MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
Federal State Autonomous Educational Institution of Higher Education
"Far Eastern Federal University"
(FEFU)
INSTITUTE OF LIFE SCIENCES AND BIOMEDICINE (SCHOOL)

APPRAISAL FUND

in the discipline "Pharmaceutical Technology"

Vladivostok
2022

The list of forms of assessment used at various stages of the formation of competencies in the course of mastering the discipline "Pharmaceutical Technology"

№	Controlled Modules/Sections /Topics Discipline	Codes and stages of competency formation		Evaluation tools - name	
				current control	Intermediate certification
1.	Pharmaceutical technology as a science. State regulation of the production and manufacture of medicines.	PC-1.3; PC-2.1; PC-2.2; PC-2.3;	Knows the theoretical foundations of studying the bioavailability of substances in various models in vitro and in vivo; theoretical foundations of registration of research results, statistical processing of results; Knows the theoretical foundations of research in the field of evaluating the efficacy and safety of medicines; theoretical foundations for the development of technological documentation in the industrial production of medicines; theoretical foundations of the technological process in the industrial production of medicines; theoretical foundations of process control in the industrial production of medicines; Knows how to draw up research results, conducts statistical processing of the results; using knowledge in the field of medical genetics, immunology, epidemiology and therapy, conduct research in the field of evaluating the efficacy and safety of medicines; develop technological documentation for the industrial production of medicines; carry out the technological process in the industrial production of medicines; to control the technological process in the industrial production of medicines; Possesses the skills to study the bioavailability of substances on various models in vitro and in vivo; conducting research in the field of assessing the efficacy and safety of medicines; development of technological documentation for the industrial production of medicines; conducting the technological process in the industrial production of medicines; control of the technological process in the industrial production of medicines;	U0-1; PR-2	
2.	Biopharmacy as a science and the basis of drug technology. Pharmaceutical factors. Bioavailability. Methods of determination.	PC-1.3; PC-2.1; PC-2.2; PC-2.3	Knows the theoretical foundations of studying the bioavailability of substances in various models in vitro and in vivo; theoretical foundations of registration of research results, statistical processing of results; Knows the theoretical foundations of research in the field of evaluating the efficacy and safety of medicines; theoretical foundations for the development of technological documentation in the industrial production of medicines; theoretical foundations of the technological process in the industrial production of medicines; theoretical foundations	U0-1; PR-2	PR-1; UO - 2

			of process control in the industrial production of medicines; Knows how to draw up research results, conducts statistical processing of the results; using knowledge in the field of medical genetics, immunology, epidemiology and therapy, conduct research in the field of evaluating the efficacy and safety of medicines; develop technological documentation for the industrial production of medicines; carry out the technological process in the industrial production of medicines; to control the technological process in the industrial production of medicines; Possesses the skills to study the bioavailability of substances on various models in vitro and in vivo; conducting research in the field of assessing the efficacy and safety of medicines; development of technological documentation for the industrial production of medicines; conducting the technological process in the industrial production of medicines; control of the technological process in the industrial production of medicines;		
3	Powders. Classification, manufacturing rules. Private powder technology.	PC-1.3; PC-2.1; PC-2.2; PC-2.3 PC-5.1; PC-5.2; PC-5.3; PC-5.4; PC-5.5; PC-5.6	Knows the theoretical foundations of research in the field of evaluating the efficacy and safety of medicines; theoretical foundations of the development of technological documentation in the industrial production of medicines; theoretical foundations of the preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with recipes and (or) requirements; theoretical foundations of the manufacture of medicines, including serial production, in the field in providing assistance to the population in emergency situations Knows how to carry out the technological process in the industrial production of medicines; to control the technological process in the industrial production of medicines; carry out activities to prepare the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture medicines, including serial production, in the field when providing assistance to the population in emergency situations; to carry out the selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; to calculate the amount of medicines and excipients for the production of all types of modern dosage forms. Possesses the skills of conducting the technological process in the industrial production of medicines; control of the technological process in the industrial production of medicines; preparation of the workplace, technological equipment, medicines and excipients for the	U0-1; PR-2	PR-1; UO - 2

			manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture of medicines, including carrying out intra-pharmacy procurement and serial production, in accordance with the established rules and taking into account the compatibility of drugs and excipients, controlling quality at all stages of the technological process; methods of packaging, labeling and (or) registration of manufactured medicines for dispensing; selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; skills in calculating the amount of medicines and excipients for the production of all types of modern dosage forms.		
4	Technology for the manufacture of liquid dosage forms. Features of the preparation of aqueous solutions of medicinal substances. Making potions with the help of a burette system. Drops. Standard pharmacopoeial fluids.	PC-1.3; PC-2.1; PC-2.2; PC-2.3 PC-5.1; PC-5.2; PC-5.3; PC-5.4; PC-5.5; PC-5.6	Knows the theoretical foundations of research in the field of evaluating the efficacy and safety of medicines; theoretical foundations of the development of technological documentation in the industrial production of medicines; theoretical foundations of the preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with recipes and (or) requirements; theoretical foundations of the manufacture of medicines, including serial production, in the field in providing assistance to the population in emergency situations Knows how to carry out the technological process in the industrial production of medicines; to control the technological process in the industrial production of medicines; carry out activities to prepare the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture medicines, including serial production, in the field when providing assistance to the population in emergency situations; to carry out the selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; to calculate the amount of medicines and excipients for the production of all types of modern dosage forms. Possesses the skills of conducting the technological process in the industrial production of medicines; control of the technological process in the industrial production of medicines; preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture of medicines, including carrying out intra-pharmacy procurement and serial production, in accordance with the established rules and taking into account the compatibility of drugs and excipients, controlling quality at all stages of the technological process; methods of packaging,	U0-1; PR-1; PR-2	

			labeling and (or) registration of manufactured medicines for dispensing; selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; skills in calculating the amount of medicines and excipients for the production of all types of modern dosage forms.		
5	Production of non-aqueous solutions. Basic non-aqueous solvents, preparation and standardization. Dilution of solutions of ethyl alcohol and glycerin.	PC-1.3; PC-2.1; PC-2.2; PC-2.3 PC-5.1; PC-5.2; PC-5.3; PC-5.4; PC-5.5; PC-5.6	Knows the theoretical foundations of research in the field of evaluating the efficacy and safety of medicines; theoretical foundations of the development of technological documentation in the industrial production of medicines; theoretical foundations of the preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with recipes and (or) requirements; theoretical foundations of the manufacture of medicines, including serial production, in the field in providing assistance to the population in emergency situations Knows how to carry out the technological process in the industrial production of medicines; to control the technological process in the industrial production of medicines; carry out activities to prepare the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture medicines, including serial production, in the field when providing assistance to the population in emergency situations; to carry out the selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; to calculate the amount of medicines and excipients for the production of all types of modern dosage forms. Possesses the skills of conducting the technological process in the industrial production of medicines; control of the technological process in the industrial production of medicines; preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture of medicines, including carrying out intra-pharmacy procurement and serial production, in accordance with the established rules and taking into account the compatibility of drugs and excipients, controlling quality at all stages of the technological process; methods of packaging, labeling and (or) registration of manufactured medicines for dispensing; selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; skills in calculating the amount of medicines and	U0-1; PR-2	

			excipients for the production of all types of modern dosage forms.		
6	Classification of high-molecular compounds (IUDs) and colloidal solutions. Application and characterization of IUDs and colloidal solutions. Properties and technology of solutions.	PC-1.3; PC-2.1; PC-2.2; PC-2.3 PC-5.1; PC-5.2; PC-5.3; PC-5.4; PC-5.5; PC-5.6	Knows the theoretical foundations of research in the field of evaluating the efficacy and safety of medicines; theoretical foundations of the development of technological documentation in the industrial production of medicines; theoretical foundations of the preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with recipes and (or) requirements; theoretical foundations of the manufacture of medicines, including serial production, in the field in providing assistance to the population in emergency situations Knows how to carry out the technological process in the industrial production of medicines; to control the technological process in the industrial production of medicines; carry out activities to prepare the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture medicines, including serial production, in the field when providing assistance to the population in emergency situations; to carry out the selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; to calculate the amount of medicines and excipients for the production of all types of modern dosage forms. Possesses the skills of conducting the technological process in the industrial production of medicines; control of the technological process in the industrial production of medicines; preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture of medicines, including carrying out intra-pharmacy procurement and serial production, in accordance with the established rules and taking into account the compatibility of drugs and excipients, controlling quality at all stages of the technological process; methods of packaging, labeling and (or) registration of manufactured medicines for dispensing; selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; skills in calculating the amount of medicines and excipients for the production of all types of	U0-1; PR-2	PR-1; UO - 2

			modern dosage forms.		
7	Suspensions for internal and external use. Stabilization of heterogeneous systems. Emulsions for external and internal use.	PC-1.3; PC-2.1; PC-2.2; PC-2.3 PC-5.1; PC-5.2; PC-5.3; PC-5.4; PC-5.5; PC-5.6	Knows the theoretical foundations of research in the field of evaluating the efficacy and safety of medicines; theoretical foundations of the development of technological documentation in the industrial production of medicines; theoretical foundations of the preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with recipes and (or) requirements; theoretical foundations of the manufacture of medicines, including serial production, in the field in providing assistance to the population in emergency situations Knows how to carry out the technological process in the industrial production of medicines; to control the technological process in the industrial production of medicines; carry out activities to prepare the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture medicines, including serial production, in the field when providing assistance to the population in emergency situations; to carry out the selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; to calculate the amount of medicines and excipients for the production of all types of modern dosage forms. Possesses the skills of conducting the technological process in the industrial production of medicines; control of the technological process in the industrial production of medicines; preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture of medicines, including carrying out intra-pharmacy procurement and serial production, in accordance with the established rules and taking into account the compatibility of drugs and excipients, controlling quality at all stages of the technological process; methods of packaging, labeling and (or) registration of manufactured medicines for dispensing; selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; skills in calculating the amount of medicines and excipients for the production of all types of	U0-1; PR-2	UO - 2

