

**7M10104 - «Pharmacy»
Scientific and pedagogical direction (2 years)**

1	Name of the educational program	7M10104 Pharmacy
2	Type of EP	New
3	Purpose of the EP	Training of highly specialized, competitive specialists of a new generation with a high level of professional competence, with teaching and research skills
4	Features of the EP	none
5	Partner university	Vilnius University
6	Learning outcomes	<p>LO 1 Demonstrates knowledge and understanding of the interdisciplinary nature of research in the field of pharmacy</p> <p>LO 1 Is able to acquire new knowledge and skills of an applied nature in research, professional and pedagogical activities in the field of pharmacy.</p> <p>LO 1 Is able to solve problems in the field of pharmacy within the framework of his qualifications based on scientific approaches.</p> <p>LO 1 Uses scientific information for the development of pharmacy and the introduction of new approaches within his qualifications</p> <p>LO 1 Clearly and unambiguously communicates information, ideas, conclusions, problems and solutions to both specialists and non-specialists in their field of qualification in the field of pharmacy</p> <p>LO 1 plans professional activities in his field of pharmacy qualifications, based on modern achievements of science and practice</p> <p>LO 1 is engaged in professional growth, demonstrates introspection skills, experience for teaching at the higher education level</p>
7	Form of study	full-time
8	Language of instruction	Kazakh, Russian, English
9	Volume of loans	120
10	Awarded academic degree	Master of Medical Sciences in the educational program "Pharmacy"

Information about disciplines:

Name of the module / disciplines	Summary of the discipline	Cycle	Component	Credits	Course	Generated learning outcomes (codes)						
						LO 1	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7
Cycle of basic disciplines (BD). University component												
History and philosophy of science	The history and philosophy of science. Medical and pharmaceutical knowledge and philosophy. The problem of consciousness in philosophy, pharmacy and medicine. Philosophical and methodological problems of defining the basic concepts of pharmacy and medicine. Classification of pharmaceutical sciences. Levels and forms of scientific pharmaceutical knowledge. The specifics of the methods of cognition in pharmacy and medicine. Ethics and pharmacy. The origins and humanistic ideals of bioethics.	BD	UC	4	1	+	+					
Foreign language (professional)	In the context of deepening integration processes in the global educational space, teaching a foreign language is an urgent need. Foreign language competence has become an integral element of the training of highly qualified, competitive specialists, mobile in the international educational space and the labor market. To improve all types of speech activity among undergraduates, allowing them to communicate on a wide range of professionally significant problems in the fields of medical practice.	BD	UC	4	1	+						
Management Psychology	The basic concepts and categories of management psychology, the study of personality, personality concepts in various areas of psychological science,	BD	UC	4	1	+						

	interpersonal relationships in a group and a team. The issues of studying personal and environmental factors that negatively affect the psyche, as well as ways to preserve human mental health, are considered. The program pays special attention to the psychological characteristics of the personality of a healthcare professional.											
Pedagogy of higher education	The content of the program reflects the basic concepts and categories of pedagogy. Goals and goal-setting in pedagogy. Pedagogical activity. Features of the profession of a teacher. Education as a pedagogical process. Education as a sociocultural phenomenon and a universal human value. Pedagogical communication. Education as an integral part of pedagogy. Fundamentals of educational system management, methods and forms. The development of pedagogical thought in Kazakhstan.	BD	UC	4	1		+					
Pedagogical practice (PP)	The content of the program reflects the basic rules for conducting the educational process in the form of lectures, seminars, practical classes. Application and demonstration of teaching skills and methods, innovative teaching technologies. Pedagogical communication skills. Application of methods and forms of the modern pedagogical process. Pedagogical practice as an important part of the educational process in the preparation of future teachers of medical universities	PP		4	1		+	+				
Training trajectory: Pharmacist-technologist												
Pharmaceutical development	Pharmaceutical development of medicines, in accordance with the required level of control of the appropriate category, namely,	BD	CC	5	1			+	+			

	the higher the risk when using it, the higher the production control. Currently, the development of medicines is carried out with the help of specialized CAD systems, which significantly reduces time and financial costs.											
Information technology in professional activity	Formation of comprehensive knowledge about the main trends in the development of information technologies related to changes in conditions in the field of their application; formation of practical skills in the use of information technologies in solving professional tasks. acquisition of theoretical and practical skills in working with a personal computer and application software packages.	BD	CC	5	1	+	+		+			
Licensing of the production of medical devices	The study of the licensing process for the production of medical devices and products, the development of permits issued by the authorized body of the licensor to an individual or legal entity to engage in pharmaceutical activities.	BD	CC	5	1			+	+			
Training trajectory: Pharmacist-Manager												
Personnel management in pharmacy	"Personnel management in pharmacy" refers to the basic (mandatory) part of the professional training cycle and is aimed at forming undergraduates' vision of an integrated management system of social and labor relations in a modern organization, mastering methods and technologies for planning and implementing a personnel strategy, motivating work, training and staff development, conflict management and labor disputes.	BD	CC	5	1			+	+			

