



Approved

Recto of SKMA JSC

M. Rysbekov

2022

EDUCATIONAL PROGRAM

Group of the educational program: «Pharmacy»

Code of the EP: 6B10106

Level of the educational program: Bachelor

Shymkent-2022

ОҢТҮСТІК ҚАЗАҚСТАН
MEDISINA
AKADEMIASY



SOUTH KAZAKHSTAN
MEDICAL
ACADEMY

«Оңтүстік Қазақстан медицина академиясы» АҚ

АО «Южно-Казахстанская медицинская академия»

Educational and methodological Center

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Educational program

Developed by the Committee of the educational program «Pharmacy»:

Head of the Department of Drug Technology, Dr. Pharman, Professor:

 B. Sagindykova


Head of the Department of OHFD, Ph.D. N, Professor:

 K. Shertayeva.

Head of the Department of Pharmaceuticals. and Toxicological Chemistry, d.pharmas. Professor:


 S. Ordabayeva

Head of the Department of Pharmacognosy, Professor, Doctor of Pharmacology:

 K. Orynbasarova

Agreed with employers:

**Director, Association of Pharmaceutical and
Medical organizations of South Kazakhstan region Damu**
Director of Zerde Farm
Director of Apple-Pharma®
Chairman of the CPC Pharmacia

 H. Alzhanova
G. Togusbayeva
Zh. Almasov
Zh. Toksanbayeva

Minutes No. 11 of 08 08 2022

Vice-Rector for EMW

Minutes No. 13 of 08 08 2022.

 M.U. Anartayeva

Approved by the Academic Council

Minutes No. 15 of 08 08 2022.

ОҢТҮСТІК ҚАЗАҚСТАН MEDISINA AKADEMIASY «Оңтүстік Қазақстан медицина академиясы» АҚ		SOUTH KAZAKHSTAN MEDICAL ACADEMY АО «Южно-Казахстанская медицинская академия»
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Educational program		

Passport of the educational program 6B10106 «Pharmacy»

1. Regulatory documents for the development of a modular educational program (state education standards, professional standards (if any), etc.)

- Code of the Republic of Kazakhstan dated July 7, 2020 No. 360-VI SAM. "On the health of the people and the healthcare system", with amendments and additions as of 07/04/2022.
- The Law of the Republic of Kazakhstan "On Education" dated 07/27/2007 No. 319-III, with amendments and additions dated 07/14/2022 No. 141-VII.
- Order of the Ministry of Health of the Republic of Kazakhstan "On approval of state mandatory standards for levels of education in the field of healthcare" dated July 4, 2022 No. KR DSM-63.
- Order of the Minister of Science and Higher Education of the Republic of Kazakhstan "On approval of State mandatory standards of higher and postgraduate education" dated July 20, 2022 No. 2.
- Order of the Ministry of Education and Science of the Republic of Kazakhstan "On approval of the Rules for organizing the educational process on credit technology of education" dated April 20, 2011 No. 152, with amendments and additions as of 05/06/2021.
- Order of the Ministry of Health of the Republic of Kazakhstan "On approval of the nomenclature of specialties and specializations in the field of healthcare, nomenclature and qualification characteristics of positions of healthcare workers" dated December 21, 2020 No. KR DSM-305/2020, with amendments and additions as of 04/09/2021
- Order of the Ministry of Education and Science of the Republic of Kazakhstan "Standard rules for conducting ongoing monitoring of academic performance, intermediate and final certification of students in higher educational institutions" dated March 18, 2008 No. 125, with amendments and additions as of 05/12/2022.
- Standard rules for the activities of organizations implementing higher and postgraduate education", Decree of the Government of the Republic of Kazakhstan dated October 30, 2018 No. 595 with amendments and additions as of 12/29/2021.

- Internal regulatory documents of JSC YUKMA.

2. **The mission of the educational program:** Become a leader in the training of competitive highly qualified specialists in the field of pharmacy!


3. **The purpose of the educational program** is to train competitive, qualified, competent pharmacists focused on the modern market, with deep theoretical and practical knowledge in the field of pharmacy, capable of performing production and practical tasks in professional activities.

4. Justification of the OP

- for students (describe the reasoned evidence of the program's potential in terms of graduate employment opportunities, etc.) - the need in the labor market (describe the reasoned evidence (society's demands, labor market needs) of the need to implement an educational program with a focus on employers)

5. The professional standard on the basis of which the educational program has been developed

6. Field of professional activity pharmaceutical activity in the field of circulation of medicines and medical devices

ОҢТҮСТІК ҚАЗАҚСТАН MEDISINA AKADEMIASY «Оңтүстік Қазақстан медицина академиясы» АҚ		SOUTH KAZAKHSTAN MEDICAL ACADEMY АО «Южно-Казахстанская медицинская академия»
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7. **Objects of professional activity pharmaceutical enterprises;** management and pharmaceutical control bodies; testing centers; laboratories for quality control, standardization and certification; chemical and toxicological departments (laboratories) of the Center for Forensic Medicine, toxicological centers; reference and information centers, information and analytical centers, etc.; educational and scientific organizations.