			modern dosage forms.		
8	Infusions and decoctions as a dosage form. Private technology of infusions and decoctions.	PC-1.3; PC-2.1; PC-2.2; PC-2.3 PC-5.1; PC-5.2; PC-5.3; PC-5.4; PC-5.5; PC-5.6	Knows the theoretical foundations of research in the field of evaluating the efficacy and safety of medicines; theoretical foundations of the development of technological documentation in the industrial production of medicines; theoretical foundations of the preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with recipes and (or) requirements; theoretical foundations of the manufacture of medicines, including serial production, in the field in providing assistance to the population in emergency situations Knows how to carry out the technological process in the industrial production of medicines; to control the technological process in the industrial production of medicines; carry out activities to prepare the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture medicines, including serial production, in the field when providing assistance to the population in emergency situations; to carry out the selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; to calculate the amount of medicines and excipients for the production of all types of modern dosage forms. Possesses the skills of conducting the technological process in the industrial production of medicines; control of the technological process in the industrial production of medicines; preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture of medicines, including carrying out intra-pharmacy procurement and serial production, in accordance with the established rules and taking into account the compatibility of drugs and excipients, controlling quality at all stages of the technological process; methods of packaging, labeling and (or) registration of manufactured medicines for dispensing; selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; skills in calculating the amount of medicines and excipients for the production of all types of	U0-1; PR-2	

			modern dosage forms.		
9	Liniments as a dosage form. Liniment technology. Ointments as a dosage form. Basics and their classification. Ointment bases, emulsifiers. Ointments on hydrophilic and hydrophobic bases. Pastes and combined ointments.	PC-1.3; PC-2.1; PC-2.2; PC-2.3 PC-5.1; PC-5.2; PC-5.3; PC-5.4; PC-5.5; PC-5.6	Knows the theoretical foundations of research in the field of evaluating the efficacy and safety of medicines; theoretical foundations of the development of technological documentation in the industrial production of medicines; theoretical foundations of the preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with recipes and (or) requirements; theoretical foundations of the manufacture of medicines, including serial production, in the field in providing assistance to the population in emergency situations Knows how to carry out the technological process in the industrial production of medicines; to control the technological process in the industrial production of medicines; carry out activities to prepare the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture medicines, including serial production, in the field when providing assistance to the population in emergency situations; to carry out the selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; to calculate the amount of medicines and excipients for the production of all types of modern dosage forms. Possesses the skills of conducting the technological process in the industrial production of medicines; control of the technological process in the industrial production of medicines; preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture of medicines, including carrying out intra-pharmacy procurement and serial production, in accordance with the established rules and taking into account the compatibility of drugs and excipients, controlling quality at all stages of the technological process; methods of packaging, labeling and (or) registration of manufactured medicines for dispensing; selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; skills in calculating the amount of medicines and excipients for the production of all types of	U0-1; PR-2	PR-1; UO - 2

			modern dosage forms.		
10	Suppositories as a dosage form. Basics of their classification. Private technology of suppositories. Influence of pharmaceutical factors on the bioavailability of medicinal substances from soft dosage forms.	PC-1.3; PC-2.1; PC-2.2; PC-2.3 PC-5.1; PC-5.2; PC-5.3; PC-5.4; PC-5.5; PC-5.6	Knows the theoretical foundations of research in the field of evaluating the efficacy and safety of medicines; theoretical foundations of the development of technological documentation in the industrial production of medicines; theoretical foundations of the preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with recipes and (or) requirements; theoretical foundations of the manufacture of medicines, including serial production, in the field in providing assistance to the population in emergency situations Knows how to carry out the technological process in the industrial production of medicines; to control the technological process in the industrial production of medicines; carry out activities to prepare the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture medicines, including serial production, in the field when providing assistance to the population in emergency situations; to carry out the selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; to calculate the amount of medicines and excipients for the production of all types of modern dosage forms. Possesses the skills of conducting the technological process in the industrial production of medicines; control of the technological process in the industrial production of medicines; preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture of medicines, including carrying out intra-pharmacy procurement and serial production, in accordance with the established rules and taking into account the compatibility of drugs and excipients, controlling quality at all stages of the technological process; methods of packaging, labeling and (or) registration of manufactured medicines for dispensing; selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; skills in	U0-1; PR-2	

			calculating the amount of medicines and excipients for the production of all types of modern dosage forms.		
11	Sterile and aseptically prepared dosage forms. General concepts, history of origin, classification. Requirements for solutions for injection. Rules of asepsis (aseptic conditions, pyrogenicity, sterilization). Obtaining purified water for injection in pharmacy and industrial conditions, quality control. Features of the manufacture of solutions with thermostable and thermolabile medicinal substances. Methods of stabilization of injection solutions. Filtration of solutions. Ultrafiltration and membrane technologies in pharmaceutical production. Technological scheme of injection solutions of aseptic manufacture. The concept of isotonation of injection solutions.	PC-1.3; PC-2.1; PC-2.2; PC-2.3 PC-5.1; PC-5.2; PC-5.3; PC-5.4; PC-5.5; PC-5.6	Knows the theoretical foundations of research in the field of evaluating the efficacy and safety of medicines; theoretical foundations of the development of technological documentation in the industrial production of medicines; theoretical foundations of the preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with recipes and (or) requirements; theoretical foundations of the manufacture of medicines, including serial production, in the field in providing assistance to the population in emergency situations Knows how to carry out the technological process in the industrial production of medicines; to control the technological process in the industrial production of medicines; carry out activities to prepare the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture medicines, including serial production, in the field when providing assistance to the population in emergency situations; to carry out the selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; to calculate the amount of medicines and excipients for the production of all types of modern dosage forms. Possesses the skills of conducting the technological process in the industrial production of medicines; control of the technological process in the industrial production of medicines; preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture of medicines, including carrying out intra-pharmacy procurement and serial production, in accordance with the established rules and taking into account the compatibility of drugs and excipients, controlling quality at all stages of the technological process; methods of packaging, labeling and (or) registration of manufactured medicines for dispensing; selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; skills in calculating the amount of medicines and	U0-1; PR-2	PR-1; UO - 2

	Methods for calculating isotonic concentrations and theoretical osmolarity. Plasma-substituting solutions.		excipients for the production of all types of modern dosage forms.		
12	Solutions for injection on non-aqueous solvents. Suspensions for injection. Emulsion for parenteral nutrition. Industrial production of suspensions and emulsions.	PC-1.3; PC-2.1; PC-2.2; PC-2.3 PC-5.1; PC-5.2; PC-5.3; PC-5.4; PC-5.5; PC-5.6	Knows the theoretical foundations of research in the field of evaluating the efficacy and safety of medicines; theoretical foundations of the development of technological documentation in the industrial production of medicines; theoretical foundations of the preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with recipes and (or) requirements; theoretical foundations of the manufacture of medicines, including serial production, in the field in providing assistance to the population in emergency situations Knows how to carry out the technological process in the industrial production of medicines; to control the technological process in the industrial production of medicines; carry out activities to prepare the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture	U0-1; PR-2	PR-1; UO - 2

			medicines, including serial production, in the field when providing assistance to the population in emergency situations; to carry out the selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; to calculate the amount of medicines and excipients for the production of all types of modern dosage forms. Possesses the skills of conducting the technological process in the industrial production of medicines; control of the technological process in the industrial production of medicines; preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture of medicines, including carrying out intra-pharmacy procurement and serial production, in accordance with the established rules and taking into account the compatibility of drugs and excipients, controlling quality at all stages of the technological process; methods of packaging, labeling and (or) registration of manufactured medicines for dispensing; selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; skills in calculating the amount of medicines and excipients for the production of all types of modern dosage forms.		
13	Organization of industrial production of medicines in accordance with the GMP standard. Clean rooms and isolation technologies.	PC-1.3; PC-2.1; PC-2.2; PC-2.3 PC-5.1; PC-5.2; PC-5.3; PC-5.4; PC-5.5; PC-5.6	Knows the theoretical foundations of research in the field of evaluating the efficacy and safety of medicines; theoretical foundations of the development of technological documentation in the industrial production of medicines; theoretical foundations of the preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with recipes and (or) requirements; theoretical foundations of the manufacture of medicines, including serial production, in the field in providing assistance to the population in emergency situations Knows how to carry out the technological process in the industrial production of medicines; to control the technological process in the industrial production of medicines; carry out activities to prepare the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture medicines, including serial production, in the field when providing assistance to the population in emergency situations; to carry out the selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; to calculate the amount of medicines and excipients for the production of all types of modern dosage forms.	U0-1; PR-2	PR-1; UO - 2