Pharmacoeconomics	The National Drug Policy of Kazakhstan highlights as one of the priorities the optimization of drug provision within the framework of guaranteed free medical care using the principles of pharmacoeconomics: costs – benefits – improving the quality of life of citizens. Pharmacoeconomics should be considered as a scientific and practical direction that arose at the junction of medicine, pharmacy and economics.	BD	CC	5	1			+	+			
Fundamentals of management accounting	Fundamentals of management accounting is one of the special pharmaceutical disciplines that forms the professional knowledge, skills and abilities of a specialist working in the pharmaceutical market, where accounting and reporting data are necessary as the main element for the development of an organization. Accounting and reporting data are also used for forecasting processes.	BD	CC	5	1			+	+			
Training trajectory: Pharmacist-analyst												
Modern directions of creation of new medicinal substances	The study of the main stages of the search for medicinal substances, the relationship between the chemical structure of the molecules of substances and their effect on the body. The dependence of pharmacological action on some physical and chemical properties of medicinal substances and the creation of new drugs by chemical and biological synthesis methods are being studied. Application of computational and information methods of drug design. Creation of functional	BD	CC	5	1			+	+			

	nanomaterials for biology and nanomedicine.											
Modern physico-chemical methods of analysis in pharmacy	The study of modern physico-chemical methods used in the analysis of medicinal plant raw materials, medicines and toxic substances: spectrophotometric analysis, NMR, HPLC, HPLC, TLC, proton magnetic resonance spectroscopy, photoelectrocolorimetry, etc.	BD	CC	5	1			+	+			
Medical Chemistry	The study of the chemical structure of medicinal substances, determining the nature of their action (pharmacological effects) and pharmacokinetic features. Factors affecting the effect of medicinal substances. The influence of the chemical structure of medicinal substances on the nature of their action. Dependence of pharmacokinetics and pharmacodynamics of medicinal substances on their physico-chemical properties.	BD	CC	5	1			+	+			
Training trajectory: Clinical Pharmacist												
Principles of the formation of the GAFMC(Guaranteed amount of free medical care)	The guaranteed amount of free medical care is provided to citizens of the Republic of Kazakhstan at the expense of budgetary funds and includes preventive, diagnostic and curative medical services with the greatest proven effectiveness. Compulsory social health insurance is a set of legal, economic and organizational measures to provide medical care at the expense of the social health insurance fund	BD	CC	5	1			+	+			
Pharmacoeconomics	The National Drug Policy of Kazakhstan highlights as one of the priorities the optimization of drug provision within the framework of guaranteed free medical	BD	CC	5	1			+	+			

	care using the principles of pharmacoeconomics: costs – benefits – improving the quality of life of citizens. Pharmacoeconomics should be considered as a scientific and practical direction that arose at the junction of medicine, pharmacy and economics.											
Good clinical practice	This standard ensures the scientific significance of research/trials, their ethical acceptability and full documentation of the clinical characteristics of the studied drug, confidence in the results obtained, as well as their recognition by authorized bodies of other countries. Compliance with this standard serves as a guarantee of the safety, well-being, security of the subjects, as well as the reliability of the data of the clinical trial/ trial.	BD	CC	5	1			+	+			
Cycle of profile disciplines. (PD)												
Management and marketing in pharmacy	Management and marketing are among the important pharmaceutical disciplines that form the professional knowledge, skills and abilities of a specialist working in the pharmaceutical market. The task of the discipline is to study theoretical concepts, categories, systems, tools, algorithms and trends of modern management in market conditions with adaptation to the specifics of pharmaceutical enterprises.	PD	UC	5	1			+	+	+	+	+
Standardization and certification of medicines	"Standardization of medicines" is one of the important pharmaceutical disciplines, which considers the study of the organizational structure of the service for standardization of medicines (drugs) using the fundamental laws of the Republic of Kazakhstan "On	PD	UC	5	1			+	+	+	+	+

