

## Catalog of elective disciplines for the 2022-2023 academic year

**1. Department:** of chemical disciplines

**2. Level of preparation:** baccalaureate

**3. Specialty:** 6B10106 - Pharmacy

**4. Course:** 1

**5. Name of elective discipline:** inorganic chemistry

**6. Amount of credits:** 4

**7. Purpose:** teaching the general theoretical fundamentals of modern inorganic chemistry and using the obtained theoretical knowledge to describe the properties of elements and their compounds, as well as to characterize the patterns of chemical processes and phenomena necessary in the activity of a pharmacist in the development and isotonation of drugs, examination, standardization and study of rational dosage forms.

**8. Tasks:**

- to form students' fundamental knowledge of modern
- chemical science, chemistry of elements and their compounds;
- form a system of knowledge about the nature of chemical bonding and the structure of chemical compounds used in pharmacy;
- teach how to predict the possibility of chemical processes;
- teach how to make calculations for the preparation of solutions of specified concentrations;
- learn to use knowledge of the properties of inorganic substances in the analysis of pharmaceuticals.

**9. Justification of the choice of discipline:**

Inorganic chemistry at a medical college is the first basic level after a high school chemistry course. Therefore, the main purpose of teaching this subject at the Faculty of Pharmacy is to study the laws and concepts of chemistry as applied to chemical processes and phenomena that are necessary in the activities of a pharmacist.

Inorganic chemistry lays the foundation for studying the courses of analytical, organic, toxicological, pharmaceutical, physical and colloidal chemistry.

**10. Learning outcomes**

	Knowledge (cognitive sphere)	Skills and abilities (psychomotor sphere)	Personal and professional competencies (relationships)
	<ul style="list-style-type: none"> <li>- general theoretical foundations of inorganic chemistry;</li> <li>- the basic principles of the theory of the structure of the atom, chemical bonding, electrolytic dissociation, the laws of thermodynamics and kinetics;</li> <li>- the basic concepts of the theory of redox reactions, the structure and properties of complex compounds;</li> <li>- the characteristic properties of s-, p-, d-elements, their compounds, has an idea of the biological</li> </ul>	<ul style="list-style-type: none"> <li>- the basic concepts of inorganic chemistry and forecasting products of all types of chemical reactions;</li> <li>- handle the simplest chemical equipment: chemical glassware, weight measuring devices, thermometers, hydrometers, etc.;</li> <li>- various methods of preparing solutions of specified concentrations;</li> <li>- perform the simplest chemical operations: dissolving heating, dilution, etc.;</li> </ul>	<ul style="list-style-type: none"> <li>- evaluates and interprets the results of educational experiments in the field of the use of inorganic compounds in medical and pharmaceutical practice;</li> <li>- uses the information material and interprets the results of the research in the field of the use of inorganic nature BAS in medical and pharmaceutical science;</li> <li>- reports information obtained from educational reference, scientific literature, Internet resources, offering their own judgments and opinions;</li> <li>- owns the skills of public speaking with the presentation</li> </ul>

role of the studied substances. - calculations of the preparation of solutions of various concentrations and knows the methods of research of inorganic preparations used in pharmacy	- use reference materials (dissociation constants, instability constants of complex compounds, standard electrode potentials, etc.) in solving scientific and practical problems.	of their own judgments, analysis and synthesis of information in the field of inorganic chemistry.
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**11. Prerequisites:** school program-chemistry, biology, physics, ecology.

**12. Post requisites:** analytical chemistry, organic chemistry, physical colloid chemistry, toxicological chemistry, pharmaceutical chemistry, pharmacognosy.

### 13. Literature

#### The main:

1. Patsaev A.K., Mamytova V.K. Neorganicheskaja khimiia. Uchebnoe posobie. Shymkent, 2007.
2. Patsaev A.K., Mamytova V.K., Serimbetova K.M., Bukharbaeva A.E. «Praktikum po neorganicheskoi khimii» - uchebno-metod. posobie., Shymkent, 2012g.
3. Babkov A.V. Obshchaja i neorganicheskaja khimiia :uch.posobie.-M. : GEOTAR-Media,2013.
4. Almabekova A.A. i.dr. Praktikum po neorganicheskoi khimii:ucheb.-metod.posobie -Almaty :Evero,2012.
5. Patsaev A.K., Mamytova V.K. Beiorganikalyk khimiia. Oqu qyraly. Shymkent, 2008.
6. Patsaev Ə.K., Mamytova V.K., Serimbetova K.M., Bukharbaeva A.E. «Beiorganikalyk khimiia paninen praktikum», Shymkent, 2012zh.
7. Shraiver, D. Beiorganikalyk khimiia. Okulyk Almaty: Evero, 2013.

#### Additional:

1. Drobashcheva T.I. Obshchaja khimiia V.Sh. Rostov na Donu 2004.
2. Golbraikh Z.E., Maslov E.I. Sbornik zadach i uprazhnenii po obshchei khimii M, 2004g.
3. Tretiakov Iu.M. Praktikum po neorganicheskoi khimii uch. Posobie, 2004g.
4. Pustovalova L.M. Nikanorova I.E. Neorganicheskaja khimiia Rostov na Donu, Feniks, 2005g.
5. Beiorganikalyk khimiia praktikumy: oqu - ədistemelik nyskaulyk / A.S. Qozhamzharova.- Almaty: Evero, 2013.

#### In English:

1. Dinesh Objektive Chemistry
2. Keith J. Laidler, John H. Meiser. Physical Chemistry.

**1. Department:** Medical Biophysics and Information Technology

**2. Baccalaureate**

**3. Specialty** «Pharmacy»

**4. Course** 1

**5. Number of credits** 4

**6. Discipline** physics «Physics»

**7. Purpose:** The purpose of studying the course "Physics" is to master the main laws of nature in the field of mechanics and molecular physics, electricity and magnetism, optics, and as well as acquaintance with their use in spectroscopy, physiology, medicine and technology(chemical technologies). Mastering the discipline helps students achieve the level of basic knowledge of the basics of physics.

**8.Tasks:** Make students aware of the basic laws of physics and the conditions for their correct application, with basic methods and instruments for measuring physical quantities, with methods for processing and analyzing the results of the experiment, with computer methods for processing experimental results, to give the student an idea of the limits of the applicability of physical models and hypotheses; to teach the student skills in solving physical problems and evaluating the order of physical quantities.

**9. Content of the discipline** Mechanics, mechanical oscillations of waves, mechanical properties of liquid and solid bodies, diffuse processes in gases, thermodynamics, electrostatic field, electric current., magnetic field, optics, light effect on matter, quantum nature of light, thermal radiation of bodies, basic physics of atomic nucleus and elementary particles, biological membranes, permeability of living cells, biopotentials, electrical conductivity of biological structures, elements of quantum biophysics, luminescence, lasers.

**10. Justification for the choice of discipline:** The Physics Course is a basic subject necessary for the study of chemical and specialized disciplines, which are taught in parallel with this subject and in subsequent courses. The study of discipline is closely related to such disciplines as mathematics, physical and colloidal chemistry, inorganic, organic, analytical, pharmaceutical chemistry, chemical technology, as well as physiology. Therefore, in the process of studying the Physics course, it is necessary to state the fundamental foundations and the current state of physical knowledge with outputs to practical applications in the field of chemical technologies, the application of the studied principles and instruments based on them in medicine and pharmacy.

**11. Learning outcomes (competencies):**

<b>Knowledge (cognitive sphere)</b>	<b>Skills and abilities (psychomotor sphere)</b>	<b>Personal and professional competences (relations)</b>
<ul style="list-style-type: none"> <li>• The basic laws of modern physics, including the theoretical foundations of physical methods of studying matter;</li> <li>• Characteristics of physical factors affecting the living organism;</li> <li>• Principles of operation of physical devices used in pharmacy and pharmaceutical technology;</li> <li>• Metrological requirements when working with physical equipment;</li> </ul> <p>Safety Rules for Physical Equipment</p>	<ul style="list-style-type: none"> <li>• Correctly express physical ideas;</li> <li>• Apply the laws of physics to analyze and solve specific physical problems;</li> <li>• Use the main physical devices;</li> <li>• Perform measurements to process the results and analyze them;</li> </ul>	<ul style="list-style-type: none"> <li>• Knows the operating principles of physical devices used in pharmacy and pharmaceutical technology.</li> <li>• Knows how to use basic physical devices, make measurements, Process the results and analyze them, knows the physical methods of research used in pharmacy to control the quality of medicines.</li> </ul>

**12. Prerequisites:**

**Post requisites:** pharmaceutical chemistry, toxicological chemistry, pharmacognosy.

**13. Literature: main and supplementary**

**Main:**

1. Crane K. S. Zamanui physics. 1-bolim: okulyk-Almaty: 2013
2. Crane K. S. Zamanui physics. 2-bolim: okulyk Almaty: 2014
3. Physics and biophysics.ruk. to practical classes: Moscow: GEOTAR-2013
4. Fedorova V. N. Fizika. - M.: GEOTAR-Media, 2013
5. Bizhigitov T. Zhalpy physics courses: okulyk-Almaty: Economics, 2013
6. Physics and biophysics: practicum: textbook. manual / V. F. Antonov [et al.]. - M.: GEOTAR-Media, 2013.
7. Remizov A. N. Meditsinskaya i biologicheskaya fizika: ucheb. for universities. - 9th ed.,

stereotype.. - M.: Bustard, 2017.

**Supplementary:**

1. Mardonov B.M. Design works for material collection: Odobr. Learned. - Almaty: Evero, 2014. - 256 s.
2. Amerkhanova S.K. Methods of Physical and Chemical Analysis: Methodological Guidelines = Physicochemical Methods of Analysis: Laboratory manual on the discipline/Sh.K. Amerkhanova.- Almaty: Evero, 2016.

**Electronic Resources:**

1. Physicochemical methods in pharmacy. Specialty: 5V110300- "Pharmacy" [Electronic resource] = 5V110300- "Pharmacy" = Physical and chemical in pharmacy, on the absorption of electromagnetic Radiation: methodological proposal/S.K. Ordabaev [b. g.]; OCMFA; Electronic. text dan. (8.72 MB). - Shymkent: B.J. 2013.

**1. Department:** of chemical disciplines

**2. Level of preparation:** baccalaureate

**3. Specialty:** 6B10106 - Pharmacy

**4. Course:** 2

**5. Name of elective discipline:** "Physical and colloid chemistry"

**6. Amount of credits:** 5

**7. Purpose:** To form knowledge of the general theoretical foundations of physical and colloid chemistry and train in the application of the knowledge and skills acquired during the analysis of medicinal substances at all stages of their manufacture and quality control of medicinal forms.

**8. Tasks:** - to form students' understanding of the patterns of the course of physicochemical processes.

- To give knowledge of the basic concepts and laws of thermodynamics.

- to form an idea about the properties of diluted solutions.

- to give an idea of the thermodynamics of electrolyte solutions, methods for measuring the pH of solutions, the properties of buffer solutions.

- to form an idea about the basic concepts and methods of electrochemistry.

- to give an idea of the kinetics of chemical reactions and catalysis.

- to form an understanding of dispersed systems and surface phenomena.

- to acquaint with physical and chemical methods of measurements.