General information

№	Field name	Note
1	Registration number	This field should be displayed after you first save the application form. The field is locked for editing.
2	Code and classification of the field of education	6B10 Health and Welfare (Medicine)
3	Code and classification of training areas	6B101 Public Health 0910
4	Educational group	«Pharmacy»
5	Educational program name	OP «Pharmacy»
6	Ope	Current OD
7	Op goal	Preparation of competitive, qualified, competent pharmaceutical specialists, oriented to the modern market, with deep theoretical and practical knowledge in the field of pharmacy, capable of performing industrial and practical tasks in professional activity.
8	ISCED level	6
9	NSC level	6
10	Orc level	6
11	OT features	Nay
	UNIVERSITY PARTNER (SOP)	Nay
	UNIVERSITY PARTNER (RDO)	Nay
12	List of competencies	A matrix of correlation of the results of training on the educational program with the competences being formed is formed (Annex 2.1)
13	Learning outcome	

14	Form of instruction	The field value must be derived from the IP of the specified university.
15	Language of instruction	Kazakh/Russian
16	Loan volume	300
17	Academic degree	Bachelor
18	Availability of an annex to the license for directing training	KZ73LAA00011788
19	OT accreditation	Eat
	Name of accreditation body	Independent Accreditation and Rating Agency
	Accreditation period	09.06.2020-08.06.2025
20	Discipline information	Information on the disciplines of the VC/HF CODs, OBD, PoA (Annex 2.2)

Appendix 1

MATRIX
correlation of the results of the education program as a whole with the competences being formed

LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8	LO9	LO 10	LO 11	LO 12
KK1	+	+	+	+	+	+	+	+	+	+	+
KK2	+	+			+		+	+	+	+	+
KK3	+	+		+	+	+	+	+	+	+	+
KK4	+	+	+	+	+	+	+	+	+	+	+
KK5	+			+	+	+	+	+	+	+	+
KK6	+					+	+			+	+

Appendix 2

Key competencies:

KK1	pharmaceutical activities
KK2	management
KK3	effective communication
KK4	Leadership and team building
KK5	Strategy for continuing professional development
KK6	research abilities

Learning outcomes:

LO 1	He uses knowledge and skills in the organization of pharmaceutical assistance to the population of Kazakhstan.
LO 2	Wholesale and retail sale of medicines and medical products
LO 3	Produces medicines in pharmacies
LO 4	Able to organize industrial production of medicines and medical products, to manage production processes
LO 5	Complies with the principles of organization and implementation of quality control of medicines, medicinal plant raw materials, pharmaceutical substances, standard samples, adjuvants and materials
LO 6	Able to organize and carry out chemical toxicological examination of toxicologically important substances

LO7	Possesses the rules of proper use of medicines: prescription of drugs, professional counselling, provision of critical information on the benefits, risks and possible contraindications of medicines
LO8	Guided by existing regulations legal documents in the organization of pharmaceutical activities and effectively manages the processes of provision of medicines and medical products in order to improve the quality of health and health system performance
LO 9	He has the skills of effective communication between healthcare stakeholders, motivation for continuous professional development, has cultural tolerance.
LO10	He shows leadership qualities (from early stages of his career) and ability to work in a team.
LO 11	Committed to lifelong learning, chooses trajectories of development of individual plan of continuous professional development on the basis of constant changes in science, pharmacy and healthcare for the development of professional competencies.
LO12	Applies scientific knowledge to the development of analytical and research skills, is able to conduct research that ensure the effectiveness, safety and quality of medicines and medical products

No	Name of discipline	Discipline brief description (30-50 words)	Cycle (GES, BD, SD) Comp onent (RC, UC, OC)	Cycle (GES, BD, SD) Comp onent (RC, UC, OC)	Number of credits	Formati on of learning outcome s (codes)
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Cycle of general education
University component/ Component of choice

1.	History of Kazakhstan	Ancient people and formation of nomadic civilization. Formation of Turkic statehood. Stages of ethno-cultural integration of Turkic-speaking peoples, formation of the Kazakh Khanate (XIII-XV c.). Kazakhstan in Modern time. Kazakhstan in the Soviet period. History of independent Kazakhstan.	GES	RC	5	LO 9 LO 10 LO 11
2.	Foreign language	Phonetic norms and grammatical forms and constructions of modern English. Mastering the lexical and terminological minimum in the specialty of pharmacy. Development of educational and professional speech of the pharmacist: development of skills and skills of reading, listening, taking notes of pharmaceutical literature; writing texts on educational and professional topics.	GES	RC	10	LO 9 LO 10 LO 11 LO 12
3.	Kazakh (Russian) language	Languages and education. Terminology of science. Language of specialty and professional culture of speech. Types of professional-communicative situations. Written and oral business communication. Terminology of science. Culture of professional speech. Types of professional-communicative situations. Actual problems of modern science. The text as the basic unit of verbal communication. Scientific description.	GES	RC	10	LO 9 LO 10 LO 11 LO 12
4.	Information and communication technology	Role of ICT in sectors of developed society. ICT standards. Introduction to computer systems. Software. Human-computer interaction. Database systems. Data analysis. Data management. Networks, telecommunications. Cybersecurity. Internet technologies. Cloud and mobile technologies. Multimedia technologies. Smart technologies. Electronic technologies. IT in medicine. Perspectives of ICT development.	GES	RC	5	LO 9
5.	Psychology and Cultural Studies	Psychology as a science. Emotions and volitional processes. Suicidal behavior of young people. Individual-typological features of the person. Values, interests, norms as Spiritual basis of personality. Interpersonal communication as a factor of development of harmonious personality of Kazakhstan. Morphology and language of culture. Semiotics and anatomy of culture. Cultural heritage of nomads. Kazakh culture in the context of modern world processes. Cultural Policy of Kazakhstan.	GES	RC	4	LO 9 LO 10