	Medicines", "On Health", "On Technical Regulation", Resolutions of the Government of the Republic of Kazakhstan regulating the structure of standardization, metrology and certification bodies.												
Phytochemical analysis of medicinal plant raw materials	Phytochemical analysis studies the conduct of qualitative analysis – qualitative reactions to the main active substances (authenticity) and quantitative analysis – quantitative determination of active substances, determination of humidity, ash content, extractive substances (goodness). For each type of LRS, the ND specifies methods of qualitative and quantitative analysis. Physicochemical methods of analysis are also widely used - spectrophotometric, chromatographic, luminescent, etc.)	PD	UC	5	1			+	+	+	+	+	
Fundamental principles of drug development	The current state and trends in the development of pharmaceutical technology. State regulation of the production of medicines. Biopharmacy. Pharmaceutical factors. Chemical engineering. Pharmaceutical development. Auxiliary substances. Free radical oxidation. Antioxidants and their use. Production of biological medicines. Fundamentals of validation of technological processes. Dossier of medicines in CTD format. The procedure for the examination of medicines.	PD	UC	5	1			+	+	+	+	+	
Training trajectory: Pharmacist-technologist													
Development of the registration	Formation of students' key professional competencies for the development of a registration dossier for medicinal	PD	CC	6	2			+	+	+	+	+	

dossier for medicinal products	products: Organization of an examination of medicinal products for the purpose of their state registration. Submission and consideration of applications for state registration of medicinal products and submission of necessary documents. The decision on the state registration of medicines.											
Rationing of pharmaceutical production	<p>he state regulation of the production of medicines is a set of requirements, legalized by relevant documents, for the quality of medicinal and auxiliary materials, and the technological process of production. Pharmaceutical Quality System (PQS). The quality of medicines: the concept, terminology, mechanisms and tools of state control.</p> <p>The personnel system of a pharmaceutical company within the framework of GMP: general requirements, organization of personnel. Key personnel. An authorized person. Premises and equipment of a pharmaceutical company within the framework of GMP requirements. The technological process within the framework of GMP requirements: proper documentation within the framework of GMP and GxP requirements.</p>	PD	CC	5	2			+	+	+	+	+
Production of medicines. Quality control and government regulation.	It forms students' understanding of the physico-chemical essence of processes and the use of the laws of chemistry, biotechnology, pharmaceuticals in complex engineering activities in the field of pharmaceutical production, in the processes of obtaining medicines, the formation of skills for independent	PD	CC	5	2			+	+	+	+	+

	formulation and conducting theoretical and experimental research											
Fundamentals of pharmaceutical engineering	Formation of students' key professional competencies in the basics of pharmaceutical engineering: The main issues of the life cycle of engineering systems and equipment at a pharmaceutical enterprise. The main elements of the engineering service structure. Classification of general engineering principles. GMP and GEP requirements.	PD	CC	5	2			+	+	+	+	+
Training trajectory: Pharmacist-Manager												
Social aspects in pharmacy	The science that studies the main tasks of pharmaceutical activity, which is to maximize people's desire to maintain their health by providing high-quality and qualified medical care, also lays down the basic principles and values that define the role and responsibility of a pharmacist to society.	PD	CC	5	2			+	+	+	+	+
The basics of auditing	Audit is an entrepreneurial activity for the independent verification of accounting and financial (accounting) statements of organizations and individual entrepreneurs. The purpose of the audit is to express an opinion on the reliability of the financial (accounting) statements of the audited entities and the compliance of the accounting procedure with the legislation of the Republic of Kazakhstan.	PD	CC	4	2			+	+	+	+	+
The complex of marketing research	A marketing mix is a set of controllable variable marketing factors, the totality of which a firm uses in an effort to elicit the desired response from the target market. A set of marketing research tools are marketing analysis tools, they have a	PD	CC	4	2			+	+	+	+	+

	specific purpose for the organization at a certain time interval.											
Strategic management	The strategic process studies the main processes of determining the interaction of an organization with its environment, expressed through the use of selected goals and achieving the desired result by allocating the organization's resources in accordance with an effective action plan, through which managers establish long-term directions for the development of the organization, its strategic goals	PD	CC	4	2			+	+	+	+	+
The concept and principles of pharmaceutical logistics	Logistics is a developing industry created with the help of technological innovations, changes in the cost structure, the emergence of demand for new types of goods and services that will allow companies to ensure the profit of the company or enterprise, offers opportunities for rapid changes in the structure of the company under changing conditions	PD	CC	4	2			+	+	+	+	+
Траектория обучения: Фармацевт-аналитик												
Validation of analytical techniques in the process of standardization of medicines	The study of the main validation characteristics, guidelines for the validation of analytical techniques. The use and certification of standard samples in the quality control of medicines. Pharmacopoeia standard sample. Standardized validation procedures for specific analysis methods. The general concept of a working standard sample.	PD	CC	5	2			+	+	+	+	+

