Federal State Autonomous Educational Institution of Higher Education
"Peoples' Friendship University of Russia"

Medical Institute
(name of the main educational unit (PMO) - the developer of the postgraduate program)

Department of Pharmaceutical and Toxicological Chemistry
(name of the basic educational unit (BUE) - the developer of the postgraduate program)

SCIENTIFIC ACTIVITY PLAN

Scientific specialty:

3.4.2. Pharmaceutical chemistry, pharmacognosy
(code and name of scientific specialty)

Pharmaceutical Chemistry:

3.4. Pharmaceutical sciences
(name of postgraduate program)

2022

1. GOALS AND OBJECTIVES OF THE DISCIPLINE

The purpose of mastering the discipline "Pharmaceutical Chemistry" is to prepare for candidate exams, as well as the development of in-depth knowledge and the acquisition of professional competencies of a researcher in the field of cardiology- methodology of scientific research.

Objectives of the discipline:

– study of methods of research of biologically active substances of synthetic and natural origin, ways of developing new medicines;

– identification of connections and patterns between the structure of a substance and its properties;

– study of the storage conditions of medicines and possible changes in properties during storage;

– mastering the methods of studying the physical and chemical properties of medicinal substances, as applied to their quality control;

– study of ways to improve the principles of standardization and the development of quality standards that ensure the therapeutic activity and safety of medicines;

– mastering the methods of validation of existing methods of quality control of medicines;

– understanding of the social and medical significance of pharmaceutical chemistry and the role of medicines in medicine.

– integration of pharmaceutical chemistry with core disciplines (pharmacology, pharmaceutical technology, pharmacognosy, toxicological chemistry, organization and economics of pharmacy).

2. REQUIREMENTS FOR THE RESULTS OF MASTERING THE DISCIPLINE:

The process of studying the discipline "Pharmaceutical Chemistry" in preparation for candidate exams.

As a result of studying the discipline, the graduate student must:
To know:

- Fundamentals of pharmacopoeia analysis methods;
- the specifics of the terminology of medicinal compounds and pharmacopoeia analysis in general;
- Latin and chemical terminology;
- features of pharmacokinetics and pharmacodynamics of drugs, taking into account the peculiarities of their physico-chemical properties.

To be able to:

- graphically depict the structure of the object;
- to adapt the acquired knowledge and skills to solving specific tasks related to

professional activities in the field of standardization and quality control of medicines;
give a general description of physical and chemical properties;
to choose and theoretically justify identification reactions;
-choose the optimal method of quantitative determination of the medicinal substance;
-to present the results obtained in laboratory studies in the form of reports, oral reports with presentations.

To have:

-modern instrumental methods of drug determination, primarily HPLC;
-methods of chemical and mathematical calculations;
-methods of processing the results of quantitative determination of drugs in biomaterials.

The above competencies of graduate students are developed during the fulfillment of the requirements for the implementation of the basic educational program, as well as during the formation of interpersonal relationships.

3. SCOPE OF DISCIPLINE AND TYPES OF ACADEMIC WORK

The total labor intensity of the discipline is 4 credits (144 hours).

Type of study work		**TOTAL, ac.h.**	**Course**			
			1	**2**	**3**	
Contact work, ac.h.		*60*		*60*	-	-
including:						
Lectures (LL)		30		30	-	--
Laboratory work (LW)						
Practical/seminar classes (SP)		30		30	-	-
Independent work of students, ac.h.		*48*		*48*	-	-
Control (credit with grade), ac.h.		*36*		*36*	-	-
Total labor input of the discipline	acc.h.	**144**		**144**	-	-
	credit	**4**		**4**	-	-

4. THE CONTENT OF THE DISCIPLINE

Table 4.1. Content of the discipline (module) by type of academic work

Name of the discipline section	Content of the section	Type of academic work
Section 1. Harmonization of pharmacopoeias – general approaches to drug quality control	Tasks of harmonization of pharmacopoeias of different states. Examples of interpharmacopoeial analysis of the monographs. Processing of pharmaceutical analysis results. Validation of analytical techniques. Thermal analysis in pharmacopoeias of different countries. Determination of the melting point of substances in accordance with the requirements of monographs. Pharmacopoeia control of water quality. Methods for determining the water content in medicines. Pharmacopoeia purity tests. Test for the maximum content of heavy metal impurities in the drug. Chemical analysis in the quality control of medicines. Part I. Chromogenic and precipitation reactions. Chemical analysis in the quality control of medicines. Part II. Titrimetric methods in pharmacopoeias.	Lectures (L), Seminar and Practical Classes (SPC)
Section 2. Harmonization of pharmacopoeia – Optical methods in pharmacopoeia analysis	Optical methods in pharmacopoeia analysis. Refractometry. Optical methods in pharmacopoeia analysis. Polarimetry. Circular dichroism. Optical spectroscopy in pharmacopoeia analysis. Spectroscopy of the ultraviolet and visible regions. Optical spectroscopy in pharmacopoeia analysis. Infrared spectroscopy.	L, SPC

Section 3. Harmonization of pharmacopoeia – Chromatographic methods in pharmacopoeia analysis	Pharmacopoeia chromatographic analysis. Chromatography in a thin layer of sorbent. Pharmacopoeia chromatographic analysis. Gas chromatography. High-performance liquid chromatography. Analytical aspects of studying the bioequivalence of generic drugs.	L, SPC