			Possesses the skills of conducting the technological process in the industrial production of medicines; control of the technological process in the industrial production of medicines; preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture of medicines, including carrying out intra-pharmacy procurement and serial production, in accordance with the established rules and taking into account the compatibility of drugs and excipients, controlling quality at all stages of the technological process; methods of packaging, labeling and (or) registration of manufactured medicines for dispensing; selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; skills in calculating the amount of medicines and excipients for the production of all types of modern dosage forms.		
14	Production of injection solutions in ampoules, syringes, vials. The concept of thermal and chemical resistance of ampoule glass, the stage of the technological process for the production of ampoules, the characteristics of the equipment used.	PC-1.3; PC-2.1; PC-2.2; PC-2.3 PC-5.1; PC-5.2; PC-5.3; PC-5.4; PC-5.5; PC-5.6	Knows the theoretical foundations of research in the field of evaluating the efficacy and safety of medicines; theoretical foundations of the development of technological documentation in the industrial production of medicines; theoretical foundations of the preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with recipes and (or) requirements; theoretical foundations of the manufacture of medicines, including serial production, in the field in providing assistance to the population in emergency situations Knows how to carry out the technological process in the industrial production of medicines; to control the technological process in the industrial production of medicines; carry out activities to prepare the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture medicines, including serial production, in the field when providing assistance to the population in emergency situations; to carry out the selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; to calculate the amount of medicines and excipients for the production of all types of modern dosage forms. Possesses the skills of conducting the technological process in the industrial production of medicines; control of the technological process in the industrial production of medicines; preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture		PR-1; UO - 2

			of medicines, including carrying out intra-pharmacy procurement and serial production, in accordance with the established rules and taking into account the compatibility of drugs and excipients, controlling quality at all stages of the technological process; methods of packaging, labeling and (or) registration of manufactured medicines for dispensing; selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; skills in calculating the amount of medicines and excipients for the production of all types of modern dosage forms.		
15	Infusion solutions, their classification and features of technology in pharmacy and industrial conditions. Solvents of injection solutions.	PC-1.3; PC-2.1; PC-2.2; PC-2.3 PC-5.1; PC-5.2; PC-5.3; PC-5.4; PC-5.5; PC-5.6	Knows the theoretical foundations of research in the field of evaluating the efficacy and safety of medicines; theoretical foundations of the development of technological documentation in the industrial production of medicines; theoretical foundations of the preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with recipes and (or) requirements; theoretical foundations of the manufacture of medicines, including serial production, in the field in providing assistance to the population in emergency situations Knows how to carry out the technological process in the industrial production of medicines; to control the technological process in the industrial production of medicines; carry out activities to prepare the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture medicines, including serial production, in the field when providing assistance to the population in emergency situations; to carry out the selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; to calculate the amount of medicines and excipients for the production of all types of modern dosage forms. Possesses the skills of conducting the technological process in the industrial production of medicines; control of the technological process in the industrial production of medicines; preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture of medicines, including carrying out intra-pharmacy procurement and serial production, in accordance with the established rules and taking into account the compatibility of drugs and excipients, controlling quality at all stages of the technological process; methods of packaging, labeling and (or) registration of manufactured medicines for dispensing; selection of excipients	U0-1; PR-2	PR-1; UO - 2

			of dosage forms, taking into account the influence of biopharmaceutical factors; skills in calculating the amount of medicines and excipients for the production of all types of modern dosage forms.		
16	Eye dosage forms. Requirements of the GF, features of private technology, quality control (drops, ointments, films). The concept of minisms, tubatins and tubes - droppers. Technology of eye films. Issues of improving eye dosage forms.	PC-1.3; PC-2.1; PC-2.2; PC-2.3 PC-5.1; PC-5.2; PC-5.3; PC-5.4; PC-5.5; PC-5.6	Knows the theoretical foundations of research in the field of evaluating the efficacy and safety of medicines; theoretical foundations of the development of technological documentation in the industrial production of medicines; theoretical foundations of the preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with recipes and (or) requirements; theoretical foundations of the manufacture of medicines, including serial production, in the field in providing assistance to the population in emergency situations Knows how to carry out the technological process in the industrial production of medicines; to control the technological process in the industrial production of medicines; carry out activities to prepare the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture medicines, including serial production, in the field when providing assistance to the population in emergency situations; to carry out the selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; to calculate the amount of medicines and excipients for the production of all types of modern dosage forms. Possesses the skills of conducting the technological process in the industrial production of medicines; control of the technological process in the industrial production of medicines; preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture of medicines, including carrying out intra-pharmacy procurement and serial production, in accordance with the established rules and taking into account the compatibility of drugs and excipients, controlling quality at all stages of the technological process; methods of packaging, labeling and (or) registration of manufactured medicines for dispensing; selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; skills in calculating the amount of medicines and excipients for the production of all types of	U0-1; PR-2	PR-1

			modern dosage forms.		
17	Aerosols as a dosage form. Definition, classification. Technologies used in the manufacture of aerosols. Medical gases. Sprays. Inhalation methods of drug administration. Nebulizers. Inhalers. Evaluation aerodynamic parameters of aerosols.	PC-1.3; PC-2.1; PC-2.2; PC-2.3 PC-5.1; PC-5.2; PC-5.3; PC-5.4; PC-5.5; PC-5.6	Knows the theoretical foundations of research in the field of evaluating the efficacy and safety of medicines; theoretical foundations of the development of technological documentation in the industrial production of medicines; theoretical foundations of the preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with recipes and (or) requirements; theoretical foundations of the manufacture of medicines, including serial production, in the field in providing assistance to the population in emergency situations Knows how to carry out the technological process in the industrial production of medicines; to control the technological process in the industrial production of medicines; carry out activities to prepare the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture medicines, including serial production, in the field when providing assistance to the population in emergency situations; to carry out the selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; to calculate the amount of medicines and excipients for the production of all types of modern dosage forms. Possesses the skills of conducting the technological process in the industrial production of medicines; control of the technological process in the industrial production of medicines; preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture of medicines, including carrying out intra-pharmacy procurement and serial production, in accordance with the established rules and taking into account the compatibility of drugs and excipients, controlling quality at all stages of the technological process; methods of packaging, labeling and (or) registration of manufactured medicines for dispensing; selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; skills in	U0-1; PR-2	

			calculating the amount of medicines and excipients for the production of all types of modern dosage forms.		
18	Powders. Pellets. Physical-chemical and technological properties of powdered medicinal substances. Pelletizing. Technologies for the production of pellets and the equipment used.	PC-1.3; PC-2.1; PC-2.2; PC-2.3 PC-5.1; PC-5.2; PC-5.3; PC-5.4; PC-5.5; PC-5.6	Knows the theoretical foundations of research in the field of evaluating the efficacy and safety of medicines; theoretical foundations of the development of technological documentation in the industrial production of medicines; theoretical foundations of the preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with recipes and (or) requirements; theoretical foundations of the manufacture of medicines, including serial production, in the field in providing assistance to the population in emergency situations Knows how to carry out the technological process in the industrial production of medicines; to control the technological process in the industrial production of medicines; carry out activities to prepare the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture medicines, including serial production, in the field when providing assistance to the population in emergency situations; to carry out the selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; to calculate the amount of medicines and excipients for the production of all types of modern dosage forms. Possesses the skills of conducting the technological process in the industrial production of medicines; control of the technological process in the industrial production of medicines; preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture of medicines, including carrying out intra-pharmacy procurement and serial production, in accordance with the established rules and taking into account the compatibility of drugs and excipients, controlling quality at all stages of the technological process; methods of packaging, labeling and (or) registration of manufactured medicines for dispensing; selection of excipients	U0-1	

			of dosage forms, taking into account the influence of biopharmaceutical factors; skills in calculating the amount of medicines and excipients for the production of all types of modern dosage forms.		
19	Grinding and sieving of solid materials in pharmaceutical technology.	PC-1.3; PC-2.1; PC-2.2; PC-2.3 PC-5.1; PC-5.2; PC-5.3; PC-5.4; PC-5.5; PC-5.6	Knows the theoretical foundations of research in the field of evaluating the efficacy and safety of medicines; theoretical foundations of the development of technological documentation in the industrial production of medicines; theoretical foundations of the preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with recipes and (or) requirements; theoretical foundations of the manufacture of medicines, including serial production, in the field in providing assistance to the population in emergency situations Knows how to carry out the technological process in the industrial production of medicines; to control the technological process in the industrial production of medicines; carry out activities to prepare the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture medicines, including serial production, in the field when providing assistance to the population in emergency situations; to carry out the selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; to calculate the amount of medicines and excipients for the production of all types of modern dosage forms. Possesses the skills of conducting the technological process in the industrial production of medicines; control of the technological process in the industrial production of medicines; preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture of medicines, including carrying out intra-pharmacy procurement and serial production, in accordance with the established rules and taking into account the compatibility of drugs and excipients, controlling quality at all stages of the technological process; methods of packaging, labeling and (or) registration of manufactured medicines for dispensing; selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; skills in calculating the amount of medicines and excipients for the production of all types of modern dosage forms.	U0-1	

20	Tablets as a dosage form. Classification. Basic requirements for tablets. Theoretical foundations of tableting. Excipients. Technological schemes for the production of tablets. Direct pressing of the tablet material. Tablet machines. Dry and wet granulation. Equipment used Modern methods of drying. Tableting. Tablets machinery	PC-1.3; PC-2.1; PC-2.2; PC-2.3 PC-5.1; PC-5.2; PC-5.3; PC-5.4; PC-5.5; PC-5.6	Knows the theoretical foundations of research in the field of evaluating the efficacy and safety of medicines; theoretical foundations of the development of technological documentation in the industrial production of medicines; theoretical foundations of the preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with recipes and (or) requirements; theoretical foundations of the manufacture of medicines, including serial production, in the field in providing assistance to the population in emergency situations Knows how to carry out the technological process in the industrial production of medicines; to control the technological process in the industrial production of medicines; carry out activities to prepare the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture medicines, including serial production, in the field when providing assistance to the population in emergency situations; to carry out the selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; to calculate the amount of medicines and excipients for the production of all types of modern dosage forms. Possesses the skills of conducting the technological process in the industrial production of medicines; control of the technological process in the industrial production of medicines; preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture of medicines, including carrying out intra-pharmacy procurement and serial production, in accordance with the established rules and taking into account the compatibility of drugs and excipients, controlling quality at all stages of the technological process; methods of packaging, labeling and (or) registration of manufactured medicines for dispensing; selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; skills in calculating the amount of medicines and excipients for the production of all types of modern dosage forms.	U0-1; PR-2	PR-1; UO - 2

