Department of pharmaceutical and toxicological chemistry Working curriculum of the discipline (Syllabus) Educational program 6B07201 "Pharmaceutical manufacturing technology"

Discipline code: MOFA 4201

Discipline title: Methods and equipment for pharmaceutical analysis

Prerequisites: Inorganic chemistry, organic chemistry

Post-requisites: Professional activities

Cycle: CS

Academic year: 2024-2025

Year: 4
Term: VII

Number of credits 120 hours/ 4 credits

(ECTS):

Component: EC

OŃTÚSTIK-QAZAQSTAN MEDISINA AKADEMIASY «Оңтүстік Қазақстан медицина академиясы» АҚ	SKMA -1979- ACADEMY AO «Южно-Казахстанская	медицинская академия»
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2. Course description (maximum 50 words)

Physicochemical (Instrumental) Methods for Pharmaceutical Analysis of Drugs. Principles and conditions for conducting work on equipment (instruments), sample preparation for analysis, interpretation of the obtained results of instrumental analysis. Refractometry, polarimetry. Methods based on the absorption of electromagnetic radiation: in the UV, visible (photoelectric colorimetry (FEC)), and IR regions. Chromatographic methods.

3.	Summative assessment form	St. Wo	6 77. 17 94 Vg. 60,"
3.1	Testing	3.5	Coursework
3.2	Writing	3.6	Essay
3.3	Oral ⋞	3.7	Project
3.4	Assessment of practical skills	3.8	Other (specify)
1	Discipline objectives	70, 1	15 C/L VO 60 1111 1 1/2

4. Discipline objectives

Training in the most important instrumental analysis methods and work on modern pharmaceutical equipment necessary to ensure the quality and safety of drugs.

5. Final learning outcomes (LO disciplines)

LO1 Demonstrates knowledge and understanding in the area of study, based on advanced knowledge in this area:

- demonstrates knowledge and understanding of the purpose of chemical-technological processes and the implementation of pharmaceutical analysis of biologically active compounds on modern equipment.

LO2. Apply knowledge and understanding at a professional level, formulate arguments and solve problems in the studied area:

- apply the theoretical foundations of general chemical technology to obtain chemical substances, conduct qualitative and quantitative analysis, own the technique of performing on modern analytical equipment for pharmaceutical analysis of drugs;
- form arguments and solve problems in the studied area, based on knowledge in the field of natural sciences and on the skills of acquired new knowledge in the disciplines of the module;
- formulate arguments and solve problems of cause-and-effect relationship between the actual result of synthesis and the requirements of regulatory documents for the quality of the substance at the stages of obtaining, production.

LO3. Collects and interprets information to form judgments taking into account social, ethical and scientific considerations:

- interprets the choice of modern equipment and devices based on the physical and chemical properties of the compounds being studied, analyzes and evaluates the tasks set, finds something new in solving problems in the field of professional activity.

LO4 Communicates information, ideas, and problem solutions to both specialists and non-specialists:

	conducting chem	ates information, ideas, and problem solutions to specialists in ical-technological processes and documenting the results obtained, specialists on the quality of medicines.					
LO5	area: - has the skills to for professional area: - interprets the processes, method accordance with medicines.	required for independent continuation of learning in the studied to search and analyze information, acquire new knowledge necessary activity in the field of pharmaceutical production; e results of own laboratory work on chemical and technological ods and equipment of pharmaceutical analysis, gives a conclusion in the requirements of regulatory documents on the quality of					
LO6	knows methoresearch, modern empirical research	and academic writing techniques and applies them to the field of ods of scientific research, methodological foundations of scientific in problems of chemical production, methods of theoretical and rch, methodology for organizing and conducting scientific its of academic writing and presentation of research results.					
LO7	knows and uphysical, chemicompounds;	edge and understanding of facts, phenomena, theories and aships between them in the field of study: Inderstands the relationship between the parameters of CTP and the cal properties and methods of obtaining biologically active and types of CTP biologically active compounds and qualitative and types of the product using modern equipment.					
LO8	Understands the understands t process, expressi	the principles and a culture of academic integrity the principles and culture of academic integrity in the educational and the honesty of students when performing all assessment work in astering theoretical and practical material in the disciplines of this					
5.1	Course LO	The learning outcomes of the EP, which are related to the					
	St. 3. 600	learning outcomes of the course					
101., 1		LO 1 LO1, LO2, LO4					
901.	LO 2						
3.	LO 3						
3.	LO 4	LO8, LO10					
	LO 5 LO4, LO10						
	C TALL	TO 1 100 1011					
	LO 6 LO 7	LO1, LO8, LO11 LO1, LO2, LO3					

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6.	Details of the cou							
6.1	Location (building Contact Informal South Kazakhst Toxicological Chainternal 266.	i <mark>tion</mark> an Medica	ıl Academy,	Departn	nent	of Pharm	aceutical and	
6.2			STIW	SIW				
7, 0	9. Ogg / Kr 3	10	9041	30		12	68	
7.	Information abo	ut teachers	Sie gn. Kr	STI	Va a	S. 411., K	1 34 00	
No	Ф.И.О.	1 2. KU	Degrees	and title	1/1/10	Em	ail address	
1.	Ordabaeva Saule Kutymovna	J.K. K. S. S.	professor, pharm	s.d.,	STSKI	ordabaeva	@mail.ru	
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3.	Asilbekova Akmaral Dzhienbekovna	US. EGD.	ass.prof., c. of en	gin. s.	asilbekova akmara			
4.	Kadeeva Mansia Sad	dilovna	ass. prof, c. of p	ss. prof, c. of pharm. s. bc_kadeyeva				
5.	Tursubekova Bayan Izteleuovna	ass. Prof., c. of pl		<u>mail</u> .ru				
6.5	Karakulova Aizhan Shirinbekovna	1 5KM	senior teacher, m pharmacy	aster of	The S	ayzhan201	15@bk.ru	
7.1	Dzhanaralieva Kakh	a Saidovna	senior teacher	11.KT	SK	mansur5	62@ mail.ru	
8.	Thematic plan	-40. K	Sh No 6	777.12	VI	This was	80° 1.1.	
Veek	Topic name	Na di Su	mmary Skill	Cours e LO	Nu mbe r of hou rs	Forms / methods /learning technologi es	Forms / assessment methods	
1 54	Introduction. State principles and provisions regulating the	field of sta medicines. standardization the Republic of	egal acts in the andardization of The system of on in healthcare of of Kazakhstan and on of medicines.	LO1, LO5, LO6	KUSKU SKU	thematic	feedback	
Skur	Laboratory lesson. Topic:		edicinal products stometric method ion.	LO2, LO3, LO5		work in pairs	laboratory work protection: 1. theoretical preparedness; 2. performing laboratory	

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Sky	c method in the UV region.	1 SKULISI SEGULIK	SKI,	My.	Siegn'y	work; 3. protocol formatting
A SHIP SHIP SHIP SHIP SHIP SHIP SHIP SHIP	stiw/siw task of the siw: State principles and provisions governing the quality of medicines.	Standardization system in healthcare of the Republic of Kazakhstan. Normative documentation (ND) governing the quality, safety and efficacy of medicines: State Pharmacopoeia of the Republic of Kazakhstan, International Pharmacopoeia of the WHO, European Pharmacopoeia, Eurasian Economic Community Pharmacopoeia. Quality assurance of medicines. Control and permit system. Quality assurance system of medicines according to international standards.	LO1, LO3, LO4, LO5	2 -/3 (1) 1 -/3	preparatio n and defense of abstracts, review of abstracts, checking in the Anti- plagiat. University system/pro ject work	assessment of the abstract/ project monitoring
20. Skrig	Lecture. Topic: Pharmacopoeial testing methods for individual quality indicators.	Rules for drafting regulatory and technical documents on quality control and safety of medicines. State Pharmacopoeia of the Republic of Kazakhstan.	LO1, LO5, LO6	was e	thematic	feedback
July Sky	Laboratory lesson. Topic: Analysis of medicinal products by spectrophotometri c method in the UV region.	Analysis of medicinal products by spectrophotometric method in the UV region.	LO2, LO3, LO5	32 St. 12	work in small groups	Defense of laboratory work: 1. theoretical preparation; 2. performance of laboratory work; 3. preparation of the protocol
ikl du.k du.k kna.	STIW/SIW Task of the SIW: General principles and methods of drug identification. Identification of drugs by physical properties and constants.	Pharmacopoeial testing methods for individual quality indicators. Physical properties and constants used to identify drugs: appearance, odor, solubility, melting point, boiling point, solidification, relative density, optical rotation, viscosity, etc. Pharmacopoeial methods of analysis used to identify drugs.	LO1, LO3, LO4		preparatio n and defense of abstracts, review of abstracts, checking in the Anti- plagiat. University	assessment of the abstract/ project monitoring