		Psychology as a science. Emotions and volitional processes. Suicidal behavior of young people. Individual-typological features of the person. Values, interests, norms as Spiritual basis of personality. Interpersonal communication as a factor of development of harmonious personality of Kazakhstan. Morphology and language of culture. Semiotics and anatomy of culture. Cultural heritage of nomads. Kazakh culture in the context of modern world processes. Cultural Policy of Kazakhstan.				
6.	Physical education	Training specifically - running exercises. General concepts of basketball. Learning to run short distances. Learning high start and finishing. Cross-race long-distance. Work with the baton. Learning low start and start-up. Learning the long jump. Training moving techniques, jumping	GES	RC	8	LO 9 LO 10 LO 11
7.	Philosophy	Philosophy as a science. Philosophy and world view. The role of philosophy in the implementation of the third modernization of modern Kazakhstan. The origin and essence of consciousness. Cognition as a problem of philosophy. Education, science, technology, technology. Society and culture. Religion and philosophical knowledge. Civilization identification of Kazakhstan in the global world.	GES	RC	5	LO 9 LO 10 LO 11
8.	Sociology and Political Science	Individual and society. Sociological research. Family and modernity. Education and social inequality. Health and medicine. Politics and society. Elite and political leadership. State and civil society. Political culture and behaviour. Political conflicts and crises. World politics and modern international relations.	GES	RC	4	LO 9 LO 10 LO 11 LO 12
Cycle of general education						
Component of choice						
9.	Fundamentals of Law and Economics	Legal education and development of anti-corruption culture of future specialists within the state program "Ruhani Zhangyru". Legal status of medical workers, their social protection. Code of the Republic of Kazakhstan "On the health of the people and the health system". Market and competition. Theory of firm and entrepreneurship. Features of development of national economy in the Republic of Kazakhstan. State policy on the development of the medical industry.	GES	OC	5	LO 1 LO 5
10.	Fundamentals of anti-	The essence and theoretical and methodological foundations of the concept of	GES	OC	5	LO 8

	corruption culture and business	"corruption". Improvement of socio-economic relations of the Kazakh society as a condition for combating corruption. Anti-corruption policy in the Republic of Kazakhstan. Legal, moral and ethical responsibility for corruption in the field of healthcare. The choice of a business idea and a startup, business planning in the system of entrepreneurial activity, the content of a business plan, the skills of their development, a startup in marketing activities.				LO 11
The cycle of basic disciplines The university component						
1.	Botany	Plants are the source of life on earth. The concept of the biosphere. Plants as a source of medicinal raw materials. The importance of plants in the cycle of matter in nature and life of the biosphere. Botany as science and pharmaceutical discipline. The value of botany for pharmacy. Similar and distinctive features between plants and animals. Geography of plants.	BD	UC	5	LO 9 LO 10 LO 11
2.	Educational practice: Field practice in botany	Collecting, drying, mounting herbarium, writing labels. Acquaintance with wild growing medicinal plants, with rare, disappearing species of plants. Compilation of a floral list indicating the phase of vegetation, family, longitude, life form. Sketching and morphological description of the collected plants, identification of medicinal plants. Processing of the collected material.	BD	UC	1	LO 9 LO 10 LO 11
3.	Organic Chemistry	Organic chemistry studies important classes of organic compounds, their nomenclature, properties that form the basis for the formation of chemical thinking and the development of orientation in the problem "Structure-properties". These include hydrocarbons and organic compound classes with those functional groups that are most characteristic of synthetic and natural medicines.	BD	UC	6	LO 1 LO 6 LO 10
4.	Analytical chemistry	Acid-basic classification of cations and anions. Basic chemical methods of analysis of analytical chemistry. Essence of gravimetric analysis. Classification of methods: isolation, deposition and distillation. Use of titrimetric analysis for the study of the composition of drugs. Theoretical bases and classification of electrochemical, optical and chromatographic methods of analysis. The foundations of analytical chemistry for use in the development of drugs, expertise, standardization and research of rational drug forms.	BD	UC	6	LO 2 LO 10 LO 12

5.	Pharmacology -1	General pharmacodynamics and pharmacokinetics of drugs and changes in the functions of organs and systems caused by pharmacological exposure. Primary pharmacological reactions between drugs and biomolecules. General principles of prescription and prescription writing. Side effects when prescribing drugs, methods of prevention and correction of side effects.	BD	UC	5	LO 7 LO 11 LO 12
6.	Pharmacology -2	Methods of selection of the most effective and safe medicines in diseases of the respiratory system, cardiovascular system, organs of the urinary system, gastrointestinal system, endocrine system, opro-motor system. . Antibacterial drugs, antibiotic resistance.	BD	UC	5	LO 7 LO 11 LO 12
7.	Fundamentals of organization of pharmaceutical activity	The basic principles of providing pharmaceutical care to the population. Organization and regulation of pharmaceutical retail business. The national GPP standard. The basic principles of placement and the procedure for opening pharmacies. The prescription and production department. Pharmaceutical examination of the prescription. The system of free medicines. Organization of the manufacture of medicines in pharmacies. Pharmacy warehouse. Customs regulation in the field of drug and MI circulation.	BD	UC	5	LO 1 LO 2 LO 8
9.	Form technology	Solid dosage forms (powders), liquid dosage forms (solutions for external and internal use, IUD solutions and colloidal solutions, suspensions, emulsions, drops, infusions and decoctions), soft dosage forms (ointments, suppositories, liniments), sterile and aseptically prepared dosage forms (solutions for injection, eye ointments and drops, with antibiotics, children's dosage forms).	BD	UC	6	LO 1 LO 3 LO 9 LO 12
1. 10.	Industrial practice "Technology of medicinal forms	Familiarization with the structure of the pharmacy, with the rules of operation of small-scale mechanization equipment, equipment for obtaining purified water. Familiarization with the production process for the manufacture of solid, liquid, soft, sterile and aseptically manufactured dosage forms. Familiarization with the activities of manufacturing dosage forms according to the requirements of a medical organization and doctor's prescriptions.	BD	UC	2	LO 1 LO 3 LO 9
2. 11.	General methods of research and analysis of medicines	State principles and regulations governing the quality of medicines. General pharmacopoeial methods of drug research. Analysis of medicinal products of inorganic nature and organic origin of derivatives of aliphatic and alicyclic	BD	UC	5	LO 5 LO 9 LO 10

