

Catalog of elective disciplines

1. Department: Pharmaceutical and Toxicological Chemistry

2. Level of preparation: undergraduate

3. Educational program: 6B10106 - «Pharmacy»

4. Course: 2

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

6. Number of credits: 5 credits

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

8. Tasks of the curriculum:

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

9. Discipline content:

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

10. Justification of the choice of discipline:

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

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

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

11. Learning outcomes (competencies):

Knowledge (cognitive sphere)	Skills and skills (psychomotor sphere)	Personal and professional competencies (relationships)
• the subject and tasks of the pharmaceutical analysis, the procedure and principles of its organization and conduct; • modern physical, chemical and physicochemical methods used in pharmaceutical analysis; • common pharmacopoeial research methods used to control the quality of medicines;	• demonstrates the ability to work with the regulatory and technical documentation for monitoring the quality and safety of drugs; • interprets the results of its own laboratory work and gives an opinion in accordance with the requirements of regulatory	- conducts all types of pharmaceutical analysis on quality control of medicines at the stages of development, production, storage and use; • uses modern physico-chemical (instrumental) methods for identification, analysis of purity and

• modern nomenclature and classification of drugs; • the interrelationship of the chemical structure with the pharmacological activity of the drugs underlying the production of new biologically active compounds; • sources and methods of obtaining medicines that form quality requirements (content of initial, intermediate, by-product and other quality indicators); • physical and chemical properties of drugs that determine the choice of methods of analysis, drug form, stability and storage conditions.	documents on the quality of medicines; • demonstrates the ability to work with scientific pharmaceutical and medical literature, as well as to evaluate domestic and foreign experience on research topics.	quantitative determination of drugs.
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12. Prerequisites: analytical chemistry, organic chemistry, general research methods and analysis of drugs, pharmaceutical chemistry.

13. Post requisites: toxicological chemistry, pharmacognosy.

14. Literature:

основная:

на русском языке:

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

на казахском языке:

1. Арыстанова Т.Ә. Фармацевтикалық химия: оқулық.т.1-Алматы: «Эверо», 2015.-592 б.
2. Арыстанова Т.Ә. Фармацевтикалық химия: оқулық.т.2-Алматы: «Эверо», 2015.-602б.
3. Қазақстан Республикасының Мемлекеттік фармакопеясы.-Алматы: «Жібек жолы», 2008.- 1 Т.-592б.
4. Қазақстан Республикасының Мемлекеттік фармакопеясы.-Алматы: «Жібек жолы», 2009.-

2 Т.-8046.

5. Қазақстан Республикасының Мемлекеттік фармакопеясы.-Алматы: «Жібек жолы», 2014.- 3 Т.-7096.
6. Краснов, Е. А. Фармациялық химия сұрақтар мен жауаптар түрінде : оқу құралы = Фармацевтическая химия в вопросах и ответах: учебное пособие. - М.: ГЭОТАР-Медиа, 2016. - 704 с
7. Ордабаева С.К., Қарақұлова А.Ш. Глицирризин қышқылы тундыларының дәрілік препараттарының бірыңғайланған сапасын бақылау әдістемелерін жасау: ғылыми-әдістемелік нұсқау.-Шымкент: «Әлем».- 2013.-92 б.

электронные ресурсы:

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

дополнительная:

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

1. **Department:** Technology of medicines and Pharmacognosy
2. **Level of education:** Bachelor's degree
3. **Educational program:** Pharmacy (accelerated 2g)
4. **Year of study:** 1
5. **Name of the elective discipline:** Project-oriented activity in pharmacy.
6. **Number of credits:** 3
7. **The purpose of the discipline:** To form students' real understanding of the future profession of a pharmacist, its role and purpose in modern society.
8. **Content of the discipline:** Pharmaceutical activity in the field of circulation of medicines, in the chemical and toxicological departments of the Center for Forensic Medicine, in the field of education and science, in the standardization and certification bodies of medicines. Project-based learning. The concept of the project and its distinctive features. The essence of project management. The place and role of project management in the field of pharmacy research. Project management methodology.
9. **Objectives:** to familiarize students with the main directions of future professional activity in the field of public drug provision; It will prepare students for more successful mastering of the disciplines studied at the Faculty of Pharmacy and determining the individual learning trajectory in the educational process.; – contribute to the selection of intellectual, personal, and business qualities, awareness of their inclinations, and understanding of the value and meaning of their future activities in their chosen profession. – To familiarize students with project-oriented activities. The concept of the project and its distinctive features. The essence of project management. The place and role of project management in the field of pharmacy research. Project management methodology.
10. **Justification of the choice of the discipline:** To form students' real understanding of the future profession of a pharmacist, its role and purpose in modern society.societies.