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SKILL	Kugisa squirit	1 SK SKUISI SG EGITIFY	SKI	I'Mai	system/ project work	KT SKUUS
3.1 2du.kl	Lecture. Topic: Methods of photometry in the ultraviolet and visible spectral regions.	Instrumental methods of testing for individual quality indicators. Spectrophotometric methods in pharmaceutical analysis. Spectrophotometry in the UV and visible region. Equipment for spectrophotometric analysis.	LO1, LO5, LO6	69014 1 540	thematic	feedback
1 skil	Laboratory lesson. Topic: Analysis of medicinal products by spectrophotometri c method in the visible region.	Analysis of medicinal products by spectrophotometric method in the visible region.	LO2, LO3, LO5	2	work in small groups	Defense of laboratory work: 1. theoretical preparation; 2. performance of laboratory work; 3. preparation of the protocol
wased sking	STIW/SIW Task of the SIW: Methods based on radiation emission: atomic absorption spectrometry, fluorimetry.	Pharmacopoeial methods of testing for individual quality indicators. Methods based on radiation emission: atomic adsorption spectrometry, fluorimetry. Methods based on radiation emission: atomic adsorption spectrometry, fluorimetry in pharmaceutical analysis. Equipment for adsorption spectrometry, fluorimetry.	LO1, LO3, LO4, LO5		preparatio n and defense of abstracts, review of abstracts, checking in the Anti- plagiat. University system/ project work	assessment of the abstract/ project monitoring
4 st. 12 du	Lecture. Topic: Methods of photometry in the ultraviolet and visible spectral regions.	Instrumental methods of testing for individual quality indicators. Spectrophotometric methods in pharmaceutical analysis. Spectrophotometry in the UV and visible region. Equipment for spectrophotometric analysis.	LO1, LO5, LO6	7.K7 7.K7 8.KU	thematic	feedback
KWO	Laboratory lesson. Topic: Analysis of medicinal	Analysis of medicinal products by spectrophotometric method in the visible region.	LO2, LO3, LO5	2	work in small groups	Defense of laboratory work: 1. theoretical

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.KI.KI	products by spectrophotometri c method in the visible region.	1. KT KLUG. SKUG. EGIT. KT	W.K.	1 SKUS	kwgiegnisegnis	preparation; 2. performance of laboratory work; 3. preparation of the protocol
J.KZ J.SKIO SKIOS.	STIW/SIW Task of the SIW: Methods based on the absorption of electromagnetic radiation: nephelometry	Pharmacopoeial methods of testing for individual quality indicators. Methods based on the absorption of electromagnetic radiation. Methods based on the absorption of electromagnetic radiation in pharmaceutical analysis. Equipment for conducting electromagnetic radiation.	LO1, LO3, LO4, LO5	1/3	presentatio n, review of presentatio n/project work	presentation evaluation/proj ect monitoring
1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	Lecture. Topic: Spectroscopy methods in drug analysis (IR, Mass, NMR)	Application of IR spectroscopy methods in determining the authenticity of drugs. Application of IR, Mass, NMR spectroscopy in pharmaceutical analysis. Near IR spectroscopy. Theoretical foundations of methods. Basic concepts. Spectroscopy methods in IR, Mass, NMR. Application of IR, Mass, NMR spectroscopy methods.	LO1, LO5, LO6	SKUL SKUL SKUL	thematic	feedback
KT KT SKUS SCOR	Laboratory lesson. Topic: Analysis of medicinal products by photoelectrocolor imetric method.	Analysis of medicinal products by photoelectrocolorimetric method.	LO2, LO3, LO5	Skugi gredn	work in small groups	Defense of laboratory work: 1. theoretical preparation; 2. performance of laboratory work; 3. preparation of the protocol
ing e	STIW/SIW Task of the SIW: Methods based on the use of a magnetic field: NMR spectroscopy.	Instrumental methods of testing for individual quality indicators. Methods based on the use of a magnetic field: NMR spectroscopy. Methods based on the use of a magnetic field in pharmaceutical	LO1, LO3, LO4	7.7.4 2du.k 13.edi	preparatio n and defense of abstracts, review of abstracts, checking in the	assessment of the abstract/ project monitoring

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J.KT. P.	skug'sgng'sgn'k	analysis. Equipment for conducting NMR spectroscopy.	17. K	1 SKUS	Anti- plagiat. University system/ project work	SKILL SKILLS
skus;	Lecture. Topic: Chromatographic methods of drug analysis. Classification.	Chromatographic methods in pharmaceutical analysis. Classification. Gas chromatography in quality control of medicines. Equipment for gas chromatography. Liquid chromatography in quality control of medicines.	LO1, LO5, LO6	ugied ingied	thematic	feedback
SKUS SKUS SKUS	Laboratory lesson. Topic: Analysis of medicinal products by refractometric method.	Analysis of medicinal products by refractometric method	LO2, LO3, LO5	ZX JUX Justina	work in small groups	Defense of laboratory work: 1. theoretical preparation; 2. performance of laboratory work; 3. preparation of the protocol
KL SKULE	STIW/SIW Task of the SIW: Methods based on the use of a magnetic field: PMR spectroscopy.	Instrumental methods of testing for individual quality indicators. Methods based on the use of a magnetic field: PMR spectroscopy. Methods based on the use of a magnetic field in pharmaceutical analysis. Equipment for conducting PMR spectroscopy.	LO1, LO3, LO4		preparatio n and defense of abstracts, review of abstracts, checking in the Anti- plagiat. University system/ project work	assessment of the abstract/ project monitoring
KUG.	Lecture. Topic: Chromatographic methods of drug analysis. Classification.	Chromatographic methods in pharmaceutical analysis. Classification. Gas chromatography in quality control of medicines. Equipment for gas chromatography. Liquid	LO1, LO5, LO6	edu.K	thematic	feedback

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SKU	Mais egninik	chromatography in quality control of medicines.	Skir	19.0	SORGINIK	2 SKULG'S
1 Skus Skus Skus Skus	Laboratory lesson. Topic: Analysis of medicinal products by refractometric method.	Analysis of medicinal products by refractometric method	LO2, LO3, LO5	1 Sking	work in small groups	Defense of laboratory work: 1. theoretical preparation; 2. performance of laboratory work; 3. preparation of the protocol
skus Gan	STIW/SIW Task of the SIW: Magnetic field based methods: mass spectroscopy.	Instrumental methods of testing for individual quality indicators. Methods based on the use of a magnetic field: mass spectroscopy. Methods based on the use of a magnetic field in pharmaceutical analysis. Equipment for conducting mass spectroscopy.	LO1, LO3, LO4, LO5	1/3	presentatio n, review of presentatio n/project work	presentation evaluation/proj ect monitoring
8	Lecture. Topic: Principles of plane and column chromatography. Application area. Advantages and disadvantages.	Principles of planar and column chromatography. Application area. Advantages and disadvantages.	LO1, LO5, LO6	51 SY 30.12	thematic	feedback
SKIL SKIL	Laboratory lesson. Topic: Analysis of medicinal products by thin layer chromatography.	Analysis of medicinal products by thin layer chromatography	LO2, LO3, LO5	a 2 kmai kmai kmai kmai kmai kmai kmai kmai	work in small groups	Defense of laboratory work: 1. theoretical preparation; 2. performance of laboratory work; 3. preparation of the protocol

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1.17	of the SIW: Midterm control -	Topics 1-7 weeks.	LO1, LO3, LO4	1/4	testing/int erim report of project work	Evaluation/def ense of the interim report of the project work
29. Edi	Lecture. Topic: Principles of Plane and Column Chromatography. Application Area. Advantages and Disadvantages.	Principles of Plane and Column Chromatography. Application Area. Advantages and Disadvantages	LO1, LO5, LO6	ug.ed	thematic	feedback
skus edn.	Laboratory lesson. Topic: Analysis of medicinal products by thin layer chromatography.	Analysis of medicinal products by thin layer chromatography	LO2, LO3, LO5	5.2 11.K1 11.K1	work in pairs	Defense of laboratory work: 1. theoretical preparation; 2. performance of laboratory work; 3. preparation of the protocol
ing.	STIW/SIW Task of the SIW: Optical methods of analysis: polarimetry	Instrumental methods of testing for individual quality indicators. Optical methods of analysis: polarimetry. Optical methods of research in pharmaceutical analysis. Equipment for conducting polarimetry.	LO1, LO3, LO4, LO5	3/4/16 3/4/16 3/6/16 3/6/16 3/6/16	preparatio n and defense of abstracts, review of abstracts, checking in the Anti- plagiat. University system/ project work	assessment of the abstract/ project monitoring
	Lecture. Topic: Pharmacopoeial methods for testing dosage forms according to the parameters "dissolution", "disintegration"	Instrumental methods for testing solid dosage forms. Validation of the methods of the "Dissolution" test. Disintegration test of solid dosage forms. Strength and abrasion test of solid dosage forms. Validation characteristics and	LO1, LO5, LO6	odu.k	thematic	feedback