5. MATERIAL AND TECHNICAL SUPPORT OF THE DISCIPLINE

Type of Lab	**Equipment of the Lab**	**Specialized educational/laboratory equipment, software and materials for the development of the discipline** (if necessary)
Lecture hall	Lab 448 at the address Moscow, Miklukho-Maklaya str. 5/2 for conducting lecture-type classes for 30 seats, equipped with a set of specialized furniture; a board (screen) and multimedia presentation equipment.	A set of specialized furniture; technical means: multimedia projector, laptop, plasma panel, magnetic board, a set of educational videos and presentations, a set of analog and digital radiographs, educational posters and tables. Software: Microsoft products (OS, office application package, including MS Office/ Office 365, Teams, Skype.
For seminars and laboratory classes	A set of specialized furniture Spectrophotometer Cary-630 pH meter pH-410 "Aquilon" pH meter rV-11 "Sartorius" Abbe "KOM3" refractometer (4) ATP-02 "Aquilon" Titrator Circular polarimeter CM-3 "ZOMS" (2) Suhozhar cabinet "BINDER FD-23" Cabinets with reagents (6) Cabinets with laboratory equipment (5) Dark room CN-6 for viewing chromatograms "Vilber Loumat" Moscow, Miklukho-Maklaya str., 8/ 2 Lab 447	
For seminars and laboratory classes	A set of specialized furniture IR Fourier spectrometer Cary-630 Agilent + PC	

Type of Lab	Equipment of the Lab	Specialized educational/laboratory equipment, software and materials for the development of the discipline (if necessary)
	RF-6000 Spectrofluorimeter, Shimadzu+PC Zetasizer Nano ZS dynamic Light Scattering laser system, Malvern+PC Atago POL-1/2 polarimeter with Peltier temperature control system Altami BIO 2 + PC Microscope Particle Size Analyzer Mastersizer 2000 Malvern pH meter pH-410 "Aquilon" Refractometer Abbe "KOM3" ATP-02 "Aquilon" titrator Water bath Memmert WNB 7-45 Scales laboratory Scales GR 200 Exhaust cabinet MM 396 01 S Moscow, Miklukho-Maklaya str., 10, bldg. 2 Aud 228	
For seminars and laboratory classes	An auditorium for independent work of students (can be used for seminars and consultations), equipped with a set of specialized furniture and computers with access to electronic educational tools.	

6. EDUCATIONAL, METHODOLOGICAL AND INFORMATIONAL SUPPORT OF THE DISCIPLINE

Electronic educational resources, databases, information and reference and search engines:

Electronic library system of the RUDN lib.rudn.ru. Scientific Electronic Library (http://elibrary.ru/defaultx.asp). Universal Library ONLINE (http://biblioclub.ru).

Elsevier Electronic Magazine Library (http://www.elsevier.com/about/open - access/open-archives).

nlm.nih.gov "bsd/pmresources.html - Medline – bibliographic database of articles on medical sciences

http://www.pubmed.gov / - database of medical and biological publications

www.eLibrary.ru – scientific electronic library

www.pnb.rsl.ru - Russian State Library (RSL), Moscow www.nlr.ru - Russian National Library (RNB), St. Petersburg www.orel.rsl.ru - Open Russian RSE Electronic Library (OREL) http://www.iqlib.ru — An online library of educational publications, which contains electronic textbooks, reference and teaching aids. Convenient search by keywords, individual topics and branches of knowledge

www.biblioclub.ru - Electronic library system "University Library-online"

http://toxnet.nlm.nih.gov/index.html - integrated database network, search engine dedicated to toxicology, hazardous substances and environmental studies.

Main literature:

1. Pharmaceutical Chemistry [Text]: Textbook / Edited by T.V. Pleteneva. - M.: GEOTAR-Media, 2017. - 816

2. Standardization and quality control of medicines. Pharmacopoeial methods of analysis [Electronic resource]: A textbook for 5th-year full-time and 4th-year correspondence students of the Faculty of Medicine studying in the specialty "Pharmacy" / T.V. Pleteneva [et al.]; Edited by T.V.

Pletenevoy. - Electronic text data. - Moscow : RUDN Publishing House, 2012. - 145 p.

Additional literature:

1. Pleteneva T.V. Drug analysis and quality control [Electronic resource]: Course Book / T.V. Pleteneva, M.A. Morozova, E.V. Uspenskaya. - M., 2017. - 114 p. http://lib.rudn.ru/MegaPro/UserEntry ?Action=Rudn_FindDoc&id=387341&idb=0

2. Guidelines on instrumental research methods in the development and examination of the quality of medicines [Text] / S.N. Bykovsky [et al.]; Edited by S.N. Bykovsky, I.A. Vasilenko, M.I. Kharchenko, A.B. Belov, et al. - M. : Pero, 2014. - 656 p.

3. Quality control of medicines by chromatography in a thin layer of sorbent [electronic resource]: A textbook for correspondence students of the Faculty of Medicine specialty "Pharmacy" / Comp. E.V. Uspenskaya, E.Y. Shishova; edited by T.V. Pleteneva. - electronic text data. - M.: RUDN Publishing House, 2011. - 56 p.

7. EVALUATION MATERIALS AND A POINT-RATING SYSTEM FOR ASSESSING THE LEVEL OF COMPETENCE FORMATION IN THE DISCIPLINE

Evaluation materials and a score-rating system for assessing the development of the discipline are presented in the Appendix to this Work Program of the discipline.

Программа составлена в соответствии с требованиями ОС ВО РУДН.

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