21	Coating of tablets with shells. Evaluation of the quality of tablets. Packing and packaging of tablets. Biopharmaceutical aspects of tablets. Development prospects.	PC-1.3; PC-2.1; PC-2.2; PC-2.3 PC-5.1; PC-5.2; PC-5.3; PC-5.4; PC-5.5; PC-5.6	Knows the theoretical foundations of research in the field of evaluating the efficacy and safety of medicines; theoretical foundations of the development of technological documentation in the industrial production of medicines; theoretical foundations of the preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with recipes and (or) requirements; theoretical foundations of the manufacture of medicines, including serial production, in the field in providing assistance to the population in emergency situations Knows how to carry out the technological process in the industrial production of medicines; to control the technological process in the industrial production of medicines; carry out activities to prepare the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture medicines, including serial production, in the field when providing assistance to the population in emergency situations; to carry out the selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; to calculate the amount of medicines and excipients for the production of all types of modern dosage forms. Possesses the skills of conducting the technological process in the industrial production of medicines; control of the technological process in the industrial production of medicines; preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture of medicines, including carrying out intra-pharmacy procurement and serial production, in accordance with the established rules and taking into account the compatibility of drugs and excipients, controlling quality at all stages of the technological process; methods of packaging, labeling and (or) registration of manufactured medicines for dispensing; selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; skills in calculating the amount of medicines and excipients for the production of all types of modern dosage forms.	U0-1; PR-2	PR-1

22	Medical capsules as a dosage form. Type of capsules, materials used, capsule production technology.	PC-1.3; PC-2.1; PC-2.2; PC-2.3 PC-5.1; PC-5.2; PC-5.3; PC-5.4; PC-5.5; PC-5.6	Knows the theoretical foundations of research in the field of evaluating the efficacy and safety of medicines; theoretical foundations of the development of technological documentation in the industrial production of medicines; theoretical foundations of the preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with recipes and (or) requirements; theoretical foundations of the manufacture of medicines, including serial production, in the field in providing assistance to the population in emergency situations Knows how to carry out the technological process in the industrial production of medicines; to control the technological process in the industrial production of medicines; carry out activities to prepare the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture medicines, including serial production, in the field when providing assistance to the population in emergency situations; to carry out the selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; to calculate the amount of medicines and excipients for the production of all types of modern dosage forms. Possesses the skills of conducting the technological process in the industrial production of medicines; control of the technological process in the industrial production of medicines; preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture of medicines, including carrying out intra-pharmacy procurement and serial production, in accordance with the established rules and taking into account the compatibility of drugs and excipients, controlling quality at all stages of the technological process; methods of packaging, labeling and (or) registration of manufactured medicines for dispensing; selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; skills in calculating the amount of medicines and excipients for the production of all types of modern dosage forms.	U0-1	

23	Technology and equipment for production of ointments. Technology and equipment for production Plasters.	PC-1.3; PC-2.1; PC-2.2; PC-2.3 PC-5.1; PC-5.2; PC-5.3; PC-5.4; PC-5.5; PC-5.6	Knows the theoretical foundations of research in the field of evaluating the efficacy and safety of medicines; theoretical foundations of the development of technological documentation in the industrial production of medicines; theoretical foundations of the preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with recipes and (or) requirements; theoretical foundations of the manufacture of medicines, including serial production, in the field in providing assistance to the population in emergency situations Knows how to carry out the technological process in the industrial production of medicines; to control the technological process in the industrial production of medicines; carry out activities to prepare the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture medicines, including serial production, in the field when providing assistance to the population in emergency situations; to carry out the selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; to calculate the amount of medicines and excipients for the production of all types of modern dosage forms. Possesses the skills of conducting the technological process in the industrial production of medicines; control of the technological process in the industrial production of medicines; preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture of medicines, including carrying out intra-pharmacy procurement and serial production, in accordance with the established rules and taking into account the compatibility of drugs and excipients, controlling quality at all stages of the technological process; methods of packaging, labeling and (or) registration of manufactured medicines for dispensing; selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; skills in calculating the amount of medicines and excipients for the production of all types of modern dosage forms.	U0-1; PR-2	

24	Extraction herbal remedies. Theoretical foundations of extraction Tinctures and extracts as dosage forms, methods of standardization. Extracts in the pharmaceutical industry.	PC-1.3; PC-2.1; PC-2.2; PC-2.3 PC-5.1; PC-5.2; PC-5.3; PC-5.4; PC-5.5; PC-5.6	Knows the theoretical foundations of research in the field of evaluating the efficacy and safety of medicines; theoretical foundations of the development of technological documentation in the industrial production of medicines; theoretical foundations of the preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with recipes and (or) requirements; theoretical foundations of the manufacture of medicines, including serial production, in the field in providing assistance to the population in emergency situations Knows how to carry out the technological process in the industrial production of medicines; to control the technological process in the industrial production of medicines; carry out activities to prepare the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture medicines, including serial production, in the field when providing assistance to the population in emergency situations; to carry out the selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; to calculate the amount of medicines and excipients for the production of all types of modern dosage forms. Possesses the skills of conducting the technological process in the industrial production of medicines; control of the technological process in the industrial production of medicines; preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture of medicines, including carrying out intra-pharmacy procurement and serial production, in accordance with the established rules and taking into account the compatibility of drugs and excipients, controlling quality at all stages of the technological process; methods of packaging, labeling and (or) registration of manufactured medicines for dispensing; selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; skills in calculating the amount of medicines and excipients for the production of all types of modern dosage forms.	U0-1; PR-2; PR-7	PR-1; UO - 2

25	Rectification of alcohol. Alcoholimetry.	PC-1.3; PC-2.1; PC-2.2; PC-2.3 PC-5.1; PC-5.2; PC-5.3; PC-5.4; PC-5.5; PC-5.6	Knows the theoretical foundations of research in the field of evaluating the efficacy and safety of medicines; theoretical foundations of the development of technological documentation in the industrial production of medicines; theoretical foundations of the preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with recipes and (or) requirements; theoretical foundations of the manufacture of medicines, including serial production, in the field in providing assistance to the population in emergency situations Knows how to carry out the technological process in the industrial production of medicines; to control the technological process in the industrial production of medicines; carry out activities to prepare the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture medicines, including serial production, in the field when providing assistance to the population in emergency situations; to carry out the selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; to calculate the amount of medicines and excipients for the production of all types of modern dosage forms. Possesses the skills of conducting the technological process in the industrial production of medicines; control of the technological process in the industrial production of medicines; preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture of medicines, including carrying out intra-pharmacy procurement and serial production, in accordance with the established rules and taking into account the compatibility of drugs and excipients, controlling quality at all stages of the technological process; methods of packaging, labeling and (or) registration of manufactured medicines for dispensing; selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; skills in calculating the amount of medicines and excipients for the production of all types of modern dosage forms.	U0-1; PR-2; PR-7	

26	Thermal evaporation processes.	PC-1.3; PC-2.1; PC-2.2; PC-2.3 PC-5.1; PC-5.2; PC-5.3; PC-5.4; PC-5.5; PC-5.6	Knows the theoretical foundations of research in the field of evaluating the efficacy and safety of medicines; theoretical foundations of the development of technological documentation in the industrial production of medicines; Knows how to carry out the technological process in the industrial production of medicines; to control the technological process in the industrial production of medicines; carry out activities to prepare the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; to calculate the amount of medicines and excipients for the production of all types of modern dosage forms. Possesses the skills of conducting the technological process in the industrial production of medicines; control of the technological process in the industrial production of medicines; preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; skills in calculating the amount of medicines and excipients for the production of all types of modern dosage forms.	U0-1	
27	Novogalenic medicines. Preparations from fresh medicinal raw materials.	PC-1.3; PC-2.1; PC-2.2; PC-2.3 PC-5.1; PC-5.2; PC-5.3; PC-5.4; PC-5.5; PC-5.6	Knows the theoretical foundations of research in the field of evaluating the efficacy and safety of medicines; theoretical foundations of the development of technological documentation in the industrial production of medicines; theoretical foundations of the preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with recipes and (or) requirements; theoretical foundations of the manufacture of medicines, including serial production, in the field in providing assistance to the population in emergency situations Knows how to carry out the technological process in the industrial production of medicines; to control the technological process in the industrial production of medicines; carry out activities to prepare the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture medicines, including serial production, in the field when providing assistance to the population in emergency situations; to carry out the selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; to calculate the amount of medicines and excipients for the production of all types of modern dosage forms. Possesses the skills of conducting the technological process in the industrial production of medicines; control of the technological	U0-1; PR-2; PR-7	PR-1; UO - 2

			process in the industrial production of medicines; preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture of medicines, including carrying out intra-pharmacy procurement and serial production, in accordance with the established rules and taking into account the compatibility of drugs and excipients, controlling quality at all stages of the technological process; methods of packaging, labeling and (or) registration of manufactured medicines for dispensing; selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; skills in calculating the amount of medicines and excipients for the production of all types of modern dosage forms.		
28	Technology of medicines from raw materials of animal origin.	PC-1.3; PC-2.1; PC-2.2; PC-2.3 PC-5.1; PC-5.2; PC-5.3; PC-5.4; PC-5.5; PC-5.6	Knows the theoretical foundations of research in the field of evaluating the efficacy and safety of medicines; theoretical foundations of the development of technological documentation in the industrial production of medicines; theoretical foundations of the preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with recipes and (or) requirements; theoretical foundations of the manufacture of medicines, including serial production, in the field in providing assistance to the population in emergency situations Knows how to carry out the technological process in the industrial production of medicines; to control the technological process in the industrial production of medicines; carry out activities to prepare the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture medicines, including serial production, in the field when providing assistance to the population in emergency situations; to carry out the selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; to calculate the amount of medicines and excipients for the production of all types of modern dosage forms. Possesses the skills of conducting the technological process in the industrial production of medicines; control of the technological process in the industrial production of medicines; preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture of medicines, including carrying out intra-pharmacy procurement and serial production, in accordance with the established rules and taking	U0-1; PR-2	PR-1; UO - 2