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L SK	and "wearability", etc.	requirements.	2, 2/K	Mg	J.edn.K	KI SKMO
ig equit	Laboratory lesson. Topic: Analysis of medicinal products by high performance liquid chromatography.	Analysis of medicinal products by high performance liquid chromatography	LO2, LO3, LO5		work in pairs	Defense of laboratory work: 1. theoretical preparation; 2. performance of laboratory work; 3. preparation of the protocol
L edu.	of the SIW: Theoretical foundations of gas chromatography. Application of gas chromatography in drug analysis.	Theoretical foundations of gas chromatography. Application of gas chromatography in drug analysis. Equipment for gas chromatography in pharmaceutical analysis.	LO1, LO3, LO4, LO5	1/3	presentatio n, review of presentatio n/ project work	presentation evaluation/proj ect monitoring
This elli	Laboratory lesson. Topic: Analysis of medicinal products by high performance liquid chromatography.	Analysis of medicinal products by high performance liquid chromatography	LO2, LO3, LO5	sking	work in pairs	Defense of laboratory work: 1. theoretical preparation; 2. performance of laboratory work; 3. preparation of the protocol
kwa:	STIW/SIW Task of the SIW: Theoretical foundations of liquid chromatography. Application of liquid chromatography in drug analysis.	Theoretical foundations of liquid chromatography. Application of liquid chromatography in drug analysis. Equipment for liquid chromatography in pharmaceutical analysis.	LO1, LO3, LO4, LO5	1/4	presentatio n, review of presentatio n/ project work	presentation evaluation/proj ect monitoring

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12kg	Laboratory lesson. Topic: Analysis of dosage forms for the dissolution test.	Regulatory documents on quality control of tableted medicinal products. Specifications of quality of tableted medicinal products. Testing of tablets in accordance with the requirements of the State Pharmacopoeia of the Republic of Kazakhstan in sections of regulatory documents: dissolution.	LO2, LO3, LO5	2 3kma. 1 3kma. 1 1.kl edu.k	work in small groups	Defense of laboratory work: 1. theoretical preparation; 2. performance of laboratory work; 3. preparation of the protocol
247. K	STIW/SIW Task of the SIW: Electrochemical methods of analysis: potentiometry. Potentiometric titration.	Electrochemical methods of analysis: potentiometry. Potentiometric titration. Equipment for conducting electrochemical research methods in pharmaceutical analysis.	LO1, LO3, LO4	1/4 5km 2 1	presentatio n, review of presentatio n/ project work	presentation evaluation/proj ect monitoring
13. Skino 1. Ledu.	Laboratory lesson. Topic: Analysis of dosage forms for the dissolution test.	Regulatory documents on quality control of tableted medicinal products. Specifications of quality of tableted medicinal products. Testing of tablets in accordance with the requirements of the State Pharmacopoeia of the Republic of Kazakhstan for sections of regulatory documents: dissolution.	LO2, LO3, LO5	ed J. Skrive	work in small groups	Defense of laboratory work: 1. theoretical preparation; 2. performance of laboratory work; 3. preparation of the protocol
KT SKUL	STIW/SIW Task of the SIW: Electrochemical methods of analysis: anodic and cathodic polarography.	Electrochemical methods of	LO1, LO3, LO4, LO5	1/3	presentatio n, review of presentatio n/ project work	presentation evaluation/proj ect monitoring
14 kg du dedu dedu deskina.	Laboratory lesson. Topic: Analysis of dosage forms for the "disintegration" and "wearability" tests.	Regulatory documents on quality control of tableted medicinal products. Specifications of quality of tableted medicinal products. Testing of tablets in accordance with the requirements of the State Pharmacopoeia of the Republic of Kazakhstan in sections of regulatory	LO2, LO3, LO5	2 g J.K.L edu.K edu.K J.R.R.R.R.R.R.R.R.R.R.R.R.R.R.R.R.R.R.R	work in pairs	Defense of laboratory work: 1. theoretical preparation; 2. performance of laboratory work; 3. preparation of the protocol

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Ski	Us. Socgnith	documents: abrasion, resistance to crushing, disintegration, dissolution.	1 SK	Kugi	is equit	K Sk skmo
J.K. K. Str. K	STIW/SIW Task of the SIW: Electrochemical methods of analysis: anodic and cathodic polarography.	Electrochemical methods of analysis: anodic and cathodic polarography. Equipment for conducting electrochemical research methods in pharmaceutical analysis.	LO1, LO3, LO4, LO5	1/4 1 1.K1 edu.k edu.k	preparatio n and defense of abstracts, review of abstracts, checking in the Anti- plagiat. University system/ project work	assessment of the abstract/ project monitoring
15 edu.	Laboratory lesson. Topic: Analysis of dosage forms for the "disintegration" and "wearability" tests.	Regulatory documents on quality control of tableted medicinal products. Specifications of quality of tableted medicinal products. Testing of tablets in accordance with the requirements of the State Pharmacopoeia of the Republic of Kazakhstan in sections of regulatory documents: abrasion, resistance to crushing, disintegration, dissolution.	LO2, LO3, LO5	2 L Skill	work in pairs	Defense of laboratory work: 1. theoretical preparation; 2. performance of laboratory work; 3. preparation of the protocol
Sking Tugies	STIW/SIW Task of the SIW: Midterm control - 2	Topics 8-15 weeks .	LO1, LO3, LO4	1/5	testing/int erim report of project work	Evaluation/def ense of the interim report of the project work
1	/ L ~ L / L / L / L / L / L / L / L / L	plementation of interim assessmen		Jan Co	12	
W. KI		of students' work is carried out a commendations for SIW	according	to the	criteria specif	ned in the
9	Methods of lear	ning and evaluation	30 701.	W	St. Va.	egriliki 1
9.1	Lectures	Thematic lectures in the	form of p	resenta	tions.	(y. 60, "/'I.
9.2	Laboratory lesson	s Laboratory lessons: wo	rk in sm	all gro	ups, work in	pairs.
9.3	SIW/STIW	Preparation of test ass Antiplagiat. VUZ syst review of abstracts, con presentation, review of	em; pre hecking	paratio in the	n and defen Antiplagiat	se of abstracts, t. VUZ system;

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G. Ednink	OŃTÚSTIK-QAZAQSTAN CÓBO SOUTH KAZAKHSTAN MEDISINA SKMA -19791979-	3.600 M.K. KJ 5.
Mig. Sign of	АКАDEMIASY АСАDEMY «Оңтүстік Қазақстан медицина академиясы» АҚ Оңтүстік Қазақстан медицина академиясы» АҚ	
S. Churagie	Department of Pharmaceutical and Toxicological Chemistry Working curriculum for the discipline	044-55/ 14 page. from
1 5K ma	"Methods and equipment for pharmaceutical analysis"	30
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students submit an interim report after testing in RK-1, and a report on the project in week 15. 9.3.1 Project topics 1. Development of spectral methods for drug analysis. 2. Development of chromatographic methods for drug analysis. 30 students submit an interim report after testing in RK-1, and a report on the project in week 15. 9.3.1 Project topics 1. Development of spectral methods for drug analysis. 2. Development of photometric methods for drug analysis. 9.4 Midterm control Midterm assessment is conducted in 2 stages: testing/oral sur	students submit an interim report after testing in RK-1, and a report on the project in week 15. 1. Development of spectral methods for drug analysis. 2. Development of chromatographic methods for drug analysis. 3. Development of photometric methods for drug analysis. 4. Midterm control Midterm assessment is conducted in 2 stages: testing/oral surv. In case of project work, students submit an interim report after testing in RK-1, and a full report on the project in week 15. 10. Evaluation criteria 11. Development of photometric methods for drug analysis. Midterm assessment is conducted in 2 stages: testing/oral surv. In case of project work, students submit an interim report after testing in RK-1, and a full report on the project in week 15. 10. Evaluation criteria 11. Development of spectral methods for drug analysis. Midterm assessment is conducted in 2 stages: testing/oral surv. In case of project work, students submit an interim report after testing in RK-1, and a full report on the project in week 15. 10. Evaluation criteria 11. Development of spectral methods for drug analysis. Stages: development of photometric methods for drug analysis.	7.1.1	Project topic	"Methods and	d equipment fo		ino M	Department of Pharmaceutical and Toxicological Chemistry 044-55/					
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MEDISINA AKADEMIASY

SKMA «Оңтүстік Қазақстан медицина академиясы» АҚ

SOUTH KAZAKHSTAN MEDICAL **ACADEMY**

АО «Южно-Казахстанская медицинская академия»

Department of Pharmaceutical and Toxicological Chemistry

044-55/

Working curriculum for the discipline "Methods and equipment for pharmaceutical analysis" 15 page. from

LO1 Demonstrates knowledge and understanding in the subject area, based on advanced knowledge the field: demonstrates knowledge and understanding of the purpose of chemicaltechnological processes and the implementation pharmaceutical analysis of biologically

active compounds on

nodern equipment.

- Demonstrates minimum knowledge and understanding organizational, legal, and methodological foundations conducting all types of pharmaceutical analysis to control the quality of medicinal substances and finished dosage forms at the stages of development, receipt, storage, and use;

Demonstrates minimum cnowledge understanding the selection of appropriate chemical physicochemical methods identification, purity analysis, and quantitative determination of medicinal products without ustification.