		compounds.				LO 11 LO 12	
3.	12.	Production practice for the organization of pharmaceutical activities	Organizational and managerial work of the head of the pharmacy. Work in the pharmaceutical retail chain: the prescription and production department, the department of finished medicines, the department of over-the-counter supply. Work in the pharmacy's inventory department: supplying the pharmacy with the necessary range of medicines, receiving goods to the pharmacy, studying demand and determining the need for medicines, storing goods. Work in the pharmaceutical wholesale chain.	BD	UC	2	LO 1 LO 2 LO 8 LO 9
4.	13.	Effective communication in pharmacy	Legal and ethical bases of pharmaceutical activity regulation in the Republic of Kazakhstan. Effective communication of the pharmacist with consumers, colleagues, doctors and other medical professionals. Barriers to pharmacist communication, factors of conflict, ways to resolve them. Rules for servicing consumers of pharmaceutical services. The art of sales in pharmacies. Ethical and legal criteria for the promotion of medicines on the market.	BD	UC	5	LO 1 LO 2 LO 8 LO 9 LO 10
5.	14.	Toxicological chemistry	Toxicological chemistry: subject, tasks, main directions and objects of research. Chemical and toxicological analysis of "medicinal" poisons, pesticides, "volatile", "metallic" poisons, caustic alkalis, mineral acids and their salts, narcotic substances in biological objects. Laboratory diagnostics of acute poisoning.	BD	UC	6	LO 6 LO 9 LO 10 LO 11 LO 12
6.	15.	Production practice "Toxicological chemistry"	Forensic examination of chemical and toxicological studies of toxicologically important substances and analytical diagnostics of acute poisonings using preliminary and confirmatory methods of analysis in accordance with normative documents.	BD	UC	2	LO 6 LO 9 LO 10 LO 11 LO 12
7.	16.	Legal Law and Business in Pharmacy	Administrative and legal responsibility in the field of pharmaceutical activities. Features of administrative responsibility. Types of administrative punishment. Illegal pharmaceutical activity. Concepts of crime and criminal misconduct. Criminal offences against public health. The organizational and legal basis of entrepreneurship in Kazakhstan. Basics of commercial law. State protection of entrepreneurial activity.	BD	UC	5	LO 1 LO 8 LO 9 LO 10

		Risks in entrepreneurial activity.					
8.	17.	Project-oriented activities in pharmacies	Pharmaceutical activity in the field of treatment of drugs, in the chemical and toxicological departments of the Center of Forensic Medicine, in the field of education and science, in the bodies of standardization and certification of medicines. Project-oriented training. Concept of the project and its distinctive features. Essence of project management. Place and role of project management in pharmacy research. Project management methodology.	BD	UC	4	LO 1 LO 8 LO 9
9.	18.	Introductory training	General familiarity with the structure, tasks and main functions of the pharmacy organization, with the staff of the pharmacy and the main functions of the pharmacy organization specialists, with the requirements of the sanitary regime of the pharmacy organization, the organization of work on the manufacture of pharmaceutical forms, organization of work on quality control, registration and issuance of medicines, organization of work on storage of medicines in a pharmacy organization.	BD	UC	1	LO 1 LO 8 LO 9
	19.	Biophysics	Mechanics. Mechanical properties of liquid and solid bodies. Diffuse processes in gases. Thermodynamics. Electrostatic field. Electric current. Magnetic field. Optics. The effect of light on matter. The quantum nature of light. Thermal radiation of bodies. Fundamentals of 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.	BD	UC	3	LO 10 LO12
	20.	Latin language	The role of Latin in the formation of pharmaceutical terminology. The use of the genitive case (Genetivus) for the design of the Latin part of the recipe and the designation of vegetable, animal raw materials. Drug Form Names. The use of vocabulary for preparation of layouts, labels, packaging means.	BD	UC	3	LO 1 LO 9 LO 11 LO 12
	21.	inorganic chemistry	Inorganic chemistry at the Medical University is the first basic level after high school chemistry. Therefore, the main purpose of teaching this subject at the Faculty of Pharmacy is to study the laws and concepts of chemistry in relation to chemical processes and phenomena necessary in the activity of the pharmacist. Inorganic chemistry lays the foundation for the study of courses of analytical,	BD	UC	4	LO 1 LO 2 LO 5 LO 7