			into account the compatibility of drugs and excipients, controlling quality at all stages of the technological process; methods of packaging, labeling and (or) registration of manufactured medicines for dispensing; selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; skills in calculating the amount of medicines and excipients for the production of all types of modern dosage forms.		
29	Industrial production of syrups. Equipment for filling, capping, packing syrups.	PC-1.3; PC-2.1; PC-2.2; PC-2.3 PC-5.1; PC-5.2; PC-5.3; PC-5.4; PC-5.5; PC-5.6	Knows the theoretical foundations of research in the field of evaluating the efficacy and safety of medicines; theoretical foundations of the development of technological documentation in the industrial production of medicines; theoretical foundations of the preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with recipes and (or) requirements; theoretical foundations of the manufacture of medicines, including serial production, in the field in providing assistance to the population in emergency situations Knows how to carry out the technological process in the industrial production of medicines; to control the technological process in the industrial production of medicines; carry out activities to prepare the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture medicines, including serial production, in the field when providing assistance to the population in emergency situations; to carry out the selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; to calculate the amount of medicines and excipients for the production of all types of modern dosage forms. Possesses the skills of conducting the technological process in the industrial production of medicines; control of the technological process in the industrial production of medicines; preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture of medicines, including carrying out intra-pharmacy procurement and serial production, in accordance with the established rules and taking into account the compatibility of drugs and excipients, controlling quality at all stages of the technological process; methods of packaging, labeling and (or) registration of manufactured medicines for dispensing; selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; skills in calculating the amount of medicines and	U0-1; PR-2; PR-7	PR-1; UO - 2

			excipients for the production of all types of modern dosage forms.		
30	Pharmaceutical incompatibility of ingredients in prescriptions and formulations.	PC-1.3; PC-2.1; PC-2.2; PC-2.3 PC-5.1; PC-5.2; PC-5.3; PC-5.4; PC-5.5; PC-5.6	Knows the theoretical foundations of research in the field of evaluating the efficacy and safety of medicines; theoretical foundations of the development of technological documentation in the industrial production of medicines; theoretical foundations of the preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with recipes and (or) requirements; theoretical foundations of the manufacture of medicines, including serial production, in the field in providing assistance to the population in emergency situations Knows how to carry out the technological process in the industrial production of medicines; to control the technological process in the industrial production of medicines; carry out activities to prepare the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture medicines, including serial production, in the field when providing assistance to the population in emergency situations; to carry out the selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; to calculate the amount of medicines and excipients for the production of all types of modern dosage forms. Possesses the skills of conducting the technological process in the industrial production of medicines; control of the technological process in the industrial production of medicines; preparation of the workplace, technological equipment, medicines and excipients for the manufacture of medicines in accordance with prescriptions and (or) requirements; manufacture of medicines, including carrying out intra-pharmacy procurement and serial production, in accordance with the established rules and taking into account the compatibility of drugs and excipients, controlling quality at all stages of the technological process; methods of packaging, labeling and (or) registration of manufactured medicines for dispensing; selection of excipients of dosage forms, taking into account the influence of biopharmaceutical factors; skills in calculating the amount of medicines and excipients for the production of all types of	U0-1; PR-2	PR-1; UO - 2

			modern dosage forms.		

*Recommended forms of evaluation tools:

1) interview (MA-1), colloquium (MA-2); report, report (MA-3); round table, discussion, controversy, dispute, debate (MA-4); etc.
2) tests (PR-1); tests (PR-2), essays (PR-3), essays (PR-4), term papers (PR-5), scientific and educational reports on practices (PR-6); laboratory work (PR-7); portfolio (PR-8); project (WP-9); business and/or role-playing game (PR-10); case problem (PR-11); workbook (PR-12), etc.
3) simulator (TS-1), etc.

Scale for assessing the level of achievement of learning outcomes for current and intermediate certification *in the discipline "Pharmaceutical Technology"*

Points (rating score)	Levels of achievement Training		*Requirements for formed competencies*
	Current and intermediate certification	*Intermediate certification*	
100 – 86	*Increased*	"credited" / "Excellent"	Freely and confidently finds reliable sources of information, operates with the information provided, has excellent skills in analyzing and synthesizing information, knows all the basic methods of solving problems provided by the curriculum, knows typical mistakes and possible difficulties in solving a particular problem and is able to choose and effectively apply an adequate method for solving a specific problem. trouble
85 – 76	*Base*	"credited" / "Good"	In most cases, he is able to identify reliable sources of information, process, analyze and synthesize the proposed information, choose a method for solving the problem and solve it. Makes single serious mistakes in solving problems, experiences difficulties in rare or complex cases of problem solving, does not know typical mistakes and possible difficulties in solving one or another trouble
75 – 61	*Threshold*	"credited" / "Satisfyingly "	Makes mistakes in determining the reliability of sources of information, is able to correctly solve only typical, most common problems in a specific area (process information, choose a method for solving a problem and solve it)
60 – 0	*Level Not reached*	"not credited" / "Dissatisfied"	He does not know a significant part of the program material, makes significant mistakes, hesitantly, with great difficulty, performs practical work.

Current certification in the discipline "Pharmaceutical Technology"

The current certification of students in the discipline "*Pharmaceutical Technology"* is carried out in accordance with the local regulations of FEFU and is mandatory.

Current certification in the discipline is carried out in the form of control measures (*protection of practical / control work, colloquium, testing)* to assess the actual learning outcomes of students and is carried out by the leading teacher.

For each object, a description of the evaluation procedures is given in relation to the appraisal tools used.

Assessment tools for ongoing control

3rd year, 6th semester (spring)

1. Interview Questions

Topic*:* "**Biopharmacy"**

1. Biopharmacy is one of the main theoretical directions of pharmaceutical technology.

2.Biopharmaceutical terms: drug substance, release, dissolution, completeness of absorption, metabolism, excretion and others.

3. Therapeutic inadequacy of medicinal substances, the causes of its occurrence. Chemical, biological and therapeutic equivalents.

4. Pharmaceutical factors affecting the therapeutic efficacy of drugs.

5. The chemical nature of medicinal substances and its effect on the bioavailability of dosage forms.

6. The physical state of medicinal substances and its effect on the rate of release and absorption.

7. The concept of polymorphism of medicinal substances and the effect of polymorphic modifications on bioavailability.

8. The role of excipients in pharmaceutical technology. The influence of the nature of excipients on the rate of absorption and the effectiveness of dosage forms.

9. The importance and role of the dosage form in the application. Effect of dosage form on stability and bioavailability.

10. The importance of technological processes in the preparation of the dosage form and their effect on therapeutic activity.

11. The importance of the solubilization process in increasing the bioavailability and therapeutic activity of medicinal substances.

12. The mechanism of the solubilization process. The main groups of solubilizers.

13. Determination of absolute and relative bioavailability. Standard dosage form.

14. In vitro methods used to determine the bioavailability and release of medicinal

substances.

15. Methods for determining bioavailability for single and repeated prescriptions of drugs.

16. Classification of "in vitro" methods used to assess the release and dissolution rate of drugs.

17. Characteristics of devices for determining the rate of dissolution with natural and forced circulation of the solvent medium.

18. Characteristics of absorption models of dissolution and distribution of medicinal substances.

19. Calculation of the degree of bioavailability. Pharmacokinetic curves and their analysis.

20. The main directions of improvement and creation of new drugs.

Topic: "Dosing of medicines"

1. Types of scales used in pharmacy practice.

2. The device of calibration and hand scales, the limit of their accuracy.

3. Metrological characteristics of the scales: stability, accuracy (fidelity), sensitivity, constancy of readings and their determination.

4. Identification of weighing errors.

5. What is the name of the amount of mass of medicinal substances prescribed in the prescription: 0.00125 g; 0.12 g; 0.5 g; 0.0248 g; 0.315 g?

6. What measuring instruments are used for volume dosing?

7. What are the main parts of pharmacy burettes and pipettes?

8. What factors affect the accuracy of burette dosing?

9. In what cases is the drop dosing method used?

10. What are the dimensions of the dosing part of a standard dropletter?

11. What factors determine the accuracy of dosing drops?

12. What is the purpose of calibrating a non-standard dropletter?

13. How is a non-standard drop calibration performed?

14. What are the norms of permissible deviations in mass and volume?

Topic: "Powders as a dosage form"

1. Powders as a dosage form.
2. Advantages and disadvantages of powders as a dosage form.
3. Classification of powders by composition, purpose, dosing method.
4. Methods of prescribing powders.
5. The main stages of powder manufacturing.
6. Basic rules for mixing ingredients in powder technology.
7. Dosing and packaging of powders.

8. Basic rules for the design of powders.
9. Evaluation of the quality of powders.

Topic: "Production of aqueous solutions"

1. What are the ways to indicate the concentration of solutions in the recipe?
2. What is the characteristics and classification of aqueous solutions as dosage forms?
3. How is the solubility of substances characterized in GF? What is its use?
4. What are the main requirements for purified water?
5. How to get purified water in a pharmacy?
6. How is water purified before distillation from reducing substances, organic impurities?
7. How to lower the hardness of water before distillation?
8. What filter media are used to clean the solutions?
9. How to prepare a solution of substances with oxidizing properties?
10. What is the concentration of iodine (if not indicated) in Lugol's solutions for internal and external use?
11. What indicators are used to assess the quality of solutions?

Topic: "IUD solutions"

1. Characteristics of high-molecular compounds used in pharmacy practice.
2. Classification of high-molecular compounds by nature of origin.
3. Classification of high-molecular compounds according to the method of dissolution.
4. The use of IUDs in pharmaceutical practice.
5. Features of the preparation of solutions of pepsin, gelatin, starch, methyl cellulose.
6. Rules for adding medicinal mediato IUD solutions.
7. Assessment of the quality of IUD solutions in accordance with the requirements of the GF and other regulatory documents.
8. Packaging, registration for release and storage of IUD solutions.