- Performs pharmacopoeial and non-pharmacopeial methods analysis and pharmaceutical conducts analysis for medicinal products using chemical and physicochemical various methods of analysis under the guidance of a teacher.
- Provides an incomplete conclusion on the quality of medicinal products in accordance with the requirements of regulatory documents;
- Draws up protocols not in accordance with established format, they are rather brief and inconsistent, calculation formulas and results of quantitative determination are not provided, units of measurement are provided; reactions of identification and purity of medicinal products are not accompanied by chemistry of reactions, quality indicators are not accompanied by drawings, illustrations based on the results of the analysis.

• -Demonstrates partial knowledge and understanding of organizational, legal, and methodological foundations conducting all types of pharmaceutical analysis to control the quality of medicinal substances and finished dosage forms at stages the development, receipt, storage, and use;

- -Demonstrates partial knowledge and understanding choosing the appropriate chemical physicochemical methods for identification, purity analysis, and quantitative determination medicinal products without justification.
- · -Partially proficient in methods pharmacopoeial and nonpharmacopeial analysis and conducts pharmaceutical analysis of medicinal products using chemical and physicochemical methods of analysis under the guidance of a teacher.
- · -Interprets the results of his own laboratory work pharmaceutical on analysis of medicinal products without justification;
- -Gives a partial conclusion on the quality of medicinal products in accordance with the requirements regulatory documents;
- · -Draws up protocols in accordance with established format, partial calculation formulas and results of quantitative determination provided. units measurement are partially provided; reactions of identification and purity of medicinal products are accompanied by the chemistry of reactions, indicators are quality partially accompanied by drawings, illustrations based on the results of the analysis.

-Demonstrates complete knowledge and understanding of the organizational, legal, and methodological foundations for conducting all types of pharmaceutical analysis to control the quality of medicinal substances and finished dosage forms at the tages of development, receipt, storage, and use;

complete -Demonstrates knowledge and understanding in the selection of appropriate chemical and physicochemical nethods for identification. ourity analysis, quantitative determination of drugs depending on the physicochemical properties and type of dosage form.

-Independently masters the methods of pharmacopoeial and non-pharmacopeial and analysis conducts pharmaceutical analysis of drugs using chemical and arious physicochemical nethods of analysis and obtains exceptional results. -Interprets the results of his

own laboratory work on pharmaceutical analysis of drugs depending on the physicochemical properties and type of dosage form; Gives the correct conclusion

on the quality of drugs in

with

accordance

requirements of regulatory documents; -Draws up protocols accordance with the established format, they are written neatly and competently, all calculation written formulas and results of quantitative determination are provided, expressed in units of neasurement; reactions of identification and purity of products are medicinal accompanied by the chemistry of reactions, quality indicators are accompanied by drawings. illustrations based on the esults of the analysis and correspond to the level of the corresponding course.

-Demonstrates exceptional knowledge and understanding of the organizational, legal, and methodological foundations for all types conducting pharmaceutical analysis control the quality of medicinal substances and finished dosage forms at the stages of development, receipt, storage, and use;

exceptional -Demonstrates knowledge and understanding in the selection of appropriate chemical and physicochemical methods for identification, purity quantitative analysis, and determination of medicinal products depending on the physicochemical properties and type of dosage form;

-Fluently uses pharmacopoeial and non-pharmacopeial analysis methods and conducts pharmaceutical analysis for medicinal products using chemical and physicochemical methods and obtains exceptional results;

Gives a substantiated conclusion on the quality of medicinal products in accordance with the requirements of regulatory documents: -Independently draws protocols in accordance with the established format: they are written correctly consistently, all calculation and formulas results quantitative determination

provided, expressed in units of measurement; reactions of and purity identification medicinal products accompanied by the chemistry of reactions. In the protocols, all indicators quality are accompanied by drawings and illustrations based on the analysis results and correspond to the level of the corresponding course.

of- presents partial, fragmentary LO₂ Apply knowledge and-presents some results understanding at aresearch in the field of quality results of research in the field professional level, control of medicines; of quality control of medicines;

- independently presents the results of research in the field pharmaceutical of quality control of

independently conducts analysis medicinal substances and finished

MEDISINA AKADEMIASY «Оңтүстік Қазақстан медицина академиясы» АҚ SKMA MEDICAL ACADEMY

ACADEMY АО «Южно-Казахстанская медицинская академия»

Department of Pharmaceutical and Toxicological Chemistry

044-55/

Working curriculum for the discipline "Methods and equipment for pharmaceutical analysis"

<u> </u>	T -04 - 04 -		V 300 . VI.D		M. J. J. M. J.
C/L		-shows some readiness to			"identification", correctly arguing
1 2		inform specialists and the			the choice of chemical and physical
/ 0	foundations of general	public about the compliance of medicines with some	compliance of medicines with		methods; - "Identification" is the basic term
1.1.	chemical technology to		the requirements of regulatory		for pharmaceutical substances and
Kr		documents;	documents;	sufficiently complete skills of	finished medicinal products;
). /[-demonstrates some skills of	- demonstrates partial,	readiness to contribute ideas	- independently conducts
1.1.1	7	readiness to introduce ideas	fragmentary skills of readiness	for solving problems in case of	
90		for solving problems in case	to contribute ideas for solving	non-compliance of the quality	medicinal products and finished
D 11		of non-compliance of the	problems in case of non-	of medicines with the	medicinal products in the section
1 00			compliance of the quality of	requirements of regulatory	"purity", correctly arguing the
		requirements of regulatory	medicines with the	documents.	relationship between the methods of
Y.O.,	pharmaceutical analysis	documents.	requirements of regulatory	2.0 YO. KI	obtaining and proper storage of
1. 2	of drugs;	21 1/10	documents.	VO. 60 "11.1	medicinal products;
	-formulate arguments		0.116	1, 3, 000 F	- independently conducts
10.	and solve problems in		1 40. KT 2	11/10 60 411.	pharmaceutical analysis of finished
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C/-	on knowledge in the field of natural sciences		D. 200 . K	2. 10, 30 11	"quality indicators", correctly arguing the type of medicinal
1	and on the skills of		2 10. V	C. V.O. 60.	product with the corresponding
	acquired new	717. 17 CF	VO. 60, 116	1 1/2 2.	quality indicator;
1.4.	knowledge in the	300 / K	11, 3, 40,	K 51 100	- independently conducts
. K-1	disciplines of the		L. W. 60 11)	· 11. c/c 10.	pharmaceutical analysis of
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	-formulate arguments ar	390. Kr	2, 1410	70, 11 CL X	medicinal products in the section
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$\sqrt{9}$.	requirements of regulator	1/11 2: -91	, Kr 2, "W	70. 11	product, therapeutic dose,
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1	documents for the quali	1. 1. 20.	200 / Kr 1 2 /	11, 5: 40, 1	analysis method.
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KL KL		working with analytical normative documentation (AND), normative and	fragmentary skills in working with analytical regulatory documentation (ARD),	analytical normative documentation (AND), normative and technical	working with analytical regulatory documentation (ARD), regulatory and technical documentation (RTD)
KI YI	information to form	working with analytical normative documentation (AND), normative and technical documentation	fragmentary skills in working with analytical regulatory documentation (ARD), regulatory and technical	analytical normative documentation (AND), normative and technical documentation (NTD) and the	working with analytical regulatory documentation (ARD), regulatory and technical documentation (RTD) and the State Pharmacopoeia of the
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911.KJ	information to form judgments taking into account social, ethical and scientific	working with analytical normative documentation (AND), normative and technical documentation (NTD) and the State Pharmacopoeia of the Republic of Kazakhstan (SP	fragmentary skills in working with analytical regulatory documentation (ARD), regulatory and technical documentation (RTD) and the State Pharmacopoeia of the Republic of Kazakhstan (SP	analytical normative documentation (AND), normative and technical documentation (NTD) and the state pharmacopoeia of the Republic of Kazakhstan (SP RK) on quality control,	working with analytical regulatory documentation (ARD), regulatory and technical documentation (RTD) and the State Pharmacopoeia of the Republic of Kazakhstan (SPRK) on quality control, standardization and safety of medicines;
in'K	information to form judgments taking into account social, ethical and scientific considerations: - interprets the choice	working with analytical normative documentation (AND), normative and technical documentation (NTD) and the State Pharmacopoeia of the Republic of Kazakhstan (SP	fragmentary skills in working with analytical regulatory documentation (ARD), regulatory and technical documentation (RTD) and the State Pharmacopoeia of the Republic of Kazakhstan (SP RK) on quality control,	analytical normative documentation (AND), normative and technical documentation (NTD) and the state pharmacopoeia of the Republic of Kazakhstan (SP RK) on quality control, standardization and safety of	working with analytical regulatory documentation (ARD), regulatory and technical documentation (RTD) and the State Pharmacopoeia of the Republic of Kazakhstan (SPRK) on quality control, standardization and
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3.690 90.KJ	information to form judgments taking into account social, ethical and scientific considerations: - interprets the choice of modern equipment and devices based on	working with analytical normative documentation (AND), normative and technical documentation (NTD) and the State Pharmacopoeia of the Republic of Kazakhstan (SP RK) on quality control, standardization and safety of medicines; - interprets some results of his	fragmentary skills in working with analytical regulatory documentation (ARD), regulatory and technical documentation (RTD) and the State Pharmacopoeia of the Republic of Kazakhstan (SP RK) on quality control, standardization and safety of medicines; - interprets partial, fragmentary	analytical normative documentation (AND), normative and technical documentation (NTD) and the state pharmacopoeia of the Republic of Kazakhstan (SP RK) on quality control, standardization and safety of medicines; - independently interprets the results of his own laboratory	working with analytical regulatory documentation (ARD), regulatory and technical documentation (RTD) and the State Pharmacopoeia of the Republic of Kazakhstan (SP RK) on quality control, standardization and safety of medicines; independently and competently interprets the results of his/her own laboratory work and gives a competent, well-founded
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solutions to problems to specialists in conducting chemical-technological processes and	requirements of regulatory documents; - demonstrates some skills of readiness to introduce ideas for solving problems in case of noncompliance of the quality of medicines with the requirements of regulatory documents.	and the public about the compliance of medicines with the requirements of regulatory documents; - demonstrates partial, fragmentary skills of readiness to contribute ideas for solving problems in the event of non-compliance of the quality of medicines with the requirements of regulatory documents.	regulatory documents; - demonstrates sufficiently	with the requirements of regulatory documents; - demonstrates fundamental skills of readiness to contribute ideas for solving problems in case of noncompliance of the quality of medicines with the requirements of regulatory documents.
independently pursue further learning in the area of study: - has the skills to search for and analyze information, acquire new knowledge necessary for professional activities in the field of pharmaceutical production; - interprets the results of his own laboratory work on chemical and technological processes, methods and equipment for pharmaceutical analysis, gives a conclusion in accordance with the requirements of regulatory documents on the quality of medicines.	is unable to demonstrate knowledge of the state system of quality control and standardization of drugs in the Republic of Kazakhstan; - does not know enough and refers to regulatory documents governing the quality of drugs in the Republic of Kazakhstan (SPh RK, AND, VAND) and to international quality standards regulating the quality of drugs (European Pharmacopoeia, British Pharmacopoeia, Japanese Pharmacopoeia, SPh RF, SPh U, SPh RB) complete lack of understanding when preparing documentation of the established form for quality control of drugs in accordance with the requirements of regulatory documents and orders; - does not sufficiently delve into the results of his own laboratory work, the design in the form of an analysis protocol and presents in class; makes an unreliable conclusion about the quality of drugs based on the results of the analysis.	demonstrates partial understanding of the knowledge of the state system of quality control and standardization of drugs in the Republic of Kazakhstan; - partially knows and refers to regulatory documents governing the quality of drugs in the Republic of Kazakhstan (SPh RK, AND, VAND) and to international quality standards regulating the quality of drugs (European Pharmacopoeia, British Pharmacopoeia, U.S. Pharmacopoeia, Japanese Pharmacopoeia, SPh RF, SPh RU, SPh RB). - adequately draws up documentation of the established form on quality control of drugs in accordance with the requirements of regulatory documents and orders; - satisfactorily presents the results of his own laboratory work, draws up an analysis protocol and presents it in class; - makes a conclusion on the quality of drugs based on the results of the analysis, without justification.	Republic of Kazakhstan; - sufficiently knows and refers to regulatory documents governing the quality of drugs in the Republic of Kazakhstan (SPh RK, AND, VAND) and to international quality standards regulating the quality of drugs (European Pharmacopoeia, British Pharmacopoeia, U.S. Pharmacopoeia, Japanese Pharmacopoeia, SPh RF, SPh U, SPh RB) prepares documentation of the established form on quality	- demonstrates exceptional knowledge of the state system of quality control and standardization of drugs in the Republic of Kazakhstan; - fully knows and appropriately refers to regulatory documents governing the quality of drugs in the Republic of Kazakhstan (SPh RK, AND, VAND) and to international quality standards regulating the quality of drugs (European Pharmacopoeia, British Pharmacopoeia, U.S. Pharmacopoeia, SPh RF, SPh U, SPh RB) independently prepares documentation of the established form on quality control of drugs in accordance with the requirements of regulatory documents and orders; - reasonably presents the results of his own laboratory work, competently draws up an analysis protocol and presents it in class; reasonably and correctly makes a conclusion on the quality of drugs based on the results of the analysis.