**9. Justification of the choice of discipline:**

Physical and colloidal chemistry is one of the main disciplines in the field of pharmaceutical education, which has a significant role in the preparation of highly qualified specialists - pharmacists. This item forms chemical thinking, determines the patterns of physical and chemical processes and the conditions for achieving chemical equilibrium, teaches to analyze and draw conclusions about the influence of external factors, the nature of substances on the course of chemical reactions.

**10. Learning outcomes**

	Knowledge (cognitive sphere)	Skills and abilities (psychomotor sphere)	Personal and professional competencies (relationships)
	- the general theoretical foundations of physical and colloid chemistry for the application of the acquired knowledge and skills at all stages of manufacturing and quality control of drugs;	- solves all typical tasks in physical and colloid chemistry; - owns the skills of experimental determination of the thermal effect of chemical reactions.	- informs and explains the observed patterns in the field of physical and physicochemistry regarding their use in pharmacy; - transmits information obtained from educational, reference, scientific literature and Internet resources;

<ul style="list-style-type: none"> <li>- general energy and kinetic patterns of chemical processes;</li> <li>- laws governing the physicochemical processes and the conditions for achieving chemical equilibrium;</li> </ul>	<ul style="list-style-type: none"> <li>- able to determine the osmotic pressure of solutions;</li> <li>-prepare buffer solutions with a given pH value.</li> <li>-determines the rate constants of chemical reactions.</li> <li>- able to determine the coefficient of surface tension of the liquid according to the method of detachment of drops;</li> <li>- prepares stable colloidal systems and emulsions, determines the degree of their stability;</li> <li>- determines the molecular weight, size and degree of swelling of the polymer.</li> </ul>	<ul style="list-style-type: none"> <li>- demonstrates the ability to work in a team, conduct a discussion, discuss the results of laboratory work on physical and colloidal chemistry.</li> <li>- uses skills and abilities in the field of physical and colloid chemistry to perform R &amp; D, draws up the results in the form of an abstract, presentations, reports and presents at meetings of the student circle, student scientific conferences, etc.</li> </ul>
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**11. Prerequisites:** inorganic chemistry.

**12. Post requisites:** analytical chemistry, organic chemistry, toxicological chemistry.

**13. Literature**

**The main:**

1. Belyaev A.P., Kuchuk V.I., Evstratova K.I., Kupina N.A. Physical and colloidal chemistry. M.: GEOTAR-Media 2008.
2. Verentsova L.G., Nechepurenko E.V. Inorganic, physical and colloid chemistry. –Almaty: Evero Publishing, 2014.

**Additional:**

1. Evstratova K.I., Kupina N.A., Malakhova N.E. Physical and colloidal chemistry. M.: High School. 1990
2. Krasnov K.S., Vorobev N.K., Godnev I.N. and others. Physical chemistry. In 2 books. M.: Higher School, 2001.

**Additional:**

1. Utelbaev B.T. Chemistry 2 vol. - Shymkent, 2000.
2. Musabekov K.B., bдиеv Қ.ЗН. Colloidty chemistry. Оқулық. - Almaty, 2011.

1. **The department of Pharmacognosy**
2. **Level of training (bachelor degree)**
3. **Educational program:** 6B10106 «Pharmacy»
4. **Course:** 2
5. **Name of elective discipline:** «Fundamentals of pharmacognosy»
6. **Amount of credits:** 4 credits (120 hours)
7. **Purpose:** acquaintance of students with history of development of a pharmacognosy, the organization of preparations of medicinal plant raw materials, the chemical composition and classification of herbs, bases of rational environmental management, methods of procuring process of medicinal plant raw materials and its standardization and also with the main directions of scientific research in the field of studying of herbs.
8. **Discipline content:** Preparation of medicinal plant raw materials, rational and careful attitude to resources of medicinal plants, sources of raw materials of mineral and animal origin, processing of plant raw materials, etc.

Macroscopic, microscopic, histochemical and microchemical studies of medicinal plant raw materials. Chemical composition of medicinal plants. Determination of benign drug raw materials.

**9. Tasks:**

- orientation in properties and the chemical composition of herbs according to constantly growing demand in quality phytoproducts and medicinal plant raw materials;
- orientation in properties and the chemical composition of the products of animal and mineral origin which are widely used in a modern arsenal the pparmacotherapy of medicines;
- carrying out phytochemical and merchandising analysis of raw materials of natural origin.

**10. Justification of the choice of discipline:**

Pharmacognosy (from Greek pharmacon – medicine, poison and gnosis – studying, knowledge) – one of pharmaceutical sciences studying herbs, medicinal plant raw materials and some products of primary processing of floral and animal origin.

Considering the increased requirements of practical pharmacy and medicine to use of medicinal raw materials of plant, animal and mineral origin, the subject "Fundamentals of pharmacognosy" considers a circle of the questions connected with preparation of medicinal plant raw materials, rational and careful attitude to resources of herbs, sources of raw materials of mineral and animal origin, processing of plant raw materials, etc.

**11. Results of training (competence):**

Knowledge (cognitive sphere)	Skills (psychomotor sphere)	Personal and professional competences (relations)
1. To know history of development of a pharmacognosy and the main stages of its formation; 2. To know the nomenclature and the chemical composition of medicinal raw materials of natural origin; 3. To know bases of preparation of medicinal raw materials of plant, animal and mineral origin.	1. To be able to use standard documentation, reference and scientific books; 2. To be able to provide advice to patients of drugstores and to the population in questions of application, collecting, drying and storage of medicinal plant raw materials; 3. To be able to carry out rational preparation, drying and storage of medicinal plant raw materials and to define its stocks on concrete sites.	1. To carry out macro - and the microscopic analysis of medicinal plant raw materials; 2. To determine herbs by anatomic and morphological features; 3. To carry out the merchandising analysis of raw materials of natural origin; 4. To store medicinal raw materials taking into account features of its chemical composition and content of biologically active agents.

**12. Prerequisites:** botany, Latin, organic chemistry, analytical chemistry, biological chemistry, ecology

**13. Postrequisites:** pharmacognosy, Drug technology, pharmaceutical chemistry.

**14. Literature**

**The main:**

1. Фармакогнозия тестовые задания и ситуационные задачи: учеб. пособие / под ред. И. А. Самылиной. - ; Мин-во образования и науки РФ. Рек. ГОУ ВПО "Мос. мед. акад. им. И. М. Сеченова". - М. : ГЭОТАР - Медиа, 2015. - 288 с
2. Дәрілік өсімдіктер және дәрілік өсімдік шикізаттары: фармакогнозия пәні бойынша оқу құралы / Джангозина Д. М. [ж. б.]. - Алматы : Эверо, 2014. - 240 бет. с.

3. Фармакогнозия. Экоотоксиканты в лекарственном растительном сырье и фитопрепаратах: учеб. пособие / И. В. Гравель [и др.] ; М-во образования и науки РФ. - ; Рек. ГОУ ВПО Первый Московский гос. мед. ун-т им. И. М. Сеченова. - М. : ГЭОТАР - Медиа, 2013. - 304 с.
4. Фармакогнозия. Учебная практика: учебное пособие / под ред. И. А. Самылиной. - ; Рек. ГОУ ВПО " Первый МГУ им. И. М. Сеченова". - М. : ООО"Медицинское информационное агентство", 2011. - 432 с.
5. Самылина, И. А. Фармакогнозия. Атлас. В 3 т. Т. 1. Общая часть. Термины и техника микроскопического анализа в фармакогнозии [Текст] : учеб. пособие. - М. : ГЭОТАР - Медиа, 2010. - 192 с. : ил.
6. Самылина, И. А. Фармакогнозия. Атлас. В 3 т. Т. 2. Лекарственное растительное сырье. Анатомо-диагностические признаки фармакопейного и нефармакопейного лекарственного растительного сырья [Текст] : учеб. пособие. - М. : ГЭОТАР - Медиа, 2010. - 384 с. : ил.
7. Самылина, И. А. Фармакогнозия. Атлас. В 3 т. Т. 3. Лекарственное растительное сырье, сборы. Растительные порошки. Лекарственные средства на основе измельченного растительного сырья: учеб. пособие. - М. : ГЭОТАР - Медиа,

**Additional:**

8. Келімханова, С. Е. Фармакогнозия: практикум / С. Е. Келімханова ; ҚР денсаулық сақтау министрлігі; С. Ж. Асфендияров атындағы ҚазҰМУ. - Қарағанды : ЖК "Ақнұр", 2014. - 180 бет. с.
9. Фармакогнозия пәнінің зертханалық-тәжірибелік сабақтарына арналған қолданба: оқу құралы / Б. Қ. Махатов [ж. б.] ; ҚР денсаулық сақтау министрлігі; ОҚМФА. - Шымкент : Б. ж., 2013. - 328 бет. с.
10. Фармакогнозия. Рабочая тетрадь к практическим занятиям:И. В. Гравель [и др.]; под ред. И. А. Самылиной ; М-во образования и науки РФ. - 2-е изд., испр. и доп ; Рек. ГОУ ВПО Московская мед. акад. им. И. М. Сеченова. - М. : ГЭОТАР - Медиа, 2013. - 264 с

**Electronic resources:**

11. Фармакогнозия. Гербарий лекарственных растений [Электронный ресурс] : учеб. пособие / И. А. Самылина [и др.]. - Электрон. текстовые дан. ( 40,5 Мб). - М. : ГЭОТАР - Медиа, 2012. - эл. опт. диск (CD-ROM).
12. Сорокина А. А. Фармакогнозия. Гербарий лекарственных растений [Электронный ресурс] : учебник. - Электрон. текстовые дан. ( 42,0 Мб). - М. : Изд. группа "ГЭОТАР-Медиа", 2012. - эл. опт. диск (CD-ROM)
13. Самылина И. А. Фармакогнозия. Атлас. В 3 т. Т.1 [Электронный ресурс] : учебник . - Электрон. текстовые дан. ( 71,6 Мб). - М. : Изд. группа "ГЭОТАР-Медиа", 2012. - эл. опт. диск (CD-ROM). - (Электронный учебник).
14. Самылина И. А. Фармакогнозия. Атлас. В 3 т. Т. 2 [Электронный ресурс] : учебник . - Электрон. текстовые дан. (101 Мб ). - М. : Изд. группа "ГЭОТАР-Медиа", 2012. - эл. опт. диск (CD-ROM). - (Электронный учебник)
15. Самылина И. А. Фармакогнозия : Атлас. В 3 т. Т. 3. [Электронный ресурс] : учебник . - Электрон. текстовые дан. ( 142 Мб). - М. : Изд. группа "ГЭОТАР-Медиа", 2012. - эл. опт. диск (CD-ROM). - (Электронный учебник).
16. Орынбасарова К. К. Некоторые лекарственные растения, содержащие флавоноиды сердечно-сосудистого действия и с Р-витаминной активностью [Электронный ресурс] : учебно-методическое пособие . - Электрон. текстовые дан. (2,25 Мб). - Шымкент : ЮКГМА, 2009
17. Сафонов Н. Н. Лекарственные растения [Электронный ресурс] : полный справочник-атлас. - Электрон. текстовые дан. ( 6,32 Мб). - М. : ООО "Директмедиа Паблшинг", 2008. - 1309 с. эл. опт. диск (CD-ROM).