		organic, physical, toxicological, pharmaceutical chemistry. The programme will cover the main topics of the inorganic chemistry course.				
22.	Physiology with basic anatomy	Physiology with the basics of anatomy is the theoretical basis of medicine, which allows the future specialist to get a comprehensive understanding of the structure and activities of cells, tissues, organs and systems. This discipline is the only subject that will acquaint students of the pharmaceutical faculty with the main object of their action - the function and structure of human organs and systems. The main method of physiology with the basics of anatomy is experimental.	BD	UC	6	LO 1 LO 9 LO 11
23.	Pathological physiology	Pathological physiology is the theoretical basis of medicine. Pathological physiology studies the general patterns of the appearance, development and outcome of disease, as well as the typical pathological processes that form the basis of diseases. The main method of general pathological physiology is experimental modelling.	BD	UC	5	LO 7 LO 9 LO 11 LO 12
24.	Microbiology	Principles of organization of microbiological laboratory. Microbiological research methods: microscopic, bacteriological, serological, biological, allergological, molecular-genetic. Study of infectious disease pathogens, informative methods of microbiological diagnosis, indications for the use of drugs specific therapy and prevention.	BD	UC	5	LO 1 LO 5 LO 9 LO 12
25.	Physical and Colloid Chemistry	Physical and colloidal chemistry is one of the main disciplines in the field of pharmaceutical education, having a significant role in the training of highly qualified specialists - pharmacists. This subject forms chemical thinking, determines the regularities of physico-chemical processes and conditions of achieving chemical equilibrium, teaches to analyze and draw conclusions about the influence of external factors, nature of substances on the course of chemical reactions.	BD	UC	5	LO 1 LO 2 LO 5 LO 7

26.	Medical and pharmaceutical merchandising	Regulatory and technical documentation for the conduct of commodity analysis. Materials science. Metal and non-metallic materials. Corrosion tools and anti-corrosion measures. Rubber medical products. Medical products made of glass and porcelain. Plastic and other non-metallic products. Spectacular optics. Sterilization - distillation equipment. Classification of medical products and pharmaceutical products. Treatment of medical products according to the EAEU rules	BD	UC	4	LO 1 LO 8 LO 12
27.	First aid in emergencies	The subject, tasks, volume and main tasks of providing first aid. Terminal conditions. First aid in case of wounds. Injuries, transport immobilization. Bleeding. First aid for burns. First aid in case of acute heart failure. First aid in case of allergic reactions.	BD	UC	4	LO 7
28.	Biological Chemistry	Biological functions and structural organization of proteins. Enzymes. The role of membranes in metabolism and their diversity. Vitamins. Specific and common paths of catabolism. Bioenergy. Exchange of carbohydrates, lipids and proteins. Macro- and trace elements. Water - salt exchange. Biochemistry of hormones. Biochemistry of liver and kidneys. Exchange of blood proteins. Biochemistry of blood. Biochemistry of tissues. Pharmaceutical biochemistry.	BD	UC	5	LO1 LO 5 LO8 LO 12
29.	Pharmaceutical Emergency and Disaster Medicine Logistics	Pharmaceutical assistance and logistics in emergencies and in disaster medicine. Development of warehouse logistics in Kazakhstan. Competitiveness of pharmaceutical logistics. Mechanism of functioning and planning of procurement logistics in pharmacy. Material reserves of pharmaceutical companies. Information logistics. Logistics and media. Transport logistics of pharmaceutical organization of import and export of products.	BD	UC	6	LO 1 LO 2 LO 8 LO 9 LO 12
30.	Resource science and ecology of medicinal plants with the basics of GACP	Resource zones and prospects of resource-related research in the Republic of Kazakhstan. Unified method of determination of reserves of medicinal plants. Ecology of medicinal plants. Influence of environmental factors on the quality of medicinal plant raw materials. Rational methods of collecting medicinal plant raw materials of various morphological groups. Good practice of GACP cultivation of medicinal plant raw materials. Identification of cultivated medicinal plants.	BD	UC	6	LO 8 LO 10 LO 12

31.	Pharmaceutical information with the basics of pharmacoeconomics	Pharmacoeconomics in the system of drug treatment. Pharmacoepidemiological research. Pharmacoeconomic analysis and its methods. Critical thinking and its role in pharmacoeconomic research. Pharmaceutical information. Legal and informational support of pharmaceutical activity. Search information by electronic databases. Methods and methods of selection of information. Analytical-synthetic processing of documents. Information technologies in the pharmaceutical market.	BD	UC	4	LO 1 LO 7 LO 8 LO 11 LO 12	
The cycle of basic disciplines Component of choice							
1.	1.	Molecular biology and basics of medical genetics	The basics of Mendelian genetics. Patterns of inheritance traits. Inheritance chained to gender. Basics of chromosome theory of heredity. Transcription. Protein biosynthesis. Regulation of gene expression. Mutations and its manifestation in human pathology. Molecular-genetic research methods. Transport of substances through membranes. Cell cycle. Medical biotechnology, nanotechnology. Technology of obtaining medicines.	BD	OC	5	LO 3 LO 5 LO 6 LO 12
2.	2.	Molecular biology and the basics of biotechnology	The basics of Mendeleev genetics. Patterns of inheritance traits. Inheritance coupled with sex. The basics of chromosome theory of heredity. Replication. Transcription. Protein biosynthesis. Regulation of gene expression. Mutation and its manifestation in human pathology. Molecular and genetic research methods. Transport of substances through membranes. Cell cycle. Medical biotechnology, nanobiotechnology. Drug technology.	BD	OC	5	LO 3 LO 5 LO 7 LO 12
3.	3.	Bioanalytical chemistry and toxicology	Issues of clinical toxicological research of certain groups of toxicologically important substances and banned substances from the WADA list. Preliminary and corroborating methods of determining toxicants in biological fluids. Features of interpretation of the results obtained.	BD	OC	4	LO -6 LO -9 LO 10 LO -11 LO -12
4.	4.	Analytical diagnosis	Clinical toxicological analysis of narcotic and other intoxicating substances of	BD	OC	4	LO -6