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LO6	Knows methods of	- formulates some part of the	- partially formulates the	- formulates the problem,	- independently formulates the
is equivalent	scientific research and academic writing and applies them to the area of study:- knows the methods of scientific research activities, the methodological foundations of scientific research, modern problems of pharmaceutical production, methods of theoretical and empirical research, the methodology of organizing and conducting a scientific experiment, the rules of academic writing and presentation of research results.	600 1 Km 3	problem, defines the purpose of the research work, understands and justifies the relevance, novelty, theoretical and practical significance of the research tasks; - partially draws up a plan, purpose and tasks of the research work; - partially masters new research methods, acquires new knowledge; - partially conducts scientific research using chemical, physicochemical methods, presents the results of his work and correctly interprets the results of the conducted research partially draws conclusions of the research work, correctly, logically and consistently presents the obtained results in writing, freely speaks about the results of his scientific work to an	defines the purpose of the research work, understands and justifies the relevance, novelty, theoretical and practical significance of the research tasks; • makes a plan, purpose and tasks of the research work; • masters new research methods, acquires new knowledge; • conducts scientific research using chemical, physicochemical methods and presents the results of his work and correctly interprets the results of the conducted research. - draws conclusions of the research work, correctly, logically and consistently presents the obtained results in writing, freely speaks about the results of his scientific work to an audience.	problem, determines the purpose of the research work, understands and justifies the relevance, novelty, theoretical and practical significance of the research objectives; • - independently draws up a plan, purpose and objectives of the research work; • - independently masters new research methods, acquires new knowledge; • - independently conducts scientific research using chemical, physicochemical methods, presents the results of his work and correctly interprets the results of the conducted research. - independently draws conclusions of the research work, correctly, logically and consistently presents the obtained results in writing, freely speaks about the results of his scientific work to an audience.
LOT TO	of biologically active compounds based on their physical and chemical properties; - conducts all types of chemical and technological testing of biologically active compounds and pharmaceutical analysis of drugs	- demonstrates a minimal understanding of the relationship between the quality indicators of drugs and their physical, chemical properties and production methods; - unreasonably selects methods for research and analysis of drugs, without taking into account their physical and chemical properties; - when forecasting, does not take into account the relationship between the chemical structure and pharmacological activity of drugs; - does not provide an accurate forecast of the storage conditions of drugs and does not take into account the physical, chemical properties, types and compositions of the dosage form	audience. - demonstrates partial understanding of the relationship between the quality indicators of drugs, but cannot describe their physical, chemical properties and methods of production; - partially selects methods of research and analysis of drugs based on their physical and chemical properties; -when forecasting, partially takes into account the relationship between the chemical structure and pharmacological activity of drugs; - predicts storage conditions of drugs, without taking into account the physical, chemical properties, types and composition of the dosage form	between the quality indicators of drugs and their physical, chemical properties and production methods; - selects methods for research and analysis of drugs based on their physical and chemical properties; - predicts the relationship between the chemical structure and pharmacological activity of drugs; - predicts the shelf life and storage conditions of drugs	knowledge and understanding of the relationship between the quality indicators of drugs and thei physical, chemical properties and production methods; - independently selects methods for research and analysis of drugs based on their physical and chemical properties;

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Understands the importance of principles and culture of academic integrity

understands the principles and culture of academic honesty in the educational expressing process, honesty students in completing all assessment work in process of mastering theoretical and practical material in the disciplines of this module.

partially observes academic honesty when completing assessed work, partially relying on his/her own knowledge and experience, personal conscientiously performs all functions of a student in an educational institution; partially understands the ethics of citation: uses a method of transmitting someone else's information and thoughts with an indication of the author, title and source of the work; - partially selects and uses reliable and trustworthy sources of information.

-observes academic honesty when completing assessed work, relying on his/her own knowledge and personal experience, conscientiously performs all functions of a student in an educational institution; -understands the ethics of citation: meaningfully and logically uses the method of conveying someone else's information and thoughts, indicating the author, title and source of the work; selects and uses reliable and trustworthy sources of information.

-observes academic honesty when completing assessed work, relying on his/her own knowledge and personal experience, conscientiously performs all functions of a student in an educational institution: -understands the ethics of citation: meaningfully and ogically uses the method of

conveying someone else's information and thoughts, indicating the author, title and source of the work; selects and uses reliable and trustworthy sources of

information.

strictly observes academic honesty when completing assessed work, relying solely on his/her own knowledge and personal experience, conscientiously performs all functions of a student in an educational institution;

correctly understands the ethics of citation: meaningfully and logically uses the method of conveying someone else's information and thoughts, indicating the author, title and source of the work;

independently selects and uses reliable and trustworthy sources of information.