Quality control of extemporal dosage forms	The study of intra-pharmacy quality control of medicines. Manufacture of sterile, non-sterile dosage forms in the pharmacy and their control (qualitative and quantitative). Analysis of liquid dosage forms for internal use. Calculations in the analysis by the refractometric method. Calculation of the substance content in liquid and solid dosage forms.	PD	CC	5	2			+	+	+	+	+
Analysis of galenic and novogalenic pharmaceutical products from medicinal plant raw materials	The study of the general characteristics of galenic and novogalenic preparations: tinctures, pharmacopoeial requirements for tinctures, the general technological scheme for the production of tinctures. The study of extracts, pharmacopoeial requirements for extracts, the general technological scheme for the production of extracts, as well as injectable dosage forms from medicinal plant raw materials.	PD	CC	5	2			+	+	+	+	+
Rules for the organization and production of medicinal products from vegetable raw materials	Studying quality assurance: the influence of anthropogenic factors on the quality of medicinal plant raw materials. The professional requirements for specialists of a pharmaceutical enterprise producing medicines from a medicinal room are being studied: requirements for premises for the production and packaging of medicinal products of plant origin. Equipment. Documentation. Production. Quality control. Validation.	PD	CC	6	2			+	+	+	+	+
Training trajectory: Clinical Pharmacist												
Social aspects of pharmacy	The science that studies the main tasks of pharmaceutical activity, which is to maximize people's desire to maintain their health by providing high-quality	PD	CC	5	2			+	+	+	+	+

	and qualified medical care, also lays down the basic principles and values that define the role and responsibility of a pharmacist to society.											
The basics of auditing	Audit is an entrepreneurial activity for the independent verification of accounting and financial (accounting) statements of organizations and individual entrepreneurs. The purpose of the audit is to express an opinion on the reliability of the financial (accounting) statements of the audited entities and the compliance of the accounting procedure with the legislation of the Republic of Kazakhstan.	PD	CC	4	2			+	+	+	+	+
Registration of medicines according to the requirements of the EAEU	The state registration, re-registration and modification of the registration dossier of a medicinal product is carried out by the state body for control over medical and pharmaceutical activities. An obligatory condition for state registration, re-registration, and making changes to the registration dossier is the examination of a medicinal product.	PD	CC	4	2			+	+	+	+	+
Rational use of medicines, taking into account the age categories of patients	The main provisions of the policy of the concept of basic medicines, the most common types of irrational use of medicines, the causes and consequences of improper use of medicines. The necessity of studying the monitoring of the situation on the rational use of medicines is justified, evaluation indicators are given, the main directions of the rational use of medicines recommended by the World Health Organization.	PD	CC	4	2			+	+	+	+	+
The complex of marketing research	The marketing complex is a set of controllable variable marketing factors,	PD	CC	4	2			+	+	+	+	+

	the totality of which the firm uses in an effort to elicit the desired response from the target market. The marketing research complex is a marketing analysis toolkit, which uses effective methods to solve urgent problems for the organization											
Research Practice (RP)	The choice of methods and methods used in the process of scientific research. Solutions to specific research tasks. The object of research and hypotheses of empirical (experimental) research.	RP	UC	8	2	+	+	+	+	+	+	+
Research work of a graduate student, including internship and completion of a master's thesis	corresponds to the profile of the Master's degree program, according to which the master's thesis is being performed and defended; is relevant and contains scientific novelty and practical significance; is based on modern theoretical, methodological and technological achievements of science and practice; is performed using modern research methods; contains research (methodological, practical) sections on the main protected provisions; is based on international best practices in the relevant field of knowledge.			24:	1-2:	+	+	+	+	+	+	+
				5	1							
				19	2							
Preparation and defense of a master's thesis				12	2	+		+	+	+		
			Total:	120								