	of drugs	natural and synthetic origin from various objects. Sampling steps, biotransformation mechanisms, selection methodology and use of preliminary and supporting research methods				LO -9 LO 10 LO -11 LO -12
Profile disciplines (PD) University component (UC)						
1.	Pharmacotherapy-1	General principles of pharmacotherapy and clinical pharmacology. Pharmacokinetic parameters of drugs, methodologies of pharmacodynamic effects of drugs. Prediction and evaluation of drug side effects. Relationship, correlation of pharmacokinetics and pharmacodynamics of drugs. General principles for assessing the effectiveness and safety of LAN applications. Clinical-pharmacological principles of pharmacotherapy of nervous system diseases, inflammation and disorders of immune processes.	PD	UC	3	LO 6 LO 7 LO 11
2.	Pharmacotherapy-2	The main symptoms and syndromes of diseases of the bronchopulmonary, cardiovascular, digestive, hepatobiliary, endocrine, urinary and blood systems. The main symptoms and syndromes of infectious and inflammatory diseases. Diagnostic methods. Clinical-pharmacological principles of rational therapy. Ways of administration, choice of dose, multiplicity of administration and course treatment depending on the nature and severity of the disease.	PD	UC	3	LO 6 LO 7 LO 11
3.	Pharmacognosy - 1	Methods of pharmacognostic analysis. Analysis of medicinal vegetable raw materials containing polysaccharides, fats, fatty oils and fat-like substances, vitamins, essential oils and alkaloids. Production, research and standardization of biologically active substances. Plant sources, botanical description, geographical distribution, habitats, chemical composition, collection and procurement of medicinal plant raw materials, medical and pharmaceutical applications.	PD	UC	5	LO 5 LO 9 LO 10 LO 11 LO 12
4.	Pharmacognosy - 2	Analysis of medicinal plant raw materials containing glycosides of different groups, flavonoids, saponins, tannins, phenolic compounds. Plant sources, botanical description, geographical distribution, habitats, chemical composition, collection and procurement of medicinal plant raw materials, medical and pharmaceutical	PD	UC	5	LO 5 LO 9 LO 10 LO 11

		applications. Medicinal raw materials of animal and mineral origin.				LO 12
5.	Pharmaceutical manufacturing practice	Acquisition of skills of practical work on organization of procurement of medicinal plant raw material, calculation of reserves, development of basic methods of collection, drying, storage and processing of medicinal plant raw material. Work to determine the reserves of medicinal plants. Methods of cultivation of medicinal plants. Taking of medicinal plant raw material from the preparer. Packing, marking and transportation of medicinal plant raw materials. Processing of materials.	PD	UC	2	LO 5 LO 9 LO 10 LO 11 LO 12
6.	Pharmaceutical Chemistry-1	Special Section of Pharmaceutical Chemistry - Studies methods of obtaining, structures, physical and chemical properties, relationship of chemical structure with pharmacological activity, methods of quality control of PE, aromatic and heterocyclic derivatives (5- and 6-term oxygen- and nitrogen-containing) compounds during the creation, production, storage and application phases in accordance with the requirements of the NR.	PD	UC	5	LO 5 LO 9 LO 10 LO 11 LO 12
7.	Pharmaceutical Chemistry-2	Special Section of Pharmaceutical Chemistry - Studies Methods of Production, Structures, Physical and Chemical Properties, Relationship of Chemical Structure with Pharmacological Activity, Methods of Quality Control of PE, Heterocyclic Derivatives (6- and 7-term nitrogen- and sulfur-containing) During the design, production, storage and application phases of IND.	PD	UC	5	LO 5 LO 9 LO 10 LO 11 LO 12
8.	Management and economics of pharmacy-1	Pharmaceutical management bodies in Kazakhstan. Licensing, import and export of PE and MI. Regulatory documents governing the activities of pharmaceutical organizations. Methods of forecasting the main economic indicators. Pricing. Analysis of turnover. Inventories and their rationing. Planning of labour and salary indicators, circulation costs, gross income, gross and net profit in a pharmacy.	PD	UC	5	LO 1 LO 2 LO 11 LO 12
9.	Management and economics of pharmacy-2	Types of accounting and accounting meters. System of legal regulation of accounting. Structure of economic means, sources of their formation Tasks of accounting of fixed assets and their classification. Valuation and recognition of property, plant and equipment. Depreciation. Cash receipts and disbursements. Accounting of settlements with MPI and other institutions. Payroll. Balance sheet. Tax system of RK.	PD	UC	5	LO 1 LO 2 LO 11 LO 12
10.	Industrial technology	Basic concepts, terms State regulation of drug production. Processes and devices of	PD		5	LO 1