10.2 Methods and criteria for evaluation

10.2.1 Checklist for a laboratory lesson

No	Level	Level					
GO.	evaluation criteria	Very high level (9.1-10.0 points at each level)	High level (7,0- 9,0 points at each level)	Average level (5,0-7,0 points at each level)	Lower level (0-5,0 points at each level)		
1 24 1 31	readiness to perform laboratory work according to the workplace	readiness to perform laboratory work according to the workplace is very good	readiness to perform laboratory work according to the workplace is good	readiness to perform laboratory work according to the workplace is average	not ready to perform laboratory work according to the workplace		
1.21 1.21 1.21 1.21 1.21 1.21	masters the technique of performing operations	very good at performing operations (calculates material balance, assembles a diagram, filters, titrates, etc.)	has a good command of the technique of performing operations (calculates material balance, assembles a diagram, filters, titrates, etc., allows minor errors)	average level of proficiency in the technique of performing operations (calculates material balance, assembles a diagram, filters, titrates, etc., makes significant errors)	does not have the technique for performing operations (cannot calculate the material balance, assemble a diagram, filter, titrate, etc.)		
Wa.	has skills in working with measuring utensils and measuring instruments	has skills in working with measuring utensils and measuring instruments	makes minor errors when working with measuring utensils and measuring instruments	makes significant mistakes when working with measuring utensils and	does not have the skills to work with measuring utensils and measuring instruments		

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	Klug Sign 9/1	Kr 2 skirus	3.500 911.KT	measuring instruments	411.KT 24 2KWG
4 J.K	observes safety precautions in the workplace	properly observes safety precautions in the workplace	allows minor errors while observing safety precautions in the workplace	makes significant mistakes when observing safety precautions in the workplace	does not observe safety precautions in the workplace
2 6 Kg	correctly evaluates the results of the operations performed	correctly evaluates the results of the operations performed	makes minor errors when evaluating the results of completed operations	makes significant mistakes when evaluating the results of completed operations	cannot evaluate the results of the operations performed
64	knows how to correctly calculate the product yield, its quantitative content, etc.	knows how to correctly calculate the product yield, its quantitative content, etc	when making calculations on the product yield, its quantitative content, etc., allows minor errors	when making calculations on the product yield, its quantitative content, etc., it makes significant errors	does not know how to correctly calculate the product yield, its quantitative content etc.
7	knows how to work with regulatory documents and other reference literature	knows how to work with regulatory documents and other reference literature	when working with regulatory documents and other reference literature, makes minor mistakes	when working with regulatory documents and other reference literature, he makes significant mistakes	does not know how to work with regulatory documents and othe reference literature
80°	correctly calculates the product yield and gives the correct conclusion	correctly calculates the product yield and gives the correct conclusion	when calculating the product yield, when concluding the obtained results, allows minor errors	when calculating the product yield, when concluding the results obtained, it makes significant errors	incorrectly calculate the product yield and gives an incorrect conclusion
10	answers control tests on the topic of the laboratory lesson (75-	answers control tests on the topic of the laboratory lesson (91-100% correct answers)	answers control tests on the topic of the laboratory lesson (70-90% correct answers)	answers control tests on the topic of the laboratory lesson (50-70% correct answers)	answers control tests on the topic of the laboratory lesson (0- 50% correct answers)

Ski	100% correct answers)	KI SKIND	J. EO GILL KI	Skulla. Segl	Mik & Sky
34	conclusion	91-100 points Excellent	70-90 баллов Good	50-70 балла Satisfactory	0-50 баллов Unsatisfactory

№	points	Evaluation criteria
1	excellent	Preparation and defense of the abstract
	A(4,0;	• the abstract fully complies with the requirements for writing abstracts set out in the
	95-	methodological recommendations for SIW;
	100%);	• when defending an abstract, demonstrates fluency in the material, presents it clearly,
	A-(3,67;	clearly, logically, competently, convincingly, and speaks professionally;
	90-94%);	• confidently and accurately answers questions;
	S. KILL	submitted on time according to schedule.
	1 2. 174.	Review of the abstract
	71.KT 2	• the review fully reflects: the relevance of the topic, novelty and practical significance, conclusions, recommendations, the degree to which the problem was solved and the work was completed, the correctness of its formulation, the author's familiarity with the scientific literature, the depth of the discussion, the literacy of
) ·	600 T.	the presentation;
	y. Ogo,	• sensible and principled comments and suggestions;
	3.00	• confidently and accurately answers questions;
	410 2:00	• submitted on time according to schedule.
	Mary S.	Presentation
	SK. Wa	1. General requirements:
11) 14)	KT SKY	• the design of the slides and the presentation of information fully complies with the requirements for the presentation, set out in the methodological recommendations for SIW;
	90'KT	 when defending, demonstrates fluency in the material, presents it clearly, clearly, logically, competently, convincingly, and speaks professionally;
۶٠,	500 / H	 confidently and accurately answers questions;
	S. 390.	• submitted on time according to schedule.
	3:00	2. Requirements for the presentation "Additions to the lecture".
	Mr. Jies	Additions to the lecture should reflect:
	L'illo	• rational name, synonyms of drugs;
	SK, Wo	• functional analysis with the chemistry of reactions;
J. K	KT SK	 justification for the choice of pharmacopoeial and non-pharmacopoeial methods of quantitative analysis with the chemistry of reactions and the necessary calculations of quantitative measurements;
	y. Kr	• justification of the purity parameters recommended by regulations;
	Egn. KI	• description of new drugs (chemical formula, Latin, rational names, physical and chemical properties, methods of analysis, application, etc.).
	60 717.	Review of the presentation
	ya. Egg	• the review fully reflects: compliance with the requirements for the presentation in terms of design style, presentation of information, content, text set out in the guidelines for SIW;

OŃTÚSTIK-QAZAQSTAN MEDISINA AKADEMIASY «Оңтүстік Қазақстан медицина академиясы» АҚ ОНТУСТІК ҚАЗАҚСТАН МЕДИЦИНА ОТ САЗАХСТАНСКАЯ	г медицинская академия»
Department of Pharmaceutical and Toxicological Chemistry	044-55/
Working curriculum for the discipline "Methods and equipment for pharmaceutical analysis"	22 page. from 30

SKINS	A SKULSER	 sensible and significant comments and suggestions; confidently and accurately answers questions; submitted on time according to schedule. Compilation of test tasks test tasks (at least 20 tasks) meet the requirements: adequacy (validity), logic, conciseness and brevity of the text, correct arrangement of task elements, simplicity - one test task must contain one task of one level of difficulty, with one correct answer; submitted on time according to schedule. Making a crossword: crossword puzzle cells are clear, distinct, symmetrical; the number of word intersections is not less than 8; a unified style of tasks is maintained, the answer is a logical conclusion of the question posed; tasks are composed lexically and stylistically correctly; the number of tasks in the crossword puzzle is not less than 30, covering all the main
edu	801.KT 2	questions of the topic. **During midterm control** 1.Testing • 90-100% correct answers
Skull Skull	good B+(3,33; 85-89%); B (3,0;80- 84%); B-(2,67; 75-79%); C+(2,33; 70-74%)	Meets the above evaluation criteria but allows: Preparation and defense of the abstract insignificant notes on design; non-fundamental mistakes when answering questions. Review of the abstract typos, incorrect expressions; not fundamental errors, inaccuracies in answering questions. Presentation minor design comments; non-fundamental errors when answering questions. Review of the presentation typos, incorrect expressions; non-fundamental mistakes, inaccuracies when answering questions. Compilation of test tasks test tasks (at least 20 tasks) have insignificant comments (no more than 2-3) according to the above criteria. Making a crossword: meets all the above criteria, but a uniform design style is not maintained. During midterm control 1. Testing 70-89% correct answers
3	satisfacto ry C (2,0; 65-69%); C- (1,67;	Meets the above assessment criteria but allows: Preparation and defense of the abstract · significant comments on the design; · fundamental mistakes in answering questions. Review of the abstract

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51 S.	60-64%) Д+(1,33; 55-63%); Д (1,0; 50-54%)	 insufficient disclosure of the points of the abstract (no more than 2 fundamental errors, inaccuracies in answering questions; commer require correction. Presentation significant comments on the design; fundamental errors in answering questions Review of the presentation fundamental errors, inaccuracies in answering questions, commentata are not fundamental. Compilation of test tasks test tasks have significant comments (no more than 2-3) accorditions. Making a crossword: meets all the above criteria, but the number of tasks in the crossword meets all the above criteria, but the number of tasks in the crossword meets all the above criteria. 	ts and suggestion ts and suggestion ding to the above
لالد	112	· 50-69% correct answers	3.60, 411.1 K
12.6 12.6 13.6 13.6	unsatisf. FX(0,5; 25-49%)	 Preparation and defense of the abstract does not meet some design requirements. does not have sufficient knowledge of the material, reads the text questions. Review of the abstract does not meet the requirements, some points of the abstract a covered. Presentation does not meet some design requirements. does not have sufficient knowledge of the material, reads text fro answer questions. Review of the presentation does not meet the requirements, some points of the presentation covered. Compilation of test tasks test tasks have significant comments (more than 2-3) according to Making a crossword: does not meet some requirements. During midterm control Testing 25-49% correct answers. 	re not sufficient m a slide, does n are not sufficient
Weg Jog	unsatisf. F (0; 0-49%)	 Preparation and defense of the abstract does not meet the design requirements; does not have the material; not submitted on time. Review of the abstract does not meet the requirements, all points of the abstract are not sunot submitted on time. Presentation does not meet the design requirements; 	ifficiently covere

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Department of Pharmaceutical an	d Toxicological Chemistry	044-55/
Working curriculum f "Methods and equipment for p	._\=\'\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	24 page. from 30

- · does not have the material;
- not submitted on time.