1. **The Department:** Drug technology.
2. **Level of training:** Bachelor.
3. **Educational program:** Pharmacy.
4. **Course:** 2
5. **Name of the elective discipline:** Introduction to the specialty.
6. **Number of credits:** 3
7. **Purpose:** To form students real understanding of the future profession of a pharmacist, its role and purpose in modern society.
8. **Content of the discipline:** The personality of the pharmacist in modern society. Professional activity. Ethics and deontology of the pharmacist. Pharmaceutical activities in pharmacy organizations at chemical and pharmaceutical enterprises, in management bodies and pharmaceutical supervision, activities in chemical and toxicological departments of the center for forensic medicine, in the field of education and science, in the bodies of standardization and certification of medicines. Pharmaceutical activities in the field of social protection organizations. Pharmaceutical activity in the management and pharmaceutical supervision bodies. Pharmaceutical hygiene of pharmacies and chemical and pharmaceutical enterprises. Labor protection of employees of pharmacy organizations and chemical and pharmaceutical enterprises.
9. **Tasks:**
  - to acquaint students with the main directions of future professional activity in the field of drug provision of the population;
  - **подготов** it will prepare students for more successful development of the disciplines studied at the Faculty of Pharmacy and determine the individual trajectory of learning in the educational process;
  - to promote the selection of intellectual, personal, business qualities, awareness of their inclinations, understanding the value and meaning of their future activities in the chosen profession.
10. **Rationale for choosing a discipline:** The main purpose of the course is: to familiarize students with their chosen profession, to show the peculiarities of the work of pharmacists, the difficulties that may occur in the process of study and work, to show the humanity of the profession of the pharmaceutical field of activity and its importance for society.
11. **Learning outcomes:**
  - 1) Knowledge and understanding:
    - knows the basic principles of training, tasks and organization of higher pharmaceutical education;
    - knows the main basic and profile disciplines and their role in the formation of a specialist;
    - demonstrates knowledge of the main types of professional activity;
    - terminology used in the field of pharmaceutical activity;
    - demonstrates the ability of self-determination in the profession;
    - demonstrates the ability to navigate the range of pharmaceutical positions;
    - knows the rules of labor protection of employees of pharmaceutical organizations and enterprises;
    - refers to the collection of legislative and regulatory acts regulating pharmaceutical activities in the Republic of Kazakhstan;
  - 2) Applying knowledge and understanding:
    - demonstrates working with literature, electronic databases, and computer training programs;
    - demonstrates a holistic system of theoretical and practical pharmaceutical disciplines and the relationship in their study;
    - is able to make an independent decision about their life goals, place and tasks in modern socio-economic conditions;



- is able to determine its educational trajectory in the system of credit technology training;
- demonstrates the provision of medical, medico-social, health and emergency care.

3) Forming judgments:

- formulates arguments for the promotion of a healthy lifestyle, conducts activities for the prevention of diseases;
- formulates the labor protection of employees of pharmaceutical organizations and enterprises.

4) Communication skills:

- is able to transfer to students their own knowledge and skills in working with information (educational, reference, scientific literature);
- is able to determine its educational trajectory in the system of credit technology training.

5) Learning Skills or learning aptitude:

- is able to present personal opinions, formalize them in the form of an abstract, present them in practical classes, student circle meetings, student scientific conferences, etc.;
- capable of self-determination in the profession;
- able to navigate the range of pharmaceutical positions.

**12. Prerequisites:** modern history of Kazakhstan, botany, information and communication technology.

**13. Post-requisites:** organization of pharmaceutical business and history of pharmacy, pharmacognosy, technology of dosage forms, educational practice on introduction to the specialty.

**14. Literature**

**основная:**

1. Арыстанов Ж.М. Введение в специальность «Фармация»: учеб.пособие / Ж.М. Арыстанов – рассмотрен и рек.к выпуску на засед. Учен.совета МУА. – Алматы: Эверо, 2015. -132 с.
2. Б.А. Сағындықова, Р.М. Анарбаева Дәрілердің дәріханалық технологиясы. -Алматы, 2018. -512 стр.
3. Б.А. Сағындықова. Дәрілердің өндірістік технологиясы. - Алматы, 2011. - 346 стр.

**дополнительная:**

1. Шертаева К.Д., Утегенова Г.И. Экономика фармации. Учебник. Шымкент 2015. – 220 с.
2. Арыстанова Т.А. Фармацевтическая химия, том I: - Алматы, изд. «Эверо», 2015. -572 с.
3. Арыстанова Т.А. Фармацевтическая химия, том II: - Алматы, изд. «Эверо», 2015. -640 с.
4. Муравьева Д.А., Самылина И.А., Яковлев Г.П. Фармакогнозия, М., «Медицина», 2013, 652 с.
5. Сапақбай М.М. «Фармация тарихы»: - оқу құралы/Мәлік Сапақбай. – Шымкент. 2014. -172 бет.

**1. Department:** "Department of History of Kazakhstan and Social and Social disciplines»

**2. Level of training:** Bachelor's degree

**3. Bilim bagdarlamalary:** "Pharmacy"

**4. Course:** 2

**5. Name of elective discipline:** Fundamentals of Law and Economics

**6. Number of credits :** 5 credits

**7. Objective:** to form a system of knowledge about the economic and legal laws of the development of society and the problems of its effective functioning.

**8. Tasks:**

- mastering the basics of the theory of state and law;
- consideration of the principles and motives of human economic behavior in conditions of limited resources;
- identification of the specifics of economic and legal relations in the Republic of Kazakhstan;
- clarification of the functions and limits of the effectiveness of the market system, as well as the main forms of economic regulation;
- disclosure of political and legal ways to improve Kazakhstan's state-legal mechanism;
- determination of the specifics of the regulatory framework in the field of economics and law.

#### **9. Rationale for choosing a discipline:**

The study of the patterns of development of economic and legal relations that arise between market entities at the micro, macro, and mega levels, between the state and market entities, the state and societies, features and priorities of the socially - oriented model of the market economy in Kazakhstan. The system of law and legislation. The Law of the Republic of Kazakhstan "On the health of the people and the health care system". The legal status of pharmaceutical and medical workers, their social security. Market equilibrium. Competition in the medical services market. Development of entrepreneurship of medical services in Kazakhstan. The structure of the national economy. Moral and ethical responsibility for acts of corruption in various spheres. Kazakhstan's participation in global integration processes and international economic organizations. WorldHealthOrganization.

- **10. Justification of the choice of discipline:** This program is designed to provide students with the necessary knowledge, skills and abilities in the discipline, to achieve learning outcomes. In the context of distance learning, the Program is implemented through the automated information system Platonus (hereinafter-AIS Platonus), Zoom, Webex, etc.. For the development of the discipline, the materials that are included in the "Task" module of the Platonus AIS are used.
- **11. Learning outcomes:**
  - 1) demonstrate knowledge of the main theoretical views accumulated in the scientific heritage on legal and economic problems;
  - 2) conduct research to identify state-legal and economic problems in the professional field and present the results for discussion;
  - 3) Demonstrate basic economic and legal knowledge through special terminology in medical practice
  - 4) apply and use the acquired knowledge in the field of economics and law in practical classes, professional activities
  - 5) analyze the features of legal and economic processes in the context of their role in the modernization of Kazakhstan's society;
  - 6) Knows the methods of scientific research and academic writing and applies them in the field of study:  
knows and applies the methods of scientific research, develops ideas and develops critical thinking and skills in writing various written works, taking into account the requirements for the structure of the construction and layout of the text, the choice of the style of presentation (journalistic or scientific); is able to make references, quote, paraphrase, build arguments, structure the text, stylistically competently build sentences, correctly design literary sources.

#### **10. Prerequisites: Modern history of Kazakhstan**

#### **11. Post-requirements: Philosophy**

#### **12. Literature:**

##### **In Russian:**

##### **Main:**

1.Альжанова, А. Н. Основы права учеб. пособие / А. Н. Альжанова, К. К. Райханова. - ; Алматы : Эверо, 2014. - 134 с

2. Правоведение: учеб. пособие. - М. : ГЭОТАР - Медиа, 2013
3. Какимова М. Основы теории государства и права: учебник. 2010. - 256 с
4. Айдарханов М.Х. Основы экономической теории. Учебник. 2012.
- 5 . Липсиц, И. В. Основы экономики: учеб. для медицинских училищ и колледжей . - М. : ГЭОТАР - Медиа, 2010. - 336 с.+эл. опт. диск (CD-ROM) .
- 6 . Рахимжанова Н.И. Основы рыночной экономики: учебник. 2010. – 168 стр.
- 7 .Таскымбаева С. М., Каратаева Ф.М. Основы экономической теории: учеб.пособие / - Караганда: АҚНҰР, 2017.

**Additional information:**

- 1.Жанысбеков, М. А. Основы антикоррупционной культуры: учебно-методическое пособие / - Караганда: АҚНҰР, 2016. – 198
- 2.Шоу М.Н. Международное право = International LAW : т.2 учебник / М.Н. Шоу. - 8-е изд. - [б. м.] : Ұлттық аударма бюросы, 2019. - 716 стр.

**Electronic resource:**

1. Основы антикоррупционной культуры [Электронный ресурс] : учебное пособие / под ред. Б. С. Абдрасилова. - Электрон. текстовые дан. ( 702Мб). - Астана : Акад. Гос. упр. при Президенте РК, 2016. - 176 с
2. Экономическая теория (Электронный ресурс): Учебник. Под ред. И.Л.Николаева, 2011.
3. Липсиц И.В. Основы экономики (Электронный ресурс): учебник.-М.: Издательская группа «ГЭОТАР- Медиа», 2010
4. Маами К.А., Рогов И.И., Малиновский В.А. РЕСПУБЛИКА КАЗАХСТАН: хроника утверждения конституционализма. – Алматы: Қазақ университеті, 2019. – 728 с.

**Electronic source databases:**

<http://lib.ukma.kz>

- Electronic catalog
- for internal users <http://10.10.202.52>
- for external users <http://89.218.155.74>
- Republican Interuniversity Electronic Library <http://rmebrk.kz/>
- Electronic source of Legal Information" Law" <https://zan.kz>
- Scientific Electronic Library <https://elibrary.ru/>
- «Web of science» (Thomson Reuters)<http://apps.webofknowledge.com>
- «Science Direct» (Elsevier)<https://www.sciencedirect.com>
- «Scopus» (Elsevier)[www.scopus.com](http://www.scopus.com)
- The UMKD is posted on the educational portal ukma.kz
- Electronic library "Student Consultant". Access link: <http://www.studmedlib.ru>, USERNAME ibragim123, PASSWORD Libukma123

**1. Department:** Pharmaceutical and Toxicological Chemistry

**2. Level of preparation:** undergraduate

**3. Educational program:** 6B10106 - «Pharmacy»

**4. Course:** 3

**5. The name of the elective discipline:** "Analysis of natural biological compounds"

**6. Number of credits:** 4 credits

**7. The objectives of the curriculum:** to teach the student to conduct quality control of medicines at the stages of development, reception, storage and use in accordance with the regulatory documentation of the Republic of Kazakhstan and with the quality standards GxP.

**8. Tasks of the curriculum:**

- to give students a methodology for pharmaceutical analysis of medicines at the stages of development, production, storage and use;
- to teach students to apply general pharmacopoeia research methods to drug analysis;
- to create in the students the skills and skills of conducting pharmaceutical analysis in accordance with the requirements of regulatory and technical documents to control the

quality and safety of medicines.