Requirements for the presentation and evaluation of materials (results):

Formulate a complete and correct answer to the questions of the seminar, logically structure and present the material. At the same time, the student must show knowledge of special literature. To obtain an excellent grade, it is necessary to demonstrate the ability to identify problematic issues in the relevant area, analyze them and offer solutions, give comprehensive answers to clarifying and additional questions.

Evaluation criteria:
- compliance of the speech with the topic, goals and objectives;
- understanding of the topic, the ability to critically analyze information;
- knowledge of study methods and the ability to apply them;
- formation of reasoned conclusions;

2. A set of standard tasks for the test

Topic: "Basic concepts and terms of pharmaceutical technology. State regulation of the production of medicines. Compliance with the sanitary and pharmaceutical regime"

Option 01.

1.Pharmaceutical technology – ...

2. The breadth of the specific action is ...

3. Therapeutic index - ...

4. Give a classification of dosage forms based on disperse systems.

5. Requirements for state registration of medicines are prescribed in which ND?

Option 02.

1. Medicines – ...

2. Therapeutic latitude -...

3. Index of specific therapeutic action - ...

4. Give a classification of dosage forms according to the method of application and route of administration

5. The pharmaceutical quality system at the enterprise is described in which ND?

Topic: "Production of complex powders with potent, coloring and difficult to grind medicinal substances"

Describe the technology, issue a PPK of the following words:

1. Take:
Ethacridine lactate 0.05
Glucose 0.25
Mix, let the powder be made.
Give such doses to the number 6.
Designate. 1 powder 2 times a day.

2. Take:
Riboflavin 0.01
Ascorbic acid 0.1
Sahara 0.3
Mix, let the powder be made.
Give such doses to the number 6.
Designate. 1 powder 3 times a day.

3. Take:
Thiamine bromide
Pyridoxine hydrochloride equally to 0.005
Riboflavin 0.01
Glutamic acid 0.1
Mix, let the powder be made.
Give such doses to the number 10.
Designate. 1 powder 3 times a day.

4. Take:
Riboflavin
Thiamine bromide equally 0.01
Nicotinic acid 0.05
Glucose 0.25
Mix, let the powder be made.
Give such doses to the number 6.
Designate. 1 powder 3 times a day.

5. Take:
Ethacridine lactate 0.05
Boric acid 0.1
Sahara 0.15
Mix, let the powder be made.
Give such doses to the number 6.

6. Take:
Atropine sulfate 0.00025
Papaverine hydrochloride 0.01
Sahara 0.2
Mix, let the powder be made.
Give such doses to the number 6.

Designate. 1 powder 2 times a day.

7. Take:
Menthol 0.01
Amidopyrine 0.3
Mix, let the powder be made.
Give such doses to the number 6.
Designate. 1 powder 3 times a day.

8. Take:
Scopolamine hydrobromide 0.0002
Sahara 0.3
Mix, let the powder be made.
Give such doses to the number 6.
Designate. 1 powder 2 times a day.

9. Take:
Thymol 0.05
Boric acid 1.0
Talcum powder 5.0
Mix, let the powder be made.
Give. Designate. Foot powder.

10. Take:
Atropine sulfate 0.00025
Sahara 0.25
Mix, let the powder be made.
Give such doses to the number 6.
Designate. 1 powder 3 times a day.

11. Take:
Strychnine nitrate 0.0005
Sahara 0.3
Mix, let the powder be made.
Give such doses to the number 6.
Designate. 1 powder 2 times a day.

12. Take:
Camphor 0.05
Analgina 0.15
Amidopyrine 0.2
Mix, let the powder be made.
Give such doses to the number 6.
Designate. 1 powder 3 times a day.

13. Take:
Strychnine nitrate 0.0005
Phytina 0.5
Mix, let the powder be made.
Give such doses to the number 6.
Designate. 1 powder 3 times a day.

14. Take:
Platyphylline hydrotartrate 0.005
Papaverine hydrochloride 0.04
Eufillina 0.2
Mix, let the powder be made.
Give such doses to the number 6.
Designate. 1 powder 3 times a day.

15. Take:
Atropine sulfate 0.0002
Phenobarbital 0.02
Bromocamphorae 0.2
Mix, let the powder be made.
Give such doses to the number 6.
Designate. 1 powder 3 times a day.

16. Take:
Streptocida
Glucose
Boric acids equally to 1.0
Mix, let the powder be made.
Divide into equal parts with the number 5.
Designate. Vaginal injections.

17. Take:
Atropine sulfate 0.00025
Codeine 0.01
Caffeine-sodium benzoate 0.05
Mix, let the powder be made.
Give such doses to the number 6.
Designate. 1 powder 3 times a day.

18. Take:
Reserpine 0.0001
Dibazola 0.03
Barbital-sodium 0.25
Mix, let the powder be made.
Give such doses to the number 6.
Designate. 1 powder 3 times a day.

19. Take:
Codeine phosphate 0.03
Camphor 0.05
Sahara 0.25
Mix, let the powder be made.
Give such doses to the number 6.
Designate. 1 powder 3 times a day.

20. Take:
Camphor 0.2
Sahara 0.2
Mix, let the powder be made.
Give such doses to the number 6.
Designate. 1 powder 3 times a day.

Topic: "Solutions as a dosage form"

1. The student stared the stand, weighed 200.0 purified water into it and dissolved 4.0 sodium bromide; I moved it to a vacation bottle. Did the student do the right thing?

2. When preparing 200 ml of a 10% solution of magnesium sulfate, the student

dissolved 20.0 ml of magnesium sulfate in 200 ml of water and filtered it into a bottle for tempering. What should be taken into account in the manufacture of this solution?

3. When preparing 200 ml of a 10% solution of calcium chloride, the student weighed 20.0 crystalline preparations and dissolved them in 180 ml of purified water. Is the medicine properly prepared?

4. When preparing 200 ml of a 10% solution of calcium gluconate, the student dissolved 20.0 of the drug in 200 ml of purified water. The resulting solution was filtered into a bottle for release. Is the dosage form prepared correctly?

5. To prepare 100 ml of a 1% solution of furacilin, the student measured purified water into a stand and added furacilin. However, the drug did not dissolve. What is the student's mistake?

6. To prepare 200 ml of a 2% solution of boric acid, the student measured 200 ml of purified water and added 4.0 boric acid. What is the student's mistake?

7. To prepare the medicine according to the prescription: sodium bromide 5.0, glucose 15.0, purified water 180 ml, the student measured 180 ml of water and dissolved the specified medicinal substances. Give an assessment of his actions.

Requirements for the presentation and evaluation of materials (results):

The student must show a comprehensive, systematic and in-depth knowledge of the educational material, independently answer the questions, the answer must be distinguished by the accuracy of the terms used, the material is presented consistently and logically.

4th year, 7-8 semester

1. ***Interview Questions:***

1)
2)
3)

Requirements for the presentation and evaluation of materials (results):

2. ***A set of standard tasks for the test***

Subject: "Dispersion in viscous media. Equipment. Ways to stabilize dosage forms - microheterogeneous systems.

Topic: "Technology and standardization of ointments and liniments. Water extractions"

Topic: "Injectable and infusion dosage forms. Organization of production of sterile dosage forms"

Requirements for the presentation and evaluation of materials (results):

The student must show a comprehensive, systematic and in-depth knowledge of the educational material, independently answer the questions, the answer must be distinguished by the accuracy of the terms used, the material is presented consistently and logically.

5th year, 9th semester (autumn)

1. Interview Questions:

"Technology and standardization of tinctures and extracts"

1. Theoretical foundations of extraction.
2. Methods of extraction of plant raw materials.
3. Purification of liquid galenic extracts.
4. Calculations for ethanol dilution.
5. Methods for determining extractives, ethanol concentration, density.
6. Ethanol recovery.
7. Drawing up a material balance.
8. Characteristics of liquid extracts as a dosage form.
9. Percolation as a method of obtaining liquid extracts.
10. Repercolation as a method of obtaining liquid extracts.
11. Apparatus and materials used for the purification of alcohol extracts.
12. Technological scheme for the production of liquid extracts.
13. Calculation of the amount of raw materials and extractant in the manufacture of liquid extracts.
14. Methods for purifying liquid extracts.
15. Quality indicators of liquid extracts.

"Medicinal syrups"

1. Technology of liquid dosage forms, preparation of solutions by weight.
2. Properties of sugars, ways of destruction of sucrose by heating.
3. The range of preservatives used in the pharmaceutical industry.
4. Drawing up a material balance, working prescription.
5. The use of NTD (GF, reference literature) in the manufacture and analysis of dosage forms.
6. Rules for working on a pH meter, refractometer, hydrometer. Know the theoretical foundations of these methods of analysis.
7. Rules for registration of finished products for release.
8. What types of syrups are used in medical practice?
9. Methods for obtaining simple sugar syrup.
10. Microbiological stability of syrups, its provision.
11. Parameters and methods for determining the quality of syrups.
12. Reasons for obtaining low-quality syrups.
13. Technology of syrups using medicinal plant materials.
14. Technology of syrups containing medicinal substances, galenic preparations.

"Pharmaceutical incompatibility"

1. Classification of incompatibilities.
2. What are the causes of physicochemical incompatibilities?
3. Characteristic of chemical incompatibility.
4. List the external signs of the chemical interaction of the ingredients.
5. List ways to overcome incompatibilities.

Requirements for the presentation and evaluation of materials (results):

Formulate a complete and correct answer to the questions of the seminar, logically structure and present the material. At the same time, the student must show knowledge of special literature. To obtain an excellent grade, it is necessary to demonstrate the ability to identify problematic issues in the relevant area, analyze them and offer solutions, give comprehensive answers to clarifying and additional questions.

Evaluation criteria:

- compliance of the speech with the topic, goals and objectives;

- understanding of the topic, the ability to critically analyze information;

- knowledge of study methods and the ability to apply them;

- formation of reasoned conclusions.