Review of the presentation

- does not meet the requirements, all points of the presentation are not sufficiently covered;
- not submitted on time.

Compilation of test tasks

- test tasks have significant comments (more than 4-5) on the above criteria;
- not submitted on time.

Making a crossword:

- does not meet requirements;
- not submitted on time.

During midterm control

Testing

• less than 50% correct answers

10.3 Criteria for evaluating project work

Criteria "Goal setting and project planning"	Points
Goal is not formulated	unsatisf. 0-49%
The goal is formulated , but there is no plan to achieve it	satisf. 50-69%
The goal is formulated, justified , and a schematic plan for achieving it is given.	good 70-89%
The goal is formulated, clearly justified , and a detailed plan for achieving it is given.	excellent 90-100%
Criterion "Statement and justification of the project problem"	Kursing
The project problem is not formulated	unsatisf. 0-49%
The formulation of the project problem is superficial	satisf. 50-69%
The project problem is clearly formulated and justified	good 70-89%
The project problem is clearly formulated, justified and deep in nature .	excellent 90-100%
Criterion "Diversity of information sources used"	24 May 56
Information that was not relevant to the topic and purpose of the project was used	unsatisf. 0-49%
Most of the information presented is not relevant to the topic of the work.	satisf.

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25 My 3 60 911. 15 25 Way 60, Mr. 1 341, Way 601	50-69%
The work contains a small amount of relevant information from a limited number of similar sources	good 70-89%
The work contains fairly complete information from a variety of sources.	excellent 90-100%
Criterion "Depth of disclosure of the project topic"	Thurst
Topic of the project is not disclosed	unsatisf. 0-49%
Topic of the project is disclosed in fragments	satisf. 50-69%
The topic of the project has been revealed, the author has demonstrated knowledge of the topic within the framework of the work program in the discipline being studied	good 70-89%
The topic of the project is fully disclosed; the author has demonstrated deep knowledge that goes beyond the scope of the work program being studied.	excellent 90-100%
Criterion "Analysis of the progress of work and the results obtained, con	nclusions"
No attempts have been made to analyze the progress and results of the work	unsatisf. 0-49%
The analysis is replaced by a brief description of the progress and order of work	satisf. 50-69%
A detailed result of the work to achieve the goals stated in the project is presented.	good 70-89%
An exhaustive analysis of the obtained work results is presented, the necessary conclusions are drawn, and work prospects are outlined.	excellent 90-100%
Criterion "Achieving the goal and compliance with the content of the	project"
The goals stated in the project were not achieved	unsatisf. 0-49%
A significant part of the working methods used do not correspond to the theme and purpose of the project	satisf. 50-69%
The methods used correspond to the theme and purpose of the project, but are insufficient	Good 70-89%
The methods of work are sufficient and used appropriately and effectively, the objectives of the project are achieved	excellent 90-100%
Criterion "Personal participation, creative approach to work"	X 54

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9.	Department of Pharmaceutical and Toxicological Chemistry Working curriculum for the discipline	044-55/ 26 page. fro
Mg	"Methods and equipment for pharmaceutical analysis"	30
The	work is formulaic , showing the formal attitude of the author	unsatisf. 0-49%
dem	author showed little involvement in the topic of the project, but did not nonstrate independence in work, did not use the possibilities of a creative roach	satisf 50-69%
den	author showed little involvement in the topic of the project, but did not nonstrate independence in work, did not use the possibilities of a creative broach	good 70-89%
	work is distinguished by a creative approach , full participation and the nor's own original attitude to the idea of the project	excellent 90-100%
/	Criterion "Compliance with the requirements for the written p	part"
	written part of the project does not meet the requirements, all sections of the k are not disclosed and the work is not submitted on time	unsatisf. 0-49%
	he written part of the work, all sections are partially disclosed,bfundamental takes	satisf. 50-69%
The	re are typos and incorrect expressions in the work.	good 70-89%
sign and fam	e work fully reflects: the relevance of the topic, novelty and practical difficance, conclusions, recommendations, the degree of solution to the problem completion of the work, the correctness of its formulation, the author's diliarity with the scientific literature, the depth of the discussion, the literacy of presentation and the work was delivered on time according to schedule	excellent 90-100%
77	Criterion "Quality of presentation"	40, 3'60, Mil
	are are a large number of fundamental errors in the presentation and answer the stions.	unsatisf. 0-49%
	presentation contains minor fundamental errors and inaccuracies; partial damental errors when answering questions	satisf. 50-69%
	presentation contains typos, incorrect expressions, some non-fundamental ors, and inaccuracies in answering questions.	good 70-89%
mee	e presentation in terms of design style, presentation of information, content, text ets the general requirements for presentation design. The author confidently and urately answers questions	excellent 90-100%
60	Criterion "Quality of the final product"	- Allow Sign
The	ere is no project product	unsatisfactory 0-49%
The	design product does not meet quality requirements (aesthetics, ease of use, apliance with stated goals)	satisfactory 50-69%

The product does not fully meet quality requirements	good 70-89%
The product fully meets the quality requirements (aesthetically pleasing, easy to use, meets the stated purposes).	excellent 90-100%

10.4 Multi-point system of knowledge assessment				
Letter System Evaluation	Digital Points Equivalent	% content	Traditional Rating Scale	
A	4,0	95-100	Excellent	
A - 0	3,67	90-94	50 M. V 34, Vs.	
B	3,33	85-89	Good	
B	3,0	80-84	Mo sec 41. 1 3K, 2	
B4 (4)	2,67	75-79	24, Way 60, Mr. 1 34,	
C+1	2,33	70-74	SK WO SER MINIT	
CUIT	2,0	65-69	Satisfactory	
C-10, 12	1,67	60-64	KJ 24 WO 3 60 471.	
D+	1,33	55-59	n. Kr 26, Wa 3:50, 411.	
D- 80 XV	1,0	50-54	go. Kr 2 25 My Sign 9.	
FX	0,5	25-49	Unsatisfactory	
F (6) 80 1/1	0	0-24	J's gr. Kr St. Wo	

11. Learning resources

11.1 Electronic resources, including but not limited to: databases of educational literature, animation simulators, professional blogs, websites, electronic reference materials.

Links to the lecture complex on the discipline "Methods and equipment for pharmaceutical analysis":

Electronic resources LIC:

Electronic library of SKMA - https://e-lib.skma.edu.kz/genres

Republican Interuniversity Electronic Library (RIEL) - http://rmebrk.kz/

Digital library «Aknurpress» - https://www.aknurpress.kz/

Electronic library «Epigraph» - http://www.elib.kz/

Epigraph - multimedia textbook portal https://mbook.kz/ru/index/

ЭБС IPR SMART https://www.iprbookshop.ru/auth

information and legal system "Zan" - https://zan.kz/ru

Cochrane Library - https://www.cochranelibrary.com/

11.2 **Electronic resources:**

1. Харитонов, Ю. Я. Аналитическая химия. Аналитика - 2. Количественный анализ. Физико-химические (инструментальные) методы анализа [Электронный ресурс]: учебник. - Электрон. текстовые дан. (43,1Мб). - М.: ГЭОТАР - Медиа, 2017

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Working curriculum for the discipline

"Methods and equipment for pharmaceutical analysis"

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- 2. Харитонов, Ю. Я. Аналитическая химия. Аналитика 1. Общие теоретические основы. Качественный анализ [Электронный ресурс]: учебник. Электрон. текстовые дан. (44,3Мб). М.: ГЭОТАР Медиа, 2017
- 3. Харитонов, Ю. Я. Аналитическая химия. Качественный анализ. Титриметрия [Электронный ресурс]: учебник. Электрон. текстовые дан. (39,9Мб). М.: ГЭОТАР Медиа, 2017
- 4. Ордабаева, С. К. Промышленные методы получения лекарственных средств [Электронный ресурс]: лабораторный практикум / С. К. Ордабаева, А. Д. Асильбекова. Шымкент: [б. и.], 2016. 200 б. эл. опт. диск (CD-ROM).
- 5. Фармациядағы физикалық-химиялық әдістер. [Электронный ресурс] = Физико-химческие методы исследования. = Physicaland chemical impharmacy, on the absorption of electromagnetig Radiation :әдістемелік ұсыныс / С. К. Ордабаева [ж. б.]; ОҚМФА; Фармацевтикалық және токсикологиялық химия каф. Электрон. текстовые дан. (8,72 Мб). Шымкент : Б. ж., 2013. эл. опт. диск
- 6. Анализ лекарственных веществ. Ч.1. Общие реакции на подлинность: учеб. пособ. / В.А. Смирнов. Самара. Самар. гос. техн. ун-т, 2008. 55 с https://aknurpress.kz/reader/web/2637
- 7. Тюкавкина, Н. А. Биоорганическая химия [Электронный ресурс] : учебник / Электрон. текстовые дан. (47,4 МБ). М. : Издательская группа "ГЭОТАР- Медиа", 2011. 416 с. эл. опт. диск (CD-ROM). (Электронный учебник).