- to consolidate the skills and skills in the field of quality control of medicines in the conditions of the existing testing laboratory;

### 9. Discipline content:

The discipline "Analysis of natural biologically active compounds" includes sections on the analysis of drugs, derivatives of terpenoids, steroid compounds, vitamins, alkaloids, antibiotics, using chemical, physico-chemical methods in accordance with the requirements of regulatory documents.

### 10. Justification of the choice of discipline:

The course "Analysis of Natural Biological Active Compounds" in the specialty 6B10106 - "Pharmacy" is aimed at developing a set of professional competencies among students, contributing to the formation of a new generation specialist in the field of drug quality control.

In recent years, the most pressing health problems throughout the world are the quality, efficacy and safety of drugs, both of synthetic origin and of natural biologically active compounds (BAS). This is due to the presence in the pharmaceutical market of a huge number of trade names of natural BAS, the penetration into the sphere of civilian trafficking of falsified drugs.

Recommended elective discipline is devoted to pharmaceutical analysis of drugs - various organic compounds from simple aliphatic to complex natural biologically active substances: alkaloids, terpenoids, vitamins, fat-soluble and water-soluble, compounds of steroid structure (hormones and hormone-like substances, cardiac glycosides), antibiotics, etc. Objects of the pharmaceutical analysis are not only individual medicinal substances (substances), but also their medicinal products (forms).

### 11. Learning outcomes (competencies):

<b>Knowledge (cognitive sphere)</b>	<b>Skills and skills (psychomotor sphere)</b>	<b>Personal and professional competencies (relationships)</b>
<ul style="list-style-type: none"><li>• the subject and tasks of the pharmaceutical analysis, the procedure and principles of its organization and conduct;</li><li>• modern physical, chemical and physicochemical methods used in pharmaceutical analysis;</li><li>• common pharmacopoeial research methods used to control the quality of medicines;</li><li>• modern nomenclature and classification of drugs;</li><li>• the interrelationship of the chemical structure with the pharmacological activity of the drugs underlying the production of new biologically active compounds;</li><li>• sources and methods of obtaining medicines that form quality requirements (content of initial, intermediate, by-product and other quality indicators);</li><li>• physical and chemical properties of drugs that determine the choice of methods</li></ul>	<ul style="list-style-type: none"><li>• demonstrates the ability to work with the regulatory and technical documentation for monitoring the quality and safety of drugs;</li><li>• interprets the results of its own laboratory work and gives an opinion in accordance with the requirements of regulatory documents on the quality of medicines;</li><li>• demonstrates the ability to work with scientific pharmaceutical and medical literature, as well as to evaluate domestic and foreign experience on research topics.</li></ul>	<p>conducts all types of pharmaceutical analysis on quality control of medicines at the stages of development, production, storage and use;</p> <ul style="list-style-type: none"><li>• uses modern physico-chemical (instrumental) methods for identification, analysis of purity and quantitative determination of drugs.</li></ul>

of analysis, drug form, stability and storage conditions.		
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**12. Prerequisites:** analytical chemistry, organic chemistry, general research methods and analysis of drugs, pharmaceutical chemistry.

**13. Post requisites:** toxicological chemistry, pharmacognosy.

**14. Literature:**

**основная:**

**на русском языке:**

1. Арыстанова Т.А. Фармацевтическая химия, учебник, том I: - Алматы: «Эверо», 2015.- 572 с.
2. Арыстанова Т.А. Фармацевтическая химия, учебник, том II:- Алматы: «Эверо», 2015.- 640с.
3. Государственная фармакопея Республики Казахстан.-Алматы:«Жібек жолы», 2008.- Том 1.- 592с.
4. Государственная фармакопея Республики Казахстан.- Алматы:«Жібек жолы», 2009.- Том 2.- 804с.
5. Государственная фармакопея Республики Казахстан.-Алматы:«Жібек жолы», 2014.- Том 3.-729с.
6. Контроль качества и стандартизация лекарственных средств: методическое пособие / под ред. Раменской Г. В., Ордабаевой С. К.-М: I МГМУ; - Шымкент: ЮКГФА, 2015. - 285 с.
7. Ордабаева С.К. Анализ лекарственных препаратов, производных ароматических соединений: учебное пособие.-Шымкент: «Әлем», 2012.-250 с.
8. Раменская Г.В. Фармацевтическая химия: учебник.-М.: БИНОМ. Лаборатория знаний, 2015.-467 с.
9. Руководство к лабораторным занятиям по фармацевтической химии под редакцией Г.В. Раменской.-М.: Пилот, 2016.-352 с.
10. Халиуллин, Ф. А. Инфракрасная спектроскопия в фармацевтическом анализе: учебное пособие / - М.: ГЭОТАР-Медиа, 2017. - 160 с
11. Method validation in pharmaceutical analysis: a guide to best practice / editors dr. Joachim Ermer. - 2nd ed. - Germany: Wiley-VCH, 2015. - 418 p.
12. Watson, David G. Pharmaceutical analysis: a textboor for pharmacy students and pharmaceutical chemists / David G. Watson. - 4th ed. - Philadelphia: Elsevier, 2017. - 459 p.

**на казахском языке:**

1. Арыстанова Т.Ә. Фармацевтикалық химия: оқулық.т.1-Алматы: «Эверо», 2015.-592 б.
2. Арыстанова Т.Ә. Фармацевтикалық химия: оқулық.т.2-Алматы: «Эверо», 2015.-602б.
3. Қазақстан Республикасының Мемлекеттік фармакопеясы.-Алматы: «Жібек жолы», 2008.-1 Т.-592б.
4. Қазақстан Республикасының Мемлекеттік фармакопеясы.-Алматы: «Жібек жолы», 2009.-2 Т.-804б.
5. Қазақстан Республикасының Мемлекеттік фармакопеясы.-Алматы: «Жібек жолы», 2014.-3 Т.-709б.
6. Краснов, Е. А. Фармациялық химия сұрақтар мен жауаптар түрінде : оқу құралы = Фармацевтическая химия в вопросах и ответах: учебное пособие. - М.: ГЭОТАР-Медиа, 2016. - 704 с
7. Ордабаева С.К., Қарақұлова А.Ш. Глицирризин қышқылы тундыларының дәрілік препараттарының бірыңғайланған сапасын бақылау әдістемелерін жасау: ғылыми-әдістемелік нұсқау.-Шымкент: «Әлем».- 2013.-92 б.

**электронные ресурсы:**

1. Арзамасцев, А. П. Фармацевтическая химия [Электронный ресурс]: учеб. пособие / А. П. Арзамасцев. - Электрон. текстовые дан. ( 86,7 Мб). - М.: "ГЭОТАР-Медиа", 2011. - 640 с. эл. опт. диск (CD-ROM).

2. Контроль качества и стандартизация лекарственных средств [Электронный ресурс]: методическое пособие / под ред. Раменской Г. В., Ордабаевой С. К.-М: I МГМУ; Шымкент: ЮКГФА.-Электрон. текстовые дан. (4.91Мб). 2015. – 285 с.
3. Ордабаева, С. К. Анализ лекарственных препаратов, производных ароматических соединений Шымкент: «Элем», 2012. - 300 с.
4. Ордабаева С.К., Каракулова А.Ш. Фармацевтикалық химия. Ароматты қосылыстар. [Электронды ресурс]: Оқулық. / С. К. Ордабаева; А.Ш. Каракулова; ҚР денсаулық сақтау министрлігі. ОҚМФА. - Электронды мәтінді мәлімет (12.5Мб). - Шымкент: ОҚМФА,- Шымкент, 2016.-296 б.
5. Фармацевтическая химия [Электронный ресурс]: учебник / под ред. Т. В. Плетневой. - Электрон. текстовые дан. ( 50,6Мб). - М : ГЭОТАР-Медиа, 2017
6. The British Pharmacopoeia (BP 2016). – London The Stationery Office.-2016.
7. The European Pharmacopoeia 8.4.- EDQM.-2015.
8. The Japanese Pharmacopoeia, 16<sup>th</sup> edition.- 2013.
9. The International Pharmacopoeia, 5<sup>th</sup> ed. – Geneva: WHO.- 2015.
10. The United States Pharmacopoeia, 38 National Formulary 33.-2015.

**дополнительная:**

1. Арыстанова Т.А., Арыстанов Ж.М. Инновационные технологии в фармацевтическом образовании: обучение и контроль. Учебно-методическое пособие. – Шымкент, 2012.- 175с.
2. Краснов, Е. А. Фармацевтическая химия в вопросах и ответах: учебное пособие. - М.: "Литтерра", 2016. - 352 с.
3. Ордабаева С.К., Надирова С.Н. Унифицированные методики хроматографического анализа лекарственных форм метронидазола: научно-методические рекомендации.- Шымкент: «Элем», 2015. – 84 с.
4. Турсубекова, Б. И. Бейорганикалық дәрілік заттарды талдау: оқу құралы.- Алматы: «Эверо», 2016. - 120 бет. С
5. English for the pharmaceutical industry: textbook / M. Bucheler [and etc.]. - New York: Oxford University Press, 2014. - 96 p. +эл. опт. диск (CD-ROM).
6. Cairns, D. Essentials of pharmaceutical chemistry: textbook / D. Cairns. - 4th ed. - London: [s. n.], 2013. - 308 p
7. Georgiyants V.A., Bezugly P.O., Burian G.O., Abu Sharkh A.I., Taran K.A. Pharmaceutical chemistry. Lectures for English-speaking students:Ph24 the study guide for students of higher schools – Kharkiv: NUPh; Original, 2013. – 527 p.

**1. The department of Pharmacognosy**

**2. Level of training (bachelor degree)**

**3. Educational program: 6B10106 «Pharmacy»**

**4. Course: 4**

**5. Name of elective discipline: «Analysis and standardization of medicinal plant raw materials»**

**6. Amount of credits: 5 credits (150 hours)**

**7. Purpose:** To develop student knowledge on standardization and quality control of medicinal plant raw materials and phytopreparations; improving student readiness for self-employment; wider knowledge of students on topical issues of standardization of medicinal plant raw materials and phytopreparations.

**8. Discipline content:** Preparation of medicinal plant raw materials, rational and careful attitude to resources of medicinal plants, sources of raw materials of mineral and animal origin, processing of plant raw materials, etc.

Macroscopic, microscopic, histochemical and microchemical studies of medicinal plant raw materials. Chemical composition of medicinal plants. Determination of benign drug raw materials.

**9. Tasks:**

- to guide students in the properties and chemical composition of medicinal plant raw materials and phytopreparations in accordance with the constantly growing demand for high-quality phytoproduction and medicinal plant raw materials;
- develop skills and skills necessary for standardization of MPRM and phytopreparations;
- instilling communication skills in students on the professional presentation of the external description of MPRM, reasoned statement, defence of own point of view, formation of logical thinking, ability to participate in discussions, etc.
- development of legal competence through familiarization with regulatory documentation regulating quality, efficiency and safety of phytopreparations from MPRM (SPh RK, etc.)
- motivated training of students for continuous improvement and development of abilities for independent and creative development of materials for standardization of medicinal plant raw materials and phytopreparations.