	of drugs 1	pharmaceutical industry. Powders. Fees. Medical solutions. Syrups. Aromatic water. Alcoholimetry. Methods of extraction. Tinctures. Extracts. Preparations from fresh plant raw materials. Biogenic stimulants. Maximally-purified phytoparates. Individual phytoparates. Preparations from animal raw materials. Enzyme preparations. Ointments. Liniments. Rectal medicinal forms. Suppository. Patches. Aerosols.				LO 4 LO 5 LO 8 LO 12
11.	Industrial technology of drugs 2	Tablets. Methods of preparation. Granulation. Coating of tablets with shells. Standardization. Equipment used. Granules. Drage. Microdragee. Spansuls. Medical gelatin capsules. Methods of production. Microcapsules. Aseptic-prepared, sterile medicinal forms. GMP requirements. Cleanliness classes of industrial premises. Ampoule production, preparation for filling. Sterilization methods. Infusion solutions. Eye Medications. Biopharmacy. Pharmaceutical Factors. Biological Accessibility. Bioequivalence.	PD	UC	5	LO 1 LO 4 LO 5 LO 8 LO 12
12.	Industrial practice "Industrial technology of medicines	Acquaintance with the pharmaceutical enterprise. Work in the tablet shop. Methods of granulation, types of granulators, tablet machines. Machines and machines for filling and packaging tablets. Work in the plant. Work in the ampoule shop. Work in the workshop of complex pharmaceuticals. Work on the grinding, sieving site. Mixers. Work in the maze shop. Work in the packing shop.	PD	UC	2	LO 1 LO 4 LO 8
13.	Production practice "Quality control and standardization medicines"	Quality control and standardization of medicines, procedures and principles of organization and conduct. Modern physical, chemical and physico-chemical methods used in pharmaceutical analysis. General pharmacopoeic research methods used for drug quality control. Modern physico-chemical (instrumental) methods for identification, analysis of purity and quantitative determination of medicines.	PD	UC	2	LO 5 LO 9 LO 10 LO 11 LO 12
14.	Industrial practice on the management and economics of pharmacy	Work on the study of the organizational structure and management of the pharmacy organization. Study of the system of work with pharmaceutical personnel. Types of accounting and accounting measures. Study of the organization of workflow and rationalization of workflow. Work on the organization and conduct of analysis and forecasting of the main economic indicators of the pharmacy organization.	PD	UC	2	LO 1 LO 2 LO 9 LO 11 LO 12
15	rational use of medicines	Prediction of the risk of side effects of drugs, prevention and correction methods when they occur, application of clinical protocols for diagnosis and treatment of	PD	UC	5	LO 7 LO 8

		diseases. Study of new drugs applied in accordance with the rules of quality clinical practice (GCP). Maintaining medical documentation based on knowledge of the legislation of the Republic of Kazakhstan in the field of health care. Development of a form list of analogue substitution, a form of a medical institution. Conduct of pharmaco-economic studies of the cost of various therapeutic and preventive regimes of prescription of medicines.				LO 10 LO 12
Profile disciplines (PD) Component of choice						
1.	GMP and clean room technology	Clean rooms. Classification. Air requirements in clean rooms, personnel requirements. Operations in the NPP zones. Control of parameters of clean rooms. Certification of clean rooms and areas. Barrier systems. Use of insulators in the pharmaceutical industry. Air and water preparation systems at pharmaceutical enterprises. Classification of air purification filters. Designs. Principles of multi-stage air cleaning.	PD	OC	4	LO 1 LO 4 LO 5 LO 8
2.	GMP standard implementation in pharmaceutical production of Kazakhstan	GMP Standards. General Regulations. Pharmaceutical Quality System. Product Review. Risk Management for Quality. Staff training. Personnel requirements. Production facilities. Equipment. Production area. Required documentation. Document management. Production formulation and process instructions. Packing instructions. Prevention of cross-contamination in production. Process operations: intermediate and bulk products.	PD	OC	4	LO 1 LO 4 LO 5 LO 8
3.	Marketing and Management in Pharmacy	The concept of marketing. Marketing environment, marketing complex. Functional structure of marketing. Market conditions. Market segmentation. Classification, product levels. Pricing policy of a pharmaceutical company. Sales activities of pharmaceutical enterprises. Marketing policy of communications. Marketing research. Methodological bases of management. Management of decision-making process. Motivation of labor activity. Fundamentals of personnel management in pharmaceutical organizations. Styles of labor collective management.	PD	OC	5	LO 1 LO 8 LO 10 LO 11 LO 12
4.	Pharmaceutical counselling	Competent pharmaceutical counselling is a recipe for success for a pharmaceutical organization. The role of the pharmacist as a consultant on the rational, efficient and safe use of medicines. Patient counselling is an important component of pharmacists' communication skills. Skills of intercultural communication in consulting patients of pharmacy. State control of pharmaceutical activity. Medicines and other medical products as objects of legal relations.	PD	OC	5	LO 1 LO 2 LO 8 LO 9 LO 10