11. Learning outcomes:

LO1	Knowledge and understanding: demonstrates knowledge of the main types of professional activity, terminology used in the field of pharmaceutical activity, is guided by the nomenclature of pharmaceutical positions, refers to the collection of legislative and regulatory legal acts regulating pharmaceutical activity in the Republic of Kazakhstan.
LO2	Application of knowledge and understanding: He uses the current regulatory legal acts regulating pharmaceutical activity, is guided by the main problems of modern science, uses the acquired knowledge in understanding the main problems, directions and prospects of pharmacy development.
LO3	The formation of judgments: Formulates arguments for the ability to promote a healthy lifestyle, conducts disease prevention activities.
LO4	Communication skills: able to impart their own knowledge and skills to students
LO5	Learning skills or learning abilities: He is able to present personal judgments, formalize them in the form of an abstract, make presentations and present them at practical classes, student circle meetings, student scientific conferences and self-determination in the profession.
LO6	Knows the methods of scientific research and academic writing and applies them in the field under study: he has the skills to work with educational, reference literature, systematization of information and uses it to solve specific problems.

12. Prerequisites: botany, analytical chemistry, organic chemistry, information and communication technologies.

13. Post-requirements: pharmacognosy-1, organization of pharmaceutical activity and history of pharmacy, technology of dosage forms, industrial technology of medicines, introductory practice.

14. Literature

In the Kazakh language

Main:

1. Sapakbai, M. M. Pharmacy tarikhy:okukuraly / KR densaulyksaktauministrliigi; OKFA. - Shymkent:Zhasulan, 2014. - 172 bet.

2. Saifulina, N. F. Pharmacy tarikhy: okulyk = History of pharmacy: textbook / Ed. and rec. to ed. Academic Council of the KSMU. - Almaty :Evero, 2014. - 260 pages
3. Arystanov, J. M. Introduction to the specialty "Pharmacy": textbook. manual / Reviewed and rec. to be released on the market. Learned. The Council of the MUA. - Almaty: Evero, 2015. - 132 p.
4. History of pharmacy : a textbook / J. M. Arystanov. Almaty : Medet Group, 2022. 194 p. 5. J. M. Arystanov. Introduction to the specialty "Pharmacy": a textbook / - Almaty Medet Group, 2022. - 148 p.

Additional information:

1. Tulemisov S.K., Zhakipbekov K.S. The main aspects of project management in the creation of pharmaceutical production of ready-made dosage forms. The monograph. 2017 Orynbayeva A.D. Pharmacy salasyndagy mamandardy dayarlau ushin akparattyk technologiylar negizinde pharmaceutikalyk kenes berudin adistemelik keshenin kuru: dis. med. gyl. magister akad. darezhesin izdenuge arnalgan / A.D. Orynbayeva. Shymkent: OKMA, 2019. 73 bet. +e-wholesale. disk
2. Orynbayeva, A.D. Pharmacy salasyndagy mamandardy dayarlau ushin akparattyk technologiylar negizinde pharmaceutikalyk kenes berudin adistemelik keshenin kuru: dis.med.gyl.magister akad. darezhesin izdenuge arnalgan. Shymkent: ALMA Publ., 2019. 73 bet.
3. Collection of Legislative and regulatory legal acts regulating pharmaceutical activity in the Republic of Kazakhstan: collection / comp. B. K. Makhatov [et al.]. Shymkent: Zhasulan, 2017. 380 p.
4. Kazakhstan Republikasyndagi pharmaceutikalyk kyzmetti retteitin zannamalyk zhane normativtik- kutyktyk aktiler zhinagi: zhinak / B. K. Makhatov - Shymkent: Zhasulan, 2016. 316
5. Boldysh, S. K. Chronicle of the history of pharmacy in Kazakhstan: a monograph / S. K. Boldysh; Approved by Scientists. By the Council of the KSMU. Almaty: Evero Publ., 2014. 168 p.
6. Kazakhstan Republikasyndagi pharmaceutikalyk kyzmetti retteitin Zannamalyk zhane normativtik-kutyktyk aktiler zhinagi: zhinak / B. K. Makhatov [zh. b.]; UFA adist. Kenesi Usyngan. Almaty: Evero Publ., 2014. 228 bet. p.
7. Arystanov J. M. Pharmaceutikalyk kyzmetti uyymdastyru negizderi: oku kuraly / J. M. Arystanov. - Almaty: New book, 2022. - 256 bet.
8. Arystanov, J. M. Pharmacy salasyndağı management negizderi: a practical course / J. M. Arystanov. - Almaty: New book, 2022. - 160 bet
9. Arystanov J. M. Farmaciyanyn uyymdastyrylyu: oku kuraly / J. M. Arystanov. - Almaty: New book, 2022. - 120 bet.
10. Lecture complex on the discipline "Fundamentals of design and equipment of production" [Text] : lecture complex / Department of Pharmaceutical Production Technology. Shymkent : SKGFA, 2015. 74 p.
11. The State Pharmacopoeia of the Republic of Kazakhstan. Vol. 1. Almaty: Zhibek Zholy Publishing House, 2015. 720 p.
12. The State Pharmacopoeia of the Republic of Kazakhstan, vol. 3. Almaty: Zhibek Zholy Publishing House, 2014, 872 pp.