#### **10. Justification of the choice of discipline:**

Pharmacognosia (from Greek rharmsion - medicine, poison and gnosis - study, knowledge) is one of the pharmaceutical sciences studying medicinal plants, medicinal plant raw materials and some products of primary processing of plant and animal origin.

Taking into account the increased requirements of practical pharmacy and medicine for the use of medicinal raw materials of plant, animal and mineral origin, the subject "Standardization of medicinal plant raw materials and phytopreparations" considers the range of issues related to the efficiency of quality control at all stages of preparatory development.

Ensuring proper quality of medicinal plant raw materials depends to a large extent on proper organization of control, its efficiency and efficiency, as well as on the level of requirements laid down in normative documents (SPh, AND, TAND) and the methods of analysis used. The study of the system of standards of quality of medicinal plant raw materials, their products, testing methods, etc., established in the national order and mandatory for producers and consumers is currently a pressing problem in the Republic of Kazakhstan.

#### **11. Results of training (competence):**

<b>Knowledge (cognitive sphere)</b>	<b>Skills (psychomotor sphere)</b>	<b>Personal and professional competences (relations)</b>
1. Know the legislative regulatory documents regulating the rules of registration, re-registration and certification of medicinal plant raw materials in the Republic. 2. To know the system of standardization of MPRM and phytopreparations, numerical indicators that regulate the benign nature of MPRM, and their methods of determination, improvement of existing methods of analysis, development of business plans, the main directions of scientific research in the field of standardization of medicinal plant raw materials and phytopreparations.	1. Be able to perform acceptance of MPRM and phytopreparations, selection for analysis in accordance with MP, carry out static processing and registration of results of commodity analysis. 2. To be able to carry out quality control of medicinal plant raw materials, develops business plans for carrying out research works in the field of phytochemical and pharmacognostic study of medicinal plant raw materials and phytopreparations.	1. Collects and interposes the legislation of Kazakhstan in the field of health care, international standards, their structure and other regulatory documentation regulating the quality of medicinal plant raw materials and phytopreparations. 2. Collects information on new methods of quality control of medicinal plant raw materials, certification and standardization, improvement of existing methods of analysis.

**12. Prerequisites:** botany, Latin, organic chemistry, analytical chemistry, biological chemistry, pharmacognosy.

**13.Post-details:** Technology of extraction preparations, standardization of medicines, resource science and ecology of medicinal plants.

#### **14. Literature**

##### **The main:**

Самылина И.А.. Фармакогнозия: учебник: / И.А.; М-во образования и науки РФ-М.ГЭОТАР – Медиа, 2013-1 экз.,

2. Самылина И.А.. Фармакогнозия: учебник: Атлас. – Т.3. – М., 2009. – 488 с.

3. Дәрілік өсімдіктер және дәрілік өсімдік шикізаттары: фармакогнозия пәні бойынша оқу құралы / Жангозина Д. М. ж. б. - Алматы : Эверо, 2014. - 240 бет.

4. Лекарственные растения, лекарственное растительное сырье и некоторые продукты переработки сырья животного происхождения Ч.1.Лекарственные растения и лекарственное растительное сырье содержащие углеводы,жиры и жироподобные вещества, витамины,терпеноиды: учебно-методическое пособие по фармакогнозии- Алматы: Эверо, 2014.

5. Лекарственные растения, лекарственное растительное сырье и некоторые продукты переработки сырья животного происхождения Ч.2.Лекарственные растения и лекарственное растительное сырье содержащие углеводы,жиры и жироподобные вещества, витамины,терпеноиды: учебно-методическое пособие по фармакогнозии- Алматы: Эверо, 2014.

6. Государственная фармакопея Республики Казахстан. Т.1. – Алматы: Издательский дом «Жибек жолы», 2008. – 592 с.

7. Государственная Фармакопея СССР: Вып. 2. Общие методы анализа. Лекарственное растительное сырье/ МЗ СССР. – 11-е изд., доп. – М.: Медицина, 1990. – 400 с.

8. Фармакогнозия. Экотоксиканты в лекарственном растительном сырье и фитопрепаратах: учеб. пособие / И. В. Гравель [и др.] ; М-во образования и науки РФ. Рек. ГОУ ВПО Первый Московский гос. мед. ун-т им. И. М. Сеченова. - М.: ГЭОТАР - Медиа, 2013. - 304 с.

9. Pharmacognosy (Pharmacognosy and Phytochemistry) Vol.1 Paperback – 2011 year.

##### **Additional:**

1. Руководство к практическим занятиям по фармакогнозии: Учебное пособие / Под ред. И.А. Самылиной, А.А. Сорокиной. – М.: ООО «Медицинское информационное агентство», 2007. – 672 с.

2. Келімханова, С. Е. Фармакогнозия: практикум / С. Е. Келімханова; ҚР денсаулық сақтау министрлігі; С. Ж. Асфендияров атындағы ҚазҰМУ. - Қарағанды: ЖК "Ақнұр", 2014. - 180 бет.

3. Фармакогнозия пәнінің зертханалық-тәжірибелік сабақтарына арналған қолданба: оқу құралы / Б. Қ. Махатов [ж. б.] ; ҚР денсаулық сақтау министрлігі; ОҚМФА. - Шымкент : Б. ж., 2013. - 328 бет

4. Самылина И.А., Аносова О.Г. и др. Фармакогнозия: учебное пособие: Атлас в 3 т. – М., 2010. – Т.1. – 192 с.; Т.2. – 384 с.; Т.3. –488 с.

5. Руководство к практическим занятиям по фармакогнозии: Анализ фасованной продукции: учеб. пособие / под ред. И.А. Самылиной. – М. ООО “Медицинское информационное агентство”, 2008. – 288 с.: ил.

6. Ә.И.Исамбаев, К.Д. Рахимов, Р.А. Егеубаева Халық медицинасында пайдаланылатын дәрілік өсімдіктер. Алматы, 2000. – 200 б

7.Фармакогнозия. Рабочая тетрадь к практическим занятиям: И. В. Гравель и др.; под ред. И. А. Самылиной ; М-во образования и науки РФ. - 2-е изд., испр. и доп ; Рек. ГОУ ВПО Московская мед. акад. им. И. М. Сеченова. - М. : ГЭОТАР - Медиа, 2013. - 264 с.

8. К.К. Орынбасарова «Дәрілік өсімдік шикізаттарын фармакогностикалық талдау»: Оқу құралы.-Шымкент, 2016. – 320 б.

9. Fundamentals of Pharmacognosy and Phytotherapy, 2nd Edition 2012

10. Pharmacognosy: Fundamentals, Applications and Strategies 1st Edition 2016

11. Marine Pharmacognosy: Trends and Applications 1st Edition 2012



**Electronic resources:**

1. Электронды кітапхана <http://lib.ukma.kz>
2. Электронды каталог ішкі пайдаланушылар үшін <http://10.10.202.52>  
сыртқы пайдаланушылар үшін <http://89.218.155.74>
3. Республикалық жоғары оқу орындары аралық электронды кітапхана <http://rmebrk.kz/>
4. «Студент кеңесшісі» Медициналық ЖОО электронды кітапханасы  
<http://www.studmedlib.ru>
5. «Параграф» ақпараттық жүйе «Медицина» бөлімі <https://online.zakon.kz/Medicine>
6. «Заң» құқықтық ақпараттың электронды дереккөзі <https://zan.kz>
7. Ғылыми электрондық кітапхана <https://elibrary.ru/>
8. «BooksMed» электронды кітапханасы <http://www.booksmed.com>
9. «Web of science» (Thomson Reuters) <http://apps.webofknowledge.com>
10. «Science Direct» (Elsevier) <https://www.sciencedirect.com>
11. «Scopus» (Elsevier) [www.scopus.com](http://www.scopus.com)
12. PubMed <https://www.ncbi.nlm.nih.gov/pubmed>

**1. Department:** Pharmaceutical and Toxicological Chemistry

**2. Specialty:** 6B10106 "Pharmacy"

**3. Course:** 5

**4. Level of preparation:** undergraduate

**5. The name of the elective discipline:** " Bioanalytical chemistry and toxicology"

**6. Number of credits:** 5 credits

**7. The objectives of the curriculum:** developing theoretical knowledge of the mechanisms of action of xenobiotics, the features of their clinical and toxicological analysis, interpretation of results, the acquisition of practical skills for analyzing xenobiotics using modern physicochemical methods: spectral, electrochemical, chromatographic, immune, etc. The study of the subject is aimed at achieving professional competencies of the future specialist (toxicologist chemist) in the field of clinical and toxicological analysis of xenobiotics in modern laboratories.

**8. Tasks of the curriculum:**

- to give students knowledge of the basic principles, procedure for organizing, conducting analytical diagnostics of acute poisoning, in accordance with current legislation;
- provide students with knowledge of the properties (physical, chemical), toxicodynamics and toxicokinetics of xenobiotics and their metabolites;
- teach students how to conduct chemical toxicological analysis of toxicologically important substances at the stages of clinical toxicological examination and analytical diagnosis of acute poisoning.

**9. Discipline content :** Analysis of certain groups of toxicologically important substances and prohibited substances WADA using GC-MS, HPLC-MS-NMR, HPLC-ICP-MS, GC-IR-FTIR, GDS, CE-ICP-MS etc. Conducting research on the requirements of international organizations for standardization and quality (ISO, OECD, EU).

**10. Justification of the choice of discipline:**

The problem of chemical safety has acquired global importance in our time. It is known that society is able to successfully counter such threats, if it is possible to quickly and reliably diagnose new toxic agents, as well as monitor and prevent the state of existing problems. The main factor determining the rates and volumes of toxicological studies in the world is a huge number of chemicals that come into circulation every year, the diversity of their structures and properties, as well as the associated risks.

In recent years, the requirements for the ability of institutions to perform at the modern level of development of analytical techniques and methodology, large volumes of specialized studies, different in nature substances within the framework of judicial chemical, clinical toxicological, anti-doping, environmental, forensic examinations, as well as in the field of

occupational pathology, clinical pharmacology, etc. At the same time methods of detection, identification and quantification of toxicants are constantly being improved and complicated. Much attention at the lessons on this elective will be given to the methodology of chemical-toxicological analysis, the interpretation of its results, as well as ensuring the quality of analysis, proper laboratory practice (GLP principles in a modern laboratory), implementation of the validation system and qualifications in the laboratory. The modern state of analytical studies of toxicants in biological objects will be fully reflected in the classes, new methods of sample preparation of biological samples, methods for the determination of toxicants in biological media by various analytical systems (gas chromatography, high performance liquid chromatography, FTIR, etc.) will be presented.

In an elective course, students will study the issues of chemical-toxicological analysis for the diagnosis of professional and environmentally dependent diseases, doping agents, as well as substances that can be used in biological terrorism.