Laboratory resources: instruments and equipment for performing laboratory tasks:

- Electric aquadistiller A9-25 MO;
- Water bath thermostat WB-4MS;
- Laboratory ion meter И-160;
- Photoelectric concentration colorimeter KΦK-2;
- Laboratory centrifuge CM-6M:
- Laboratory microscope MC 50;
- Magnetic stirrer with heating MSH-300;
- Mini shaker 3D;
- Refractometer RL3;
- Refractometer *IP* Φ-454 Б2M;
- pH meter millivoltmeter pH-150MA;
- Rotamix RM-1;
- Spectrophotometer CΦ-2000;
- Water thermostat U/UH;
- Photoelectric photometers KΦK-3-«3OM3»;
- Fourier spectrometer infrared infralum ΦT-08
- Chromatograph ЛХМ-2000:
- Digital spectrophotometer PD-303S;

Electronic scales CAS ME - 410, PIONEER, AA-160, etc.;

11.3 Special programs: STATISTICA-Version 10 (StatSoft Inc, CIIIA), Microsoft Office Excel, «ChemStation 3D»

Y	Journals (electronic journals): journals "Pharmacy", "Chemical-Pharmaceutical Journal", "Pharmacy of Kazakhstan", etc.
7	Literature
	main: 3. du la se
	in Russian language
	Анализ лекарственных препаратов, производных ароматических соединений:
	Ордабаева С.КШымкент: Типография «Әлем» 2012270 с.
	Асильбекова, А. Д. Промышленные методы получения лекарственных средств:
	лабораторный практикум / А. Д. Асильбекова, С. К. Ордабаева Алматы : New book, 2022212 с.
	Государственная фармакопея Республики КазахстанАлматы: Издательский дом «Жибек жолы»2008Том 1592 с.
	Государственная фармакопея Республики Казахстан Алматы: Издательский дом «Жибек жолы»2009Том 2804 с.
	Государственная фармакопея Республики КазахстанАлматы: Издательский дом «Жибек жолы»2014Том 3864 с.
	Государственная Фармакопея Республики Казахстан. Т.1. – Алматы: Издательский дом «Жибек жолы», 2015. – 720 с.
	Руководство по инструментальным методам исследований при разработке и
	экспертизе качества лекарственных препаратов. — М. Изд-во Перо, 2014. — 656с.
	Харитонов, Ю. Я. Аналитическая химия. Количественный анализ, физико-
	химические методы анализа: практикум: учеб. пособие -М.:ГЭОТАР - Медиа, 2012 368с.
	Харитонов, Ю. Я. Аналитическая химия. Аналитика 2. Количественный анализ.
	Физико-химические (инструментальные) методы анализа: учебник - М: ГЭОТАР - Медиа, 2014 656 с.
	. Адиходжаева, Б. Б. Аналитическая химия: учебное пособие / -Алматы: ЭСПИ, 2023220с.
	. Бошкаева, А. К. Структурные исследования лекарственных веществ методами физико- химического анализа: учеб. пособие/ - Алматы : New book, 2022 276 с.
	. Халиуллин, Ф. А. Инфракрасная спектроскопия в фармацевтическом анализе: учебное пособие / - М.: ГЭОТАР - Медиа, 2017 160 с
	. Сейтембетова, А. Ж. Аналитическая химия: учебное пособие / - Алматы: New book, 2022124c.
	. Тюкавкина, Н. А. Биоорганикалық химия: оқулық / Қаз. тілінен ауд. жауапты ред. Т. С. Сейтембетов М.: ГЭОТАР - Медиа, 2014 400 бет. +эл. опт. диск (CD-ROM)
	. Тюкавкина, Н. А. Биоорганическая химия: учебник /- М.: ГЭОТАР -Медиа, 2011 416c.
	in Kazakh language
	Дәріс кешені- Фармацевтикалық талдаудың әдістері мен құралдары пәні бойынша з дәріс кешені / фармацевтикалық және токсикологиялық химия кафедрасы Шымкент : ОҚМФА, 2016 92 бет

Қазақстан Республикасының Мемлекеттік фармакопеясы.-Алматы: «Жібек жолы» баспа үйі.-2008.-1 Т.-592 б.

Қазақстан Республикасының Мемлекеттік фармакопеясы.-Алматы: «Жібек жолы» баспа үйі.-2008.-2 Т.-792 б.

Қазақстан Республикасының Мемлекеттік фармакопеясы.-Алматы: «Жібек жолы» баспа үйі.-2014.-3 Т.-864 б.

Қазақстан Республикасының Мемлекеттік фармакопеясы. Т. 1. – Алматы: «Жібек жолы» баспа үйі, 2015. - 720 бет

additional:

Арзамасцев, А. П. Фармацевтическая химия: учеб. пособие/-3-е изд., испр. . - М. : Γ ЭОТАР - Медиа, 2008. - 640 с

Арзамасцев, А. П. Руководство к лабораторным занятиям по фармацевтической химии: учебное пособие / М.: Медицина, 2004. - 384 с. - (Учеб. лит. для студ. фарм. вузов и фак.).

Беликов, В. Г. Фармацевтическая химия : учебное пособие/- 2-е изд. - М. : Медпресс-информ, 2008. - 616 с.

Практикум по физико-химическим методам анализа, под ред. О.М. Петрухина.-М., 1987.-248 с.

12 | Course policy

Requirements for students, attendance, behavior, grading policies, penalties, incentives, etc.

Students need:

possess theoretical knowledge and practical skills in basic chemical disciplines (inorganic, organic, physical chemistry) and be able to apply them to chemical technological processes;

be prepared to perform laboratory work in the field of chemical production individually, in pairs, in small groups;

carry out SIW according to schedule;

attend SIW classes, attendance of which is recorded weekly in the journal; if the SIW is absent from classes, penalties are prescribed;

have an idea of the topic of the upcoming lecture, be prepared for feedback during the lecture:

be able to work in a team;

observe safety precautions in the chemical laboratory;

treat laboratory glassware, supplies, and equipment with care;

keep the workplace clean.

the penalty point for missing one lecture class without a good reason is 1 point, which is deducted from the MC's grades; if you miss one SIW lesson - 2 points from the AAR (excluding 60% of current control);

assessment of the admission rating (AAR) for the final control in the discipline consists of average scores for the laboratory lesson, SIW, midterm control and lecture attendance;

 \checkmark AAR for the final control in discipline must be at least 30 points (50%).

13 Academic policy based on the moral and ethical values of the academy МиссияMission

«Оңтүстік Қазақстан медицина академиясы» АҚ

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Training of highly qualified competitive medical and pharmaceutical specialists for the Southern region and the country as a whole based on the achievements of modern science and practice, ready to adapt to rapidly changing conditions in the medical and pharmaceutical industry through continuous improvement of competence and development of creative initiative.

Vision

An effective system of medical and pharmaceutical education, based on a competency-based approach and the needs of practical healthcare and the pharmaceutical industry, focused on training specialists who meet international quality and safety standards.

Basic ethical principles on which SKMA relies to implement its mission:

The principle of high professionalism of SKMA teaching staff is the constant improvement of their knowledge and skills, ensuring the provision of high-quality educational services to students at all levels of training.

The principle of quality in SKMA is the implementation of the concept of modernization of Kazakhstani education, the main direction of which is to ensure modern quality of education based on maintaining its fundamentality and compliance with the current and future needs of the individual, society and the state, which is ensured by the use in the educational process, research activities and advisory - diagnostic work of innovative technologies and new achievements of science and practice.

The principle of learning orientation is the implementation of a student-centered educational process along flexible trajectories of educational programs, taking into account rapidly changing economic conditions and current trends in the labor market, creating the most effective conditions for students for their professional growth, developing motivation and monitoring learning outcomes, continuous updating of educational programs, expanding the scope of knowledge and competencies necessary for effective professional activities.

Date of agreement with BIC	Protocol	Full name of the head of BIC	Signature
14.06.2024	№ 9	Darbicheva R.I., head of BIC	1 Can
Date of approval by the department	Protocol	Full name of the head	Signature
10.06.2024	№ 21	Ordabaeva S.K., pharm s.d., professor	a.apy
Date of review by the AC of EP	Protocol	Full name of chairman of the EPC in PMT	Signature
14.06.2024	№ 10	Torlanova B.O., C. of Pharm. s., ass. Prof.	Jung
Date of revision at the department	Protocol	Full name of the head	Signature

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