2. A set of standard tasks for the test

Topic: "Ointments, plasters, tinctures and extracts"
Option 01.

01. Theoretical foundations of extraction.
02. From 115 kg of belladonna leaves with an alkaloid content of 0.38%, 750 liters of standard tincture containing 0.032% alkaloids were prepared. Make a material balance for the active ingredients and calculate the yield, expenditure and expenditure coefficient.
03. The chemical and pharmaceutical plant received 750 liters of 95.2% ethanol. 130 liters of 80% ethanol and 75 liters of 40% ethanol were consumed. Determine the ethanol residue.
04. How many kilograms of 96% ethanol will it take to strengthen 500 kg of 18%

recuperate to get 30% ethanol.

05. Make a scheme for obtaining a liquid extract 1: 1 from 150 kg of plant material by repercolation with a complete cycle in three percolators.

Option 02

01. Extracts. Classification, extraction methods.

02. How many kilograms of 96% ethanol would it take to strengthen 185 kg of 22% recuperate to get 40% ethanol.

03. Make a scheme for obtaining a liquid extract 1: 1 from 350 kg of plant material by percolation.

04. According to the consignment note, the plant released 440 kg of anhydrous ethanol in the form of ethanol with a strength of 80% by weight. What is the volume and mass of the released ethanol.

05. How many kilograms of 96% ethanol will it take to strengthen 380 kg of 28% recuperate to get 80% ethanol.

Option 03

01. Ethanol recovery and rectification.

02. Calculate the amount of extractant required to obtain 820 liters of extract 1:1 and 1:2 by percolation, if the ethanol absorption coefficient of the raw material is 3.

03. How many liters of 96% ethanol should be added to 400 liters of 16% recuperate to get 75% ethanol? How many liters of 75% ethanol will result from mixing, how much mass will ethanol have?

04. 185 liters of calendula tincture with an ethanol content of 69% (20C) were obtained, for which 340 liters of 69.8% ethanol (19C) were consumed. From the spent raw materials, 45 liters of 36% ethanol (22C) were recovered. Make a material balance for absolute ethanol. Calculate the output, spending, and expense ratio.°°°

05. Make a scheme for obtaining a liquid extract 1: 2 from 210 kg of plant material by repercolation with a complete cycle in three percolators.

Topic: "Pharmaceutical incompatibility"

1. The combination of components in the prescription, in which, as a result of the interaction of medicinal substances with each other or with excipients, the therapeutic effect, physical and chemical properties change, is called

1. Pharmacological incompatibility
2. Pharmaceutical incompatibility
3. Therapeutic incompatibility
4. Biological incompatibility

2. Basic techniques for overcoming pharmaceutical incompatibility:

3. Pharmaceutical incompatibility can be conditionally divided into 2 groups:

_____ and _____.

4. Incompatibilities, in which there is a change only in the physical state of the medicinal substances included in the preparation, are called _____.

5. Incompatibilities, which are accompanied by unforeseen chemical reactions of simultaneously prescribed medicines, are called _____

6. Distribute incompatibilities: *powder moistening, hydrolysis, eutectic formation, oxidation, neutralization, immiscibility, sorption, coagulation, coalescence* into groups.

Requirements for the presentation and evaluation of materials (results):

The student must show a comprehensive, systematic and in-depth knowledge of the educational material, independently answer the questions, the answer must be distinguished by the accuracy of the terms used, the material is presented consistently and logically.

I. Intermediate certification in the discipline "Pharmaceutical Technology"

Intermediate certification of students. Intermediate certification of students in the discipline "Pharmaceutical Technology" is carried out in accordance with the local regulations of FEFU and is mandatory.

Evaluation tools for intermediate control (offset)

List of questions for the test:

6th semester, 3rd year

1. Basic concepts and terms of pharmaceutical technology.
2. Directions of state regulation of drug production.
3. The concept of doses.
4. Basic rules for the design of recipes.
5. Metrological characteristics of scales used in pharmacy practice.
6. Powders as a dosage form. Classification, the main stages of production.
7. Biopharmacy, as one of the main directions of pharmaceutical technology, biopharmaceutical terms. Pharmaceutical factors affecting the therapeutic efficacy of drugs.
8. Classification of liquid dosage forms by purpose and as disperse systems.
9. Methods for indicating the concentrations of solutions in the recipe.
10. What are standard pharmacopoeial solutions?
11. Features of the preparation of liquid medicinal forms by the mass-volume method.
12. Features of the manufacture of concentrated solutions and their use in the technology of medicines.
13. Features of the technology of solutions on non-volatile solvents
14. Features of the technology of solutions on volatile solvents.
15. Characteristics of high-molecular compounds.

List of questions for the test:
8th semester, 4th year

1. The history of the first Russian GMP rules.
2. The main sections of the GMP rules.
3. Rationing the quality of medicines.
4. Personnel. Requirements for management personnel and people working directly in production.
5. Buildings and premises. Classification of clean rooms. Sanitation at the enterprise. Particle pollution and methods to prevent it. What is unidirectional (laminar) airflow?
6. Requirements for overalls for personnel working in clean rooms. Requirements for equipment, conditions for monitoring the cleanliness of equipment.
7. Production process. Validation. Timing of validation and revalidation.
8. Drying in the chemical and pharmaceutical industry.
9. Grinding and classification processes, types of grinding devices.
10. Sterilization. Thermal and chemical sterilization. Ways to maintain the sterility of equipment.
11. Give definitions of the concepts of "asepsis", aseptic conditions.
12. Define the concepts of "sterilization" and "sterility".
13. What is the peculiarity of thermal sterilization?
14. Advantages and disadvantages of liquid dosage forms? Classification of liquid dosage forms?
15. What is "solubility"? How is this concept reflected in chemistry? What substance in solution is considered a solvent?
16. What are the requirements for purified water? What factors affect the quality of treated water? Methods of obtaining purified water?
17. What are their main advantages and disadvantages? Technology of preparation of liniments.
18. Ointments. Their main types. What are the basics of making ointments?
19. Methods for producing hydrophobic, hydrophilic and silicone ointment bases.
20. Ointments-suspensions. The technology of their production on the example of zinc ointment.
21. The main equipment used in the production of ointments.
22. What are the features of the manufacture of emulsion ointments?
23. Methods of homogenization. Ointments-emulsions. Direct and reverse emulsions.
24. What medicinal substances are used for the preparation of homogeneous ointments: a) on hydrophilic bases; b) on lipophilic bases?
25. Ointments-combinations of dispersed systems.Kakimazi are called

combined, and what are the features of their manufacture?

26. What are the features of hydrophilic-based ointments-gels?
27. Tablets as a finished dosage form. Their main advantages and disadvantages.
28. The main technological stages in the production of tablets.
29. Preparation of ingredients for tableting.
30. Dry and wet granulation, granulate drying.
31. The role of sliding, loosening, binders and fillers in the production of tablets.
32. Rotary and eccentric tablet machines, their comparative characteristics and principle of operation.
33. Coating of tablets with shells.
34. Multilayer tablets, tablets with an insoluble skeleton, trituration tablets.
35. Dragee. Dragging boilers. Technological scheme of coating.
36. Features in the production of microdragees, spansul.
37. Ways to prolong the action of drugs.
38. Capsules as receptacles of medicines. Soft and hard capsules. Preparation of the gelatin base, molding and sealing of capsules.
39. Technological scheme for the production of gelatin capsules. Basic requirements for capsules. Explain the benefits of gelatin capsules as a finished dosage form.
40. Suppositories as a finished dosage form. What are their main advantages and disadvantages? How are suppositories classified depending on the route of administration?
41. What suppository bases are used in the production of candles, their preparation.
42. The main technological operations in the production of suppositories? Technological scheme for the preparation of suppositories.
43. Aerosols as a finished dosage form. Their main advantages and disadvantages. Types of inhalation aerosols. Propellants used in production.
44. Types of glasses used for the production of ampoules and their applications.
45. Ampoules as receptacles and their manufacture.
46. The process of ampoule (opening of ampoules, washing, filling, sealing, rejection).
47. Methods for stabilizing solutions used for ampoule.

List of questions for the exam

7 semester, 4th year

1. Basic concepts and terms of pharmaceutical technology.
2. Directions of state regulation of drug production.
3. The concept of doses.
4. Basic rules for the design of recipes.
5. Metrological characteristics of scales used in pharmacy practice.
6. Powders as a dosage form. Classification, the main stages of production.
7. Biopharmacy, as one of the main directions of pharmaceutical technology, biopharmaceutical terms. Pharmaceutical factors affecting the therapeutic efficacy of drugs.
8. Classification of liquid dosage forms by purpose and as dispersed systems.
9. Methods for indicating the concentrations of solutions in the recipe.
10. What are standard pharmacopoeial solutions?Features of the calculation of pharmacopoeial liquids of various groups.
11. Features of the preparation of liquid medicinal forms by the mass-volume method.
12. Features of the manufacture of concentrated solutions and their use in the technology of medicines.
13. Features of the technology of solutions on non-volatile solvents
14. Features of the technology of solutions on volatile solvents.
15. Characteristics of high-molecular compounds.
16. Characteristics of suspensions as dispersed systems and dosage forms, their classification. Advantages and disadvantages.
17. Theoretical foundations of the preparation of suspensions from hydrophilic, non-sharply and sharply hydrophobic substances.
18. Characteristics of emulsions as a dispersed system and dosage form. their classification. Advantages and disadvantages.
19. General rules and methods for the preparation of oil emulsions. Introduction into emulsions of medicinal substances with different physicochemical properties.
20. Types of stability of suspensions and emulsions. Factors influencing their sustainability. Stokes' law.
21. Characteristics of infusions and decoctions as a dosage form. Advantages and disadvantages.
22. Stages of preparation of infusions and decoctions. Calculation of the volume of the extractant using the water absorption coefficient.
23. Characteristics of liniments as dispersed systems and dosage forms, their classification.