**11. Learning outcomes (competencies):**

Knowledge (cognitive sphere)	Skills and skills (psychomotor sphere)	Personal and professional competencies (relationships)
<ul style="list-style-type: none"> <li>• know the organizational, legal, legal and methodological basis for conducting chemical-toxicological examination and analytical diagnostics in case of acute poisoning with poisonous, potent, narcotic and drug-addictive substances;</li> <li>• know the methodology of the systemic chemical-toxicological analysis of toxic and highly active substances.</li> </ul>	<ul style="list-style-type: none"> <li>• be able to conduct chemical-toxicological studies of material evidence on various toxic substances (biological, physico-chemical and chemical);</li> <li>• be able to interpret the results of chemical-toxicological analysis;</li> <li>• possess the skills of conducting chemical and toxicological research;</li> <li>• possess the skills to document the conduct of laboratory and expert research (drawing up the opinion and chemical toxicological research report).</li> </ul>	<ul style="list-style-type: none"> <li>• to be ready for independent work and to carry out their activities, taking into account moral and legal norms adopted in the society, to comply with laws and regulations on work with confidential information;</li> <li>• be able to design and implement their own educational trajectory throughout life, ensuring success and competitiveness;</li> <li>• to be able to effectively collaborate with other people: build effective communications, collaborate with colleagues, and establish maximum trusting relationships with partners.</li> </ul>

**12. Prerequisites:** toxicological chemistry

**13. Post requisites:** professional activities

**14. Literature:**

**основная:**

**на русском языке:**

1. Вергейчик Т.Х. Токсикологическая химия: учебник для студентов фарм. вузов и факультетов / Т.Х. Вергейчик; ред. Е.Н. Вергейчик. - 3-е изд., перераб. и доп. - М.: МЕДпресс-информ, 2012. - 432 с.
2. Плетенёва, Т. В. Токсикологическая химия: учебник /. - М.: ГЭОТАР - Медиа, 2013. - 513 с
3. Токсикологическая химия: метаболизм и анализ токсикантов: учебное пособие + CD/ под ред. Н.И. Калетиной. – М., 2008. – 1016 с. Переплет.
4. Токсикологическая химия: учебник / под ред. Т.В. Плетеневой. – 2-ое изд. – М., 2008. – 512 с. Переплет.

5. ТСХ- скрининг токсикологически значимых соединений, изолируемых экстракцией и сорбцией: учебное пособие / Г.В. Раменская, Г.М. Родионова, Н.И. Кузнецова и А.Е. Петухов; ред. А.П. Арзамасцев . - М. : ГЭОТАР-Медиа, 2010. - 240 с.

**на казахском языке:**

1. Арыстанова, Т. А. Биологиялық материалдан минералдау әдісімен оқшауланатын улы және күшті әсерлі заттар тобы: химия -фармацевтикалық фак. IV курс студенттеріне арналған оқу құралы / - Алматы : Эверо, 2012. - 100 бет. С
2. Арыстанова, Т. А. Биологиялық материалдан экстракция әдісі арқылы оқшауланатын улы және күшті әсерлі заттар топтары: химия -фармацевтикалық факультетінің IV-курс студенттеріне арналған оқу құралы / - Алматы : Эверо, 2012
3. Мұхаметжанов, А. М. Химиялық қарудың жалпы және медицина-тактикалық сипаттамасы: оқу құралы. - 2-бас. - Қарағанды : ЖК "Ақ Нұр", 2013.
4. Ордабаева С.Қ., Серікбаева А.Д., Қарақұлова А.Ш., Жұматаева Г.С. Сот-химиялық сараптау және аналитикалық диагностика. Оқу-әдістемелік құралы. – Алматы: «Эверо» баспасы, 2016. -280б.
5. Тулеев, И. Клиникалық токсикология: оқу құралы/. - Шымкент: "Нұрдана - LTD", 2013. - 592 бет. с.
6. Шүкірбекова, А. Б. Токсикологиялық химия : оқулық . - Алматы : Эверо, 2013

**электронные ресурсы:**

1. Аналитическая диагностика наркомании и токсикомании. Биоаналитическая химия и токсикология [Электронный ресурс / ЮКГФА; Мед. и фармацевтический факультеты. - Электрон. текстовые дан. ( 25,4 Мб). - Шымкент : Б. и., 2011. - эл. опт. диск (CD-ROM).
2. Токсикологическая химия. Аналитическая токсикология [Электронный ресурс]: учебник / под ред. Р. У. Хабриева. - Электрон. текстовые дан. (43,7 МБ). - М.: Издательская группа "ГЭОТАР- Медиа", 2010. - 752 с. эл. опт. диск (CD-ROM)
3. Химические опасности и токсиканты. Принципы безопасности в химической лаборатории [Электронный ресурс] : учебное пособие / Л. В. Евсеева [и др.]. - Электрон. текстовые дан. (47,2Мб). - М.: "Литтерра", 2017. - эл. опт. диск (CD-ROM).
4. Химиялық қауіптер мен уыттылықтар. Химиялық зертханадағы қауіпсіздік ұстанымдары [Электронный ресурс]: оқу құралы = Химические опасности и токсиканты. Принципы безопасности в химической лаборатории: учебное пособие / У. М. Датхаев. - Электрон. текстовые дан. (67.9Мб). - М. : "Литтерра", 2016. - 480б. с

**дополнительная:**

1. Кузьменко, А. Н. Стандартизация лекарственного растительного сырья и растительных сборов методами ионо-эксклюзионной и газо- жидкостной хроматографии : монография. - Алматы : Эверо, 2017. - 120 с.
2. Сраубаев, Е. Н. Өндірістік токсикология негізі. Өндірістік улар және уланулар: оқу-әдістемелік құрал /. - Алматы : Эверо, 2014. - 156 бет. с.

**1. Department:** Pharmaceutical and Toxicological Chemistry

**2. Level of preparation:** undergraduate

**3. Educational program:** 6B10106 - «Pharmacy»

**4. Course:** 5

**5. The name of the elective discipline:** "The standardization of medicines and metrology "

**6. Number of credits:** 6 credits

**7. The objectives of the curriculum:** to teach the student to conduct quality control of medicines at the stages of development, production, storage and use in accordance with the regulatory documentation of the RK and with the quality standards GxP.

**8. Tasks of the curriculum:**

- to give students a methodology for pharmaceutical analysis of medicines at the stages of development, production, storage and use;

- to create in the students the skills and skills of conducting pharmaceutical analysis in accordance with the requirements of regulatory and technical documents to control the quality and safety of medicines.
- to provide students with knowledge of the basic principles, procedures for organizing and conducting standardization and certification of medicines;
- to consolidate the skills in the field of quality control and standardization of medicines in the conditions of the current testing laboratory;

### 9. Discipline content:

The current state and ways to improve the standardization of drugs in the Republic of Kazakhstan. Rules for the development of regulatory documents for monitoring the quality and safety of medicines. Pharmacopoeia methods of quality control and standardization of medicinal substances and dosage forms. Appropriate quality standards to ensure the efficacy and safety of drugs.

### 10. Justification of the choice of discipline:

Currently, a pressing health issue in Kazakhstan is to ensure the quality, efficacy and safety of medicines (drugs). Medicinal products are a special product, the quality of which is directly related to health. The issues of quality control and standardization of medicines increase their relevance due to the general increase in the number of medicines registered in Kazakhstan, which come, as a rule, from different manufacturers. Highly active substances belonging to new classes of natural and synthetic compounds have entered medical practice, the number of replicated drugs increases annually. Falsified (counterfeit) drugs penetrate the pharmaceutical market.

In modern conditions, pharmaceutical science is rapidly developing, new directions of pharmaceutical research are emerging, new approaches to the analysis of medicines, and science-based technologies are being introduced.

All this is of undoubted interest for students, allows them to improve their knowledge, improve their professional level.

This elective discipline will prepare a graduate pharmacist for professional activities in:

- production area (pharmaceutical institutions, chemical and pharmaceutical enterprises, etc.);
- control and authorization system (licensing, certification, registration, re-registration);
- research area.

### 11. Learning outcomes (competencies):

Knowledge (cognitive sphere)	Skills and skills (psychomotor sphere)	Personal and professional competencies (relationships)
<ul style="list-style-type: none"> <li>• know the state system of standardization and certification of drugs;</li> <li>• know the regulatory documents on the quality of medicines;</li> <li>• know systemic efficiency, safety and quality at all stages of the life cycle of drugs;</li> <li>• know the requirements for the development and preparation of regulatory documents on the control of the quality and safety of drugs;</li> <li>• know the regulatory and legal and organizational bases</li> </ul>	<ul style="list-style-type: none"> <li>• be able to carry out all types of pharmaceutical analysis on the quality control of medicines at the stages of development, production, storage and use;</li> <li>• be able to develop a quality specification based on the study of physical, chemical, pharmacological properties and production methods;</li> <li>• be able to conduct tests of drug quality indicators in accordance with the requirements of regulatory documentation;</li> <li>• be able to predict the period and conditions of storage of medicines on the</li> </ul>	<ul style="list-style-type: none"> <li>• to be ready for independent work and to carry out their activities taking into account the moral and legal norms adopted in the society, to comply with laws and regulations on work with confidential information;</li> <li>• be able to design and carry out their own educational trajectory throughout life, ensuring success and competitiveness;</li> <li>• be able to effectively collaborate with other people: build effective</li> </ul>

of metrological assurance of measurement uniformity; • know certification tests and certification procedure for medicinal products	basis of physical, chemical properties and method of preparation; • be able to determine the validation characteristics of analytical techniques	communications, collaborate with colleagues, and establish maximum trusting relationships with partners.
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**12. Prerequisites:** analytical chemistry, organic chemistry, general research methods and analysis of drugs

**13. Post requisites:** professional activities

**14. Literature:**

**основная:**

**на русском языке:**

13. Арыстанова Т.А. Фармацевтическая химия, учебник, том I: - Алматы: «Эверо», 2015.- 572 с.
14. Арыстанова Т.А. Фармацевтическая химия, учебник, том II:- Алматы: «Эверо», 2015.- 640с.
15. Государственная фармакопея Республики Казахстан.-Алматы:«Жібек жолы», 2008.- Том 1.- 592с.
16. Государственная фармакопея Республики Казахстан.- Алматы:«Жібек жолы», 2009.- Том 2.- 804с.
17. Государственная фармакопея Республики Казахстан.-Алматы:«Жібек жолы», 2014.- Том 3.-729с.
18. Контроль качества и стандартизация лекарственных средств: методическое пособие / под ред. Раменской Г. В., Ордабаевой С. К.-М: I МГМУ; - Шымкент: ЮКГФА, 2015. - 285 с.
19. Ордабаева С.К. Анализ лекарственных препаратов, производных ароматических соединений: учебное пособие.-Шымкент: «Әлем», 2012.-250 с.
20. Раменская Г.В. Фармацевтическая химия: учебник.-М.: БИНОМ. Лаборатория знаний, 2015.-467 с.
21. Руководство к лабораторным занятиям по фармацевтической химии под редакцией Г.В. Раменской.-М.: Пилот, 2016.-352 с.
22. Халиуллин, Ф. А. Инфракрасная спектроскопия в фармацевтическом анализе: учебное пособие / - М.: ГЭОТАР-Медиа, 2017. - 160 с
23. Method validation in pharmaceutical analysis: a guide to best practice / editors dr. Joachim Ermer. - 2nd ed. - Germany: Wiley-VCH, 2015. - 418 p.
24. Watson, David G. Pharmaceutical analysis: a textboor for pharmacy students and pharmaceutical chemists / David G. Watson. - 4th ed. - Philadelphia: Elsevier, 2017. - 459 p.