Electronic resource:

1. The UMKD of the discipline is posted on the educational portal of the UCMA <https://ukma.kz>
2. The YUKMA Electronic Library - <https://e-lib.skma.edu.kz/genres>
3. Republican Interuniversity Electronic Library (RMEB) – <http://rmebrk.kz/>
4. Aknurpress Digital Library - <https://www.aknurpress.kz/>
5. The Epigraph Electronic Library - <http://www.elib.kz/>
6. Epigraf - multimedia textbook portal <https://mbook.kz/ru/index/>
7. EBS IPR SMART <https://www.iprbookshop.ru/auth>
8. Information and legal system "Zan" - <https://zan.kz/ru>
9. Medline Ultimate EBSSO
10. eBook Medical Collection EBSSO
11. Scopus - <https://www.scopus.com/>

Online resource:

1. Arystanov J.M. Introduction to the specialty "Pharmacy": A textbook / J.M. Arystanov. Almaty: Evero Publ., 2020. https://www.elib.kz/ru/search/read_book/182/
2. "Pharmacy tarikhy" pani boyynsha daris kesheni. Mamandyk: 5B110300-"Pharmacy" = Lecture abstracts on the discipline "History of pharmacy". Specialty: 5B110300- "Pharmacy": lectionartesis / KDSM OSMFA SHZHK RMK; Pharmacy isin uyyymdastyru zhane baskaru Department - Electron. text data. (216 Mb). Shymkent: B. zh., 2013. 76 bet. e. wholesale. Disk
3. Sayfulina N.F., Sultanov A.K. Pharmacy tarikhy: Okulyk. Almaty: Evero Publ., 2020.
4. 320 bet. https://www.elib.kz/ru/search/read_book/381/
5. "Pharmaciyanyn baskaryluy zhane ekonomikasy" pani boyynsha daris kesheni. Mamandyk: 5B110300-"Pharmacy"= Abstracts of lectures on the discipline "Management and economics of pharmacy".: lektiylar theses / KRDSM SHZHK RMK; OKFA; Pharmacy isin uyyymdastyru zhane baskaru department. - Shymkent: 2013. - 92
6. Decree of the Prime Minister of the Republic of Kazakhstan dated October 6, 2020 No.
7. "On approval of the Comprehensive Plan for the development of the pharmaceutical and Medical Industry" for 2020-2025 <https://adilet.zan.kz/rus/docs/R2000000132>
8. Order of the Ministry of Health of the Republic of Kazakhstan dated October 28, 2020 No. KR DSM-165/2020. Registered with the Ministry of Justice of the Republic of Kazakhstan on October 30, 2020, No. 21545 "On Approval of the Rules for Conducting Stability Studies, Establishing Shelf Life and repeated control of Medicines by the Manufacturer of a medicinal product" <https://adilet.zan.kz/rus/docs/V2000021545#z7>
9. Order of the Acting Ministry of Health of the Republic of Kazakhstan dated February 4, 2021 No. KR DSM-15. Registered with the Ministry of Justice of the Republic of Kazakhstan on February 9, 2021 No. 22167 "On Approval of Good Pharmaceutical Practices" <https://adilet.zan.kz/rus/docs/V2100022167>
10. Order of the Ministry of Health of the Republic of Kazakhstan dated December 23, 2020 No. KR DSM-319/2020. Registered with the Ministry of Justice of the Republic of Kazakhstan on December 24, 2020 No. 2189 "On Approval of the Code of Honor of Medical and Pharmaceutical Workers of the Republic of Kazakhstan" <https://adilet.zan.kz/rus/docs/V2000021890>
11. Order of the Ministry of Health of the Republic of Kazakhstan dated December 21, 2020 No. KR DSM-305/2020. Registered with the Ministry of Justice of the Republic of Kazakhstan on December 22, 2020 No. 21856 "On approval of the nomenclature of specialties and specializations in the field of healthcare, nomenclature and qualification characteristics of positions of healthcare workers" <https://adilet.zan.kz/rus/docs/V2000021856#z1343>