24. Characteristics of ointments as a dosage form and dispersed systems. Classification of ointments (according to medical purpose, place of application, consistency and physicochemical properties of the incoming ingredients).

25. Rules for the introduction of medicinal substances into homogeneous (solutions, alloys, extraction), suspension (solid phase up to 5%, more than 5%, more than 25%), emulsion ointments.

26. Definition of suppositories as a dosage form. Classification of suppositories depending on the purpose, on the type of base.

27. Stages of the technological process of suppositories during manual molding. Advantages and disadvantages.

28. Stages of the technological process of suppositories by pouring. Advantages and disadvantages.

29. Rules for the introduction of medicinal substances into the suppository base: water-soluble, fat-soluble, insoluble in base and water.

Typical tasks for the exam 7th semester, 4th year

01. Describe the technology, issue a passport of written control:
Recipe: Acidi ascorbinici 0,1
Glucosi 0,5
Thiamini bromidi 0,05 Misce fiat pulvis
Da tales doses numero 30
Signa: 1 powder 3 times a day

02. Describe the technology, issue a passport of written control:
Recipe: Atropini sulfatis 0,0003 Papaverini hydrochtoridi 0,04
Anaesthesini 0,15
Sacchari 0,2 Misce fiat pulvis
Da tales doses numero 30
Signa: 1 powder 3 times a day

03. Describe the technology, issue a passport of written control:
Recipe: Analgini 3.0
Natrii bromidi 4.0
Aquae purificatae 200 ml Misce. Da.
Signa: 1 tablespoon 3 times a day

04. Describe the technology, issue a passport of written control:
Recipe: Solutionis Acidi hydrochlorici 6% - 100 ml
Da. Signa: Solution No. 2 to Demyanovich. Wipe the affected areas of the skin

05. Describe the technology, issue a passport of written control:
Recipe: Emulsi oleosi 150,0 Mentholi 1,0
Phenylii salicylatis 2,0 Misce. Da.
Signa: 1 tablespoon 3 times a day

06. Describe the technology, issue a passport of written control:
Rp: Bismuthi subnitratis 0,2 Novocaini 0,05
Mentholi 0,1
Solutionis Adrenalini hydrochloride guttas XX
Lanolini 2,0
Vaselini 18,0
Misce fiat unguentum
Da. Signa: Nasal Ointment
07. Describe the technology, issue a passport of written control:
Recipe: Ichthyoli
Acidi borici ana 0,25
Massae gelotinosae quantum satis ut fiat globulus Da tates doses numero 10
Signa: 1 ball 2 times a day

08. How much water should be added to 250 ml of 55% glucose solution to obtain a 50% solution.

09. How many g of sodium bromide must be added to 50 ml of an 18% solution to obtain a 20% solution.

10. How many liters of 96% ethanol should be added to 500 liters of 40% ethanol to get 70% ethanol? How many liters of 70% ethanol will result from mixing?

List of questions for the exam 9th semester, 5th year

1. The role and place of production of finished dosage forms in the domestic chemical and pharmaceutical industry. Basic requirements for these productions.
2. Standardization and classification of finished dosage forms.
3. What are called doses? What are the different doses depending on the strength of action and the degree of toxicity?
4. What are the basic terms and concepts used in the technology of finished dosage forms?
5. What are preservatives used for in the technology of dosage forms?
6. What is the significance of the classification of dosage forms according to the method of administration, the state of aggregation?
7. What are the current requirements for dosage forms?
8. The history of the first Russian GMP rules.
9. The main sections of the GMP rules.
10. Rationing the quality of medicines.
11. Personnel. Requirements for management personnel and people working directly in production.
12. Buildings and premises. Classification of clean rooms. Sanitation at the enterprise. Particle pollution and methods to prevent it. What is unidirectional (laminar) airflow?
13. Requirements for overalls for personnel working in clean rooms. Requirements for equipment, conditions for monitoring the cleanliness of equipment.
14. Production process. Validation. Timing of validation and revalidation.
15. Grinding and classification processes, types of grinding devices.
16. Sterilization. Thermal and chemical sterilization. Ways to maintain the sterility of equipment.
17. Give definitions of the concepts of "asepsis", aseptic conditions.
18. Define the concepts of "sterilization" and "sterility".
19. What is the peculiarity of thermal sterilization?
20. Advantages and disadvantages of liquid dosage forms? Classification of liquid dosage forms?
21. What is "solubility"? How is this concept reflected in chemistry? What substance in solution is considered a solvent?
22. What are the requirements for purified water? What factors affect the quality of treated water? Methods of obtaining purified water?
23. Sterile and aseptically prepared dosage forms. General concepts, history of origin, classification. Requirements for solutions for injection.

24. Features of the manufacture of solutions with thermostable and thermolabile medicinal substances. Methods of stabilization of injection solutions.

25. Filtration of solutions.Ultrafiltration and membrane technologies in pharmaceutical production.

26. Technological scheme of injection solutions of aseptic manufacture.

27. The concept of isotonation of injection solutions. Methods for calculating isotonic concentrations and theoretical osmolarity. Plasma-substituting solutions.

28. Solutions for injection on non-aqueous solvents. Suspensions for injection. Emulsions for parenteral nutrition. Industrial production of suspensions and emulsions.

29. Production of injection solutions in ampoules, syringes, vials. The concept of thermal and chemical resistance of ampoule glass, the stage of the technological process for the production of ampoules, the characteristics of the equipment used.

30. Infusion solutions, their classification and features of technology in pharmacy and industrial conditions. Solvents of injection solutions.

31. Eye dosage forms. Requirements of the GF, features of private technology, quality control (drops, ointments, films). The concept of minisms, tubatins and tubes - droppers. Technology of eye films. Issues of improving eye dosage forms.

32. Theoretical foundations of extraction. Tincture. What is the ratio of raw material and extractant? Classification and standardization of tinctures.

33. Ways to get tinctures. Technological scheme of production of tinctures.

34. Extracts. Dry, thick and liquid extracts.

35. Extractants used to extract active ingredients from medicinal plant materials. Requirements.

36. Methods of preparation of extracts (percollation , repercollation, bismaceration).

37. Drying methods used for the preparation of dry extracts.

38. What are their main advantages and disadvantages? Technology of preparation of liniments.

39. Ointments. Their main types. What are the basics of making ointments?

40. Methods for producing hydrophobic, hydrophilic and silicone ointment bases.

41. Ointments-suspensions. The technology of their production on the example of zinc ointment.

42. The main equipment used in the production of ointments.

43. What are the features of the manufacture of emulsion ointments?

44. Methods of homogenization. Ointments-emulsions. Direct and reverse emulsions. Emulsifiers used to produce them. Methods of dispersion of ointments-

emulsions.

45. What medicinal substances are used for the preparation of homogeneous ointments: a) on hydrophilic bases; b) on lipophilic bases?

46. Ointments-combinations of dispersed systems.Kakimazi are called combined, and what are the features of their manufacture?

47. What are the features of hydrophilic-based ointments-gels?

48. Tablets as a finished dosage form. Their main advantages and disadvantages.

49. The main technological stages in the production of tablets.

50. Preparation of ingredients for tableting.

51. Dry and wet granulation, granulate drying.

52. The role of sliding, loosening, binders and fillers in the production of tablets.

53. Rotary and eccentric tablet machines, their comparative characteristics and principle of operation.

54. Coating of tablets with shells.

55. Multilayer tablets, tablets with an insoluble skeleton, trituration tablets.

56. Dragee. Dragging boilers. Technological scheme of coating.

57. Features in the production of microdragees, spansul.

58. Ways to prolong the action of drugs.

59. Capsules as receptacles of medicines. Soft and hard capsules. Preparation of the gelatin base, molding and sealing of capsules.

60. Technological scheme for the production of gelatin capsules. Basic requirements for capsules. Explain the benefits of gelatin capsules as a finished dosage form.

61. Suppositories as a finished dosage form. What are their main advantages and disadvantages? How are suppositories classified depending on the route of administration?

62. What suppository bases are used in the production of candles, their preparation.

63. The main technological operations in the production of suppositories? Technological scheme for the preparation of suppositories.

64. Aerosols as a finished dosage form. Their main advantages and disadvantages. Types of inhalation aerosols. Propellants used in production.

65. What are novogalenic preparations? How do they differ from tinctures?

66. What are the ways to obtain new galenic drugs?

67. What are organopreparations? Characteristics, classification, technological schemes for the production of organopreparations.

68. What are enzyme preparations?

69. Pharmaceutical incompatibility. Classification, examples.
70. Children's dosage forms. Features of the technology.
71. Rectification of alcohol. Alcoholimetry.
72. Thermal evaporation processes.
73. Industrial production of syrups.Equipment for filling, capping, packing syrups.

Typical tasks for the exam 9th semester, 5th year

1. How much water needs to be added to bring ***2*** liters of sugar syrup with a density of 1,350 to the standard (1,301-1,313)
2. How many kilograms of 96% ethanol would it take to strengthen 250 kg of 30% recuperate to get 80% ethanol.
3. 120 liters of motherwort tincture containing 67% ethanol were obtained, for which 180 liters of 70.4% ethanol were consumed. From waste raw materials recovered

140 liters of 19.37% ethanol. Make a material balance for absolute ethanol. Calculate the output, spending, and expense ratio.

4. Calculate the amount of extractant and raw materials to obtain 500 liters of liquid extract of Eleutherococcus ($K_{\text{alcohol absorption}}$ 1.9; $K_{\text{consumable}}$ 1.012).
5. Calculate the amount of extractant and raw materials to obtain 300 liters of eucalyptus $_{\text{tincture}}$ ($K_{\text{alcohol absorption}}$ 3.5; $K_{\text{consumable}}$ 1.012).
6. The form gives candles from a pure fat base weighing 3.5 g. Calculate

the amount of fat base required for the manufacture of 600 candles containing 0.15 g each. basic bismuth nitrate and 0.1 g. zinc oxide. K expendable 1.18.