**на казахском языке:**

1. Арыстанова Т.Ә. Фармацевтикалық химия: оқулық,т.1-Алматы: «Эверо», 2015.-592 б.
2. Арыстанова Т.Ә. Фармацевтикалық химия: оқулық,т.2-Алматы: «Эверо», 2015.-602б.
3. Қазақстан Республикасының Мемлекеттік фармакопеясы.-Алматы: «Жібек жолы», 2008.-1 Т.-592б.
4. Қазақстан Республикасының Мемлекеттік фармакопеясы.-Алматы: «Жібек жолы», 2009.-2 Т.-804б.
5. Қазақстан Республикасының Мемлекеттік фармакопеясы.-Алматы: «Жібек жолы», 2014.-3 Т.-709б.
6. Краснов, Е. А. Фармациялық химия сұрақтар мен жауаптар түрінде : оқу құралы = Фармацевтическая химия в вопросах и ответах: учебное пособие. - М.: ГЭОТАР-Медиа, 2016. - 704 с

7. Ордабаева С.К., Қарақұлова А.Ш. Глицирризин қышқылы тундыларының дәрілік препараттарының бірыңғайланған сапасын бақылау әдістемелерін жасау: ғылыми-әдістемелік нұсқау.-Шымкент: «Әлем».- 2013.-92 б.

**электронные ресурсы:**

1. Арзамасцев, А. П. Фармацевтическая химия [Электронный ресурс]: учеб. пособие / А. П. Арзамасцев. - Электрон. текстовые дан. ( 86,7 Мб). - М.: "ГЭОТАР-Медиа", 2011. - 640 с. эл. опт. диск (CD-ROM).
2. Контроль качества и стандартизация лекарственных средств [Электронный ресурс]: методическое пособие / под ред. Раменской Г. В., Ордабаевой С. К.-М: I МГМУ; Шымкент: ЮКГФА.-Электрон. текстовые дан. (4.91Мб). 2015. – 285 с.
3. Ордабаева, С. К. Анализ лекарственных препаратов, производных ароматических соединений Шымкент: «Әлем», 2012. - 300 с.
4. Ордабаева С.К., Карақұлова А.Ш. Фармацевтикалық химия. Ароматты қосылыстар. [Электронды ресурс]: Оқулық. / С. К. Ордабаева; А.Ш. Карақұлова; ҚР денсаулық сақтау министрлігі. ОҚМФА. - Электронды мәтінді мәлімет (12.5Мб). - Шымкент: ОҚМФА,- Шымкент, 2016.-296 б.
5. Фармацевтическая химия [Электронный ресурс]: учебник / под ред. Т. В. Плетневой. - Электрон. текстовые дан. ( 50,6Мб). - М : ГЭОТАР-Медиа, 2017
6. The British Pharmacopoeia (BP 2016). – London The Stationery Office.-2016.
7. The European Pharmacopoeia 8.4.- EDQM.-2015.
8. The Japanese Pharmacopoeia, 16<sup>th</sup> edition.- 2013.
9. The International Pharmacopoeia, 5<sup>th</sup> ed. – Geneva: WHO.- 2015.
10. The United States Pharmacopoeia, 38 National Formulary 33.-2015.

**дополнительная:**

1. Арыстанова Т.А., Арыстанов Ж.М. Инновационные технологии в фармацевтическом образовании: обучение и контроль. Учебно-методическое пособие. – Шымкент, 2012.- 175с.
2. Краснов, Е. А. Фармацевтическая химия в вопросах и ответах: учебное пособие. - М.: "Литтерра", 2016. - 352 с.
3. Ордабаева С.К., Надирова С.Н. Унифицированные методики хроматографического анализа лекарственных форм метронидазола: научно-методические рекомендации.- Шымкент: «Әлем», 2015. – 84 с.
4. Турсубекова, Б. И. Бейорганикалық дәрілік заттарды талдау: оқу құралы.- Алматы: «Эверо», 2016. - 120 бет. С
5. English for the pharmaceutical industry: textbook / M. Bucheler [and etc.]. - New York: Oxford University Press, 2014. - 96 p. +эл. опт. диск (CD-ROM).
6. Cairns, D. Essentials of pharmaceutical chemistry: textbook / D. Cairns. - 4th ed. - London: [s. n.], 2013. - 308 p
7. Georgiyants V.A., Bezugly P.O., Burian G.O., Abu Sharkh A.I., Taran K.A. Pharmaceutical chemistry. Lectures for English-speaking students:Ph24 the study guide for students of higher schools – Kharkiv: NUPh; Original, 2013. – 527 p.

1. **The Department:** Drug technology.

2. **Level of training:** Bachelor.

3. **Educational program:** Pharmacy.

4. **Course:** 5

5. **Name of the elective discipline:** Innovative pharmaceutical technologies.

6. **Number of credits:** 5

7. **Purpose:** the main purpose of the discipline is to teach students the traditional forms of activity of a pharmacist-technologist, as well as to study the latest achievements in the production of medicines.

8. **Content of the discipline:** The study program includes: homeopathic dosage forms (essences, tinctures, triturations, granules, solutions, opodoldoki, etc.), cosmetics (hygienic, therapeutic and

prophylactic, decorative, etc.), age-related and veterinary dosage forms, dietary supplements, biotechnological process of drug production, the main provisions of the standards of Good Practices.

#### **9. Tasks:**

- study of the nomenclature and theoretical bases of technology of homeopathic medicinal forms, medicines from plant and animal raw materials, from mineral substances and chemical compounds, dilutions from various medicinal products;
- study of the peculiarities of preparation of age-related dosage forms, selection of doses, excipients and ways of administration of dosage forms depending on the age factor;
- technology features of cosmetic and veterinary medicines, biologically active additives, parapharmaceutical and nutraceutical products;
- study of modern requirements for the production of medicines and implementation of GMP in the pharmaceutical industry of the Republic of Kazakhstan;
- introduction to the theoretical foundations of biotechnology, genetic engineering and tissue culture.

**10. Rationale for the choice of discipline:** the Discipline "Innovative pharmaceutical technologies" is one of the special pharmaceutical disciplines and is aimed at the formation of a specialist pharmacist with special technological training. The program of the discipline reflects the main concepts of the development of pharmacy and medicine at the present stage and the achievements of pharmaceutical science and practice.

#### **11. Learning outcomes:**

1) Demonstrates knowledge and understanding:

- demonstrates knowledge of the achievements of pharmaceutical science and practice; concepts of the development of pharmacy and medicine at the present stage.

2) Applies knowledge and understanding at a professional level, formulates arguments and solves problems of the studied area:

- organizes the production process for the production of medicines, manufactures all types of dosage forms in accordance with the requirements of regulatory documents of the Ministry of Health of the Republic of Kazakhstan and GMP, GPP.

3) Collects and interprets information to form judgments based on social, ethical and scientific considerations:

- interprets and justifies the technological process of production of medicines (preparation, production, packaging, labeling and storage of medicines).

4) Provides information, ideas, and problem solutions to both specialists and non-specialists:

- able to transfer knowledge on the development and implementation of innovative technologies in the field of drug production to students and other interested parties.

5) Learning skills necessary for independent continuation of further training:

- uses information based on IT technologies in the field of professional activity.

6) Knows the methods of scientific research and academic writing and applies them in the field of study:

- substantiates his own thoughts through a short, structured text, stylistically competently builds sentences, correctly forms literary sources.

7) Applies knowledge and understanding of facts, phenomena, theories and complex relationships between them in the field of study:

- determines the compatibility of the incoming ingredients, the correspondence of the prescribed doses to the age of the patient; calculates the amount of medicines and excipients; prepares the workplace, equipment and means of small mechanization; justifies the technology of preparation of the dosage form and registers the data of quality control of medicines.

8) Understands the importance of the principles and culture of academic integrity:

- knows and understands the set of values and principles that express the integrity of the student in teaching when performing written works (essays, essays, test tasks, etc.), answers in classes

and exams, in research, expressing their position, in relationships with academic staff, teachers and other students.

**12. Prerequisites of the discipline:** technology of dosage forms, technology of extraction preparations, industrial medicine technology.

**13. Post-requirements of the discipline:** professional activity, post-University training.

#### **14. Literature**

##### **основная:**

1. Фармацевтическая технология. Технология лекарственных форм: учебник / под ред. И. И. Красноюка – М.: ГЭОТАР – Медиа, 2015. – 656 с.
2. Орехов С.Н. Фармацевтическая биотехнология. Руководство к практическим занятиям учебное пособие. - М.: ГЭОТАР - Медиа, 2015. - 432 с.
3. Тихонова С.А., Жетерова С.К., Затыбекова А.К. Методические рекомендации к практическим занятиям по технологии гомеопатических препаратов: методические рек. для студ. фарм. вузов и фак. - Алматы: Эверо, 2016. - 140 с.

##### **дополнительная:**

1. Государственная Фармакопея Республики Казахстан. Т.1. – Алматы: Издательский дом «Жибек жолы», 2008. – 591 с.
2. Государственная Фармакопея Республики Казахстан. Т.2. – Алматы: Издательский дом «Жибек жолы», 2009 – 804 с.
3. Государственная Фармакопея Республики Казахстан. Т.3. – Алматы: Издательский дом «Жибек жолы», 2014. – 872 с.

##### **Электронный ресурс:**

1. УМКД дисциплины размещен на образовательном портале
2. Фармацевтическая технология. Технология лекарственных форм [Электронный ресурс]: учебник / под ред. И. И. Красноюка. – Электрон. текстовые дан. (47,6 МБ). - М.: Издательская группа "ГЭОТАР- Медиа", 2011. - 656 с. эл. опт. диск (CD-ROM).
3. Сағындықова Б.А., Анарбаева Р.М. Дәрілердің дәріханалық технологиясы [Электронный ресурс]: оқулық / Б.А. Сағындықова, Р.М. Анарбаева – Электрон.текстовые дан. (6,01 МБ). – Шымкент.: ОҚМА. – 2018. – 513 б. эл. опт. диск (CD-ROM).

##### **Интернет ресурс:**

1. Меньшутина Н.В., Мишина Ю.В., Алвес С.В. Инновационные технологии и оборудование фармацевтического производства. - Т.1. – М.: Издательство БИНОМ, 2016. - 328 с., ил. <https://b-ok.xyz/book/2874358/c59eaa>
2. Меньшутина Н.В., Мишина Ю.В., Алвес С.В., Гордиенко М.Г., Гусева Е.В., Троянкин А.Ю. Инновационные технологии и оборудование фармацевтического производства. -Т.2. – М.: Издательство БИНОМ, 2013. - 480 с., ил. <https://b-ok.cc/book/2874359/b6ef3c>
3. Орехов, С. Н. Фармацевтическая биотехнология / Орехов С. Н. - Москва: ГЭОТАР-Медиа, 2013. - 384 с. - ISBN 978-5-9704-2499-5. - Текст: электронный // URL: <http://www.studmedlib.ru/book/ISBN9785970424995>.
4. Быков, В. А. Фармацевтическая биотехнология. Руководство к практическим занятиям. учебное пособие / Орехов С. Н.; под ред. В. А. Быкова, А. В. Катлинского. - Москва: ГЭОТАР-Медиа, 2012. - 384 с. - ISBN 978-5-9704-1303-6. - Текст: электронный // URL: <http://www.studmedlib.ru/book/ISBN9785970413036>.
5. Краснюк, И. И. Фармацевтическая технология. Руководство к практическим занятиям / И. И. Краснюк, Н. Б. Демина, М. Н. Анурова - Москва: ГЭОТАР-Медиа, 2018. - 368 с. - ISBN 978-5-9704-4216-6. - Текст: электронный // URL: <http://www.studmedlib.ru/book/ISBN9785970442166>.
6. Приказ Министерства здравоохранения Республики Казахстан от 8 мая 2019 года № ҚР ДСМ-71 О внесении изменений в приказ Министерства здравоохранения и социального развития Республики Казахстан от 27 мая 2015 года № 392 "Об утверждении надлежащих фармацевтических практик" <https://adilet.zan.kz/rus/docs/V1900018658>

**1. The department of Pharmacognosy**

**2. Level of training (bachelor degree)**

**3. Educational program:** 6B10106 «Pharmacy»



4. **Course:** 5

5. **Name of elective discipline:** «Resource study and ecology of medicinal plants»

6. **Amount of credits:** 5 credits (150 hours)

7. **Purposes:** formation at students of knowledge when studying a resource study of herbs consists in mobilization of resources of flora for needs of medicine, studying by students of concrete species of herbs giving raw materials used in Kazakh the Republics.