5.	Phytochemistry and standardization of medicinal raw materials	Standardization system in Kazakhstan. Standardization and quality control of medicinal plant raw materials. Processing of medicinal plant raw materials: granules, phytoschies, briquettes, etc. Procedure for approval of regulatory documentation on medicinal plants and products of their processing. Commodity Analysis. Current state and ways to improve the standardization of medicines containing plant components.	PD	OC	6	LO 5 LO 9 LO 10 LO 11 LO 12
6.	Phytocosmetology	The range of medicinal plants used in phytocosmetology. The main cosmetic human problems. Methods and forms of application of plants for cosmetic purposes. Rules of procurement, collection and processing of medicinal plant raw materials. Products of natural origin in cosmetology. Evaluation of quality and rules of storage of plant raw materials and finished products.	PD	OC	6	LO 8 LO 10 LO 12
7.	Organizational framework for good practices and personnel management	Standards of Good Pharmaceutical Practices (GLP, GCP, GMP, GDP, GPP, GVP). Good Pharmaceutical Practice Guides setting quality standards at all stages of the LAN and MI life cycle. Methodological bases of personnel management. The process of recruitment, selection and training of personnel. Professional orientation and adaptation. Planning and analysis of labor indicators. Assessment of economic efficiency of management.	PD	OC	5	LO 1 LO 2 LO 8 LO 9 LO 10
8.	Communication skills with the basics of pharmaceutical ethics	Ethics, deontology, ethical and legal basis of promotion of pharmacy products on the market. Communication, communicative process, communicative competence and principles of effective communication of pharmacist with patients of pharmacy, colleagues, doctors and other medical workers. Barriers of communication pharmacist, factors of occurrence of conflicts, ways of their resolution. Pharmacist approaches to the patient depending on his personality, age and nature of the disease.	PD	OC	5	LO 1 LO 2 LO 8 LO 9 LO 10
9.	Innovative pharmaceutical technology	Technology of creation of innovative PE: production of new chemical products; synthesis of pharmacologically active metabolites or their isomers: creation of new drug forms with improved pharmacokinetic properties. Biotechnological PE with a new mechanism of action. Pharmaceutical nanotechnology as a direction of creation of means of target delivery of LP. Computer modeling of LP. Prediction of compatibility of medicinal and auxiliary substances.	PD	OC	5	LO 1 LO 4 LO 9 LO 12
10.	Perfume technology - cosmetics	Perfumes and cosmetics. Classification, nomenclature and functional use of components of perfumes and cosmetics. Fundamentals of construction of perfume	PD	OC	5	LO 1 LO 4

		compositions and their production. Technology of production of perfume and cosmetic products. Quality control and regulatory documents regulating the turnover of perfumes and cosmetics in the territory of the Republic of Kazakhstan.				LO 9 LO 12
1.	11.	Technology of biologically active additives to food BAD - additional sources of protein, amino acids, vitamins, mineral elements, parapharmaceuticals, eubiotics. Classification of BADs. Safety requirements for dietary supplements. Technology of production of biologically active additives for food products. Sources of natural biologically active substances (BAV). Vitamins. Assemblies. Homeopathic medicinal forms. Veterinary medicinal forms. Packaging, labeling, etc.	PD	OC	5	LO 1 LO 4 LO 11 LO 12
	12.	Development of drug packaging design Packaging is a way for the manufacturer to communicate with patients, pharmacists and doctors. Types of medical packages. Materials for packaging. Rigid packaging of drugs. Semi-rigid packaging. Soft packaging. Primary packaging. Secondary packaging. Transport packaging. Requirements for the packaging of drugs. Ensuring the safety of preparations by packaging. Color scheme of basic and additional shades. Color dosage of active substance. Algorithm of packaging design.	PD	OC	5	LO 1 LO 4 LO 11 LO 12
2.	13.	Standardization of drugs with the basics of GLP State principles and regulations governing the quality of medicines in the Republic of Kazakhstan. Rules of development of normative documents on quality and safety of medicines. Requirements of ICH series "Q" documents to the quality of medicines. The concept of appropriate pharmaceutical practices (GxP), their role in ensuring quality at all stages of the PE life cycle	PD	OC	6	LO5 LO9 LO 10 LO11 LO 12
	14.	Analysis of medicinal products of natural origin Analysis of drugs, terpenoids derivatives, steroid compounds, vitamins, alkaloids, antibiotics using chemical, physico-chemical methods in accordance with the requirements of the normative documentation.	PD	OC	6	LO 5 LO 9 LO 10 LO 11 LO 12
3.	15.	Pharmaceutical custody Guidelines for Patient Counselling in Rational Drug Prescription - List of Prescription Drugs; advising patients on possible side effects of drugs and evaluating possible drug interactions. Issues of compatibility and incompatibility of medicines with each other and food components, the transferability of drugs to the	PD	OC	5	LO 1 LO 7 LO 11

		body,				
16.	Drug interaction and interchangeability	The subject of the interaction of drugs and interchangeability studies the following types of interaction of drugs at the same time, pharmacological, namely, changes in pharmacokinetics and pharmacodynamics of drugs. He also studies the pharmaceutical interaction of drugs. It provides an opportunity to get acquainted with the types of interaction, mechanisms, relationship with cytoceptors, changes in the function of organs and systems as a result of the interaction of medicines.	PD	OC	5	LO 7 LO 8 LO 10 LO 12
4.	17. Final certification	Basic principles of organization of pharmaceutical assistance to the population. Design and release of medicines. Technology of drug forms. Methods of pharmacognostic analysis. Analysis of medicinal plant raw materials containing various groups of BAV. Analysis of medicinal agents, derivatives of aromatic and heterocyclic compounds of synthetic origin using chemical, General pharmacodynamics and pharmacokinetics of drugs and changes in the functions of organs and systems caused by pharmacological effects.			4	LO 1, LO 2, LO 3, LO 4, LO 5, LO 6, LO 7, LO 8, LO 9, LO 10, LO 11, LO 12

RO achievement matrix with different learning methods

RO (codes)	Methods of teaching and instruction
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Matrix of PO conformity to evaluation methods

RO (codes)	Assessment methods					