorod region.
24. Protected medicinal plants of the Nizhny Novgorod region.
25. Influence of external factors on the content of active substances in medicinal raw materials.
26. Use of medicinal plants in pediatrics
27. Animal products in official and traditional medicine

Course work as an element of an academic discipline should contribute to the formation of competencies provided for in the competence matrix for this discipline and specified in the RPA.

6. Criteria for evaluating learning outcomes

Learning outcomes	Assessment of competence developed			
	unsatisfactory	**satisfactory**	**good**	**excellent**
Completeness of knowledge	The level of knowledge is below the minimum requirements. There were bad mistakes	The minimum acceptable level of knowledge. A lot of light mistakes were made	The level of knowledge in the volume corresponding to the training program. A few light mistakes were made	The level of knowledge in the volume corresponding to the training program, without errors
Availability of skills	Basic skills are not demonstrated when solving standard tasks. There were bad mistakes	Basic skills are demonstrated. Typical problems with light mistakes have been solved. All tasks have been completed, but not in full.	All basic skills are demonstrated. All the main tasks have been solved with light mistakes. All tasks have been completed, in full, but some of them with shortcomings	All the basic skills were demonstrated, all the main tasks were solved with some minor shortcomings, all the tasks were completed in full
Availability of skills (possession of experience)	Basic skills are not demonstrated when solving standard tasks. There were bad mistakes	There is a minimal set of skills for solving standard tasks with some shortcomings	Basic skills in solving standard tasks with some shortcomings are demonstrated	Skills in solving non-standard tasks without mistakes and shortcomings are demonstrated
Characteristics of competence formation*	The competence is not fully formed. The available knowledge and skills are not enough to solve professional tasks. Repeated training is required	The formation of competence meets the minimum requirements. The available knowledge and abilities are generally sufficient to solve professional tasks, but additional practice is required for most practical tasks	The formation of competence generally meets the requirements, but there are shortcomings. The available knowledge, skills and motivation are generally sufficient to solve professional tasks, but additional practice is required for some professional tasks	The formation of competence fully meets the requirements. The available knowledge, skills and motivation are fully sufficient to solve complex professional tasks
The level of competence formation*	Low	Below average	Intermediate	High

Mark "5" (Excellent) - points (100-90%)
Mark"4" (Good) - points (89-80%)
Mark "3" (Satisfactory) - points (79-70%)

Less than 70% – Unsatisfactory – Mark "2"

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Date " 14 " December 2022