8. **Content of discipline:** Resource science and ecology of medicinal plants. Resource zones and prospects of resource research in the Republic of Kazakhstan. Uniform method of determining the reserves of medicinal plants. Ecology of herbs. Impact of environmental factors on the quality of medicinal plant raw materials. Rational methods of collecting medicinal plant raw materials of different morphological groups.

9. **Tasks:**

- orientation in properties and the chemical composition of herbs according to constantly growing demand in quality phytoproducts and medicinal plant raw materials;

- orientation in properties and the chemical composition of the products of animal and mineral origin which are widely used in a modern arsenal the pharmacotherapy of medicines;

- carrying out phytochemical and merchandising analysis of raw materials of natural origin.

10. **Justification of the choice of discipline:**

Pharmacognosy (from Greek pharmakon – medicine, poison and gnosis – studying, knowledge) – one of pharmaceutical sciences studying herbs, medicinal plant raw materials and some products of primary processing of floral and animal origin.

Considering the increased requirements of practical pharmacy and medicine to use of medicinal raw materials of plant, animal and mineral origin, the subject "Fundamentals of Pharmacognosy" considers a circle of the questions connected with preparation of medicinal plant raw materials, rational and careful attitude to resources of herbs, sources of raw materials of mineral and animal origin, processing of plant raw materials, etc.

11. **Results of training (competence):**

<b>Knowledge (cognitive sphere)</b>	<b>Skills (psychomotor sphere)</b>	<b>Personal and professional competences (relations)</b>
To know history of development of a pharmacognosy and the main stages of its formation; To know the nomenclature and the chemical composition of medicinal raw materials of natural origin; To know bases of preparation of medicinal raw materials of plant, animal and mineral origin.	To be able to use standard documentation, reference and scientific books; To be able to provide advice to patients of drugstores and to the population in questions of application, collecting, drying and storage of medicinal plant raw materials; To be able to carry out rational preparation, drying and storage of medicinal plant raw materials and to define its stocks on concrete sites.	To carry out macro - and the microscopic analysis of medicinal plant raw materials; To determine herbs by anatomic and morphological features; To carry out the merchandising analysis of raw materials of natural origin; To store medicinal raw materials taking into account features of its chemical composition and content of biologically active agents.

12. **Prerequisites:** botany, Latin, Organic chemistry, analytical chemistry, biological chemistry, ecology.

13. **Post-details:** Pharmacognosy, drug technology, pharmaceutical chemistry.

#### 14. Literature

##### The main:

1. Токсанбаева, Ж. С. Лекарственное ресурсоведение: учебное пособие - Алматы : Эверо, 2015. - 116 с
2. Лекарственное ресурсоведение, Шымкент 2014., Токсанбаева Ж.С., Патсаев А.К., Сейдалиева С.К.
3. Государственная Фармакопея РК, первое издание., том I. - Астана, 2008.
4. Государственная Фармакопея РК, первое издание., том II. - Астана, 2009.
5. Государственная Фармакопея РК, первое издание., том III. - Астана, 2014.
6. Муравьева Д.А. Фармакогнозия. М.: Медицина, 2002.
7. М.Қ.Кукенов. Ресурсы лекарственных растений Казахстана Тян-Шаня. 1989
8. М.Қ.Кукенов. Флавоноидосодержащие растения Юго-Востока Казахстана. 1984

##### Additional:

1. Руководство к практическим занятиям по фармакогнозии. Учебное пособие. Под ред. И.А. Самылиной, А.А. Сорокиной. М., МИА, 2007
2. Атлас ареалов и ресурсов лекарственных растений СССР. Под ред. Шуран. 1976.

##### Electronic resources:

13. Электронды кітапхана <http://lib.ukma.kz>
14. Электронды каталог ішкі пайдаланушылар үшін <http://10.10.202.52>  
сыртқы пайдаланушылар үшін <http://89.218.155.74>
15. Республикалық жоғары оқу орындары аралық электронды кітапхана <http://rmebrk.kz/>
16. «Студент кеңесшісі» Медициналық ЖОО электронды кітапханасы <http://www.studmedlib.ru>
17. «Параграф» ақпараттық жүйе «Медицина» бөлімі <https://online.zakon.kz/Medicine>
18. «Зан» құқықтық ақпараттың электронды дереккөзі <https://zan.kz>
19. Ғылыми электрондық кітапхана <https://elibrary.ru/>
20. «BooksMed» электронды кітапханасы <http://www.booksmed.com>
21. «Web of science» (Thomson Reuters) <http://apps.webofknowledge.com>
22. «Science Direct» (Elsevier) <https://www.sciencedirect.com>
23. «Scopus» (Elsevier) [www.scopus.com](http://www.scopus.com)
24. PubMed <https://www.ncbi.nlm.nih.gov/pubmed>

1. **The Department:** Drug technology.
2. **Level of training:** Bachelor.
3. **Educational program:** Pharmacy.
4. **Course:** 4
5. **Name of the elective discipline:** Technology of extraction preparations.
6. **Number of credits:** 6
7. **Purpose:** formation of students ' theoretical knowledge and practical skills in the production of extraction preparations.
8. **Content of the discipline:** Basic concepts and terms. Goals and objectives of extraction drug technology. State regulation of drug production. General principles of the organization of production of finished dosage forms. Processes and devices of the pharmaceutical industry. Powders. Fees. Medical solutions. Syrups. Aromatic waters. Alcoholimetry. Extraction medicines: tinctures, extracts. Preparations made from fresh vegetable raw materials. Preparations of biogenic stimulants. Maximally purified phytopreparations (novogalene

preparations). Individual phytopreparations. Preparations from animal raw materials. Enzyme preparations.

#### 9. **Tasks:**

- to form knowledge on development of the basic principles of the organization of pharmaceutical production;
- develop knowledge of good manufacturing practices – GMP;
- to teach the theoretical foundations and professional skills and knowledge of the manufacture of extractive drugs;
- to teach methods of post-stage control and standardization of extraction preparations.

**10. Rationale for choosing a discipline:** The course "technology of extraction preparations" studies the main processes and devices of pharmaceutical production, processes of preparation of medicinal plant raw materials and preparation of extractant, methods of obtaining extraction preparations, standardization of the finished product, packaging and packaging. As well as the structure and principles of operation of machines and devices that are used in the course of the technological process.

#### 11. **Learning outcomes:**

1) Knowledge and understanding:

- demonstrates knowledge and understanding of the device and the principle of operation of technological equipment used in the production of extraction drugs, the rules of its operation, knowledge of the manufacture of extraction dosage forms in accordance with the ND (technological regulations, OST, GOST, etc.).

2) Applying knowledge and understanding:

- develops technology of extraction preparations in pharmaceutical industries, performs calculations in the production of extraction preparations;

3) Forming judgments:

- formulates arguments for replacing old equipment with modern ones in pharmaceutical companies;

4) Communication skills:

- demonstrates the ability, knowledge and skills in planning and conducting the production process of extraction preparations.

5) Learning Skills or learning aptitude:

- demonstrates the ability to work with reference and scientific pharmaceutical literature, electronic databases, provides information in various forms (drawings, graphs, diagrams, tables) and on various media (paper, electronic version);

**12. Prerequisites:** technology of dosage forms.

**13. Post-requisites:** industrial drug technology, innovative pharmaceutical technology.

#### 14. **Literature in Kazakh Main**

1. Б.А. Сағындықова. Дәрілердің өндірістік технологиясы. - Алматы, 2011. - 346 б.

#### **in Russian**

##### **Main:**

1. Меньшутина Н.В., Мишина Ю.В., Алвес С.В. Инновационные технологии и оборудование фармацевтического производства. - Т.1. – М.: Издательство БИНОМ, 2016. - 328 с., ил.

2. Меньшутина Н.В., Мишина Ю.В., Алвес С.В., Гордиенко М.Г., Гусева Е.В., Троянкин А.Ю. Инновационные технологии и оборудование фармацевтического производства. - Т.2. – М.: Издательство БИНОМ, 2013. - 480 с., ил.

1. Фармацевтическая технология: руководство к лабораторным занятиям. / Быков В.А., Демина Н.Б., Скатков С.А., Анурова М.Н./ – М.: ГЭОТАР – Медиа, 2009.- 304 с.

##### **Additional:**

1. Государственная Фармакопея Республики Казахстан. – том 1 – Алматы. – Издательский дом: «Жибек жолы». – 2008. – 592 с.
2. Государственная Фармакопея Республики Казахстан. – том 2. – Алматы. – Издательский дом: «Жибек жолы». – 2009. – 792 с.
3. Государственная Фармакопея Республики Казахстан. – том 3. – Алматы. – Издательский дом: «Жибек жолы». – 2014. – 872 с.
4. ГФ СССР XI издания М., Медицина. – 1987. – том 1. – 1989. – том 2.
5. Технология лекарственных форм. (Под ред. Ивановой Л.А.). – М., Медицина. – 1991. – 2-й том. – 544 с.
6. Руководство к лабораторным занятиям по заводской технологии лекарственных форм. – (Под ред. Тенцовой А.И.). – М., 1986. – 271 с.
7. Торланова Б.О. Машины и автоматы для фасовки и упаковки лекарственных форм. – Шымкент. – 2003. – 166 с.

**E-textbook:**

1. Б.А. Сағындықова. Дәрілердің өндірістік технологиясы (эл.ресурс): оқулық. – электрон.текстовые дан.(5,30 Мб).- Алматы, 2011. – 1 экз.

**Online resource:**

1. Чуешов В.И. и др. Промышленная технология лекарств. – Харьков. – 2010. <https://www.twirpx.com/file/93256/>
2. Гладух Е.В., Чуешов В.И. Технология лекарств промышленного производства. Том 1. – 2014. – 696с. <https://www.twirpx.com/file/2721399/>
3. Технология лекарств промышленного производства: учебник: в 2 ч. / О.А. Ляпунова, Е.А.Рубан, Е.В.Гладух (и др.): Национальный фармацевтический университет. – Винница: Нова Книга, 2014. – Часть 2. – 662с.